USDA NRCS
Natural Resources Conservation Service

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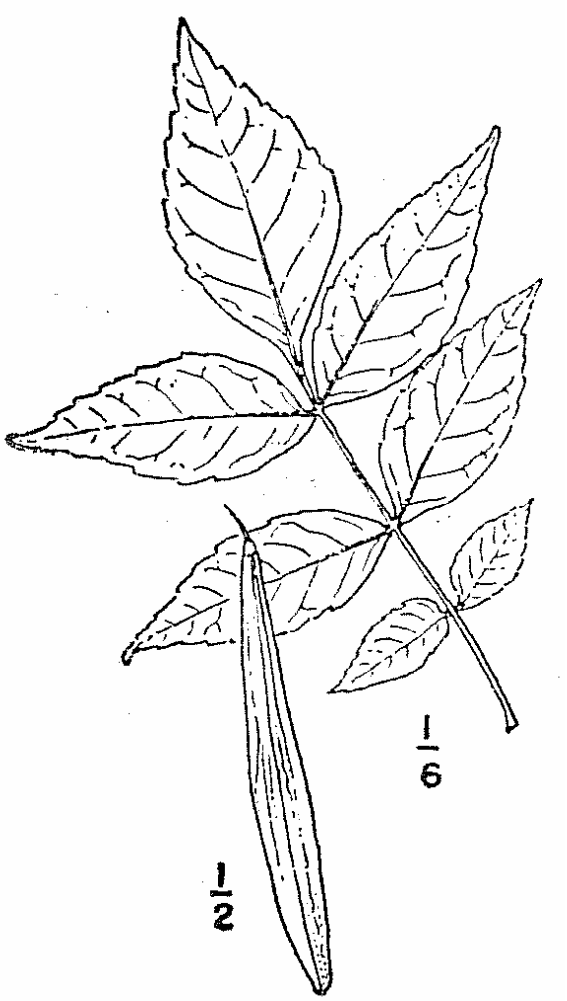
**Plant Materials Center**
**Bismarck, North Dakota**

# Technical Report, 2006

## Part 2 of 2: Trees and Shrubs




Green ash
*Celtis occidentalis*

United States Department of Agriculture. 1949. *Trees, The Yearbook of Agriculture.*

**United States Department of Agriculture**
**Natural Resources Conservation Service**
**Bismarck Plant Materials Center**

# Technical Report

# Trees and Shrubs

# 2006

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**PART II**

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# INTRODUCTION

**Objectives and Functions**

The USDA Natural Resources Conservation Service (NRCS), Plant Materials Center (PMC), Bismarck, North Dakota, primarily serves the States of North Dakota, South Dakota, and Minnesota. Activities are directed toward meeting the needs and priorities set forth in the three States' long-range programs.

The objectives and functions of the Plant Materials Center are to:

1. Identify, select, and improve plants to meet the resource conservation needs of the three States.

2. Determine techniques for successful propagation and establishment of these plants.

3. Assemble and comparatively evaluate materials on and off the Center.

4. Make comparative field plantings for final testing of promising plants and techniques with conservation districts and cooperators.

5. Work with universities, experiment stations, and other State and Federal agencies to cooperatively release improved conservation plants.

6. Produce limited quantities of foundation or foundation quality seed. This seed is made available to conservation districts, state seed certifying organizations, commercial seed growers, or other agencies for establishing seed increase fields or seed orchards.

7. Encourage conservation districts, commercial seed growers, and commercial and state nurseries to produce adapted plant materials and named cultivars.

8. Promote these materials in conservation programs.

One of the major objectives of the PMC is to improve the quality and quantity of native and introduced trees and shrubs available for field and farmstead windbreaks, erosion control on cropland and critical areas, surface mine reclamation, recreation areas, wildlife habitat, and barrier plantings.

The NRCS has agreements with soil conservation districts, State universities, and other State and Federal agencies at 9 locations in North Dakota, South Dakota, and Minnesota to provide cooperative off-center sites with long-term land tenure for testing woody plant materials. These agreements provide sites for assembly and initial evaluation of trees and shrubs under diverse soil and climatic conditions. They represent major land resource areas and key windbreak suitability groups. Initial evaluations are recorded on individual spaced plants or rows under uniform culture and management conditions.

# PLANT MATERIALS CENTER LONG RANGE PLAN
# BISMARCK, NORTH DAKOTA
# 2006-2010

## I. Introduction

The mission of the Plant Materials Program is to develop and transfer effective state-of-the-art plant science technology to meet customer and resource needs. The purpose of the Plant Materials Program is to carry out specialized activities in resource conservation, as part of the overall program of the Natural Resources Conservation Service (NRCS). It is the responsibility of the Plant Materials Center (PMC) to:

1. Assemble, test, and release plant materials for conservation use.
2. Determine techniques for the successful use and management of conservation species.
3. Facilitate the commercial increase of conservation species.
4. Provide for the development and transfer of applied plant science technology to solve conservation problems.
5. Promote the use of plant science technology to meet the goals and objectives of the USDA and NRCS Strategic Plans.

The PMC Long Range Plan (LRP) identifies, guides, and directs PMC operation toward solving high-priority resource problems identified in the States' PMC LRP. The PMC LRP is consistent with goals and objectives identified in the NRCS Strategic Plan, National Plant Materials Program Strategic Plan, and State Strategic Plans. Recommended action items and specific products are identified in individual State Annual Plans which are reviewed and updated annually.

## II. Long Range Plan Development

The LRP is in accordance with the revised National Plant Materials Manual, Part 540.22. This plan acts as a guide for directing PMC activities within Minnesota, North Dakota, and South Dakota. NRCS representatives from all three states met in Fargo, North Dakota, on March 8, 2006, to determine the basis for this plan. Feedback in the form of survey questionnaires was received from various NRCS offices, conservation districts, and partners in the three States. The *"Plant Materials Program Strategic Plan Survey Responses"* publication (2/7/05) was also used to provide insight and guidance to the decision making process.

### General Description of the Service Area

**Climate** – USDA Plant Hardiness Zones 2, 3, 4, and 5 are within the area serviced. Precipitation is quite varied both in annual amount and in seasonal distribution, and predominantly occurs in the form of rainfall. Long-term average annual precipitation varies from 12 inches to 35 inches. The growing season ranges from 95 days to 155 days. The titles of the four Land Resource Regions include:

- Northern Great Plains Spring Wheat
- Western Great Plains Range and Irrigated
- Central Feed Grains and Livestock
- Northern Lake States Forest and Forage

A detailed description of the major land resource areas, land use, and climate may be found in the reference *"Land Resource Regions and Major Land Resource Areas of the United States,"* Agricultural Handbook 296.

## III. Goals

Three broad-based goals have been identified.

**Goal 1:**

- Identify and evaluate plants and develop technology for their successful establishment and maintenance to solve natural resource problems.

**Goal 2:**

- Provide plant materials and plant technology that are economically feasible for solving conservation problems and to meet emerging energy and environmental needs.

**Goal 3:**

- Provide equal access for all Americans to the Plant Materials Program. All products and services must be delivered fairly and equitably. Promote the increased use of plant materials to address human health, safety, cultural, and aesthetic issues.

## IV. Plant Materials Priorities and Resource Concerns

Native Prairie Ecosystems Restoration

- Identify additional species and develop sources.
- Develop establishment and management protocol.
- Market PMC releases.

Warm-Season Grass Promotion and Development

- Promote economic as well as conservation benefits.
- Promote the benefits of big bluestem.
- Promote proven management techniques to minimize invasive species.
- Select a switchgrass or other native species as alternatives to smooth bromegrass in grassed waterways.

Tree and Shrub Related Technology

- Increase species diversity in windbreaks.
- Identify/develop additional tall tree species.
- Identify/develop additional native shrub species.
- Identify and promote alternatives for invasive species.

Wetland and Riparian Plant Materials

- Identify/develop additional species.
- Develop establishment and management protocol.

Saline/Alkaline Tolerant Plant Materials

- Develop and distribute information.

Filter Strips/Nutrient Management

- Develop/promote effective plants for nutrient uptake.

Streambank and Lakeshore Stabilization

- Develop establishment and management protocol.

Information, Education, and Outreach

- Promote the value of PMC releases.
- Identify and promote perennial plants for wildlife food plots.
- Remarket older plant releases.
- Target specific outreach opportunities to non-traditional clientele.

Alternative and Specialized Use of Conservation Plants

- Utilize agroforestry technology.
- Recognize alternative income species.
- Promote switchgrass as a biomass fuel for energy savings.

Urban Conservation

- Provide information on effective species/varieties.
- Promote native landscaping as low energy and reduced maintenance.
- Sell the economic as well as the environmental benefits.

## V. Partners and Cooperators

Plant Materials Program activities are conducted in cooperation with universities, State and Federal agencies, industries, conservation groups, soil and water conservation districts and associations, and others. The primary customers are the NRCS field offices in Minnesota, North Dakota, and South Dakota. Improved plant materials will be released with cooperating agencies, Agricultural Experiment Stations, and State crop improvement associations. Seed growers and conservation nurseries will be kept informed of the availability of new plants and production techniques.

Approved by: Bismarck Plant Materials Center Advisory Committee

8/31/06

**WILLIAM HUNT, NRCS State Conservationist, St. Paul, Minnesota** **Date**

8/31/06

**JANET OERTLY, NRCS State Conservationist, Huron, South Dakota** **Date**

8-31-06

**J.R. FLORES, NRCS State Conservationist, Bismarck, North Dakota** **Date**

## Location

The Bismarck Plant Materials Center is located in south central North Dakota, near the center of the North American landmass. It is on the east bank of the Missouri River in a shallow basin 7 miles wide and 11 miles long. Elevation is 1,647 feet, latitude 46°46'N and longitude 100°45'W.

## Physical Facilities and Evaluation Sites

The PMC does not own land but manages a total of approximately 138 acres split among three separate sites within 25 miles of each other. These locations are:

1. Lincoln-Oakes Nursery, Bismarck, North Dakota. The USDA Natural Resources Conservation Service, Plant Materials Center operates under a cooperative working agreement with the North Dakota Association of Soil Conservation Districts (NDASCD). The Association owns and operates the Lincoln-Oakes Nursery which in turn provides the PMC with 70 acres of land located on the nursery. This site is primarily used by the PMC for foundation quality grass seed production. The PMC shares a building site with the Nursery, with the NRCS buildings located on the north part of the acreage. Buildings include an office, greenhouse, lathhouse, machine storage shed (housing tree and seed storage refrigeration units), seed cleaning building, chemical storage shed, and a second equipment storage building containing a small shop.

2. North Dakota Game and Fish Department, McKenzie, North Dakota. The Department, under cooperative agreement, provides the PMC with a 24-acre tract on the McKenzie Slough Game Management Area. Since 1972, this site has been used for the initial evaluation of woody plant material established in single row, nonreplicated plots. It is now used for long-term observation of plant performance, as well as seed collection. No new plantings will be made.

3. USDI Fish and Wildlife Service (FWS), Apple Creek Township, Burleigh County, North Dakota. The FWS has granted the use of 42 acres on a Waterfowl Production Area (WPA) near Apple Creek for woody test plantations and seed orchards. Three large assemblies of native shrubs, including chokecherry, buffaloberry, and hawthorn are established on this site. In 1995, an additional 5-acre tract was added. This is an initial evaluation site for untested material. This WPA is also the site of an 8.58-acre seed orchard.

4. Off-center evaluation sites in Minnesota, South Dakota, and North Dakota. These 8 other off-center evaluation sites, located in the three-state area, are cooperative with various state and federal agencies. These locations provide long-term testing sites for trees, shrubs, and grasses evaluated under uniform culture and management. Refer to map, page 12.

## Soils

At the PMC, the soil type is a Mandan silt loam. The Mandan series typically consists of deep, well-drained soils formed in silty sediments on uplands and terraces. The surface layer is dark grayish-brown and grayish-brown silt loam 20 inches thick. The subsoil is grayish-brown silt loam 9 inches thick. The underlying material is 28 inches of light brownish-gray silt loam over light brownish-gray loam. Slopes range 0 to 7 percent. Ordinarily, surface runoff is medium and fertility is high. Controlling erosion is the major concern in management. Both soil blowing and water erosion are hazards. This soil is well-suited to small grain, corn, and alfalfa. Capability unit IIe5, windbreak group 3.

**Climatological Information and Weather Summary**

Climate of the area is semiarid, typically continental in character. During the summer, there are a few hot and humid days, but the winters are quite cold and fairly long. The relative humidity during the summer is generally low, and high temperature and high humidity are seldom experienced together.

Normal precipitation is 16.84 inches per year. Refer to Table AV-1 on page 184 for 2006 weather data. More than 75 percent of this falls during the six-month period of April through September, and 50 percent normally falls in May, June, and July. Most summer precipitation occurs during thunderstorms that occur about 34 days per year. Damaging hail occurs about once in 10 years.

The winter season begins in late November and continues until late March. Nearly all winter precipitation is snow, often associated with strong winds and low temperatures. Snow has been reported for all months except July and August. Occasional winter blizzards can be severe.

Temperatures range from an average mean of 6.7 degrees F in January to a mean of 70.4 degrees F in July. During short periods, the temperatures may climb as high as 100 degrees F in summer or drop as low as -40 degrees F in winter. Frequent clear and partly cloudy days contribute to a high percentage of possible sunshine, with the total annual average about 2,700 hours out of a possible 4,470 hours. The average wind speed is a little less than 11 miles per hour, with a prevailing direction from the west-northwest. April and May are the windiest months. The average freeze-free period is 134 days from mid-May to late September.

# REGIONAL DESCRIPTION

## REGIONAL DESCRIPTION: TECHNICAL REPORT – 2006

### Major Land Resource Areas

The three States served by the PMC, North Dakota, South Dakota, and Minnesota, include portions of 23 Major Land Resource Areas in four Land Resource Regions. They are the Northern Great Plains Spring Wheat Region, Western Great Plains Range and Irrigated Region, Northern Lake States Forest and Forage Region, and the Central Feed Grains and Livestock Region.

### Potential Natural Vegetation

Most of central and western North and South Dakota support a mixed grass prairie of predominantly western wheatgrass (*Pascopyrum smithii*), green needlegrass (*Nassella viridula*), needleandthread (*Hesperostipa comata*), slender wheatgrass (*Elymus trachycaulus*), and prairie junegrass (*Koeleria macrantha*). Little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), plains muhly (*Muhlenbergia cuspidata*), sedge (*Carex*), and blue grama (*Bouteloua gracilis*) are the principal climax species on xeric soils, steeper eroded slopes or thin uplands. Prairie sandreed (*Calamovilfa longifolia*) is important on sandy soils throughout the region. Moist sites support such species as big bluestem (*Andropogon gerardii*) and prairie cordgrass (*Spartina pectinata*). Whitetop (*Scolochloa festucacea*), bulrushes (*Scirpus*), and common reed (*Phragmites australus*) are typical of lowland meadows and marshes. Snowberry (*Symphoricarpos albus*), rose (*Rosa*), buffaloberry (*Shepherdia argentea*), and chokecherry (*Prunus virginiana*) are abundant shrubs in draws and narrow valleys. Rocky mountain juniper (*Juniperus scopulorum*) is common in the western Badlands. Eastern South Dakota, southern Minnesota, and the Red River Valley support vegetation dominated by tall grass prairie species; principally big bluestem, switchgrass (*Panicum virgatum*), and Indiangrass (*Sorghastrum nutans*). Other important species include little bluestem, prairie dropseed (*Sporobolus heterolepis*), porcupine grass (*Stipa spartea*), green needlegrass, and prairie cordgrass. Bur oak (*Quercus macrocarpa*), basswood (*Tilia americana*), hackberry (*Celtis occidentalis*), cottonwood (*Populus deltoides*), and willow (*Salix*) follow major draws and floodplains.

Two distinct forested regions occur within the three-State area. The first is the Black Hills of South Dakota where Ponderosa pine forest (*Pinus ponderosa*) and pine/oak savannas dominate. The second is the northern and eastern sections of Minnesota, which support mixed hardwood and conifer forests. Principal species include oak (*Quercus*), maple (*Acer*), elm (*Ulmus americana*), aspen (*Populus*), jackpine (*Pinus banksiana*), red pine (*Pinus resinosa*), and balsam fir (*Abies balsamea*). Black spruce (*Picea mariana*), tamarack (*Larix laricina*), and white cedar (*Thuja occidentalis*) are typical of lowlands and swamps.

### Climate and Species Adaptation

North Dakota and Minnesota are the two coldest States in the nation excluding Alaska. Mean annual temperatures range from 36 degrees F to 48 degrees F for all reporting stations. Plant hardiness zones (USDA) vary from 3 to 4 with mean minimum temperatures between -10 degrees F and -50 degrees F. Annual precipitation varies from 13 inches in western North Dakota to 30 inches or more in southeast Minnesota. Growing seasons are short, averaging from 110 to 150 days. The central and western Dakotas are principally semiarid in nature while the eastern Dakotas and Minnesota are considered subhumid.

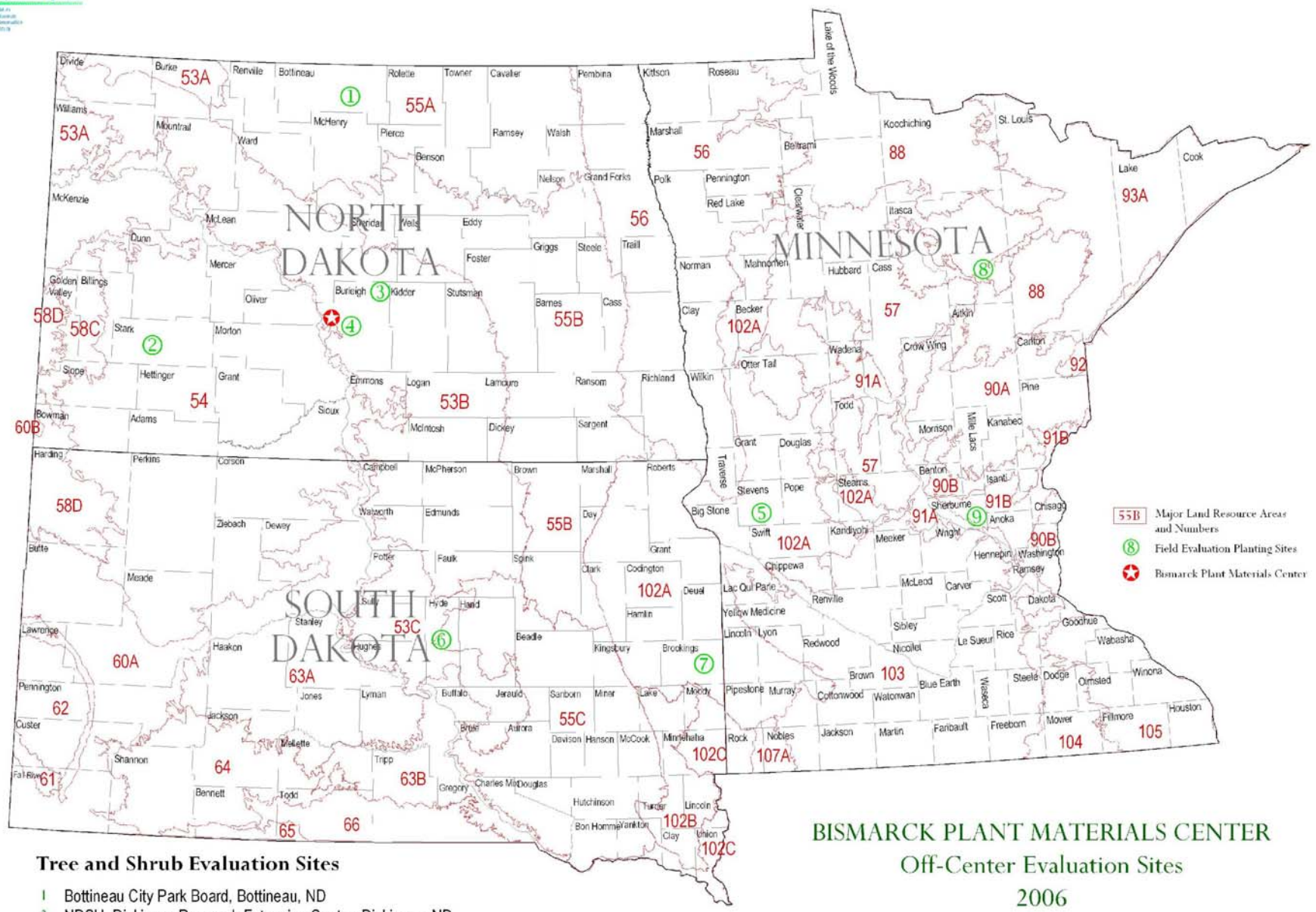
Because of cold and drought, the diversity of woody species is severely limited, especially in the Dakotas. The scarcity of native tall tree species for windbreaks has relegated at least a portion of the tree improvement effort in the Northern Great Plains to improving upon existing cultivars of native species or increasing survival and pest resistance of hardy exotics such as Siberian elm. Species from Siberia, Russia, Manchuria, or Mongolia are among the most viable introductions for prairie plantings where precipitation is generally less than 20 inches

annually. There is generally little shortage of shrub species for shelterbelt, barrier, or wildlife plantings except in the most hostile environments or specific cases related to pest resistance.

The short growing season limits the potential annual growth rate of trees. Late spring frosts can decimate fruit set of early flowering fruit trees following a week or so of warm temperatures. However, hardy native shrubs like plum, chokecherry, and hawthorn are well adapted and regularly produce abundant crops. Indigenous species may rely on a secondary bud flush to produce foliage in some years. Winter dessication of needle leaved evergreens is not uncommon on exposed sites, making conifer establishment a challenge for vast areas of the Northern Plains. Symptoms of winter injury on hardwoods may be as mild as tip dieback on exterior limbs to complete death of above ground stems and subsequent resprouting. Damaged trees are ideal sites for insects and disease infection.

The importance of adapted seed sources and the need for provenance tests is especially critical in the extreme and variable environment of the Northern Plains. In the three-State region served by the PMC, winter hardy, drought, and pest resistant cultivars are in demand by the nursery trade. Seed sources from regions further south frequently express superior growth rates but are more susceptible to winter injury.

# MAPS




# BISMARCK PLANT MATERIALS CENTER

## Off-Center Evaluation Sites

## 2006

### Tree and Shrub Evaluation Sites

1 Bottineau City Park Board, Bottineau, ND
2 NDSU, Dickinson Research Extension Center, Dickinson, ND
4 USDI Fish & Wildlife Service, Apple Creek Twp., Burleigh Co., ND
5 Univ. of Minn., West Central Research & Outreach Center, Morris, MN
6 SDSU, Central Crops & Soils Research Station, Highmore, SD
8 Univ. of Minn., North Central Research & Outreach Center, Grand Rapids, MN
9 Univ. of Minn., Sand Plain Research Farm, Becker, MN

### Herbaceous/Misc. Plants Evaluation Sites

3 North Dakota Game & Fish Department, Burleigh Co., ND
7 Eastern South Dakota Soil & Water Research Farm, Brookings, SD



USDA-NRCS Bismarck State Office GIS Center, Bismarck, ND 2007

Revised May 2007

# ASSEMBLY AND INITIAL EVALUATION

## Off-Center Evaluation Plantings

**OFF-CENTER EVALUATION PLANTINGS: TECHNICAL REPORT – 2006**

Study 38I308K Bottineau City Park Board, Bottineau, North Dakota.

Study Title: Field Evaluation of Woody Plant Materials.

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas were located in the three states served by the PMC. These sites provide planting locations under long-term land tenure for assemblies of trees and shrubs to be evaluated under uniform culture and management. New material can be added on an annual basis. Comparisons are then made with previously released cultivars and area of adaptation determined.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use. Superior cultivars will be selected and released for increase by commercial nurseries.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the Bottineau City Park Board and the Turtle Mountain Soil Conservation District. A sign has been erected to notify visitors.

Location: This project is located within the city limits of Bottineau, on land operated by the Bottineau City Park Board. Legal description: SE 1/4 sec. 25, T. 162 N., R. 75 W., Bottineau County, North Dakota.

Major Land Resource Area: The site is located in Major Land Resource Area 55A, Black Glaciated Plains. This nearly level glacial plain is bordered by rolling morainic hills along the western edge. Local relief is low in most areas. Elevation is 1,100 to 2,000 feet. Twenty-five percent of the area is rangeland.

Soils: There are three different soils mapping units in the planting sites: Barnes Svea Tonka complex (12), Hamerly loam (19), and Vallers loam (21). This was once a landfill site.

The Barnes-Svea complex (12) consists of deep, moderately well-drained and well-drained, loam to clay loam material formed in calcareous glacial till on till plains and moraines. The surface layer is black loam or clay loam 7 to 9 inches thick. The subsoil is olive dark brown loam or mottled clay loam. Substratum is olive brown loam or grayish-brown clay loam. Permeability is moderately slow and water holding capacity is good. Slopes are 0-1 percent. The Barnes soils belong to windbreak suitability group 3. The Svea soils belong to the windbreak suitability group 1. They are well-drained, moderately deep to deep loamy soils. If moisture is conserved, these soils are well-suited to all types of windbreaks and other plantings. Wind and water erosion are the only hazards.

The Hamerly series (19) consists of very deep, somewhat poorly or moderately well-drained soils that formed in calcareous loamy glacial till. Permeability is moderate in the upper horizons and moderate or moderately slow in the lower horizons. These soils are on flats on till floored lake plains and on convex slopes surrounding shallow depressions and on slight rises on till plains. They have slopes ranging from 0 to 6 percent.

The Vallers series (21) consists of deep, poorly drained soils that formed in calcerous loamy glacial till on glacial moraines. These soils have moderately slow permeability. Slopes range from 0 to 3 percent.

Climate: For MLRA 055A, the average annual precipitation is 14 to 20 inches; with wide fluctuations year to year. Rainfall is highest from late spring to early autumn. Winter precipitation is snow. The average annual temperature is 36 to 41 degrees F. The average freeze-free period is 100 to 145 days, increasing from north to south. The plant hardiness zone is 3a, with an average annual minimum

temperature of -40 to -30 degrees F. Climatic data for 2006 recorded at Bottineau, North Dakota, is shown in Table BO-1.

## Methods and Materials

Assembly: Refer to Table BO-2 for a list of woody species planted from 1978 through 2006.

Planting Plan: The plots are not randomized or replicated but systematically arranged for ease of evaluation and demonstration purposes. The evaluation planting originally consisted of four planting blocks. Block I had a total of 45 rows which are no longer being evaluated. Blocks II and III are located several hundred yards north of Block I (See Figure BO-1). Rows run north-south. Block IV is located to the west of Block II, but is no longer evaluated. The single non-replicated plots consist of 1 to 5 plants. Spacing between rows is 10 to 20 feet. Standards of comparison are used when available.

Plot Preparation: A clean, firm planting site was prepared annually by disking and harrowing.

Planting Method: All trees and shrubs were hand planted using approved forestry methods.

Planting Date: Refer to Table BO-2 for planting dates of species planted from 1978 through 2006. Replacements are planted the year after establishment if available.

Fertilization: No fertilizer has been applied to planting area.

Weed Control: No herbicide was applied to any plot during year of establishment. Quackgrass was treated with Glyphosate in Block III in the spring 1985. Weeds were controlled in Blocks II and III by clean cultivation between and within rows. Two to three tillage operations were used in the months of May through August. No hand hoeing has been done in the past five years. A permanent sod cover of ryegrass was established in Block I in 1981.

1994: All blocks were spot sprayed with glyphosate in June. In July, a rotary tree cultivator (attached to JD2240) was used between trees within rows. In September, the thistles were sprayed with Stinger. In October, Casaron was applied at a rate of 150 lb/ac in Blocks II and III.

1995: Roundup was used to spot spray in July.

Biological Control: No insecticides or animal repellents were applied.

Irrigation: Each year, newly planted materials were watered by hand. No water was applied following year of establishment.

Crop Residue Management: No cover crop has been planted in Blocks II and III. Block I is in permanent sod. The grass is mowed annually.

Silvicultural Practices: Dead trees and broken branches have been cut and removed for sanitation. A minimum of pruning was done in 1980 to improve tractor accessibility in rows 1 through 19.

In September 1981 and 1982, and May 1985 and 1986, extensive roguing and pruning of dead or diseased trees and branches were done on Block I. Contaminating species were cut and removed. All mulberry and honeylocust sustained severe winter injury and were removed in 1985. In September 1989, all Russian olive accessions in Block I were removed.

In 2001, a number of accessions in Block III were removed to make room for new material.

Evaluations and Measurements: Records of planting date, survival, vigor, cold hardiness, canopy width, and height have been maintained since 1974. Selected data appears in this report. Additional data can be requested from the PMC.

Plant performance data is recorded on one or more accessions during the growing season for three years. After the third year, data is gathered according to a specific schedule. Notes are recorded on survival, vigor, canopy width, plant height, and seed amount.

## Results

Plant Performance: Eighty-one accessions of 62 species are currently under evaluation. Overall, weeds have been adequately maintained at this site. While this site does receive added protection from surrounding shelterbelts and benefits from an improved microclimate within city limits, it remains our coldest (most northern) testing location. As such, winter injury to southern seed sources is often the most striking feature. The years 1988 and 1989 were extremely dry. Many of the new accessions planted in those years did not become established. In 1999, most of the land was leased to the Bottineau City Park Board. Mean data for individual accessions of trees and shrubs are recorded in Table BO-2. The following accessions exhibit potential for further evaluation:

| Accession Number | Genus/Species Origin/Source | Plot Location |
|---|---|---|
| ND-21<br>9034900<br>PI-560908 | nannyberry<br>*Viburnum lentago*<br>USDA, ARS, Mandan, ND | II/03/N-S |
| PI-323957 | chokeberry<br>*Photinia melanocarpa*<br>P.I. Station, Ames, IA | II/05/1-5 |
| ND-170<br>9005728 | cotoneaster<br>*Cotoneaster integerrimus*<br>USDA, NRCS, PMC, Bismarck, ND | II/02/16-20 |
| 9057409 | American hazel<br>*Corylus americana*<br>Turtle Mountains, Bottineau, ND<br>NDFS | II/04/11-15 |
| 9047238 | seaberry<br>*Hippophae rhamnoides*<br>PFRA, Indianhead, Saskatchewan | |
| 'Meadowlark' | forsythia<br>*Forsythia ovata x europaea*<br>Lee Nursery, Fertile, MN | |

**Figure BO-1. Bottineau Woody Field Evaluation Planting - Plot Layout**

| Block II (95 feet long) | | | | Row No. |
|---|---|---|---|---|
| | | | | |
| | ND-428 black walnut | ‘Flame’ amur maple | 9082712 bittersweet | 1 |
| ND-170 E. cotoneaster | 90047236 false indigo | 9008041 false indigo | 9047238 sea buckthorn | 2 |
| <---------- ND-21 nannyberry ----------> | | | | 3 |
| ND-3744 Korean barberry | 9057409 American hazel | ‘Silver Sands’ sandbar willow | ‘Meadowlark’ forsythia | 4 |
| <---------- ‘Magenta’ crabapple ----------> | | ND-2106 hardy almond | 323957 chokeberry | 5 |
| <---------- 9063098 black walnut ----------> | | <---------- ‘Midwest’ crabapple ----------> | | 6 |
| | 9057406 rugosa rose | ‘Streamco’ purpleosier willow | ‘Freedom’ honeysuckle | 7 |
| <---------- ND-3796 white poplar ----------> | | <---------- 9063141 native cottonwood ----------> | | 8 |
| <---------- ND-1843 Russian olive ----------> | | <---------- ‘McDermand’ Ussurian pear ----------> | | 9 |
| <---------- ND-1759 green ash ----------> | | <---------- ‘Cardan’ green ash ----------> | | 10 |
| <---------- ND-686 Pekin lilac ----------> | | <---------- ND-3207 green ash ----------> | | 11 |
| <---------- ‘Raverdeau’ poplar ----------> | | <---------- ND-3779 Manchurian poplar ----------> | | 12 |
| <---------- 9008183 Sheridan source common chokecherry ----------> | | <---------- 9069081 littleleaf linden ----------> | | 13 |
| <---------- ‘Assiniboine’ poplar ----------> | | <---------- ‘Imperial’ Carolina poplar ----------> | | 14 |
| <---------- ND-3899 willow ----------> | | <---------- 370126 crack willow ----------> | | 15 |
| <---------- ND-3898 Harbin pear ----------> | | <---------- 9069090 quaking aspen ----------> | | 16 |
| <---------- 9057410 hackberry ----------> | | <---------- ND-3825 silver maple ----------> | | 17 |
| <---------- ND-3890 Russian olive ----------> | | <---------- 9057412 bur oak ----------> | | 18 |
| <---------- 9063115 green ash ----------> | | <---------- 9063116 black ash ----------> | | 19 |
| | | | | 20 |
| | | | | 21 |
| | | | | |
| | | | | |
| | | revised 6/05 | North ----------> | |

**Figure BO-1 (continued)**

| Row | **Block III (60 feet long)** | |
|---|---|---|
| No. | | |
| 1 | <---------- 9069164 Scots pine ----------> | |
| 2 | <---------- 9076719 Scots pine ----------> | |
| 3 | <---------- 9076718 Scots pine ----------> | |
| 4 | ND-81 sloe | ND-46 juneberry\|'Success' juneberry |
| 5 | 'Bighorn' skunkbush sumac | ND-629 amur maple |
| 6 | <---------- ND-26 honeysuckle ----------> | |
| 7 | <---------- ND-11 amur honeysuckle ----------> | |
| 8 | <---------- 'Regal' Russian almond ----------> | |
| 9 | 9082684 smooth sumac | 9082738 gray dogwood |
| 10 | 'Arnolds Red' honeysuckle | 9063143 tatarian honeysuckle |
| 11 | 9069129 Amur chokecherry | 9069128 tatarian honeysuckle |
| 12 | | ND-633 false indigo |
| 13 | 9082726 beaked hazel | 9076686 roundleaf hawthorn |
| 14 | 9082885 quaking aspen | 9091969 Russian peashrub |
| 15 | 'Indigo' silky dogwood | ND-3889 dogwood |
| 16 | 'Roselow' Sargents crabapple | ND-3888 cotoneaster |
| 17 | ND-3887 caragana | ND-3892 tatarian honeysuckle |
| 18 | ND-3893 American plum | ND-3894 sandcherry |
| 19 | 'Centennial' cotoneaster | ND-3896 Nanking cherry |
| 20 | ND-3900 late lilac | ND-3901 common lilac |
| 21 | 'Prairie Red' select plum | SD-131 mayday |
| | | |
| | | |
| | North ----------> | revised 6/05 |

**Table No. BO-1: 2006 Weather Summary - Official Station - Bottineau, North Dakota**

| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) | | |
|---|---|---|---|---|---|---|
| | | | | Actual | | Deviation from Normal |
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 23.3 | 3.0 | | 0.11 | 0.49 | -0.38 |
| February | 10.5 | 10.5 | | 0.79 | 0.46 | 0.33 |
| March | 24.3 | 22.9 | | 1.88 | 0.79 | 1.09 |
| April | 48.4 | 39.7 | | 1.00 | 1.22 | -0.22 |
| May | 53.5 | 53.8 | | 1.33 | 2.16 | -0.83 |
| June | 64.2 | 62.4 | | 1.56 | 3.29 | -1.73 |
| July | 72.8 | 66.7 | | 0.43 | 3.04 | -2.61 |
| August | 69.1 | 65.5 | | 1.62 | 2.62 | -1.00 |
| September | 56.0 | 54.4 | | 0.91 | 1.94 | -1.03 |
| October | 38.0 | 41.4 | | 0.44 | 1.27 | -0.83 |
| November | 25.3 | 23.2 | | 0.99 | 0.66 | 0.33 |
| December | 17.7M | 8.5 | | 0.24M | 0.51 | -0.27 |
| **Annual** | **41.9M** | **37.7** | | **11.30M** | **18.45** | **-7.15M** |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |
| M=missing data | | | | | | |
| | | 2006 | | | | |
| Last Frost (28 degrees) | | 5-May | | | | |
| First Frost (28 degrees) | | 28-Sep | | | | |
| Frost Free Period | | 145 days | | | | |

**Key to Table BO-2. 38I308K Field Evaluation of Woody Plant Materials – Bottineau, North Dakota**
PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table BO-2.**
**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| sign | 9082706 | ROSA | prairie rose | 16-May | 03 | 03 | | 5 | 5 | 100 | 4 | 1.0 | 0.9 | |
| | | | *Rosa* | | | 04 | | | 5 | 100 | 3 | 1.6 | 1.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| II/I/1-5 | 9082712 | CESC | bittersweet | 14-May | 02 | 02 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 1.3 | |
| | | | *Celastrus scandens* | | | 03 | | | 5 | 100 | 5 | 0.6 | 0.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 4 | 0.7 | 1.8 | suckers on 4,5 |
| | | | | | | 06 | | | 5 | 100 | 4 | 1.0 | 1.3 | |
| II/01/6-10 | 'Flame' | ACGI | amur maple | 5-May | 87 | 87 | PLBR | 5 | 4 | 80 | 4 | 0.9 | 1.6 | |
| | PI-483442 | | *Acer ginnala* | | | 88 | | | 3 | 60 | 4 | 2.1 | 2.7 | |
| | | | USDA, SCS, PMC, Elsberry, MO | | | 89 | | | 5 | 100 | 4 | 1.7 | 2.5 | |
| | | | | | | 91 | | | 3 | 60 | 3 | 5.6 | 5.3 | |
| | | | | | | 93 | | | 3 | 60 | | 6.2 | 6.7 | |
| | | | | | | 96 | | | 3 | 60 | 3 | 7.2 | 9.4 | |
| | | | | | | 01 | | | 3 | 60 | 3 | 14.5 | 12.3 | |
| | | | | | | 06 | | | 3 | 60 | 3 | 17.5 | 14.3 | |
| II/01/11-15 | ND-428 | JUNI | black walnut | 6-May | 85 | 85 | PLBR | 2 | 2 | 100 | 4 | 0.8 | 0.9 | |
| | 9005970 | | *Juglans nigra* | | | 86 | | | 1 | 50 | 2 | 1.6 | 2.0 | |
| | | | NDSU, Fargo, ND | | | 87 | | | 1 | 50 | 4 | 3.4 | 2.1 | |
| | | | | | | 89 | | | 1 | 50 | 5 | 6.6 | 4.3 | |
| | | | | | | 91 | | | 1 | 50 | 3 | 8.9 | 6.7 | |
| | | | | | | 94 | | | 1 | 50 | | 11.8 | 9.8 | |
| | | | | | | 99 | | | 1 | 50 | 3 | 13.5 | 16.7 | |
| | | | | | | 04 | | | 1 | 50 | 3 | 21.5 | 21.3 | |
| II/02/1-5 | 9047238 | HIRH80 | seaberry | 5-May | 87 | 87 | PLBR | 5 | 2 | 40 | 4 | 1.0 | 2.0 | |
| | | | *Hippophae rhamnoides* | | | 88 | | | 2 | 40 | 4 | 1.9 | 3.4 | |
| | | | PFRA, Indianhead, Saskatchewan | | | 89 | | | 2 | 40 | 4 | 1.6 | 3.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 91 | | | 4 | 80 | 3 | 2.2 | 3.1 | |
| | | | | | | 93 | | | 4 | 80 | 4 | 3.5 | 4.8 | |
| | | | | | | 96 | | | 5 | 100 | | 5.1 | 6.4 | heavy fruit crop, sprout |
| | | | | | | 02 | | | 4 | 80 | 2 | 12.5 | 9.8 | |
| | | | | | | 06 | | | 3 | 60 | 4 | 15.0 | 11.2 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/02/6-10 | 'Survivor' | AMFR | false indigo | 5-May | 87 | 87 | PLBR | 5 | 5 | 100 | 5 | 1.9 | 1.9 | |
| | 9008041 | | *Amorpha fruticosa* | | | 88 | | | 3 | 60 | 3 | 3.6 | 3.0 | |
| | | | USDA, SCS, PMC, Aberdeen, ID | | | 89 | | | 3 | 60 | 3 | 4.1 | 3.5 | |
| | | | | | | 91 | | | 5 | 100 | 3 | 5.7 | 4.3 | |
| | | | | | | 93 | | | 5 | 100 | 3 | 5.0 | 5.0 | |
| | | | | | | 96 | | | 5 | 100 | 2 | 11.8 | 8.5 | solid |
| | | | | | | 01 | | | 5 | 100 | 3 | 14.5 | 6.0 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 12.0 | 10.0 | many other volunteers |
| II/02/11-15 | 9047236 | AMFR | false indigo | 5-May | 87 | 87 | PLBR | 5 | 5 | 100 | 4 | 1.2 | 1.9 | |
| | | | *Amorpha fruticosa* | | | 88 | | | 5 | 100 | 4 | 2.4 | 2.4 | |
| | | | Lincoln-Oakes Nursery, | | | 89 | | | 5 | 100 | 3 | 3.9 | 2.9 | |
| | | | Bismarck, ND | | | 91 | | | 5 | 100 | 3 | 6.5 | 3.3 | |
| | | | | | | 93 | | | 5 | 100 | 4 | 6.9 | 4.3 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 11.8 | 6.1 | |
| | | | | | | 01 | | | 5 | 100 | 3 | 14.5 | 6.0 | |
| | | | | | | 06 | | | 1 | 20 | 4 | 12.0 | 5.5 | overgrown chokecherry |
| II/02/16-20 | ND-170 | COIN16 | cotoneaster | 8-May | 90 | 90 | CONT | 5 | 5 | 100 | | 0.5 | 1.0 | |
| | 9005728 | | *Cotoneaster integerrimus* | | | 91 | | | 5 | 100 | 3 | 1.5 | 1.8 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 92 | | | 5 | 100 | 3 | 2.1 | 2.2 | 4 plts have fruit |
| | | | | | | 94 | | | 5 | 100 | 3 | 3.8 | 3.1 | |
| | | | | | | 96 | | | 5 | 100 | 2 | 6.6 | 3.8 | heavy fruit crop |
| | | | | | | 99 | | | 5 | 100 | 2 | 8.2 | 4.9 | |
| | | | | | | 04 | | | 5 | 100 | 1 | 12.5 | 6.2 | |
| II/03/1-10 | ND-21 | VILE | nannyberry | 5-May | 86 | 86 | PLBR | 10 | 10 | 100 | 3 | 0.3 | 0.6 | |
| | 9034900 | | *Viburnum lentago* | | | 87 | | | 5 | 50 | 4 | 0.5 | 1.2 | |
| | PI-560908 | | USDA, ARS, Mandan, ND | | | 88 | | | 10 | 100 | 5 | 0.6 | 1.2 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 90 | | | 6 | 60 | | 0.8 | 1.5 | |
| | | | | | | 92 | | | 6 | 60 | 3 | 1.7 | 2.5 | |
| | | | | | | 95 | | | 6 | 60 | 2 | 4.6 | 4.9 | |
| | | | | | | 00 | | | 6 | 60 | 2 | 6.7 | 7.6 | |
| | | | | | | 05 | | | 6 | 60 | 2 | 7.9 | 8.5 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/04/1-5 | 'Meadowlark' | FOOV80 | forsythia | 8-May | 89 | 89 | PLBR | 5 | 5 | 100 | 7 | 0.2 | 0.5 | |
| | 9005886 | | *Forsythia ovata X europaea* | | | 90 | | | 2 | 20 | | 0.5 | 0.7 | |
| | | | Lee Nursery, Fertile, MN | | | 91 | | | 4 | 80 | 4 | 1.3 | 1.5 | |
| | | | NDSU, Fargo, ND | | | 93 | | | 4 | 80 | 4 | 2.2 | 3.3 | |
| | | | | | | 95 | | | 4 | 80 | 4 | 3.7 | 4.3 | |
| | | | | | | 98 | | | 4 | 80 | 2 | 5.9 | 5.5 | |
| | | | | | | 03 | | | 4 | 80 | 3 | 8.0 | 7.7 | |
| II/04/11-15 | 9057409 | COAM3 | American hazel | 10-May | 88 | 88 | PLBR | 5 | 0 | 0 | | | | |
| | | | *Corylus americana* | | | 89 | | | 5 | 100 | 4 | 0.9 | 1.3 | |
| | | | Turtle Mountains | | | 90 | | | 4 | 80 | 3 | 1.0 | 1.1 | |
| | | | NDFS, Bottineau, ND | | | 92 | | | 4 | 80 | 3 | 1.5 | 1.5 | |
| | | | | | | 94 | | | 4 | 80 | 3 | 2.5 | 2.5 | |
| | | | | | | 97 | | | 4 | 80 | 2 | 3.9 | 3.0 | |
| | | | | | | 05 | | | 4 | 80 | 1 | 6.6 | 6.2 | |
| II/04/16-20 | ND-3744 | BEKO | Korean barberry | 10-May | 88 | 88 | CONT | 5 | 0 | 0 | | | | |
| | 9019577 | | *Berberis koreana* | | | 89 | | | 2 | 40 | | 0.5 | 0.6 | |
| | | | *NDSU* | | | 90 | | | 2 | 40 | 6 | 0.3 | 0.9 | |
| | | | McKenzie FEP, ND | | | 92 | | | 2 | 40 | 4 | 1.5 | 1.6 | |
| | | | | | | 94 | | | 2 | 40 | 4 | 2.3 | 3.1 | |
| | | | | | | 97 | | | 2 | 40 | 5 | 2.3 | 2.3 | |
| | | | | | | 02 | | | 1 | 20 | 2 | 6.0 | 5.0 | |
| II/05/1-5 | PI-323957 | PHME13 | chokeberry | 10-May | 88 | 88 | CONT | 5 | 0 | 0 | | | | drought |
| | | | *Photinia melanocarpa* | | | 89 | | | 5 | 100 | | 0.6 | 1.5 | |
| | | | P.I. Sta., Ames, IA | | | 90 | | | 5 | 100 | 3 | 1.1 | 1.4 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 92 | | | 5 | 100 | 3 | 1.8 | 1.8 | |
| | | | | | | 94 | | | 5 | 100 | 2 | 2.6 | 2.9 | 2 plants have fruit |
| | | | | | | 97 | | | 5 | 100 | 6 | 3.7 | 2.1 | dieback on all plants |
| | | | | | | 02 | | | 5 | 100 | 3 | 4.0 | 5.3 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/05/6-10 | ND-2106 | PRUNU | hardy almond | 8-May | 90 | 90 | CONT | 5 | 2 | 40 | | 0.6 | 0.8 | |
| | 9047151 | | *Prunus* | | | 91 | | | 2 | 40 | 4 | 1.6 | 1.6 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 92 | | | 2 | 40 | 4 | 1.7 | 1.6 | |
| | | | | | | 94 | | | 2 | 40 | 3 | 2.8 | 3.1 | |
| | | | | | | 96 | | | 2 | 40 | 4 | 4.5 | 4.0 | |
| | | | | | | 99 | | | 2 | 40 | 4 | 5.2 | 4.6 | |
| | | | | | | 04 | | | 2 | 40 | 2 | 8.5 | 7.0 | |
| II/05/11-15 | 'Magenta' | MALUS | crabapple | 12-May | 92 | 92 | PLBR | 5 | 3 | 60 | 7 | 0.3 | 0.6 | |
| | PI-514275 | | *Malus* | | | 93 | | | 4 | 80 | 5 | 0.9 | 1.4 | |
| | | | USDA, SCS, PMC, E. Lansing, MI | | | 94 | | | 5 | 100 | 5 | 0.9 | 1.8 | |
| | | | | | | 96 | | | 5 | 100 | 4 | 2.9 | 3.6 | |
| | | | | | | 98 | | | 5 | 100 | 5 | 4.1 | 5.0 | |
| | | | | | | 01 | | | 4 | 80 | 3 | 7.9 | 9.0 | |
| | | | | | | 06 | | | 4 | 80 | 3 | 8.8 | 10.6 | |
| II/06/1-5 | 'Midwest' | MAMA37 | Manchurian crabapple | 27-Apr | 82 | 82 | PLBR | 5 | 5 | 100 | 3 | 1.5 | 2.2 | |
| | 9006003 | | *Malus mandshurica* | | | 83 | | | 4 | 80 | 3 | 3.4 | 3.9 | good vigor |
| | PI-478000 | | Res. Sta., Morden, MB, Canada | | | 84 | | | 4 | 80 | 3 | 5.0 | 5.0 | spring frost damage |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 86 | | | 4 | 80 | 3 | 8.2 | 6.9 | |
| | | | | | | 88 | | | 4 | 80 | 3 | 10.8 | 8.5 | |
| | | | | | | 91 | | | 3 | 60 | 3 | 13.8 | 10.4 | |
| | | | | | | 96 | | | 3 | 60 | 2 | 17.4 | 12.4 | |
| | | | | | | 01 | | | 3 | 60 | 3 | 24.0 | 14.5 | |
| | | | | | | 06 | | | 3 | 60 | 4 | 18.0 | 15.0 | |
| II/06/6-10 | 9063098 | JUNI | black walnut | 6-May | 91 | 91 | PLBR | 5 | 5 | 100 | 4 | 1.0 | 1.8 | |
| | | | *Juglans nigra* | | | 92 | | | 5 | 100 | 4 | 0.7 | 2.2 | Tubex on all |
| | | | Big Sioux Nursery, Watertown, SD | | | 93 | | | 5 | 100 | 4 | 1.2 | 3.0 | |
| | | | | | | 95 | | | 5 | 100 | 3 | 2.5 | 4.3 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 3.0 | 5.0 | |
| | | | | | | 00 | | | 5 | 100 | | 6.4 | 9.5 | Tubex removed |
| | | | | | | 05 | | | 5 | 100 | 4 | 11.8 | 12.8 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
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| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/07/1-5 | 'Freedom' | LOKO | honeysuckle | 8-May | 90 | 90 | PLBR | 5 | 5 | 100 | 4 | 1.3 | 1.5 | |
| | 9057424 | | *Lonicera korolkowii* | | | 91 | | | 5 | 100 | 3 | 4.4 | 4.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 92 | | | 5 | 100 | 3 | 4.1 | 3.4 | all have fruit, all have |
| | | | | | | 94 | | | 5 | 100 | 2 | 5.6 | 6.6 | some tip dieback |
| | | | | | | 97 | | | 5 | 100 | 5 | 11.3 | 8.9 | |
| | | | | | | 99 | | | 5 | 100 | | 11.8 | 10.5 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 17.0 | 12.0 | slight dieback |
| II/07/6-10 | 'Streamco' | SAPU | purpleosier willow | 8-May | 90 | 90 | PLBR | 5 | 5 | 100 | 4 | 1.0 | 1.7 | |
| | PI-434309 | | *Salix purpurea* | | | 91 | | | 3 | 60 | 4 | 3.5 | 1.5 | |
| | | | USDA, SCS, PMC, Big Flats, NY | | | 92 | | | 3 | 60 | 4 | 2.9 | 1.8 | |
| | | | | | | 94 | | | 2 | 40 | 4 | 4.7 | 4.3 | |
| | | | | | | 96 | | | 2 | 40 | 4 | 9.4 | 6.6 | |
| | | | | | | 99 | | | 2 | 40 | 3 | 10.5 | 8.4 | |
| | | | | | | 02 | | | | | | | | to be removed-doing very poorly |
| II/7/6-10 | 9057406 | RORU | rugosa rose | 14-May | 02 | 02 | CONT | 5 | 5 | 100 | 5 | 0.6 | 1.2 | |
| | | | *Rosa rugosa* | | | 03 | | | 2 | 40 | 8 | 0.2 | 0.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 2 | 40 | 7 | 0.4 | 0.8 | |
| | | | | | | 06 | | | 2 | 40 | 6 | 0.6 | 0.8 | |
| II/08/1-5 | 9063141 | PODE3 | eastern cottonwood | 11-May | 93 | 93 | PLBR | 5 | 5 | 100 | 3 | 1.3 | 3.0 | |
| | | | *Populus deltoides* | | | 94 | | | 5 | 100 | 3 | 3.2 | 5.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 95 | | | 5 | 100 | 1 | 6.7 | 9.9 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 9.3 | 16.3 | |
| | | | | | | 99 | | | 5 | 100 | | 10.8 | 23.2 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 11.5 | 20.8 | |
| II/08/6-10 | 9030611 | POAL7 | white poplar | 11-May | 93 | 93 | CONT(P) | 5 | 3 | 60 | 5 | 1.4 | 1.2 | plt 3,4 had competition from |
| | ND-3796 | | *Populus alba* | | | 94 | | | 2 | 40 | 4 | 1.3 | 2.3 | apricot sprouts |
| | | | Turner Co., SD | | | 95 | | | 2 | 40 | 2 | 6.2 | 5.8 | |
| | | | McKenzie FEP, ND | | | 97 | | | 2 | 40 | 2 | 6.5 | 8.7 | |
| | | | | | | 99 | | | 2 | 40 | 3 | 13.6 | 17.2 | |
| | | | | | | 02 | | | 2 | 40 | | 11.0 | 17.6 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/09/1-5 | 'McDermand' | PYUS2 | Ussurian pear | 6-May | 81 | 81 | CONT | 5 | 5 | 100 | 4 | 0.9 | 2.0 | |
| | ND-14 | | *Pyrus ussuriensis* | | | 82 | | | 5 | 100 | 4 | 2.3 | 3.5 | |
| | 9006095 | | Res. Sta., Morden, MB, Canada | | | 83 | | | 5 | 100 | 4 | 2.6 | 5.2 | |
| | PI-478004 | | | | | 85 | | | 5 | 100 | 4 | 5.5 | 8.1 | |
| | | | | | | 87 | | | 5 | 100 | 4 | 7.2 | 10.4 | |
| | | | | | | 88 | | | 5 | 100 | 4 | 9.7 | 11.2 | |
| | | | | | | 90 | | | 5 | 100 | 3 | 9.8 | 11.8 | |
| | | | | | | 95 | | | 5 | 100 | 4 | 11.7 | 17.0 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 14.4 | 18.6 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 17.0 | 18.6 | |
| II/09/6-11 | ND-1843 | ELAN | Russian olive | 6-May | 81 | 81 | CONT | 5 | 4 | 80 | 4 | 3.4 | 3.6 | |
| | 9011840 | | *Elaeagnus angustifolia* | | | 82 | | | 4 | 80 | 4 | 7.1 | 6.0 | |
| | | | Res. Sta., Morden, MB, Canada | | | 83 | | | 4 | 80 | 5 | 7.2 | 8.0 | |
| | | | | | | 85 | | | 2 | 40 | 4 | 9.2 | 9.2 | moderate canker |
| | | | | | | 87 | | | 2 | 40 | 3 | 14.7 | 12.4 | severe tractor damage on 1 |
| | | | | | | 90 | | | 3 | 60 | | 12.7 | 14.4 | |
| | | | | | | 95 | | | 3 | 60 | 5 | 15.2 | 18.9 | |
| | | | | | | 00 | | | 3 | 60 | 5 | 16.9 | 22.2 | |
| | | | | | | 05 | | | 3 | 60 | 4 | 16.7 | 21.6 | some dead stems on 3 |
| II/10/1-5 | 'Cardan' | FRPE | green ash | 6-May | 81 | 81 | CONT | 5 | 5 | 100 | 3 | 1.3 | 3.0 | |
| | 9005895 | | *Fraxinus pennsylvanica* | | | 82 | | | 5 | 100 | 3 | 3.9 | 5.7 | |
| | PI-469226 | | Carlyle, MT | | | 83 | | | 5 | 100 | 4 | 5.0 | 7.0 | severe ash plant bug |
| | | | | | | 85 | | | 5 | 100 | 3 | 8.4 | 11.5 | |
| | | | | | | 87 | | | 5 | 100 | 3 | 10.9 | 14.4 | |
| | | | | | | 90 | | | 5 | 100 | 4 | 11.1 | 16.3 | |
| | | | | | | 95 | | | 5 | 100 | 3 | 11.5 | 20.0 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 13.5 | 24.3 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 24.6 | 28.7 | |
| | | | | | | 06 | | | 5 | 100 | 2 | 18.0 | 26.7 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/10/6-10 | ND-1759 | FRPE | green ash | 6-May | 81 | 81 | PLBR | 5 | 5 | 100 | 3 | 1.3 | 2.8 | |
| | 9005893 | | *Fraxinus pennsylvanica* | | | 82 | | | 5 | 100 | 3 | 3.5 | 5.6 | |
| | | | SD-156 X 'Cardan' | | | 83 | | | 5 | 100 | 5 | 3.7 | 6.7 | severe ash plant bug, leaf rust |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 85 | | | 5 | 100 | 3 | 7.0 | 11.0 | |
| | | | | | | 87 | | | 5 | 100 | 4 | 10.3 | 14.9 | |
| | | | | | | 90 | | | 4 | 80 | | 11.6 | 17.5 | |
| | | | | | | 95 | | | 5 | 100 | 4 | 13.1 | 20.9 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 15.2 | 24.9 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 24.6 | 26.4 | |
| II/11/1-5 | ND-3207 | FRPE | green ash | 27-Apr | 82 | 82 | PLBR | 5 | 5 | 100 | 3 | 1.1 | 3.8 | |
| | 9011849 | | *Fraxinus pennsylvanica* | | | 83 | | | 5 | 100 | 5 | 1.9 | 5.5 | moderate ash plant |
| | | | Hettinger Co., ND | | | 84 | | | 5 | 100 | 2 | 3.6 | 6.4 | bug, leaf rust |
| | | | | | | 86 | | | 5 | 100 | 3 | 8.2 | 10.2 | |
| | | | | | | 88 | | | 5 | 100 | 3 | 8.9 | 12.2 | |
| | | | | | | 91 | | | 5 | 100 | 4 | 10.8 | 15.0 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 12.4 | 19.4 | |
| | | | | | | 01 | | | 5 | 100 | 3 | 17.7 | 22.8 | |
| II/11/6-10 | ND-686 | SYREP | pekin lilac | 27-Apr | 82 | 82 | PLBR | 5 | 2 | 40 | | 1.1 | 1.2 | |
| | 9006225 | | *Syringa reticulata* ssp. *pekinensis* | | | 83 | | | 2 | 40 | 5 | 1.9 | 2.4 | |
| | PI-478008 | | Res. Sta., Morden, MB, Canada | | | 84 | | | 5 | 100 | 6 | 1.4 | 1.7 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 86 | | | 3 | 60 | 3 | 4.1 | 3.5 | |
| | | | | | | 88 | | | 2 | 40 | 4 | 7.7 | 7.3 | |
| | | | | | | 91 | | | 3 | 60 | 3 | 6.7 | 7.1 | |
| | | | | | | 96 | | | 2 | 40 | 5 | 10.9 | 11.9 | |
| | | | | | | 01 | | | 2 | 40 | 3 | 16.0 | 15.5 | |
| | | | | | | 06 | | | 2 | 40 | 3 | 12.8 | 17.9 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
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| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/12/1-5 | ND-3779 | POLA82 | Manchurian poplar | 27-Apr | 82 | 82 | CONT | 5 | 5 | 100 | 3 | 3.1 | 4.2 | |
| | 9029137 | | *Populus laurifolia* | | | 83 | | | 5 | 100 | 1 | 5.9 | 8.6 | good-excellent growth and |
| | | | Lee Nursery, Fertile, MN | | | 84 | | | 5 | 100 | 1 | 8.3 | 14.0 | vigor |
| | | | | | | 86 | | | 5 | 100 | 2 | 11.2 | 19.5 | |
| | | | | | | 88 | | | 5 | 100 | 3 | 12.8 | 22.3 | |
| | | | | | | 91 | | | 5 | 100 | 4 | 13.5 | 25.2 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 15.7 | 30.7 | |
| | | | | | | 01 | | | 5 | 100 | 3 | 20.0 | 35.0 | |
| | | | | | | 06 | | | 2 | 40 | 4 | 19.8 | 37.1 | |
| II/12/6-10 | 'Raverdeau' | POPUL | hybrid poplar | 12-May | 93 | 93 | PLBR | 5 | 5 | 100 | 3 | 1.0 | 3.0 | |
| | 9069085 | | *Populus* | | | 94 | | | 5 | 100 | 3 | 1.6 | 4.7 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 3 | 5.1 | 7.8 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 6.9 | 13.0 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 9.3 | 23.0 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 10.2 | 24.3 | |
| II/13/1-5 | 9069081 | TICO2 | littleleaf linden | 12-May | 93 | 93 | PLBR | 5 | 5 | 100 | 5 | 0.8 | 1.2 | |
| | | | *Tilia cordata* | | | 94 | | | 4 | 80 | 4 | 1.5 | 1.7 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 3 | 2.5 | 1.9 | |
| | | | | | | 97 | | | 3 | 60 | 5 | 2.6 | 2.0 | |
| | | | | | | 99 | | | 3 | 60 | 4 | 3.8 | 4.6 | |
| | | | | | | 02 | | | 3 | 60 | 5 | 6.5 | 5.8 | |
| II/13/6-10 | 9008183 | PRVI | common chokecherry | 3-May | 05 | 05 | PLBR | 5 | 5 | 100 | 5 | 0.7 | 1.9 | |
| | | | *Prunus virginiana* | | | 06 | | | 5 | 100 | 4 | 1.2 | 2.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| II/14/1-5 | 'Imperial' | POCA19 | Carolina poplar | 27-Apr | 82 | 82 | CONT | 5 | 5 | 100 | 3 | 2.3 | 4.7 | |
| | PI-432347 | | *Populus X canadensis* | | | 83 | | | 5 | 100 | 1 | 6.4 | 9.2 | excellent growth and vigor, |
| | | | USDA, SCS, PMC, Rose Lake, MI | | | 84 | | | 5 | 100 | 1 | 9.2 | 14.6 | looks very good |
| | | | | | | 86 | | | 5 | 100 | 2 | 11.2 | 19.6 | |
| | | | | | | 88 | | | 5 | 100 | 3 | 13.5 | 23.0 | |
| | | | | | | 91 | | | 5 | 100 | 4 | 13.9 | 21.2 | |
| | | | | | | 96 | | | 5 | 100 | 4 | 17.4 | 26.2 | |
| | | | | | | 01 | | | 5 | 100 | 4 | 28.0 | 34.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/14/6-10 | 'Assiniboine' | POPUL | hybrid poplar | 12-May | 93 | 93 | PLBR | 5 | 4 | 80 | 6 | 0.5 | 1.6 | |
| | 9063147 | | *Populus* | | | 94 | | | 5 | 100 | 5 | 1.0 | 2.8 | |
| | | | PFRA, Indianhead, Saskatchewan | | | 95 | | | 5 | 100 | 3 | 2.8 | 4.4 | |
| | | | | | | 97 | | | 4 | 80 | 5 | 4.3 | 7.5 | |
| | | | | | | 99 | | | 4 | 80 | 4 | 5.0 | 15.1 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 6.5 | 18.4 | |
| II/15/1-5 | PI-370126 | SAFR | crack willow | 27-Apr | 82 | 82 | CONT | 5 | 5 | 100 | 3 | 3.0 | 3.1 | |
| | | | *Salix fragilis* | | | 83 | | | 5 | 100 | 3 | 6.6 | 6.1 | |
| | | | P.I. Sta., Glendale, MD | | | 84 | | | 5 | 100 | 2 | 8.8 | 7.4 | spring frost damage, |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 86 | | | 5 | 100 | 2 | 9.4 | 8.9 | looks good |
| | | | | | | 88 | | | 5 | 100 | 3 | 12.3 | 10.8 | |
| | | | | | | 91 | | | 5 | 100 | 4 | 12.8 | 10.7 | |
| | | | | | | 96 | | | 4 | 80 | | 12.4 | 12.7 | |
| | | | | | | 01 | | | 4 | 80 | 4 | 13.0 | 13.8 | |
| II/15/6-10 | ND-3899 | SALIX | willow | 25-May | 83 | 83 | PLBR | 5 | 5 | 100 | 4 | 1.7 | 3.0 | |
| | 9035209 | | *Salix* | | | 84 | | | 5 | 100 | 5 | 5.9 | 4.3 | |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 5 | 100 | 3 | 7.5 | 7.2 | |
| | | | | | | 87 | | | 5 | 100 | 4 | 14.0 | 13.8 | |
| | | | | | | 89 | | | 5 | 100 | 4 | 10.5 | 14.4 | |
| | | | | | | 92 | | | 5 | 100 | 5 | 12.5 | 16.3 | |
| | | | | | | 97 | | | 4 | 80 | 4 | 20.3 | 21.1 | |
| | | | | | | 02 | | | 3 | 60 | 4 | 26.7 | 17.3 | |
| II/16/1-5 | 9069060 | POTR5 | quaking aspen | 12-May | 93 | 93 | PLBR | 5 | 0 | 0 | | | | did not establish |
| | | | *Populus tremuloides* | | | 94 | | | 5 | 100 | 4 | 1.1 | 3.1 | replants |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 4 | 80 | 2 | 3.3 | 5.2 | |
| | | | | | | 97 | | | 4 | 80 | 2 | 3.8 | 6.6 | |
| | | | | | | 99 | | | 4 | 80 | 3 | 5.1 | 11.0 | |
| | | | | | | 02 | | | 4 | 80 | 3 | 6.1 | 14.2 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/16/6-10 | ND-3898 | PYUS2 | Ussurian pear | 25-May | 83 | 83 | PLBR | 5 | 1 | 20 | 5 | 0.3 | 1.5 | |
| | 9035208 | | *Pyrus ussuriensis* | | | 84 | | | 4 | 80 | 5 | 0.9 | 1.2 | |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 5 | 100 | 4 | 1.1 | 2.3 | |
| | | | | | | 87 | | | 3 | 60 | 3 | 4.2 | 5.9 | |
| | | | | | | 89 | | | 3 | 60 | 4 | 5.4 | 7.3 | |
| | | | | | | 92 | | | 3 | 60 | | 9.0 | 10.7 | |
| | | | | | | 97 | | | 3 | 60 | 8 | 15.9 | 13.1 | |
| | | | | | | 02 | | | 3 | 60 | 5 | 12.2 | 14.2 | |
| II/17/1-5 | ND-3825 | ACSA2 | silver maple | 25-May | 83 | 83 | CONT | 5 | 5 | 100 | 5 | 0.3 | 1.0 | |
| | 9034904 | | *Acer saccharinum* | | | 84 | | | 5 | 100 | | 0.4 | 1.1 | |
| | | | Bismarck, ND | | | 85 | | | 3 | 60 | 5 | 0.8 | 2.1 | |
| | | | | | | 86 | | | 2 | 40 | 2 | 2.2 | 4.6 | |
| | | | | | | 87 | | | 4 | 80 | 4 | 3.5 | 4.7 | |
| | | | | | | 89 | | | 2 | 40 | 6 | 4.6 | 5.7 | |
| | | | | | | 92 | | | 2 | 40 | 4 | 9.5 | 11.2 | |
| | | | | | | 97 | | | 2 | 40 | 5 | 21.0 | 17.6 | |
| | | | | | | 02 | | | 2 | 40 | 5 | 20.5 | 18.4 | |
| II/17/6-10 | 9057410 | CEOC | hackberry | 10-May | 88 | 88 | CONT | 5 | 4 | 80 | | 0.3 | 0.7 | |
| | | | *Celtis occidentalis* | | | 89 | | | 1 | 20 | | 0.7 | 0.8 | |
| | | | *Bottineau Co., ND* | | | 90 | | | 5 | 100 | | 0.6 | 1.1 | |
| | | | NDFS | | | 92 | | | 5 | 100 | 4 | 1.5 | 2.8 | Tubex on 4 of trees |
| | | | | | | 94 | | | 5 | 100 | 4 | 3.4 | 4.6 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 6.8 | 9.0 | |
| | | | | | | 02 | | | 5 | 100 | | 8.8 | 13.6 | |
| II/18/1-5 | 9057412 | QUMA2 | bur oak | 10-May | 88 | 88 | CONT | 5 | 1 | 20 | | 0.5 | 1.0 | |
| | | | *Quercus macrocarpa* | | | 89 | | | 1 | 20 | | 0.5 | 0.7 | |
| | | | Foster Co., ND | | | 90 | | | 5 | 100 | 7 | 0.4 | 0.9 | |
| | | | NDFS | | | 92 | | | 4 | 80 | 7 | 0.5 | 1.0 | |
| | | | | | | 94 | | | 4 | 80 | 4 | 1.1 | 1.9 | |
| | | | | | | 97 | | | 4 | 80 | 2 | 1.8 | 4.0 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 7.0 | 8.8 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/18/6-10 | ND-3890 | ELAN | Russian olive | 25-May | 83 | 83 | PLBR | 5 | 3 | 60 | 4 | 0.4 | 1.6 | poor quality stock |
| | 9035200 | | *Elaeagnus angustifolia* | | | 84 | | | 2 | 40 | 4 | 3.9 | 4.1 | |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 2 | 40 | 4 | 5.5 | 5.6 | |
| | | | | | | 87 | | | 2 | 40 | 4 | 8.5 | 7.3 | |
| | | | | | | 89 | | | 2 | 40 | | 9.7 | 9.6 | |
| | | | | | | 92 | | | 2 | 40 | 5 | 13.6 | 12.9 | |
| | | | | | | 97 | | | 2 | 40 | 8 | 10.5 | 10.8 | |
| | | | | | | 02 | | | | | | | | should be removed |
| II/19/1-5 | 9063116 | FRNI | black ash | 5-May | 94 | 94 | CONT | 5 | 5 | 100 | 4 | 0.9 | 1.4 | |
| | | | *Fraxinus nigra* | | | 95 | | | 5 | 100 | 3 | 1.6 | 3.6 | |
| | | | Itasca State Park, MN | | | 96 | | | 5 | 100 | 3 | 2.2 | 4.8 | |
| | | | | | | 99 | | | 5 | 100 | 5 | 2.6 | 7.5 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 2.4 | 8.8 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 4.3 | 12.6 | |
| II/19/6-10 | 9063115 | FRPE | green ash | 5-May | 94 | 94 | CONT | 5 | 5 | 100 | 4 | 0.7 | 1.3 | |
| | | | *Fraxinus pennsylvanica* | | | 95 | | | 5 | 100 | 3 | 1.4 | 2.9 | |
| | | | Itasca State Park, MN | | | 96 | | | 5 | 100 | 4 | 2.2 | 4.0 | cut off |
| | | | | | | 99 | | | 5 | 100 | 5 | 3.3 | 6.3 | |
| | | | | | | 00 | | | 5 | 100 | 5 | 3.8 | 8.1 | |
| | | | | | | 03 | | | 5 | 100 | 2 | 6.9 | 13.3 | |
| III/01/1-5 | 9069164 | PISYM | Scots pine | 14-May | 02 | 02 | CONT | 5 | 3 | 60 | 3 | 1.0 | 2.4 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 03 | | | 4 | 80 | 4 | 1.0 | 2.4 | |
| | | | PRC, Heilongjiang Province | | | 04 | | | 4 | 80 | 3 | 1.3 | 3.0 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 1.9 | 3.8 | |
| III/02/1-5 | 9076719 | PISYM | Scots pine | 14-May | 02 | 02 | CONT | 5 | 3 | 60 | 3 | 1.0 | 2.2 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 03 | | | 4 | 80 | 4 | 0.7 | 2.3 | |
| | | | PRC, Heilongjiang Province | | | 04 | | | 2 | 40 | 4 | 0.6 | 2.9 | |
| | | | | | | 06 | | | 4 | 80 | 4 | 1.3 | 3.2 | |
| III/03/1-5 | 9076718 | PISYM | Scots pine | 14-May | 02 | 02 | CONT | 5 | 3 | 60 | 3 | 1.4 | 2.2 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 03 | | | 5 | 100 | 3 | 1.1 | 2.5 | |
| | | | PRC, Heilongjiang Province | | | 04 | | | 5 | 100 | 3 | 1.1 | 3.0 | |
| | | | | | | 06 | | | 4 | 80 | 3 | 2.8 | 5.1 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/04/1-3 | ND-81 | PRSP | sloe | 24-May | 78 | 78 | PLBR | 3 | 2 | 67 | 3 | 0.8 | 1.2 | |
| | 9006078 | | *Prunus spinosa* | | | 79 | | | 2 | 67 | 3 | 2.1 | 2.0 | |
| | | | Res. Sta., Morden, MB, Canada | | | 80 | | | 2 | 67 | 6 | 2.1 | 1.7 | |
| | | | | | | 82 | | | 2 | 67 | 5 | 4.3 | 5.2 | |
| | | | | | | 83 | | | 2 | 67 | 4 | 5.2 | 6.0 | mildew |
| | | | | | | 84 | | | 2 | 67 | 5 | 5.9 | 6.2 | |
| | | | | | | 87 | | | 2 | 67 | | 8.5 | 7.9 | |
| | | | | | | 92 | | | 2 | 57 | 5 | 6.4 | 7.4 | |
| | | | | | | 97 | | | 1 | 33 | 4 | 14.4 | 10.3 | |
| | | | | | | 02 | | | 1 | 33 | 3 | 15.0 | 9.5 | |
| III/04/6 | ND-46 | AMAL2 | juneberry | 24-May | 78 | 78 | PLBR | 1 | 1 | 100 | 3 | 1.2 | 0.9 | |
| | 9005661 | | *Amelanchier alnifolia* | | | 79 | | | 1 | 100 | 3 | 2.1 | 1.6 | |
| | | | Towner Co., ND | | | 80 | | | 1 | 100 | 7 | 2.0 | 1.5 | |
| | | | | | | 82 | | | 1 | 100 | 4 | 3.6 | 3.0 | |
| | | | | | | 83 | | | 1 | 100 | 4 | 4.1 | 3.0 | |
| | | | | | | 84 | | | 1 | 100 | 3 | 5.1 | 3.1 | |
| | | | | | | 87 | | | 1 | 100 | 3 | 6.1 | 3.8 | |
| | | | | | | 92 | | | 1 | 100 | 4 | 7.1 | 4.3 | |
| | | | | | | 97 | | | 1 | 100 | 3 | 9.8 | 6.2 | |
| III/04/7-10 | 'Success' | AMAL2 | juneberry | 24-Apr | 78 | 78 | PLBR | 4 | 4 | 100 | 3 | 1.3 | 1.0 | |
| | 9005662 | | *Amelanchier alnifolia* | | | 79 | | | 4 | 100 | 3 | 1.9 | 1.6 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 80 | | | 3 | 75 | 4 | 2.9 | 2.1 | |
| | | | | | | 82 | | | 3 | 75 | 3 | 4.2 | 3.8 | |
| | | | | | | 83 | | | 3 | 75 | 3 | 4.8 | 3.8 | slight leaf rust |
| | | | | | | 84 | | | 3 | 75 | 3 | 5.0 | 4.3 | |
| | | | | | | 87 | | | 4 | 100 | 4 | 5.9 | 4.8 | |
| | | | | | | 92 | | | 4 | 100 | 3 | 7.2 | 5.9 | |
| | | | | | | 97 | | | 4 | 100 | 3 | 9.0 | 7.1 | |
| | | | | | | 02 | | | | | | | | mostly new shoots |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/05/1-5 | 'Bighorn' | RHTR | skunkbush sumac | 24-May | 79 | 79 | PLBR | 5 | 4 | 80 | | 0.4 | 0.8 | |
| | WY-843 | | *Rhus trilobata* | | | 80 | | | 4 | 80 | 4 | 2.5 | 3.0 | |
| | 9004646 | | Bighorn Co., WY | | | 81 | | | 4 | 80 | 4 | 5.2 | 3.9 | |
| | PI-483445 | | USDA, SCS, PMC, Bismarck, ND | | | 83 | | | 2 | 40 | 5 | 7.9 | 5.0 | |
| | | | | | | 85 | | | 2 | 40 | 2 | 8.7 | 4.9 | |
| | | | | | | 88 | | | 2 | 40 | 3 | 11.5 | 7.5 | |
| | | | | | | 93 | | | 2 | 40 | | 16.4 | 7.7 | |
| | | | | | | 98 | | | 2 | 40 | 6 | 15.9 | 8.4 | |
| III/05/6-7 | ND-629 | ACGI | amur maple | 24-May | 78 | 78 | PLBR | 2 | 2 | 100 | 1 | 2.5 | 2.5 | |
| | 9005645 | | *Acer ginnala* | | | 79 | | | 2 | 100 | 1 | 6.4 | 4.9 | |
| | PI-477992 | | Res. Sta., Morden, MB, Canada | | | 80 | | | 2 | 100 | 3 | 7.7 | 6.3 | |
| | | | | | | 82 | | | 2 | 100 | 4 | 13.5 | 10.8 | |
| | | | | | | 83 | | | 2 | 100 | 4 | 12.2 | 11.7 | tractor damage, 2,4-D damage |
| | | | | | | 84 | | | 2 | 100 | 3 | 17.1 | 12.6 | |
| | | | | | | 87 | | | 2 | 100 | 3 | 20.3 | 17.7 | |
| | | | | | | 92 | | | 2 | 100 | 2 | 28.1 | 20.5 | |
| | | | | | | 97 | | | 2 | 100 | 2 | 32.8 | 24.0 | |
| | | | | | | 02 | | | 1 | 50 | | 34.0 | 21.8 | |
| III/06/1-8 | ND-26 | LONIC | honeysuckle | 24-May | 79 | 79 | PLBR | 8 | 8 | 100 | | 1.4 | 1.5 | |
| | 9011852 | | *Lonicera* | | | 80 | | | 8 | 100 | 5 | 2.3 | 2.6 | |
| | | | USDA, ARS, Mandan, ND | | | 81 | | 9 | 9 | 100 | 5 | 3.7 | 4.0 | |
| | | | | | | 83 | | 8 | 8 | 100 | 4 | 5.6 | 5.7 | excellent fruit, |
| | | | | | | 85 | | | 8 | 100 | 3 | 7.9 | 7.1 | slight honeysuckle aphid, |
| | | | | | | 88 | | | 8 | 100 | 4 | 9.0 | 8.2 | witches broom, mildew |
| | | | | | | 93 | | | 7 | 88 | | 14.6 | 9.5 | |
| | | | | | | 98 | | | 7 | 88 | 5 | 13.5 | 10.2 | |
| | | | | | | 03 | | | 7 | 88 | | 10.8 | 11.0 | |

**Project No.: 38I308K Field Evaluation of Woody Plant Materials, Bottineau, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/07/1-10 | ND-11 | LOMA6 | amur honeysuckle | 6-May | 81 | 81 | CONT | 10 | 10 | 100 | 5 | 1.6 | 1.5 | |
| | 9005993 | | *Lonicera maackii* | | | 82 | | | 10 | 100 | 4 | 3.7 | 3.0 | |
| | PI-477998 | | Res. Sta., Morden, MB, Canada | | | 83 | | | 10 | 100 | 4 | 4.1 | 3.5 | leaf wilt, |
| | | | | | | 85 | | | 10 | 100 | 3 | 5.9 | 4.7 | leaf scorch |
| | | | | | | 87 | | | 10 | 100 | 3 | 8.2 | 7.0 | |
| | | | | | | 88 | | | 10 | 100 | 3 | 7.7 | 6.3 | |
| | | | | | | 90 | | | 10 | 100 | 4 | 9.2 | 6.8 | |
| | | | | | | 95 | | | 10 | 100 | 3 | 9.8 | 8.3 | |
| | | | | | | 00 | | | 10 | 100 | 4 | 11.9 | 9.8 | |
| | | | | | | 05 | | | 10 | 100 | 3 | 11.2 | 10.5 | |
| III/08/1-10 | 'Regal' | PRTE5 | Russian almond | 6-May | 81 | 81 | CONT | 10 | 10 | 100 | 4 | 1.2 | 2.5 | |
| | ND-283 | | *Prunus tenella* | | | 82 | | | 10 | 100 | 4 | 3.1 | 3.4 | |
| | 9006079 | | NDG&F Dept. | | | 83 | | | 10 | 100 | 3 | 3.9 | 3.8 | |
| | PI-540442 | | | | | 85 | | | 10 | 100 | 4 | 5.9 | 5.0 | |
| | | | | | | 87 | | | 10 | 100 | 4 | 7.4 | 5.3 | |
| | | | | | | 88 | | | 10 | 100 | 4 | 7.9 | 5.3 | |
| | | | | | | 90 | | | 10 | 100 | 3 | 7.9 | 5.6 | |
| | | | | | | 95 | | | 10 | 100 | 3 | 11.3 | 6.1 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 13.5 | 7.3 | |
| | | | | | | 05 | | | 10 | 100 | 2 | 15.4 | 6.6 | |
| III/09/1-5 | 9082684 | RHGL | smooth sumac | 16-May | 03 | 03 | | 5 | 2 | 40 | 5 | 0.8 | 1.0 | poor stock |
| | | | *Rhus glabra* | | | 04 | | | 2 | 40 | 3 | 0.7 | 1.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 05 | | | 2 | 40 | 4 | 0.7 | 1.4 | |
| III/09/6-10 | 9082738 | CORA6 | gray dogwood | 6-May | 03 | 03 | | 5 | 5 | 100 | 4 | 0.7 | 1.5 | |
| | | | *Cornus racemosa* | | | 04 | | | 5 | 100 | 3 | 0.7 | 1.9 | |
| | | | Wisconsin | | | 05 | | | 5 | 100 | 3 | 1.0 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| III/10/1-5 | 'Arnolds Red' | LOTA | red tatarian honeysuckle | 12-May | 93 | 93 | PLBR | 5 | 4 | 80 | 4 | 1.0 | 1.5 | |
| | 9069080 | | *Lonicera tatarica* | | | 94 | | | 4 | 80 | 4 | 1.6 | 2.1 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 4 | 2.5 | 3.1 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 3.9 | 4.6 | |
| | | | | | | 99 | | | 5 | 100 | 4 | 4.3 | 5.4 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 5.5 | 6.9 | alot of fruit on all |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/10/6-10 | 9063143 | LOTA | red tatarian honeysuckle | 12-May | 93 | 93 | PLBR | 5 | 5 | 100 | 4 | 1.2 | 1.4 | |
| | | | *Lonicera tatarica* | | | 94 | | | 5 | 100 | 5 | 1.2 | 1.9 | |
| | | | Iowa | | | 95 | | | 5 | 100 | 4 | 3.5 | 3.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 97 | | | 5 | 100 | 3 | 5.3 | 5.5 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 6.0 | 7.3 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 7.5 | 8.8 | |
| III/11/1-5 | 9069129 | PRMA80 | Amur chokecherry | 11-May | 94 | 94 | PLBR | 5 | 3 | 60 | 2 | 1.9 | 3.2 | |
| | | | *Prunus maackii* | | | 95 | | | 5 | 100 | 2 | 3.3 | 5.1 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 96 | | | 5 | 100 | 3 | 5.1 | 6.6 | |
| | | | | | | 98 | | | 5 | 100 | 2 | 6.6 | 8.2 | |
| | | | | | | 00 | | | 5 | 100 | 1 | 6.2 | 12.3 | |
| | | | | | | 03 | | | 5 | 100 | 2 | 11.7 | 13.1 | |
| III/11/6-10 | 9069128 | LOTA | red tatarian honeysuckle | 11-May | 94 | 94 | PLBR | 5 | 4 | 80 | 5 | 1.0 | 1.0 | |
| | | | *Lonicera tatarica* | | | 95 | | | 5 | 100 | 4 | 2.9 | 3.1 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 96 | | | 5 | 100 | 4 | 3.4 | 4.7 | herbicide damage |
| | | | | | | 98 | | | 5 | 100 | 3 | 5.8 | 7.1 | |
| | | | | | | 00 | | | 5 | 100 | 2 | 5.3 | 10.7 | |
| | | | | | | 03 | | | 5 | 100 | 4 | 8.6 | 12.7 | |
| III/13/1-5 | 9082726 | COCO6 | beaked hazel | 7-May | 03 | 03 | | 5 | 1 | 20 | 7 | 0.6 | 1.0 | |
| | | | *Corylus cornuta* | | | 04 | | | 1 | 20 | 5 | 0.3 | 1.3 | |
| | | | Sandy Lake, Bottineau Co., ND | | | 05 | | | 2 | 40 | 5 | 0.5 | 0.6 | |
| | | | | | | 06 | | | 0 | 0 | | | | all dead |
| III/13/6-10 | 9076686 | CRCH | roundleaf hawthorn | 26-May | 04 | 04 | | 5 | 5 | 100 | 4 | 0.4 | 0.7 | caged |
| | | | *Crataegus chrysocarpa* | | | 05 | | | 5 | 100 | 4 | 0.8 | 1.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 3 | 1.0 | 1.5 | |
| III/14/1-5 | 9082885 | POTR5 | quaking aspen | 26-May | 04 | 04 | | 5 | 5 | 100 | 4 | 0.3 | 2.2 | |
| | | | *Populus tremuloides* | | | 05 | | | 5 | 100 | 4 | 0.6 | 2.2 | |
| | | | NDFS Nursery, Towner, ND | | | 06 | | | 2 | 40 | 4 | 1.0 | 2.8 | |
| III/14/6-10 | 90911969 | CAFR80 | Russian peashrub | 3-May | 05 | 05 | | 5 | 5 | 100 | 3 | 0.7 | 3.1 | |
| | | | *Caragana frutex* | | | 06 | | | 5 | 100 | 4 | 0.8 | 3.0 | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/15/1-5 | 'Indigo' | COAM2 | silky dogwood | 25-May | 83 | 83 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 1.3 | |
| | Mich-765 | | *Cornus amomum* | | | 84 | | | 5 | 100 | 4 | 2.0 | 1.9 | |
| | 9004971 | | USDA, SCS, PMC, Rose Lake, MI | | | 85 | | | 5 | 100 | 3 | 3.0 | 3.0 | |
| | PI-468117 | | | | | 87 | | | 4 | 80 | 4 | 6.2 | 4.3 | |
| | | | | | | 89 | | | 4 | 80 | 4 | 5.0 | 4.5 | |
| | | | | | | 92 | | | 4 | 80 | 5 | 5.6 | 4.9 | |
| | | | | | | 97 | | | 4 | 80 | 4 | 9.8 | 7.2 | |
| | | | | | | 02 | | | 4 | 80 | 3 | 10.5 | 8.3 | |
| III/15/6-10 | ND-3889 | COST4 | dogwood | 25-May | 83 | 83 | PLBR | 5 | 4 | 80 | 6 | 0.5 | 1.1 | |
| | 9035199 | | *Cornus stolonifera* | | | 84 | | | 3 | 60 | 4 | 0.9 | 1.8 | |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 3 | 60 | 3 | 2.7 | 2.7 | |
| | | | | | | 87 | | | 3 | 60 | 4 | 5.7 | 3.7 | |
| | | | | | | 89 | | | 2 | 40 | 4 | 5.8 | 4.4 | |
| | | | | | | 92 | | | 2 | 40 | 2 | 7.6 | 5.8 | |
| | | | | | | 97 | | | 2 | 40 | 2 | 7.6 | 5.8 | |
| | | | | | | 02 | | | 3 | 60 | 4 | 10.5 | 6.3 | |
| III/16/1-5 | 'Roselow' | MASA9 | Sargent crabapple | 25-May | 83 | 83 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 1.2 | |
| | Mich-1339 | | *Malus sargentii* | | | 84 | | | 5 | 100 | 3 | 1.5 | 1.7 | 1 chlorotic |
| | 9005026 | | USDA, SCS, PMC, Rose Lake, MI | | | 85 | | | 5 | 100 | 4 | 1.7 | 2.3 | |
| | PI-477986 | | | | | 87 | | | 4 | 80 | 4 | 3.1 | 3.6 | |
| | | | | | | 89 | | | 4 | 80 | 4 | 3.8 | 4.1 | |
| | | | | | | 92 | | | 1 | 20 | 4 | 5.4 | 4.9 | |
| | | | | | | 97 | | | 1 | 20 | 5 | 9.0 | 6.6 | |
| | | | | | | 02 | | | 1 | 20 | 4 | 11.0 | 10.5 | |
| III/16/6-10 | ND-3888 | COAC* | cotoneaster | 25-May | 83 | 83 | PLBR | 5 | 5 | 100 | 4 | 1.0 | 1.4 | |
| | 9035198 | | *Cotoneaster acutifolia* | | | 84 | | | 5 | 100 | 4 | 1.5 | 1.9 | |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 5 | 100 | 4 | 2.4 | 2.9 | |
| | | | | | | 87 | | | 5 | 100 | 4 | 5.5 | 4.3 | |
| | | | | | | 89 | | | 5 | 100 | 3 | 6.0 | 5.3 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 9.8 | 7.0 | |
| | | | | | | 97 | | | 5 | 100 | 5 | 8.9 | 7.5 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 11.0 | 9.7 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/17/1-5 | ND-3887 | CAAR18 | caragana | 25-May | 83 | 83 | PLBR | 5 | 5 | 100 | 4 | 0.5 | 1.3 | |
| | 9035197 | | *Caragana arborescens* | | | 84 | | | 5 | 100 | 5 | 0.8 | 1.9 | |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 5 | 100 | 4 | 1.4 | 2.8 | |
| | | | | | | 87 | | | 4 | 80 | 4 | 4.3 | 6.2 | |
| | | | | | | 89 | | | 5 | 100 | 4 | 5.2 | 7.1 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 7.3 | 9.8 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 14.6 | 13.1 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 15.5 | 14.8 | |
| III/17/6-10 | ND-3892 | LOTA | red tatarian honeysuckle | 25-May | 83 | 83 | PLBR | 5 | 5 | 100 | 6 | 0.6 | 1.2 | |
| | 9035202 | | *Lonicera tatarica sibirica* | | | 84 | | | 5 | 100 | 5 | 1.1 | 1.9 | leaf wilt, aphid |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 5 | 100 | 3 | 2.3 | 2.7 | |
| | | | | | | 87 | | | 5 | 100 | 4 | 5.3 | 5.2 | |
| | | | | | | 89 | | | 5 | 100 | 4 | 6.1 | 6.2 | |
| | | | | | | 92 | | | 5 | 100 | 4 | 6.8 | 8.5 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 14.3 | 10.9 | |
| | | | | | | 02 | | | 5 | 100 | 4 | | 12.8 | |
| III/18/1-5 | ND-3893 | PRAM | American plum | 25-May | 83 | 83 | PLBR | 5 | 4 | 80 | 6 | 0.5 | 1.8 | |
| | 9035203 | | *Prunus americana* | | | 84 | | | 5 | 100 | 5 | 0.9 | 1.8 | |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 5 | 100 | 4 | 1.2 | 2.4 | |
| | | | | | | 87 | | | 5 | 100 | 4 | 4.8 | 5.6 | |
| | | | | | | 89 | | | 5 | 100 | 4 | 6.9 | 7.8 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 8.3 | 9.5 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 15.5 | 12.3 | |
| | | | | | | 02 | | | 5 | 100 | 5 | 15.0 | 13.5 | |
| III/19/1-5 | 'Centennial' | COIN16 | European cotoneaster | 6-May | 85 | 85 | PLBR | 5 | 5 | 100 | 3 | 0.6 | 1.1 | |
| | ND-177 | | *Cotoneaster integerrimus* | | | 86 | | | 5 | 100 | 3 | 1.8 | 2.3 | |
| | 9005729 | | USDA, SCS, PMC, Bismarck, ND | | | 87 | | | 5 | 100 | 3 | 4.4 | 3.6 | |
| | PI-113095 | | | | | 89 | | | 5 | 100 | 4 | 5.9 | 5.4 | |
| | | | | | | 91 | | | 4 | 80 | 3 | 10.8 | 6.6 | |
| | | | | | | 94 | | | 4 | 80 | 3 | 11.8 | 8.7 | |
| | | | | | | 99 | | | 3 | 60 | 4 | 9.6 | 10.4 | |
| | | | | | | 04 | | | 5 | 100 | 6 | 11.0 | 9.0 | fireblight |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/19/6-10 | ND-3896 | PRTO80 | nanking cherry | 25-May | 83 | 83 | PLBR | 5 | 3 | 60 | 8 | 0.3 | 0.5 | poor quality stock, |
| | 9035206 | | *Prunus tomentosa* | | | 84 | | | 4 | 80 | 6 | 0.3 | 0.9 | failed to establish, |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 4 | 80 | 3 | 0.7 | 1.3 | 5 cultivated out |
| | | | | | | 87 | | | 2 | 40 | 4 | 3.0 | 4.0 | |
| | | | | | | 89 | | | 2 | 40 | 3 | 4.4 | 5.2 | |
| | | | | | | 92 | | | 2 | 40 | 4 | 7.0 | 5.6 | |
| | | | | | | 97 | | | 2 | 40 | 6 | 6.9 | 5.0 | |
| | | | | | | 02 | | | 2 | 40 | 4 | 9.0 | 8.5 | |
| III/20/1-5 | ND-3900 | SYVI3 | late lilac | 25-May | 83 | 83 | CONT | 5 | 5 | 100 | 8 | 0.3 | 1.0 | heat stress, |
| | 9035210 | | *Syringa villosa* | | | 84 | | | 3 | 60 | 9 | 0.4 | 0.8 | poor quality stock |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 4 | 80 | 4 | 0.5 | 1.2 | |
| | | | | | | 86 | | | 5 | 100 | 3 | 1.3 | 1.9 | |
| | | | | | | 87 | | | 3 | 60 | | | | |
| | | | | | | 89 | | | 5 | 100 | 4 | 2.4 | 3.2 | |
| | | | | | | 92 | | | 4 | 80 | 4 | 4.6 | 5.6 | |
| | | | | | | 97 | | | 4 | 80 | 4 | 10.2 | 8.5 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 9.5 | 10.5 | |
| III/20/6-10 | ND-3901 | SYVU | common lilac | 25-May | 83 | 83 | CONT | 5 | 5 | 100 | 8 | 0.3 | 0.5 | severe weed competition, |
| | 9035211 | | *Syringa vulgaris* | | | 84 | | | 4 | 80 | 7 | 0.3 | 0.5 | moisture stress, |
| | | | Lawyer Nursery, Plains, MT | | | 85 | | | 4 | 80 | 4 | 0.5 | 0.7 | 5 cultivated out |
| | | | | | | 87 | | | 4 | 80 | 4 | 1.7 | 2.3 | |
| | | | | | | 89 | | | 4 | 80 | 4 | 3.1 | 3.5 | |
| | | | | | | 92 | | | 4 | 80 | 4 | 5.4 | 5.6 | |
| | | | | | | 97 | | | 4 | 80 | 2 | 9.2 | 9.5 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 10.5 | 10.5 | |
| III/21/1-5 | 'Prairie Red' | PRUNU | plum | 6-May | 85 | 85 | PLBR | 5 | 3 | 60 | 6 | 0.4 | 1.6 | |
| | ND-1134 | | *Prunus* | | | 86 | | | 3 | 60 | 4 | 1.1 | 2.3 | |
| | 9047203 | | Miller, SD | | | 87 | | | 2 | 40 | 4 | 2.7 | 3.2 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 88 | | | 3 | 60 | 4 | 3.2 | 4.1 | |
| | | | | | | 89 | | | 3 | 60 | 4 | 5.0 | 6.5 | |
| | | | | | | 91 | | | 3 | 60 | 3 | 8.0 | 8.5 | |
| | | | | | | 94 | | | 3 | 60 | | 9.8 | 9.1 | |
| | | | | | | 99 | | | 3 | 60 | 3 | 15.7 | 12.5 | |
| | | | | | | 04 | | | 3 | 60 | 4 | 17.0 | 13.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/21/6-10 | SD-131 | PRPA5 | mayday | 6-May | 85 | 85 | PLBR | 5 | 5 | 100 | 2 | 0.6 | 1.4 | |
| | 9006073 | | *Prunus padus* | | | 86 | | | 5 | 100 | 2 | 1.5 | 2.5 | |
| | PI-536048 | | Brookings Co., SD | | | 87 | | | 4 | 80 | 4 | 2.1 | 3.4 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 88 | | | 5 | 100 | 4 | 2.5 | 4.0 | |
| | | | | | | 89 | | | 5 | 100 | 4 | 4.3 | 5.7 | |
| | | | | | | 91 | | | 5 | 100 | 3 | 6.7 | 7.7 | |
| | | | | | | 94 | | | 5 | 100 | 4 | 7.0 | 9.7 | |
| | | | | | | 99 | | | 5 | 100 | 4 | 12.1 | 14.6 | black knot |
| | | | | | | 05 | | | | | | | | should be removed; mostly dead |

**OFF-CENTER EVALUATIONS: TECHNICAL REPORT – 2006**

Study 38I315K South Dakota State University, Central Research Station, Highmore, South Dakota.

Study Title: Field Evaluation of Woody Plant Materials.

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas are located in the three states served by the PMC. These sites provide planting locations under long-term land tenure, for assemblies of trees and shrubs to be evaluated under uniform culture and management. New material can be added on an annual basis. Comparisons are then made with previously released cultivars and area of adaptation determined.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use. Superior cultivars will be selected and released for increase by commercial nurseries.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with South Dakota State University, Central Crop and Soils Research Station, Highmore, South Dakota.

Location: This study is approximately 1/2 mile west of Highmore, South Dakota, on the SDSU, Central Crop and Soils Research Station. Legal description: NW 1/4 sec. 11, T. 112 N., R. 72 W., Hyde County, South Dakota. A sign is posted identifying the site and cooperators.

Major Land Resource Area: The site is located in Major Land Resource Area 53C, Dark Brown Glaciated Plain. This gently rolling glaciated plain includes some areas of kames and moraines that have irregular topography. Steep slopes and badlands border major streams and valleys. Most soils developed from calcareous glacial till. Elevation is 1,500 to 3,000 feet. Forty percent of the area is rangeland.

Soils: The soil type is mostly Glenham-Java loams. The Glenham series consists of deep, well-drained, moderately slow or slowly permeable soils formed in calcareous glacial till on uplands. These soils have a dark grayish-brown loam surface layer three inches thick. Subsoil is dark, grayish-brown clay loam. The substratum is light brownish-gray calcareous clay loam. Available water capacity and fertility are high. Organic matter content is moderate. This soil is in conservation Tree/Shrub Group 3.

The soils in this group are well-suited for windbreaks and other types of woody plantings. They occur in swales and on lake plains, terraces, and uplands. Except for those species of trees and shrubs with high moisture requirements, all climatically adapted tree and shrub species have the potential to grow well.

Climate: For MLRA 053C, the average annual precipitation is 15 to 18 inches; highest in the growing season. Rainfall is low and somewhat erratic. Winter precipitation is snow. Average annual temperature is 40 to 46 degrees F. Average freeze-free period is 105 to 140 days. The plant hardiness zone is 4a, with an average annual minimum temperature of -30 to -25 degrees F. Climatic data for 2006 at Highmore, South Dakota, is shown in Table HI-1.

**Methods and Materials**

Assembly: Refer to Table HI-2 for a list of woody species planted from 1978 through 2004.

Planting Plan: Plots are not randomized or replicated but systematically arranged for ease of evaluation and demonstration purposes. The planting site is divided into four blocks. Block I contains tall trees, Block II medium trees, Block III shrubs, and Block IV conifers (Refer to Figure HI-1 for a plot map).

Each block consists of single row non-replicated plots. Five or ten trees are planted per plot. Rows are 50 or 100 feet long. Spacing is 15 feet between rows and 10 feet within row for tall and medium-tall trees and conifers; 5 feet within row for shrubs. Standards are planted when available.

Plot Preparation: A clean, firm planting site was prepared annually by disking, and harrowing.

Planting Method: All trees and shrubs were planted using approved forestry methods.

Planting Date: Refer to Table HI-2 for planting dates of woody species planted from 1978 through 2004. Replacements are planted the year after establishment if available.

Fertilization: No fertilizer has been applied to planting area.

Weed Control: No herbicide was applied to any plot during year of establishment or in succeeding years. Mechanical weed control was by clean cultivating between rows, within row, and in fallow areas. Six to seven tillage operations were performed each year in the months of May through August. Hand hoeing was done as needed to control weeds in rows.

Pest Control: No insecticides have been applied. In 1978, animal repellent was applied to tree trunks to discourage rodent damage. In the fall 1979, the planting area was fenced to exclude rabbits and prevent further animal damage.

Irrigation: Some years, newly planted materials were watered by hand. No water is added following the year of establishment.

Crop Residue Management: No winter cover crop was seeded.

Silvicultural Practices: Dead trees and damaged branches were cut and removed each year for sanitation. In 1990 a number of accessions were removed due to poor performance and/or lack of adaptation.

Evaluation and Measurements: Records of planting date, survival, vigor, canopy width, and plant height have been maintained since 1978. Selected data appear in this report. Additional data can be requested from the PMC.

Plant performance data is recorded on one or more accessions during the growing season for three years. After the third year, data is gathered according to a specific schedule. Notes were taken on survival, vigor, canopy width, plant height, insect and disease symptoms, animal damage, and winter injury.

## Results

Plant Performance: One hundred twenty-five accessions of 74 species are currently under evaluation. Site management, especially weed control have been excellent, affording maximum survival potential under natural climatic conditions. Animal damage is not a factor because of fencing. Severe snow damage on many shrubs and some trees occurred during the winters of 1995-1996, and 2000-2001. Mean data for individual accessions of trees and shrubs is shown in Table HI-2. The final year of evaluation for this study was 2006. The following accessions exhibit potential for further evaluation and use.

| Accession Number | Genus/Species Origin/Source | Plot Location |
|---|---|---|
| ND-2103<br>PI-399414 | highbush cranberry<br>*Viburnum opulus*<br>P.I. Station, Ames, IA<br>USDA, NRCS, PMC, Bismarck, ND | III/23/1-5 |
| ND-1879<br>9011850<br>PI-503531 | honeylocust<br>*Gleditsia triacanthos*<br>USDA, ARS, Mandan, ND | 1/15/1-10 |
| 'Prairie Red'<br>9047203 | select plum<br>*Prunus*<br>Miller, SD | 2/21/1-10 |
| PI-323957 | chokeberry<br>*Photinia melanocarpa*<br>P. I. Sta., Ames, IA | 3/21/1-10 |
| Survivor Germplasm<br>9008041 | false indigo<br>*Amorpha fruticosa*<br>USDA, NRCS, PMC, Aberdeen, ID | 3/17/1-5 |
| 'Freedom'<br>9057424 | honeysuckle<br>*Lonicera korolkowii*<br>U of M, WC Exp. Sta., Morris, MN | 3/16/6-10 |
| ND-21<br>9034900 | nannyberry<br>*Viburnum lentago*<br>USDA, ARS, Mandan, ND | 2/25/1-10 |
| 'Bighorn'<br>9004646<br>PI-483445 | aromatic sumac<br>*Rhus trilobata*<br>USDA, NRCS, PMC, Bismarck, ND | III/10/1-10 |
| Silver Sands Germplasm<br>ND-3902<br>9035212 | sandbar willow<br>*Salix interior*<br>NDSU, Fargo, ND | V/15/1-10 |
| 'Streamco'<br>434309 | purpleosier willow<br>*Salix purpurea*<br>USDA, NRCS, PMC, Big Flats, NY | V/12/1-10 |
| ND-3744<br>9019577 | Korean barberry<br>*Berberis koreana*<br>NDSU, Fargo, ND | III/22/1-10 |
| ND-170<br>9005728 | European cotoneaster<br>*Cotoneaster integerrimus*<br>USDA, NRCS, PMC, Bismarck, ND | V/13/1-10 |

| Accession Number | Genus/Species<br>Origin/Source | Plot Location |
|---|---|---|
| Timm's | juneberry<br>*Amelanchier alnifolia*<br>Towner Co., ND<br>USDA, NRCS, PMC, Bismarck, ND | III/03/1-10 |
| ND-1863<br>9005909 | honeylocust<br>*Gleditsia triacanthos*<br>USDA, NRCS, PMC, Bismarck, ND | I/19/1-5 |
| 9058862 | tamarack<br>*Larix laricina*<br>Chippewa Farms, Grand Rapids, MN | IV/15/1-5 |

N

## Figure HI-1. Highmore Woody Field Evaluation Planting – Plot Layout

| Row | BLOCK 1 TALL TREES | | BLOCK 2 MEDIUM TREES | |
|---|---|---|---|---|
| 1 | SD-13 green ash | SD-156 green ash | 'Midwest' Manchurian crabapple | |
| 2 | ND-1753 green ash | ND-1734 green ash | 'Red Splendor' crabapple | ND-1731 Siberian crabapple |
| 3 | 'Cardan' green ash | | 'McDermand' Ussurian pear | |
| 4 | ND-1759 green ash | | | |
| 5 | ND-647 black ash | ND-1432 Ohio buckeye | | |
| 6 | 9063098 black walnut | ND-3796 white poplar | | |
| 7 | 9063126 Japanese elm | | | |
| 8 | ND-465 black walnut | ND-1755 black walnut | | |
| 9 | 9063127 white ash | | ND-1751 chokecherry | ND-1732 chokecherry |
| 10 | 9069087 boxelder | | 'Schubert' chokecherry | ND-1733 American plum |
| 11 | 'Raverdeau' poplar | Walker poplar | ND-286 manet plum | ND-288 plum |
| 12 | 'Assiniboine' poplar | 'Theves' poplar | open | open |
| 13 | ND-1737 bur oak | | ND-629 Amur maple | 'Flame' Amur maple |
| 14 | 9069090 quaking aspen | 9009082 pin oak | ND-1752 Amur maple | |
| 15 | ND-1879 honeylocust | | ND-1873 Amur maple | ND-686 Pekin lilac |
| 16 | 'Oahe' hackberry | | 9063131 sugar maple | 9049970 chickasaw plum |
| 17 | SD-75 hackberry | SD-211 hackberry | ND-624 common hoptree | 514677 American plum |
| 18 | ND-1863 honeylocust | 9047231 Russian olive | 'Roselow' Sargent crabapple | |
| 19 | ND-3773 willow | Mich-433 laurel willow | 9069081 littleleaf linden | |
| 20 | ND-428 black walnut | ND-3825 silver maple | 'Homestead' Arnold hawthorn | |
| 21 | 14271 poplar | 14272 poplar | 'Prairie Red' select plum | |
| 22 | 14273 poplar | 14274 poplar | SD-131 mayday | |
| 23 | 14390 Walker poplar | 14392 Walker poplar | ND-2102 apricot | |
| 24 | 9058896 Austree | 9058897 Austree | 9069129 amur chokecherry | 9063130 river birch |
| 25 | 9058899 Austree | 9063100 Austree | ND-21 nannyberry | |
| 26 | 9057983 l. cottonwood | 9039340 cottonwood | 9069121 mayday | ND-673 mountain ash |
| 27 | 9057965 balsam poplar | 9063141 n. cottonwood | ND-1567 hawthorn | |
| | | | | |
| | | | | |
| | | | | |
| | | | | Aug-06 |

## Figure HI-1 (continued). Highmore Woody Field Evaluation Planting – Plot Layout

| Row | BLOCK 3 SHRUBS | | BLOCK 4 CONIFERS & MISCELLANEOUS | |
|---|---|---|---|---|
| 1 | ND-1020 riverbank grape | | ND-1480 yucca | |
| 2 | ND-46 Timm's juneberry | | ND-1729 Siberian larch | |
| 3 | 'Success' juneberry | | SL-383-T Siberian larch | |
| 4 | 'Centennial' cotoneaster | | ND-1765 Siberian larch | |
| 5 | 9069128 honeysuckle | | ND-1763 ponderosa pine | |
| 6 | | 9076737 black cherry | Mich-1841 n. white cedar | Mich-1468 n. white cedar |
| 7 | 'Scarlet' Mongolian cherry | | 9067413 ponderosa pine | |
| 8 | 'Sakakawea' silver buffaloberry | | 9057411 lodgepole pine | |
| 9 | 9057406 rugosa rose | 9082685 redleaf rose | 9058862 tamarack | |
| 10 | 'Bighorn' skunkbush sumac | | 'Pete' eastern gammagrass | |
| 11 | 'Regal' Russian almond | 'Dakota Sunrise' potentilla | 9063156 Scotch pine | |
| 12 | ND-11 Amur honeysuckle | | 9063154 Scotch pine | |
| 13 | ND-995 prairie willow | 370126 crack willow | 9057412 bur oak | |
| 14 | 'Indigo' silky dogwood | | 9057410 hackberry | |
| 15 | 9082664 Siberian dogwood | 'Freedom' honeysuckle | 9082609 Meyer's spruce | |
| 16 | 9047238 sea buckthorn | | PMK-1407 bur oak | |
| 17 | 9008041 false indigo | 9047236 false indigo | 9069089 English oak | |
| 18 | 'Arnold's Red' honeysuckle | | 9063116 black ash | |
| 19 | 9063143 tatarian honeysuckle | | 9063148 corktree | |
| 20 | open | ND-2507 pigmy caragana | 9082666 black birch | |
| 21 | 323957 chokeberry | | 9063115 green ash | |
| 22 | ND-3744 Korean barberry | | 9016318 Siberian elm | |
| 23 | ND-2103 highbush cranberry | 9057409 American hazel | 9054820 Siberian elm | |
| 24 | 'Meadowlark' forsythia | | | |
| 25 | 'Hedge King' honeysuckle | | ND-170 cotoneaster | |
| 26 | ND-2506 Maxim. caragana | 'Legacy' late lilac | 9005399 blueleaf honeysuckle | |
| 27 | open | open | | |

**Table No. HI-1: 2006 Weather Summary - Official Station - Highmore, South Dakota**

| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) | | |
|---|---|---|---|---|---|---|
| | | | | Actual | | Deviation from Normal |
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 31.1 | 14.6 | | 0.55 | 0.40 | 0.15 |
| February | 24.4 | 21.5 | | 0.37 | 0.54 | -0.17 |
| March | 31.7 | 32.1 | | 1.36 | 1.38 | -0.02 |
| April | 50.9 | 45.4 | | 2.45 | 2.59 | -0.14 |
| May | 58.5 | 57.3 | | 0.95 | 3.07 | -2.12 |
| June | 69.7 | 66.7 | | 2.02 | 3.16 | -1.14 |
| July | 80.4 | 72.8 | | 0.98 | 3.25 | -2.27 |
| August | 73.3 | 71.7 | | 4.58 | 2.26 | 2.32 |
| September | 57.4 | 61.4 | | 3.45 | 1.66 | 1.79 |
| October | 45.7 | 48.3 | | 0.00 | 1.79 | -1.79 |
| November | 33.2 | 30.7 | | 0.00 | 0.75 | -0.75 |
| December | 30.88M | 18.6 | | 0.00M | 0.38 | -0.38M |
| **Annual** | **46.4M** | **45.1** | | **16.71M** | **21.23** | **-04.52M** |
| M=missing data | | | | | | |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |

| | 2006 |
|---|---|
| Last Frost (28 degrees) | M |
| First Frost (28 degrees) | M |
| Frost Free Period | M |

**Key to Table HI-2. 38I315K Field Evaluation of Woody Plant Materials – Highmore, South Dakota**

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table HI-2.**
**Project No.: 38I315K Field Evaluation of Woody Plant Materials, Highmore, South Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/01/1-5 | SD-13 | FRPE | green ash | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 0.6 | 2.1 | |
| | 9005888 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 0.8 | 2.6 | |
| | | | Potter Co., Gettysburg, ND | | | 80 | | | 5 | 100 | | 1.6 | 3.3 | |
| | | | | | | 82 | | | 5 | 100 | | 5.7 | 6.9 | |
| | | | | | | 83 | | | 5 | 100 | | 7.6 | 8.3 | |
| | | | | | | 84 | | | 5 | 100 | | 6.5 | 9.4 | |
| | | | | | | 87 | | | 5 | 100 | | 13.1 | 14.8 | |
| | | | | | | 92 | | | 5 | 100 | | 15.4 | 19.1 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 15.7 | 23.3 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 1.0 | 28.5 | |
| I/01/6-10 | SD-156 | FRPE | green ash | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 1 | 0.1 | 2.0 | |
| | 9005890 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 0.9 | 2.6 | |
| | | | Deuel Co., Clear Lake, SD | | | 80 | | | 5 | 100 | | 2.1 | 3.3 | |
| | | | | | | 82 | | | 5 | 100 | | 6.0 | 8.1 | |
| | | | | | | 83 | | | 5 | 100 | | 8.9 | 9.5 | |
| | | | | | | 84 | | | 5 | 100 | | 8.1 | 11.2 | |
| | | | | | | 87 | | | 5 | 100 | | 14.0 | 16.2 | |
| | | | | | | 92 | | | 5 | 100 | | 17.5 | 19.6 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 17.2 | 25.6 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 15.0 | 28.5 | |
| I/02/1-5 | ND-1753 | FRPE | green ash | 21-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 1 | 0.4 | 1.7 | standard |
| | 9005892 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 1.2 | 2.8 | |
| | | | Gurney Seed & Nursery Co., Yankton, SD | | | 80 | | | 5 | 100 | | 2.3 | 3.7 | |
| | | | | | | 82 | | | 5 | 100 | | 6.5 | 8.2 | |
| | | | | | | 83 | | | 5 | 100 | | 8.9 | 8.8 | |
| | | | | | | 84 | | | 5 | 100 | | 7.7 | 10.1 | |
| | | | | | | 87 | | | 5 | 100 | | 12.7 | 15.3 | |
| | | | | | | 92 | | | 5 | 100 | | 15.8 | 19.2 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 19.5 | 24.4 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 18.0 | 28.5 | |

**Project No.: 38I315K Field Evaluation of Woody Plant Materials, Highmore, South Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/02/6-10 | ND-1734 | FRPE | green ash | 21-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 0.2 | 1.9 | standard |
| | 9005891 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 0.6 | 3.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | | 1.7 | 4.5 | |
| | | | | | | 82 | | | 5 | 100 | | 5.7 | 9.1 | |
| | | | | | | 83 | | | 5 | 100 | | 7.2 | 10.6 | |
| | | | | | | 84 | | | 5 | 100 | | 7.8 | 11.4 | |
| | | | | | | 87 | | | 5 | 100 | | 11.8 | 16.9 | |
| | | | | | | 92 | | | 5 | 100 | | 14.0 | 20.2 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 19.7 | 25.9 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 12.0 | 28.5 | |
| I/03/1-10 | 'Cardan' | FRPE | green ash | 11-Apr | 78 | 78 | PLBR | 10 | 9 | 90 | 2 | 0.1 | 1.9 | |
| | MDN-12002 | | *Fraxinus pennsylvanica* | | | 79 | | | 10 | 100 | | 0.6 | 2.1 | |
| | 9005895 | | Carlyle, MT | | | 80 | | | 10 | 100 | | 1.5 | 3.4 | |
| | PI-469226 | | USDA, ARS, Mandan, ND | | | 82 | | | 10 | 100 | | 5.7 | 7.7 | |
| | | | | | | 83 | | | 10 | 100 | | 8.1 | 9.2 | |
| | | | | | | 84 | | | 10 | 100 | | 7.9 | 10.5 | |
| | | | | | | 87 | | | 10 | 100 | | 12.5 | 15.5 | |
| | | | | | | 92 | | | 10 | 100 | | 13.8 | 18.7 | |
| | | | | | | 97 | | | 10 | 100 | 2 | 19.7 | 25.9 | |
| | | | | | | 02 | | | 10 | 100 | 4 | 15.0 | 28.0 | |
| I/04/1-10 | ND-1759 | FRPE | green ash | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 1 | 0.2 | 2.0 | |
| | 9005893 | | *Fraxinus pennsylvanica* | | | 79 | | | 10 | 100 | | 1.0 | 3.0 | |
| | | | PM-SD-156 X MDN-12002 | | | 80 | | | 10 | 100 | | 2.0 | 4.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 10 | 100 | | 6.0 | 8.3 | |
| | | | | | | 83 | | | 10 | 100 | | 8.2 | 10.0 | |
| | | | | | | 84 | | | 10 | 100 | | 8.8 | 11.5 | |
| | | | | | | 87 | | | 10 | 100 | | 14.2 | 16.7 | |
| | | | | | | 92 | | | 10 | 100 | 3 | 18.1 | 19.4 | |
| | | | | | | 97 | | | 10 | 100 | 3 | 20.5 | 26.2 | |
| | | | | | | 02 | | | 10 | 100 | 4 | 19.0 | 28.0 | |

**Project No.: 38I315K Field Evaluation of Woody Plant Materials, Highmore, South Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/05/1-5 | ND-647 | FRNI | black ash | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 3 | 0.1 | 0.7 | |
| | 9005887 | | *Fraxinus nigra* | | | 79 | | | 4 | 80 | | 0.3 | 0.8 | |
| | | | Res. Sta., Morden Manitoba, Canada | | | 80 | | | 4 | 80 | | 0.6 | 1.4 | |
| | | | | | | 82 | | | 5 | 100 | | 0.6 | 3.0 | |
| | | | | | | 83 | | | 5 | 100 | | 2.0 | 5.2 | |
| | | | | | | 84 | | | 5 | 100 | | 2.5 | 6.3 | |
| | | | | | | 87 | | | 5 | 100 | | 7.6 | 11.6 | |
| | | | | | | 92 | | | 5 | 100 | | 9.0 | 19.6 | |
| | | | | | | 97 | | | 4 | 80 | 2 | 12.6 | 22.3 | |
| | | | | | | 02 | | | 4 | 80 | 5 | 15.0 | 25.2 | |
| I/05/6-10 | ND-1432 | AEGL | Ohio buckeye | 11-Apr | 78 | 78 | PLBR | 5 | 3 | 60 | 6 | 0.0 | 0.3 | |
| | 9005658 | | *Aesculus glabra* | | | 79 | | | 0 | 0 | | | | |
| | | | Res. Sta., Morden, Manitoba, Canada | | | 80 | | | 1 | 20 | | 0.2 | 0.3 | |
| | | | | | | 82 | | | 2 | 40 | | 0.3 | 0.6 | |
| | | | | | | 83 | | | 2 | 40 | | 1.0 | 1.1 | |
| | | | | | | 84 | | | 2 | 40 | | 1.3 | 2.0 | |
| | | | | | | 87 | | | 2 | 40 | | 2.1 | 4.1 | |
| | | | | | | 92 | | | 2 | 40 | | 7.1 | 8.2 | |
| | | | | | | 97 | | | 2 | 40 | | 9.8 | 13.4 | |
| | | | | | | 02 | | | 2 | 40 | 4 | 12.0 | 15.8 | |
| I/06/1-5 | 9063098 | JUNI | black walnut | 18-Apr | 91 | 91 | PLBR | 5 | 5 | 100 | 5 | 0.5 | 1.7 | |
| | | | *Juglans nigra* | | | 92 | | | 5 | 100 | 5 | 1.1 | 2.0 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 93 | | | 4 | 80 | 3 | 1.4 | 2.4 | |
| | | | | | | 95 | | | 4 | 80 | 4 | 4.2 | 3.8 | |
| | | | | | | 97 | | | 3 | 60 | 4 | 10.4 | 8.9 | |
| | | | | | | 00 | | | 3 | 60 | 3 | 11.8 | 13.8 | |
| | | | | | | 05 | | | 3 | 60 | 4 | 12.3 | 16.5 | |
| I/06/6-10 | 9030611 | POAL | white poplar | 15-Apr | 92 | 92 | CONT(P) | 5 | 0 | 0 | | | | |
| | | | *Populus alba* | | | 93 | | | 4 | 80 | 3 | 2.0 | 2.0 | |
| | | | Turner Co., SD | | | 94 | | | 4 | 80 | 3 | 5.7 | 5.0 | |
| | | | | | | 96 | | | 4 | 80 | 1 | 12.3 | 15.7 | excellent growth, good form, |
| | | | | | | 98 | | | 4 | 80 | 1 | 16.3 | 22.8 | minor suckering, no disease |
| | | | | | | 01 | | | 4 | 80 | 2 | 24.0 | 31.8 | |
| | | | | | | 06 | | | 4 | 80 | 3 | 25.0 | 32.8 | |

**Project No.: 38I315K Field Evaluation of Woody Plant Materials, Highmore, South Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/07/1-10 | 9063126 | ULJA | Japanese elm | 15-Apr | 92 | 92 | CONT(P) | 10 | 7 | 70 | | 1.3 | 1.7 | |
| | | | *Ulmus japonica* | | | 93 | | | 7 | 70 | 3 | 2.0 | 1.8 | |
| | | | Manchuria | | | 94 | | | 7 | 70 | 4 | 3.0 | 2.9 | |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 96 | | | 7 | 70 | 4 | 3.2 | 3.8 | severe deer browse on all |
| | | | | | | 98 | | | 6 | 60 | 7 | 3.5 | 4.5 | |
| | | | | | | 01 | | | 3 | 60 | 6 | 7.5 | 13.8 | |
| | | | | | | 06 | | | 2 | 40 | 5 | 11.2 | 12.2 | 1 mostly dead |
| I/08/1-5 | ND-465 | JUNI | black walnut | 11-Apr | 78 | 78 | PLBR | 5 | 3 | 60 | 4 | 0.1 | 0.6 | |
| | 9005971 | | *Juglans nigra* | | | 79 | | | 2 | 40 | | 0.3 | 0.6 | |
| | | | Res. Sta., Morden, Manitoba, Canada | | | 80 | | | 5 | 100 | | 0.3 | 0.7 | |
| | | | | | | 82 | | | 5 | 100 | | 2.8 | 2.7 | |
| | | | | | | 83 | | | 5 | 100 | | 4.1 | 4.1 | |
| | | | | | | 84 | | | 5 | 100 | | 5.9 | 6.3 | |
| | | | | | | 87 | | | 5 | 100 | | 12.4 | 11.8 | |
| | | | | | | 92 | | | 5 | 100 | | 16.9 | 16.0 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 20.5 | 22.0 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 24.0 | 21.5 | |
| I/08/6-10 | ND-1755 | JUNI | black walnut | 21-Apr | 78 | 78 | PLBR | 5 | 4 | 80 | 6 | 0.3 | 3.1 | standard |
| | 9005972 | | *Juglans nigra* | | | 79 | | | 1 | 20 | | 0.2 | 1.5 | |
| | | | Gurney Seed & Nursery Co., Yankton, SD | | | 80 | | | 1 | 20 | | 1.5 | 1.6 | |
| | | | | | | 82 | | | 1 | 20 | | 5.9 | 6.4 | |
| | | | | | | 83 | | | 1 | 20 | | 10.2 | 6.9 | |
| | | | | | | 84 | | | 1 | 20 | | 11.8 | 9.5 | |
| | | | | | | 87 | | | 1 | 20 | | 17.9 | 16.2 | |
| | | | | | | 92 | | | 1 | 20 | | 23.0 | 24.0 | |
| | | | | | | 97 | | | 2 | 40 | 2 | 33.5 | 26.2 | |
| | | | | | | 02 | | | 2 | 40 | 2 | 36.0 | 30.0 | |
| I/10/1-10 | 9069087 | ACNE | boxelder | 19-Apr | 93 | 93 | PLBR | 10 | 10 | 100 | 4 | 0.5 | 1.5 | |
| | | | *Acer negundo* | | | 94 | | | 10 | 100 | 7 | 0.8 | 1.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 95 | | | 10 | 100 | 5 | 1.0 | 2.0 | |
| | | | | | | 97 | | | 9 | 90 | 4 | 2.9 | 3.7 | |
| | | | | | | 99 | | | 9 | 90 | | 5.2 | 5.4 | |
| | | | | | | 02 | | | 8 | 80 | 7 | 5.4 | 6.1 | |

**Project No.: 38I315K Field Evaluation of Woody Plant Materials, Highmore, South Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/11/1-5 | 'Raverdeau' | POPUL | hybrid poplar | 19-Apr | 93 | 93 | PLBR | 5 | 4 | 80 | 4 | 1.0 | 2.3 | |
| | 9069085 | | *Populus* | | | 94 | | | 4 | 80 | 4 | 7.3 | 8.9 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 4 | 80 | 4 | 11.5 | 17.4 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 15.4 | 28.3 | |
| | | | | | | 99 | | | 4 | 80 | 3 | 23.4 | 35.4 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 21.0 | 31.2 | |
| I/11/6-10 | 'Walker' | POPUL | hybrid poplar | 19-Apr | 93 | 93 | PLBR | 5 | 5 | 100 | 5 | 0.7 | 1.0 | |
| | 9063146 | | *Populus* | | | 94 | | | 8 | 80 | 6 | 5.0 | 7.4 | |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 95 | | | 5 | 100 | 4 | 7.0 | 10.6 | |
| | | | | | | 97 | | | 5 | 100 | 6 | 7.4 | 14.8 | |
| | | | | | | 99 | | | 5 | 100 | 5 | 11.9 | 22.2 | deer rub and girdled on 2 |
| | | | | | | 02 | | | 3 | 60 | 4 | 14.0 | 32.0 | |
| I/12/1-5 | 'Assiniboine' | POPUL | hybrid poplar | 19-Apr | 93 | 93 | PLBR | 5 | 3 | 60 | 6 | 0.7 | 1.5 | |
| | 9063147 | | *Populus* | | | 94 | | | 4 | 80 | 6 | 3.9 | 4.9 | |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 95 | | | 5 | 100 | 4 | 5.1 | 9.1 | |
| | | | | | | 97 | | | 5 | 100 | 5 | 8.0 | 14.0 | |
| | | | | | | 99 | | | 4 | 80 | 3 | 9.1 | 20.2 | |
| | | | | | | 02 | | | 2 | 40 | 5 | 12.0 | 29.0 | |
| I/12/6-10 | 'Theves' | POPUL | hybrid poplar | 19-Apr | 93 | 93 | PLBR | 5 | 5 | 100 | 2 | 1.8 | 4.7 | |
| | 9069086 | | *Populus* | | | 94 | | | 5 | 100 | 2 | 5.2 | 11.4 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 3 | 7.6 | 18.7 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 10.2 | 27.8 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 7.7 | 31.2 | |
| | | | | | | 02 | | | 4 | 80 | 7 | 4.9 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/13/1-10 | ND-1737 | QUMA2 | bur oak | 21-Apr | 78 | 78 | CONT | 10 | 10 | 100 | 4 | 0.1 | 0.9 | |
| | 9006099 | | *Quercus macrocarpa* | | | 79 | | | 9 | 90 | | 0.1 | 0.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 50 | | 0.2 | 0.3 | |
| | | | | | | 82 | | | 9 | 90 | | 1.0 | 1.7 | |
| | | | | | | 83 | | | 9 | 90 | | 2.2 | 2.8 | |
| | | | | | | 84 | | | 9 | 90 | | 2.8 | 4.4 | |
| | | | | | | 86 | | | 9 | 90 | 3 | 4.9 | 6.5 | |
| | | | | | | 88 | | | 9 | 90 | 3 | 6.7 | 8.8 | |
| | | | | | | 93 | | | 9 | 90 | 3 | 9.8 | 14.4 | |
| | | | | | | 97 | | | 9 | 90 | 2 | 14.8 | 19.0 | |
| | | | | | | 03 | | | 9 | 90 | 2 | 20.0 | 22.5 | |
| I/15/1-10 | ND-1879 | GLTR | honeylocust | 16-Apr | 80 | 80 | PLBR | 10 | 9 | 90 | | 1.2 | 2.3 | |
| | 9011850 | | *Gleditsia triacanthos* | | | 81 | CONT | | 10 | 100 | | 2.3 | 3.4 | |
| | PI-503531 | | Great Plains Field Sta., Woodward, OK | | | 82 | | | 10 | 100 | | 5.2 | 6.7 | |
| | | | USDA, ARS, Mandan, ND | | | 83 | | | 10 | 100 | | 6.9 | 10.3 | |
| | | | | | | 84 | | | 10 | 100 | | 8.5 | 13.8 | |
| | | | | | | 86 | | | 10 | 100 | | 12.2 | 16.7 | |
| | | | | | | 87 | | | 10 | 100 | | 13.8 | 18.2 | |
| | | | | | | 89 | | | 10 | 100 | | 14.6 | 20.8 | |
| | | | | | | 94 | | | 10 | 100 | 3 | 19.4 | 24.6 | |
| | | | | | | 99 | | | 10 | 100 | 2 | 23.5 | 28.7 | |
| I/16/1-10 | 'Oahe' | CEOC | hackberry | 16-Apr | 80 | 80 | PLBR | 10 | 10 | 100 | | 0.5 | 2.1 | |
| | MDN-12003 | | *Celtis occidentalis* | | | 81 | | | 10 | 100 | | 2.8 | 2.9 | |
| | 9005725 | | USDA, ARS, Mandan, ND | | | 82 | | | 10 | 100 | | 4.8 | 5.2 | |
| | PI-476982 | | | | | 83 | | | 10 | 100 | | 8.3 | 7.7 | |
| | | | | | | 84 | | | 10 | 100 | | 8.2 | 9.9 | |
| | | | | | | 86 | | | 10 | 100 | 4 | 11.9 | 14.0 | |
| | | | | | | 89 | | | 10 | 100 | 1 | 14.9 | 16.8 | |
| | | | | | | 94 | | | 10 | 100 | 3 | 15.0 | 20.2 | |
| | | | | | | 99 | | | 10 | 100 | 2 | 16.0 | 28.2 | |
| | | | | | | 04 | | | 10 | 100 | 4 | 15.0 | 28.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/17/1-5 | SD-75 | CEOC | hackberry | 14-Apr | 81 | 81 | PLBR | 5 | 4 | 80 | | 1.2 | 1.6 | |
| | 9005713 | | *Celtis occidentalis* | | | 82 | | | 5 | 100 | | 4.2 | 3.7 | |
| | | | Potter Co., SD | | | 83 | | | 5 | 100 | | 7.4 | 7.3 | |
| | | | | | | 84 | | | 5 | 100 | | 7.1 | 8.4 | |
| | | | | | | 85 | | | 5 | 100 | 2 | 9.6 | 9.9 | |
| | | | | | | 87 | | | 5 | 100 | | 13.6 | 14.0 | |
| | | | | | | 90 | | | 5 | 100 | 3 | 14.4 | 20.6 | |
| | | | | | | 95 | | | 5 | 100 | 1 | 16.4 | 23.8 | |
| | | | | | | 00 | | | 5 | 100 | 2 | 18.0 | 28.0 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 18.8 | 31.8 | |
| I/17/6-10 | SD-211 | CEOC | hackberry | 14-Apr | 81 | 81 | PLBR | 5 | 5 | 100 | | 1.6 | 1.2 | |
| | 9005714 | | *Celtis occidentalis* | | | 82 | | | 5 | 100 | | 4.7 | 3.3 | |
| | | | Sanborn Co., SD | | | 83 | | | 5 | 100 | | 8.4 | 7.1 | |
| | | | | | | 84 | | | 5 | 100 | | 7.7 | 9.1 | |
| | | | | | | 85 | | | 5 | 100 | | 11.9 | 10.4 | |
| | | | | | | 87 | | | 5 | 100 | | 16.6 | 16.2 | |
| | | | | | | 90 | | | 5 | 100 | | 16.6 | 21.6 | |
| | | | | | | 95 | | | 5 | 100 | 3 | 20.0 | 22.3 | |
| | | | | | | 00 | | | 5 | 100 | | 15.6 | 28.5 | |
| | | | | | | 05 | | | 5 | 100 | | 26.0 | 30.5 | |
| I/18/1-5 | ND-1863 | GLTR | honeylocust | 23-Apr | 82 | 82 | PLBR | 5 | 5 | 100 | | 2.3 | 2.3 | |
| | 9005909 | | *Gleditsia triacanthos* | | | 83 | | | 5 | 100 | | 6.5 | 7.0 | |
| | | | Brown Co., SD | | | 84 | | | 3 | 60 | | 4.8 | 5.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 86 | | | 3 | 60 | 5 | 9.4 | 7.5 | |
| | | | | | | 87 | | | 3 | 60 | | 12.9 | 13.9 | |
| | | | | | | 88 | | | 3 | 60 | 2 | 13.1 | 16.2 | |
| | | | | | | 91 | | | 3 | 60 | 2 | 15.8 | 21.0 | |
| | | | | | | 96 | | | 3 | 60 | 4 | 16.0 | 28.2 | |
| | | | | | | 01 | | | 3 | 60 | 4 | 15.0 | 34.0 | |
| | | | | | | 06 | | | 3 | 60 | 5 | 13.3 | 32.3 | half dead, canker on 3 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/18/6-10 | 9047231 | ELAN | Russian olive | 26-Apr | 88 | 88 | CONT | 5 | 2 | 40 | 8 | 0.3 | 0.8 | |
| | | | *Elaeagnus angustifolia* | | | 90 | | | 3 | 60 | 2 | 2.0 | 2.0 | |
| | | | Chinle, AZ | | | 92 | | | 2 | 40 | 2 | 4.8 | 5.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 94 | | | 2 | 40 | 5 | 9.7 | 9.8 | |
| | | | | | | 97 | | | 2 | 40 | 6 | 15.2 | 12.6 | canker on 5 |
| | | | | | | 02 | | | 1 | 20 | 6 | 11.5 | 13.0 | |
| I/19/1-5 | ND-3773 | SALIX | willow | 23-Apr | 82 | 82 | PLBR | 5 | 5 | 100 | | 2.6 | 3.9 | |
| | 9021576 | | *Salix* | | | 83 | | | 5 | 100 | | 7.2 | 7.3 | |
| | | | Norman Co., MN | | | 84 | | | 5 | 100 | | 9.5 | 10.6 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 86 | | | 5 | 100 | 2 | 15.0 | 15.2 | |
| | | | | | | 88 | | | 5 | 100 | 2 | 18.5 | 18.4 | |
| | | | | | | 91 | | | 5 | 100 | 1 | 20.7 | 18.2 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 25.6 | 25.6 | |
| | | | | | | 01 | | | 4 | 80 | 8 | 31.8 | 20.0 | |
| | | | | | | 06 | | | 3 | 60 | 7 | 7.7 | 14.8 | all mostly dead |
| I/19/6-10 | Mich-433 | SAPE4 | laurel willow | 23-Apr | 82 | 82 | PLBR | 5 | 4 | 80 | | 3.1 | 3.9 | |
| | 9005049 | | *Salix pentandra* | | | 83 | | | 5 | 100 | | 6.8 | 6.6 | |
| | | | USDA, NRCS, PMC, Rose Lake, MI | | | 84 | | | 5 | 100 | | 8.8 | 10.4 | |
| | | | | | | 86 | | | 5 | 100 | 3 | 15.6 | 15.1 | |
| | | | | | | 88 | | | 3 | 60 | 4 | 19.6 | 19.8 | |
| | | | | | | 91 | | | 2 | 40 | 2 | 24.3 | 20.5 | |
| | | | | | | 96 | | | 2 | 40 | 2 | 27.2 | 26.6 | |
| | | | | | | 01 | | | 1 | 20 | 6 | 15.0 | 35.0 | |
| | | | | | | 06 | | | 1 | 20 | 6 | 15.0 | 22.5 | |
| I/20/1-5 | ND-428 | JUNI | black walnut | 23-Apr | 85 | 85 | PLBR | 5 | 5 | 100 | 4 | 0.3 | 0.7 | |
| | 9005970 | | *Juglans nigra* | | | 86 | | | 4 | 80 | 3 | 1.3 | 1.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 87 | | | 4 | 80 | | 2.8 | 2.2 | |
| | | | | | | 89 | | | 4 | 80 | 2 | 3.7 | 3.3 | |
| | | | | | | 91 | | | 4 | 80 | 3 | 4.5 | 4.6 | |
| | | | | | | 94 | | | 4 | 80 | 4 | 9.5 | 9.4 | |
| | | | | | | 99 | | | 3 | 60 | 5 | 9.4 | 11.3 | |
| | | | | | | 04 | | | 3 | 60 | 6 | 9.3 | 13.7 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/20/6-10 | ND-3825 | ACSA2 | silver maple | 22-Apr | 86 | 86 | PLBR | 5 | 5 | 100 | 2 | 1.9 | 3.3 | |
| | 9034904 | | *Acer saccharinum* | | | 87 | | | 5 | 100 | | 4.0 | 4.5 | |
| | | | Bismarck, ND | | | 88 | | | 5 | 100 | 3 | 5.6 | 5.8 | |
| | | | | | | 90 | | | 5 | 100 | 4 | 9.8 | 9.6 | |
| | | | | | | 92 | | | 5 | 100 | 4 | 13.5 | 15.4 | |
| | | | | | | 95 | | | 5 | 100 | 5 | 24.9 | 22.4 | all double leaders, poor form |
| | | | | | | 00 | | | 5 | 100 | 3 | 21.6 | 28.5 | |
| | | | | | | 05 | | | 5 | 100 | 6 | 29.8 | 28.9 | many stems on all |
| I/21/1-5 | 9058869 | PDXP8 | poplar | 19-Apr | 90 | 90 | PLBR | 5 | 5 | 100 | 4 | 2.3 | 3.9 | |
| | 14271 | | *Populus deltoides x P. nigra* | | | 91 | | | 5 | 100 | 2 | 5.0 | 8.4 | |
| | | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 2 | 7.6 | 13.0 | |
| | | | | | | 94 | | | 5 | 100 | 2 | 10.2 | 21.9 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 12.9 | 27.8 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 14.3 | 39.3 | |
| | | | | | | 04 | | | 3 | 60 | 5 | 13.3 | 42.4 | |
| I/22/1-5 | 9058871 | PDXP8 | poplar | 19-Apr | 90 | 90 | PLBR | 5 | 5 | 100 | 5 | 2.2 | 3.3 | |
| | 14273 | | *Populus deltoides x P. nigra* | | | 91 | | | 5 | 100 | 3 | 5.2 | 7.8 | |
| | | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 3 | 8.6 | 11.6 | |
| | | | | | | 94 | | | 5 | 100 | 4 | 12.0 | 22.0 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 13.8 | 28.0 | canker on all |
| | | | | | | 99 | | | 5 | 100 | 3 | 17.8 | 36.2 | |
| | | | | | | 04 | | | 2 | 40 | 8 | 9.5 | 22.9 | |
| I/23/1-5 | 'CanAm' | POPUL | poplar | 19-Apr | 90 | 90 | PLBR | 5 | 5 | 100 | 3 | 4.4 | 5.3 | |
| | 9058873 | | *Populus* | | | 91 | | | 5 | 100 | 2 | 8.1 | 11.7 | |
| | 14390 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 2 | 10.6 | 15.6 | |
| | | | | | | 94 | | | 5 | 100 | 4 | 13.8 | 21.0 | |
| | | | | | | 96 | | | 5 | 100 | 4 | 15.1 | 24.7 | |
| | | | | | | 99 | | | 3 | 60 | 3 | 19.9 | 41.7 | 1 blown down, 2 trunk split |
| | | | | | | 04 | | | 3 | 60 | 4 | 18.0 | 45.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/24/1-5 | 9058896 | SALIX | Austree | 19-Apr | 90 | 90 | PLBR | 5 | 4 | 80 | 2 | 5.0 | 6.6 | |
| | Clone C | | *Salix matsudana x alba* | | | 91 | | | 5 | 100 | 2 | 8.0 | 10.9 | |
| | | | Austree Inc., Pescadero, CA | | | 92 | | | 4 | 80 | 6 | 9.5 | 8.9 | |
| | | | | | | 94 | | | 4 | 80 | 3 | 18.2 | 18.0 | |
| | | | | | | 96 | | | 4 | 80 | 6 | 18.8 | 24.1 | severe dieback on 1,2 |
| | | | | | | 99 | | | 4 | 80 | 4 | 29.5 | 29.5 | multi-stemmed |
| | | | | | | 04 | | | 4 | 80 | 7 | 14.5 | 22.1 | dieback on all, 4 broke off |
| I/24/6-10 | 9058897 | SALIX | Austree | 19-Apr | 90 | 90 | PLBR | 5 | 4 | 80 | 5 | 3.6 | 5.1 | |
| | Clone E | | *Salix matsudana x alba* | | | 91 | | | 4 | 80 | 2 | 7.5 | 11.2 | |
| | | | Austree, Inc., Pescadero, CA | | | 92 | | | 4 | 80 | 6 | 9.9 | 10.4 | |
| | | | | | | 94 | | | 4 | 80 | 3 | 17.9 | 19.7 | |
| | | | | | | 96 | | | 4 | 80 | 3 | 20.3 | 26.2 | |
| | | | | | | 99 | | | 4 | 80 | 4 | 29.5 | 29.5 | |
| | | | | | | 04 | | | 4 | 80 | 6 | 21.0 | 41.8 | |
| I/25/1-5 | 9058899 | SALIX | Austree | 18-Apr | 91 | 91 | PLBR | 5 | 5 | 100 | 3 | 6.4 | 7.1 | |
| | | | *Salix matsudana x alba* | | | 92 | | | 4 | 80 | 4 | 6.6 | 7.5 | |
| | | | Austree Inc., Pescadero, CA | | | 94 | | | 4 | 80 | 3 | 15.7 | 18.3 | |
| | | | | | | 96 | | | 4 | 80 | 6 | 19.8 | 22.3 | dieback on 2,3,5 |
| | | | | | | 97 | | | 4 | 80 | 2 | 19.4 | 27.6 | |
| | | | | | | 00 | | | 4 | 80 | 6 | 16.0 | 35.3 | dieback multi-stems |
| | | | | | | 05 | | | 4 | 80 | 7 | 20.0 | 30.6 | dieback on all |
| I/25/6-10 | 9063100 | SALIX | Austree | 23-May | 91 | 91 | PLBR | 5 | 5 | 100 | | 5.7 | 7.2 | |
| | Clone #3 | | *Salix matsudana x alba* | | | 92 | | | 4 | 80 | 3 | 8.2 | 9.5 | |
| | | | Austree Inc., Pescadero, CA | | | 94 | | | 4 | 80 | 3 | 16.7 | 20.9 | |
| | | | | | | 96 | | | 4 | 80 | 4 | 17.7 | 26.5 | |
| | | | | | | 97 | | | 4 | 80 | 1 | 19.4 | 32.2 | |
| | | | | | | 00 | | | 4 | 80 | 6 | 17.5 | 39.5 | |
| | | | | | | 05 | | | 4 | 80 | 6 | 27.0 | 36.0 | dieback on all |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/26/6-10 | 9039340 | PODE | plains cottonwood | 23-May | 91 | 91 | PLBR | 5 | 3 | 60 | 3 | 1.6 | 4.5 | |
| | | | *Populus deltoides* | | | 92 | | | 4 | 80 | 4 | 3.7 | 4.2 | |
| | | | USDA, NRCS, PMC, Bridger, MT | | | 93 | | | 3 | 60 | 5 | 7.8 | 9.4 | all are multi-stemmed |
| | | | | | | 95 | | | 3 | 60 | 3 | 14.3 | 20.1 | |
| | | | | | | 97 | | | 3 | 60 | | 16.7 | 29.0 | |
| | | | | | | 00 | | | 3 | 60 | 4 | 13.0 | 38.0 | |
| | | | | | | 05 | | | 3 | 60 | 5 | 14.0 | 29.8 | |
| I/27/1-5 | 9057965 | POBA | balsam poplar | 23-May | 91 | 91 | PLBR | 5 | 5 | 100 | 4 | 3.1 | 3.9 | |
| | | | *Populus balsamifera* | | | 92 | | | 5 | 100 | 3 | 5.9 | 5.5 | |
| | | | USDA, NRCS, PMC, Bridger, MT | | | 93 | | | 5 | 100 | 4 | 8.5 | 8.9 | plts 2-4 have poor form |
| | | | | | | 95 | | | 2 | 40 | 5 | 9.8 | 12.3 | |
| | | | | | | 97 | | | 2 | 40 | 5 | 11.2 | 12.9 | |
| | | | | | | 00 | | | 1 | 20 | 8 | 4.6 | 8.1 | |
| | | | | | | 05 | | | 1 | 20 | 5 | 9.0 | 13.5 | volunteer cottonwood |
| I/27/6-10 | 9063141 | PODE | native cottonwood | 19-Apr | 93 | 93 | PLBR | 5 | 5 | 100 | 5 | 2.9 | 3.5 | |
| | | | *Populus deltoides* | | | 94 | | | 4 | 80 | 4 | 6.7 | 7.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 95 | | | 4 | 80 | 4 | 8.7 | 11.4 | |
| | | | | | | 97 | | | 4 | 80 | 4 | 11.1 | 15.7 | |
| | | | | | | 99 | | | 4 | 80 | 4 | 14.8 | 18.8 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 11.2 | 25.5 | |
| II/01/1-10 | 'Midwest' | MAMA37 | Manchurian crabapple | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 4 | 0.7 | 1.4 | |
| | 9006003 | | *Malus mandshurica* | | | 79 | | | 9 | 90 | | 1.8 | 2.6 | |
| | PI-478000 | | Echo, Manchuria/Res. Sta., Morden, | | | 80 | | | 10 | 100 | | 3.2 | 3.1 | |
| | | | Manitoba, Canada | | | 82 | | | 10 | 100 | | 8.3 | 7.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 10 | 100 | | 10.6 | 8.9 | |
| | | | | | | 84 | | | 10 | 100 | | 11.5 | 9.9 | |
| | | | | | | 87 | | | 10 | 100 | | 16.5 | 12.2 | |
| | | | | | | 92 | | | 10 | 100 | 3 | 18.6 | 13.8 | |
| | | | | | | 97 | | | 10 | 100 | 2 | 19.0 | 19.0 | fireblight on 2 |
| | | | | | | 02 | | | 10 | 100 | 3 | 24.0 | 20.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/2/02/1-5 | 'Red Splendor' | MABA | flowering crabapple | 21-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 1.1 | 2.0 | standard |
| | | | *Malus X* | | | 79 | | | 5 | 100 | | 2.5 | 3.2 | |
| | 9006004 | | Lee Nursery, Fertile, MN | | | 80 | | | 5 | 100 | | 3.4 | 4.2 | |
| | | | | | | 82 | | | 5 | 100 | | 8.2 | 8.5 | |
| | | | | | | 83 | | | 5 | 100 | | 11.2 | 10.3 | |
| | | | | | | 84 | | | 5 | 100 | | 11.0 | 11.5 | |
| | | | | | | 87 | | | 5 | 100 | | 15.2 | 12.7 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 16.4 | 15.0 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 17.4 | 19.9 | |
| | | | | | | 03 | | | 4 | 80 | 5 | 16.0 | 21.2 | |
| II/02/6-10 | ND-1731 | MABA | Siberian crabapple | 21-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 3 | 0.8 | 1.9 | |
| | 9006001 | | *Malus baccata* | | | 79 | | | 5 | 100 | | 2.0 | 3.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | | 3.1 | 4.2 | |
| | | | | | | 82 | | | 5 | 100 | | 7.1 | 8.5 | |
| | | | | | | 83 | | | 5 | 100 | | 9.4 | 10.6 | |
| | | | | | | 84 | | | 5 | 100 | | 9.8 | 11.5 | |
| | | | | | | 87 | | | 5 | 100 | | 16.3 | 13.5 | |
| | | | | | | 92 | | | 5 | 100 | 2 | 16.4 | 15.7 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 17.4 | 18.8 | |
| | | | | | | 02 | | | 5 | 100 | 5 | 15.0 | 24.2 | |
| II/03/1-10 | 'McDermand' | PYUS* | Ussurian pear | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 3 | 0.5 | 1.8 | |
| | ND-14 | | *Pyrus ussuriensis* | | | 79 | | | 10 | 100 | | 1.4 | 3.2 | |
| | 9006095 | | Harbin, Manchuria/Res. Sta. | | | 80 | | | 10 | 100 | | 2.5 | 3.8 | |
| | PI-478004 | | Morden, Manitoba, Canada | | | 82 | | | 10 | 100 | | 5.6 | 8.3 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 10 | 100 | | 7.8 | 10.4 | |
| | | | | | | 84 | | | 10 | 100 | | 9.1 | 11.6 | |
| | | | | | | 87 | | | 10 | 100 | | 11.7 | 14.2 | |
| | | | | | | 88 | | | 10 | 100 | 3 | 12.0 | 16.3 | |
| | | | | | | 92 | | | 10 | 100 | 3 | 15.1 | 16.9 | |
| | | | | | | 97 | | | 10 | 100 | 2 | 15.1 | 21.4 | snow damage on all |
| | | | | | | 02 | | | 10 | 100 | 3 | 19.0 | 25.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/09/1-5 | ND-1751 | PRVI | chokecherry | 21-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 5 | 0.3 | 1.0 | standard |
| | 9006091 | | *Prunus virginiana* | | | 79 | | | 5 | 100 | | 1.1 | 2.2 | |
| | | | Plumfield Nursery Inc., Fremont, NE | | | 80 | | | 5 | 100 | | 3.2 | 3.5 | |
| | | | | | | 82 | | | 5 | 100 | | 5.7 | 6.8 | |
| | | | | | | 83 | | | 5 | 100 | | 8.6 | 9.2 | |
| | | | | | | 84 | | | 5 | 100 | | 9.4 | 10.3 | |
| | | | | | | 87 | | | 5 | 100 | | 13.9 | 12.1 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 17.3 | 15.9 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 19.7 | 18.7 | disease on 3 |
| | | | | | | 02 | | | 3 | 60 | 3 | 27.0 | 22.2 | |
| II/09/6-10 | ND-1732 | PRVI | chokecherry | 21-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 0.4 | 1.8 | standard |
| | 9006090 | | *Prunus virginiana* | | | 79 | | | 5 | 100 | | 1.8 | 2.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | | 3.0 | 4.6 | |
| | | | | | | 82 | | | 5 | 100 | | 6.7 | 8.2 | |
| | | | | | | 83 | | | 5 | 100 | | 9.7 | 10.4 | |
| | | | | | | 84 | | | 5 | 100 | | 9.9 | 11.3 | |
| | | | | | | 87 | | | 5 | 100 | | 13.9 | 13.1 | |
| | | | | | | 92 | | | 5 | 100 | 2 | 19.3 | 18.6 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 20.3 | 19.5 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 27.0 | 21.5 | |
| II/10/1-5 | 'Schubert' | PRVI | chokecherry | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 3 | 0.5 | 1.4 | |
| | 9012608 | | *Prunus virginiana* | | | 79 | | | 5 | 100 | | 1.0 | 2.1 | |
| | | | USDA, ARS, Mandan, ND | | | 80 | | | 4 | 80 | | 2.6 | 3.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 4 | 80 | | 5.1 | 6.5 | |
| | | | | | | 83 | | | 4 | 80 | | 7.2 | 8.6 | |
| | | | | | | 84 | | | 5 | 100 | 1 | 6.8 | 8.1 | |
| | | | | | | 87 | | | 4 | 80 | | 13.3 | 11.6 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 14.4 | 14.3 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 15.7 | 19.0 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 21.0 | 20.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/10/6-10 | ND-1733 | PRAM | American plum | 21-Apr | 78 | 78 | PLBR | 5 | 4 | 80 | 3 | 0.5 | 1.7 | standard |
| | 9006060 | | *Prunus americana* | | | 79 | | | 5 | 100 | | 2.0 | 3.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | | 4.3 | 4.2 | |
| | | | | | | 82 | | | 5 | 100 | | 8.8 | 6.9 | |
| | | | | | | 83 | | | 5 | 100 | | 12.3 | 8.9 | |
| | | | | | | 84 | | | 5 | 100 | | 12.7 | 9.5 | |
| | | | | | | 87 | | | 5 | 100 | | 15.7 | 9.3 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 16.9 | 11.4 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 21.3 | 17.4 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 14.5 | 19.5 | |
| II/11/1-5 | 'Manet' | PRAM | American plum | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 5 | 0.6 | 1.7 | |
| | ND-286 | | *Prunus americana* | | | 79 | | | 5 | 100 | | 1.7 | 3.5 | |
| | 9006057 | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | | 3.3 | 4.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 5 | 100 | | 8.3 | 8.1 | |
| | | | | | | 83 | | | 5 | 100 | | 11.5 | 8.4 | |
| | | | | | | 84 | | | 5 | 100 | | 11.3 | 9.2 | |
| | | | | | | 87 | | | 5 | 100 | | 14.8 | 9.7 | |
| | | | | | | 92 | | | 5 | 100 | 5 | 15.0 | 10.6 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 16.5 | 13.6 | |
| | | | | | | 02 | | | 4 | 80 | 5 | 18.0 | 12.5 | |
| II/11/6-10 | ND-288 | PRAM | American plum | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 4 | 0.8 | 1.8 | |
| | 9006059 | | *Prunus americana* | | | 79 | | | 5 | 100 | | 1.9 | 3.4 | |
| | | | SD Selection/Ft. Lincoln Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | | 3.7 | 4.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 5 | 100 | | 8.0 | 7.7 | |
| | | | | | | 83 | | | 5 | 100 | | 11.5 | 8.8 | |
| | | | | | | 84 | | | 5 | 100 | | 12.0 | 9.6 | |
| | | | | | | 87 | | | 5 | 100 | | 15.2 | 9.9 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 15.6 | 11.0 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 19.7 | 14.8 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 19.5 | 13.8 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/13/1-5 | ND-629 | ACGI | amur maple | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 1.8 | 2.6 | |
| | 9005645 | | *Acer ginnala* | | | 79 | | | 5 | 100 | | 4.2 | 3.4 | |
| | 477992 | | Res. Sta., Morden, MB, Canada | | | 80 | | | 5 | 100 | | 6.5 | 5.3 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 5 | 100 | | 11.4 | 9.5 | |
| | | | | | | 83 | | | 5 | 100 | | 11.4 | 11.7 | |
| | | | | | | 84 | | | 5 | 100 | | 16.0 | 13.3 | |
| | | | | | | 87 | | | 5 | 100 | | 21.7 | 16.7 | |
| | | | | | | 92 | | | 5 | 100 | 1 | 23.9 | 19.5 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 29.5 | 25.2 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 35.0 | 25.0 | |
| II/13/6-10 | 'Flame' | ACGI | amur maple | 11-Apr | 78 | 78 | PLBR | 5 | 5 | 100 | 5 | 0.6 | 1.5 | |
| | MI-891 | | *Acer ginnala* | | | 79 | | | 5 | 100 | | 1.9 | 2.5 | |
| | 9005157 | | USDA, NRCS, PMC, Elsberry, MO | | | 80 | | | 3 | 60 | | 3.3 | 3.2 | |
| | PI-483442 | | | | | 82 | | | 3 | 60 | | 7.3 | 7.6 | |
| | | | | | | 83 | | | 3 | 60 | | 10.7 | 9.7 | |
| | | | | | | 84 | | | 3 | 60 | | 12.6 | 10.6 | |
| | | | | | | 87 | | | 3 | 60 | | 17.5 | 13.5 | |
| | | | | | | 92 | | | 3 | 60 | 3 | 19.0 | 15.8 | |
| | | | | | | 97 | | | 3 | 60 | 1 | 21.6 | 21.9 | |
| | | | | | | 02 | | | 3 | 60 | 3 | 27.0 | 24.0 | |
| II/14/1-10 | ND-1752 | ACGI | amur maple | 21-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 4 | 0.8 | 1.5 | standard |
| | 9005646 | | *Acer ginnala* | | | 79 | | | 10 | 100 | | 2.1 | 2.4 | |
| | | | Gurney Seed & Nursery Co., Yankton, SD | | | 80 | | | 10 | 100 | | 3.6 | 3.4 | |
| | | | | | | 82 | | | 10 | 100 | | 7.0 | 6.8 | |
| | | | | | | 83 | | | 10 | 100 | | 10.0 | 8.4 | |
| | | | | | | 84 | | | 10 | 100 | | 11.1 | 9.2 | |
| | | | | | | 87 | | | 10 | 100 | | 14.3 | 13.4 | |
| | | | | | | 92 | | | 10 | 100 | 5 | 15.9 | 13.6 | |
| | | | | | | 97 | | | 10 | 100 | 2 | 16.3 | 20.6 | |
| | | | | | | 02 | | | 9 | 90 | 5 | 18.0 | 21.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/15/1-5 | ND-1873 | ACGI | amur maple | 17-Apr | 79 | 79 | PLBR | 5 | 5 | 100 | | 1.0 | 1.6 | |
| | 9005648 | | *Acer ginnala* | | | 80 | | | 5 | 100 | | 2.1 | 2.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 81 | | | 5 | 100 | | 3.9 | 3.6 | |
| | | | | | | 83 | | | 5 | 100 | | 8.9 | 7.2 | |
| | | | | | | 84 | | | 5 | 100 | | 10.6 | 8.6 | |
| | | | | | | 85 | | | 5 | 100 | 2 | 11.7 | 9.4 | |
| | | | | | | 87 | | | 5 | 100 | | 15.8 | 12.6 | |
| | | | | | | 93 | | | 5 | 100 | 3 | 19.1 | 14.6 | |
| | | | | | | 98 | | | 5 | 100 | 3 | 22.3 | 18.3 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 22.5 | 20.0 | |
| II/15/6-10 | ND-686 | SYREP | Pekin lilac | 17-Apr | 79 | 79 | PLBR | 5 | 2 | 40 | | 0.1 | 1.0 | |
| | 9006225 | | *Syringa reticulata* ssp. *pekinensis* | | | 80 | | | 1 | 20 | | 0.3 | 0.7 | |
| | PI-478008 | | USDA, NRCS, PMC, Bismarck, ND | | | 81 | | | 2 | 40 | | 1.7 | 2.0 | |
| | | | | | | 83 | | | 2 | 40 | | 5.8 | 3.9 | |
| | | | | | | 84 | | | 3 | 60 | 3 | 3.5 | 3.1 | |
| | | | | | | 85 | | | 3 | 60 | | 6.4 | 5.5 | |
| | | | | | | 88 | | | 3 | 60 | 2 | 9.1 | 7.9 | |
| | | | | | | 93 | | | 3 | 60 | 3 | 11.1 | 11.2 | |
| | | | | | | 98 | | | 3 | 60 | | 15.2 | 15.2 | |
| | | | | | | 03 | | | 4 | 80 | 2 | 15.0 | 16.6 | |
| II/16/6-10 | 9049970 | PRAN | chickasaw plum | 19-Apr | 90 | 90 | PLBR | 5 | 4 | 80 | 4 | 1.0 | 1.3 | |
| | | | *Prunus angustifolia* | | | 91 | | | 2 | 80 | 2 | 2.8 | 3.1 | |
| | | | USDA, NRCS, PMC, Manhattan, KS | | | 92 | | | 2 | 80 | 2 | 5.1 | 4.8 | |
| | | | | | | 94 | | | 4 | 80 | 6 | 5.6 | 4.7 | |
| | | | | | | 96 | | | 1 | 20 | 9 | 5.1 | 4.8 | |
| | | | | | | 99 | | | 1 | 20 | | 6.7 | 3.8 | |
| | | | | | | 04 | | | | | | | | mostly gone, remove |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/17/1-5 | ND-624 | PTTR | common hoptree | 23-Apr | 82 | 82 | PLBR | 5 | 5 | 100 | | 0.9 | 1.9 | |
| | 9006094 | | *Ptelea trifoliata* | | | 83 | | | 5 | 100 | | 2.7 | 3.3 | |
| | | | Ramsey Co., ND | | | 84 | | | 5 | 100 | | 5.0 | 5.1 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 86 | | | 5 | 100 | 4 | 10.2 | 7.4 | |
| | | | | | | 88 | | | 5 | 100 | 3 | 10.4 | 9.6 | |
| | | | | | | 96 | | | 5 | 100 | 2 | 20.4 | 14.8 | |
| | | | | | | 01 | | | 5 | 100 | 3 | 21.0 | 20.0 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 27.2 | 17.4 | |
| II/17/6-10 | 514677 | PRAM | American plum | 19-Apr | 90 | 90 | PLBR | 5 | 5 | 100 | 2 | 2.1 | 3.1 | |
| | | | *Prunus americana* | | | 91 | | | 5 | 100 | 2 | 4.9 | 5.6 | |
| | | | USDA, NRCS, PMC, Manhattan, KS | | | 92 | | | 5 | 100 | 2 | 7.8 | 7.5 | |
| | | | | | | 94 | | | 5 | 100 | 1 | 14.6 | 9.2 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 15.4 | 10.8 | 1 shaded, some dieback on 2, |
| | | | | | | 99 | | | 5 | 100 | 4 | 19.7 | 10.7 | heavy suckering between rows |
| | | | | | | 04 | | | 5 | 100 | | 18.0 | 12.8 | thicket |
| II/18/1-10 | 'Roselow' | MASA9 | Sargent crabapple | 27-Apr | 83 | 83 | PLBR | 10 | 10 | 100 | | 0.6 | 1.2 | |
| | Mich-1339 | | *Malus sargentii* | | | 84 | | | 10 | 100 | | 1.5 | 1.7 | |
| | 9005026 | | USDA, NRCS, PMC, Rose Lake, MI | | | 85 | | | 10 | 100 | 4 | 2.6 | 1.9 | |
| | | | | | | 87 | | | 10 | 100 | | 4.1 | 3.7 | |
| | | | | | | 89 | | | 10 | 100 | | 6.3 | 4.6 | |
| | | | | | | 92 | | | 10 | 100 | 6 | 8.6 | 5.9 | |
| | | | | | | 97 | | | 10 | 100 | 4 | 10.5 | 7.7 | |
| | | | | | | 02 | | | | 20 | | | | mostly dead |
| II/19/1-10 | 9069081 | TICO | littleleaf linden | 19-Apr | 93 | 93 | PLBR | 10 | 10 | 100 | 3 | 1.4 | 1.7 | |
| | | | *Tilia cordata* | | | 94 | | | 10 | 100 | 4 | 3.5 | 3.6 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 10 | 100 | 3 | 4.1 | 5.9 | |
| | | | | | | 97 | | | 10 | 100 | 2 | 8.2 | 10.4 | |
| | | | | | | 99 | | | 10 | 100 | 2 | 12.1 | 13.8 | |
| | | | | | | 02 | | | 9 | 90 | 4 | 14.0 | 15.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/20/1-10 | ND-19 | CRAN6 | arnold hawthorn | 23-Apr | 84 | 84 | CONT | 10 | 10 | 100 | | 0.3 | 0.8 | |
| | 9005731 | | *Crataegus X anomala* | | | 85 | | | 10 | 100 | 2 | 0.9 | 1.4 | |
| | | | Morden, Manitoba, Canada | | | 86 | | | 10 | 100 | 3 | 2.0 | 3.0 | |
| | | | | | | 87 | | | 10 | 100 | | 3.1 | 4.3 | |
| | | | | | | 88 | | | 10 | 100 | 2 | 4.3 | 5.2 | |
| | | | | | | 90 | | | 10 | 100 | 3 | 6.9 | 7.9 | aphid damage |
| | | | | | | 93 | | | 10 | 100 | 1 | 10.1 | 10.7 | |
| | | | | | | 98 | | | 10 | 100 | 3 | 13.5 | 13.5 | severe leaf rust |
| | | | | | | 03 | | | 10 | 100 | | 19.0 | 18.0 | rust |
| II/21/1-10 | 'Prairie Red' | PRUNU | hybrid plum | 23-Apr | 85 | 85 | PLBR | 10 | 6 | 60 | 6 | 1.0 | 2.1 | |
| | ND-1134 | | *Prunus* | | | 86 | | | 7 | 70 | 4 | 3.1 | 3.9 | |
| | 9047203 | | Miller, SD | | | 87 | | | 7 | 70 | | 5.3 | 5.8 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 89 | | | 7 | 70 | 3 | 8.8 | 7.7 | |
| | | | | | | 91 | | | 7 | 70 | 1 | 12.0 | 9.2 | dieback on 3 |
| | | | | | | 94 | | | 6 | 60 | 3 | 14.2 | 10.1 | |
| | | | | | | 99 | | | 6 | 60 | | 11.3 | 11.0 | |
| | | | | | | 04 | | | | | 6 | 12.0 | 11.0 | dying out |
| II/23/1-10 | ND-2102 | PRAR3 | apricot | 22-Apr | 86 | 86 | PLBR | 10 | 10 | 100 | | 2.1 | 3.7 | |
| | 9036029 | | *Prunus armeniaca* | | | 87 | | | 10 | 100 | | 3.9 | 5.9 | |
| | | | Hand Co., SD | | | 88 | | | 10 | 100 | 3 | 6.1 | 8.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 90 | | | 10 | 100 | 3 | 9.7 | 10.7 | |
| | | | | | | 92 | | | 10 | 100 | 3 | 11.6 | 13.6 | |
| | | | | | | 96 | | | 10 | 100 | 3 | 16.8 | 15.6 | herbicide damage 2, canker 4 |
| | | | | | | 00 | | | 10 | 100 | 4 | 20.5 | 18.1 | |
| | | | | | | 05 | | | 10 | 100 | 4 | 25.2 | 20.2 | canker |
| II/24/1-5 | 9069129 | PRMA | amur chokecherry | 31-May | 95 | 95 | CONT(P) | 5 | 5 | 100 | 3 | 1.0 | 2.2 | |
| | | | *Prunus maackii* | | | 96 | | | 3 | 60 | 6 | 2.4 | 3.4 | all appear weak, stunted leaves |
| | | | Big Sioux Nursery, Watertown, SD | | | 97 | | | 5 | 100 | 3 | 1.0 | 2.2 | |
| | | | | | | 01 | | | 1 | 20 | 5 | 4.5 | 11.0 | |
| | | | | | | 04 | | | 1 | 20 | 8 | 3.0 | 8.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/24/6-10 | 9063130 | BENI | river birch | 19-Apr | 93 | 93 | CONT(P) | 5 | 5 | 100 | 2 | 2.1 | 3.0 | |
| | | | *Betula nigra* | | | 94 | | | 5 | 100 | 2 | 5.2 | 5.7 | |
| | | | MN Forestry Association | | | 95 | | | 5 | 100 | 3 | 9.2 | 9.8 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 12.8 | 14.1 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 16.0 | 17.1 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 14.0 | 18.5 | |
| II/25/1-10 | ND-21 | VILE | nannyberry | 22-Apr | 86 | 86 | PLBR | 10 | 10 | 100 | 3 | 0.5 | 1.1 | |
| | 9034900 | | *Viburnum lentago* | | | 87 | | | 9 | 90 | | 1.2 | 2.2 | |
| | | | USDA, ARS, Mandan, ND | | | 88 | | | 8 | 80 | 3 | 1.9 | 3.1 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 90 | | | 8 | 80 | 4 | 3.1 | 4.0 | |
| | | | | | | 92 | | | 8 | 80 | 3 | 4.3 | 5.0 | |
| | | | | | | 95 | | | 7 | 70 | 2 | 6.7 | 6.8 | |
| | | | | | | 00 | | | 7 | 70 | 2 | 9.8 | 9.2 | |
| | | | | | | 05 | | | 7 | 70 | 4 | 12.7 | 9.7 | severe leaf rust on 2 |
| II/26/1-5 | 9069121 | PRPA5 | mayday | 15-Apr | 96 | 96 | CONT(P) | 5 | 4 | 80 | 6 | 0.4 | 1.0 | |
| | | | *Prunus padus* | | | 97 | | | 4 | 80 | 6 | 1.1 | 2.0 | |
| | | | Norway | | | 98 | | | 4 | 80 | | 1.2 | 2.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 00 | | | 3 | 60 | 4 | 3.3 | 6.6 | |
| | | | | | | 02 | | | 3 | 60 | | 2.2 | 2.9 | |
| | | | | | | 05 | | | 2 | 40 | 8 | 3.0 | 4.0 | sucker on 5 |
| II/26/6-10 | ND-673 | SOAUX2 | yellowberry mountain ash | 23-Apr | 87 | 87 | PLBR | 5 | 5 | 100 | | 1.1 | 1.4 | |
| | 9006214 | | *Sorbus aucuparia* | | | 88 | | | 5 | 100 | 3 | 1.6 | 2.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 89 | | | 5 | 100 | 5 | 2.2 | 3.8 | |
| | | | | | | 91 | | | 5 | 100 | 3 | 4.4 | 6.3 | |
| | | | | | | 93 | | | 5 | 100 | 2 | 6.2 | 7.3 | |
| | | | | | | 96 | | | 5 | 100 | 4 | 9.4 | 9.3 | good fruit amount |
| | | | | | | 01 | | | 5 | 100 | 3 | 7.0 | 11.2 | multi-stemmed |
| | | | | | | 06 | | | 5 | 100 | | 11.7 | 12.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/27/1-10 | ND-1567 | CRATA | hawthorn | 26-Apr | 88 | 88 | CONT | 10 | 9 | 90 | | 0.6 | 1.3 | |
| | 9005751 | | *Crataegus* | | | 89 | | | 4 | 40 | 5 | 0.8 | 1.3 | |
| | | | Wells Co., ND | | | 90 | | | 7 | 70 | 4 | 1.0 | 1.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 6 | 60 | 6 | 1.2 | 1.0 | |
| | | | | | | 94 | | | 4 | 40 | 6 | 2.3 | 1.8 | |
| | | | | | | 97 | | | 4 | 40 | 6 | 3.8 | 3.2 | leaf rust on 2,8 |
| | | | | | | 02 | | | 2 | 20 | | 5.0 | 6.8 | |
| III/01/1-10 | ND-1020 | VIRI | river bank grape | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 4 | 0.8 | 0.9 | |
| | 9006238 | | *Vitis riparia* | | | 79 | | | 10 | 100 | | 1.2 | 1.1 | |
| | | | Res. Sta., Morden, Manitoba, Canada | | | 80 | | | 10 | 100 | | 1.8 | 1.1 | |
| | | | | | | 82 | | | 10 | 100 | | 3.1 | 1.8 | |
| | | | | | | 83 | | | 10 | 100 | | 4.8 | 2.3 | |
| | | | | | | 84 | | | 10 | 100 | | 5.9 | 2.5 | |
| | | | | | | 87 | | | 10 | 100 | | 14.3 | 5.1 | |
| | | | | | | 92 | | | 10 | 100 | | 9.0 | 5.4 | |
| | | | | | | 97 | | | 10 | 100 | 3 | 9.2 | 4.6 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 21.0 | 3.2 | |
| III/02/1-10 | 'Timm's' | AMAL2 | juneberry | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 3 | 1.2 | 1.1 | |
| | ND-46 | | *Amelanchier alnifolia* | | | 79 | | | 10 | 100 | | 1.5 | 1.1 | |
| | | | Towner Co., Cando, ND | | | 80 | | | 10 | 100 | | 1.9 | 1.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 10 | 100 | | 2.7 | 2.3 | |
| | | | | | | 83 | | | 10 | 100 | | 4.5 | 2.8 | |
| | | | | | | 84 | | | 10 | 100 | | 5.0 | 3.4 | |
| | | | | | | 87 | | | 10 | 100 | | 7.7 | 4.8 | |
| | | | | | | 92 | | | 10 | 100 | | 8.8 | 6.1 | |
| | | | | | | 97 | | | 8 | 80 | 3 | 12.0 | 8.2 | snow breakage on all |
| | | | | | | 02 | | | 8 | 80 | 3 | 11.0 | 9.8 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/03/1-10 | 'Success' | AMAL2 | juneberry | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 4 | 1.0 | 1.1 | |
| | 9005662 | | *Amelanchier alnifolia* | | | 79 | | | 10 | 100 | | 1.2 | 1.0 | |
| | | | USDA, ARS, Mandan, ND | | | 80 | | | 10 | 100 | | 1.6 | 1.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 10 | 100 | | 3.5 | 2.6 | |
| | | | | | | 83 | | | 10 | 100 | | 4.8 | 3.2 | |
| | | | | | | 84 | | | 10 | 100 | | 5.1 | 4.0 | |
| | | | | | | 87 | | | 10 | 100 | | 6.2 | 5.2 | |
| | | | | | | 92 | | | 10 | 100 | 3 | 8.9 | 6.6 | |
| | | | | | | 97 | | | 10 | 100 | 5 | 10.5 | 7.7 | snow breakage on all |
| III/04/1-10 | 'Centennial' | COIN16 | cotoneaster | 11-Apr | 78 | 78 | PLBR | 10 | 6 | 60 | 8 | 0.7 | 1.0 | |
| | ND-177 | | *Cotoneaster intergerrimus* | | | 79 | | | 5 | 50 | | 3.4 | 2.9 | |
| | 9005729 | | USDA, ARS, Cheyenne, WY | | | 80 | | | 5 | 50 | | 4.8 | 3.2 | |
| | PI-113095 | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 5 | 50 | | 10.1 | 6.3 | |
| | | | | | | 83 | | | 5 | 50 | | 11.9 | 7.3 | |
| | | | | | | 84 | | | 5 | 50 | | 10.9 | 7.6 | |
| | | | | | | 87 | | | 5 | 50 | | 14.3 | 9.6 | |
| | | | | | | 92 | | | 5 | 50 | 2 | 14.9 | 10.5 | |
| | | | | | | 97 | | | 5 | 50 | 7 | 17.1 | 10.7 | severe fireblight |
| | | | | | | 02 | | | 5 | 100 | 3 | 14.0 | 9.8 | |
| III/05/1-10 | 9069128 | LONIC | honeysuckle | 31-May | 95 | 95 | CONT(P) | 10 | 8 | 80 | 4 | 1.3 | 1.4 | |
| | | | *Lonicera tatarica* | | | 96 | | | 10 | 100 | 4 | 2.5 | 3.0 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 97 | | | 10 | 100 | 3 | 4.3 | 5.3 | all chlorotic |
| | | | | | | 99 | | | 10 | 100 | 4 | 7.8 | 8.4 | |
| | | | | | | 01 | | | 9 | 90 | 4 | 6.0 | 7.4 | |
| | | | | | | 04 | | | 10 | 100 | 3 | 11.7 | 10.6 | |
| III/06/6-10 | 9076737 | PRSE | black cherry | 5-May | 97 | 97 | PLBR | 5 | 4 | 80 | 1 | 1.9 | 3.1 | |
| | | | *Prunus serotina* | | | 98 | | | 3 | 60 | 2 | 5.2 | 4.9 | |
| | | | Apple Valley FEP | | | 99 | | | 3 | 60 | 4 | 8.5 | 8.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 3 | 60 | 4 | 7.6 | 11.0 | |
| | | | | | | 03 | | | 3 | 60 | 3 | 9.8 | 12.2 | |
| | | | | | | 06 | | | 0 | 0 | | | | all dead |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/07/1-10 | 'Scarlet' | PRFR2 | Mongolian cherry | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 4 | 0.8 | 1.5 | |
| | ND-3 | | *Prunus fruticosa* | | | 79 | | | 10 | 100 | | 1.5 | 2.0 | |
| | 9006072 | | Res. Sta., Morden, Manitoba, Canada | | | 80 | | | 10 | 100 | | 2.6 | 2.3 | |
| | PI-478003 | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 10 | 100 | | 5.5 | 4.1 | |
| | | | | | | 83 | | | 10 | 100 | | 7.9 | 4.7 | |
| | | | | | | 84 | | | 10 | 100 | | 8.0 | 5.2 | |
| | | | | | | 87 | | | 10 | 100 | | 10.1 | 6.3 | |
| | | | | | | 92 | | | 10 | 100 | 2 | 11.0 | 6.7 | |
| | | | | | | 97 | | | 9 | 90 | 2 | 13.1 | 7.9 | some leaf spot |
| | | | | | | 02 | | | 7 | 70 | 3 | 18.0 | 6.2 | |
| III/08/1-10 | 'Sakakawea' | SHAR | silver buffaloberry | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | | 0.7 | 1.3 | |
| | ND-10 | | *Shepherdia argentea* | | | 79 | | | 10 | 100 | | 1.6 | 2.3 | |
| | 9006158 | | Res. Sta., Morden, Manitoba, Canada | | | 80 | | | 10 | 100 | | 3.3 | 3.3 | |
| | PI-478005 | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 10 | 100 | | 8.6 | 7.2 | |
| | | | | | | 83 | | | 10 | 100 | | 10.1 | 7.9 | |
| | | | | | | 84 | | | 10 | 100 | | 11.0 | 8.6 | |
| | | | | | | 87 | | | 10 | 100 | | 14.3 | 11.5 | |
| | | | | | | 92 | | | 10 | 100 | 4 | 15.1 | 11.6 | |
| | | | | | | 97 | | | 4 | 40 | 6 | 22.5 | 12.5 | wind damaged, laying down |
| | | | | | | 02 | | | 9 | 90 | 3 | 25.0 | 13.0 | |
| lll/11/1-5 | 'Regal' | PRTE5 | Russian almond | 16-Apr | 80 | 80 | PLBR | 5 | 4 | 80 | | 0.5 | 1.6 | |
| | ND-283 | | *Prunus tenella* | | | 81 | | | 5 | 100 | | 1.4 | 2.4 | |
| | 9006079 | | ND Game & Fish Dept., Bismarck, ND | | | 82 | | | 5 | 100 | | 3.5 | 3.4 | |
| | PI-540442 | | USDA, NRCS, PMC, Bismarck, ND Increase Block | | | 83 | | | 5 | 100 | | 5.8 | 4.3 | |
| | | | | | | 84 | | | 5 | 100 | | 6.8 | 4.7 | |
| | | | | | | 86 | | | 5 | 100 | | 8.0 | 7.1 | |
| | | | | | | 87 | | | 5 | 100 | | 10.3 | 6.6 | |
| | | | | | | 89 | | | 5 | 100 | 1 | 10.2 | 6.8 | |
| | | | | | | 94 | | | 4 | 80 | 2 | 14.6 | 8.2 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 18.5 | 9.8 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 20.0 | 5.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/12/1-10 | ND-11 | LOMA6 | amur honeysuckle | 14-Apr | 81 | 81 | CONT | 10 | 10 | 100 | 4 | 1.7 | 1.3 | |
| | 9005993 | | *Lonicera maackii* | | | 82 | | | 10 | 100 | | 3.0 | 2.5 | |
| | PI-477998 | | Res. Sta., Morden, Manitoba, Canada | | | 83 | | | 10 | 100 | | 4.4 | 3.6 | |
| | | | | | | 84 | | | 10 | 100 | | 5.1 | 4.4 | |
| | | | | | | 85 | | | 10 | 100 | | 5.9 | 4.8 | |
| | | | | | | 87 | | | 10 | 100 | | 8.1 | 7.0 | |
| | | | | | | 88 | | | 10 | 100 | 3 | 7.4 | 7.1 | |
| | | | | | | 90 | | | 10 | 100 | 7 | 8.1 | 7.8 | drought stress and leaf blight |
| | | | | | | 95 | | | 10 | 100 | 4 | 10.2 | 9.1 | |
| | | | | | | 00 | | | 10 | 100 | | 11.5 | 11.3 | |
| | | | | | | 05 | | | 10 | 100 | | 14.0 | 11.5 | all plants very similar |
| III/14/1-10 | 'Indigo' | COAM2 | silky dogwood | 27-Apr | 83 | 83 | PLBR | 10 | 10 | 100 | | 1.1 | 1.5 | |
| | Mich-765 | | *Cornus amomum* | | | 84 | | | 10 | 100 | | 3.2 | 2.7 | |
| | PI-468117 | | USDA, NRCS, PMC, Rose Lake, MI | | | 85 | | | 10 | 100 | 3 | 4.3 | 3.1 | |
| | | | | | | 87 | | | 10 | 100 | | 7.1 | 5.1 | |
| | | | | | | 89 | | | 9 | 90 | 3 | 7.3 | 5.5 | |
| | | | | | | 92 | | | 9 | 90 | 5 | 8.6 | 6.1 | |
| | | | | | | 97 | | | 9 | 90 | 1 | 5.9 | 9.2 | |
| | | | | | | 02 | | | 5 | 50 | 5 | 10.0 | 9.2 | |
| III/16/6-10 | 'Freedom' | LOKO | honeysuckle | 17-Apr | 89 | 89 | CONT | 5 | 5 | 100 | 1 | 2.3 | 1.8 | |
| | 9057424 | | *Lonicera korolkowii* | | | 90 | | | 5 | 100 | 1 | 4.9 | 3.5 | |
| | | | U of MN, WC Exp. Sta., Morris, MN | | | 91 | | | 5 | 100 | 2 | 7.6 | 4.9 | |
| | | | | | | 93 | | | 5 | 100 | 1 | 11.3 | 8.0 | |
| | | | | | | 95 | | | 5 | 100 | 1 | 15.1 | 10.1 | |
| | | | | | | 98 | | | 5 | 100 | 1 | 17.4 | 12.8 | |
| | | | | | | 03 | | | 5 | 100 | | 25.0 | 12.3 | |
| III/17/1-5 | 9008041 | AMFR | false indigo | 23-Apr | 87 | 87 | PLBR | 5 | 5 | 100 | | 3.5 | 2.5 | |
| | | | *Amorpha fruticosa* | | | 88 | | | 5 | 100 | 3 | 7.0 | 4.1 | |
| | | | USDA, NRCS, PMC, Aberdeen, ID | | | 89 | | | 5 | 100 | 1 | 9.5 | 4.7 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 91 | | | 5 | 100 | 1 | 9.6 | 6.8 | good seed crop |
| | | | | | | 93 | | | 5 | 100 | 2 | 12.3 | 6.1 | |
| | | | | | | 96 | | | 5 | 100 | 7 | 10.6 | 6.2 | dieback on all, drought, cold |
| | | | | | | 01 | | | 5 | 100 | 2 | 12.0 | 7.8 | contaminants |
| | | | | | | 06 | | | 0 | 0 | | | | all dead, some regrowth |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/17/6-10 | 9047236 | AMFR | false indigo | 23-Apr | 87 | 87 | PLBR | 5 | 5 | 100 | | 2.4 | 2.5 | |
| | | | *Amorpha fruticosa* | | | 88 | | | 5 | 100 | 3 | 5.3 | 3.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 89 | | | 5 | 100 | 1 | 7.3 | 3.9 | |
| | | | | | | 91 | | | 5 | 100 | 1 | 8.5 | 5.9 | good seed crop |
| | | | | | | 93 | | | 5 | 100 | 4 | 9.4 | 5.6 | |
| | | | | | | 96 | | | 5 | 100 | 9 | 10.5 | 5.2 | severe dieback |
| | | | | | | 01 | | | 5 | 100 | 4 | 8.4 | 5.0 | contaminants |
| | | | | | | 06 | | | 0 | 0 | | | | all dead, some regrowth |
| III/18/1-10 | 9069080 | LOTA | red tatarian honeysuckle | 19-Apr | 93 | 93 | PLBR | 10 | 10 | 100 | 2 | 2.0 | 2.1 | |
| | 'Arnolds Red' | | *Lonicera tatarica* | | | 94 | | | 10 | 100 | 3 | 4.1 | 3.8 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 10 | 100 | 3 | 5.2 | 5.1 | |
| | | | | | | 97 | | | 10 | 100 | 2 | 7.9 | 7.3 | |
| | | | | | | 99 | | | 10 | 100 | 4 | 8.7 | 9.0 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 14.0 | 9.0 | |
| III/19/1-10 | 9063143 | LOTA | red tatarian honeysuckle | 19-Apr | 93 | 93 | PLBR | 10 | 10 | 100 | 3 | 1.9 | 2.5 | |
| | | | *Lonicera tatarica* | | | 94 | | | 10 | 100 | 4 | 3.1 | 3.3 | |
| | | | Iowa | | | 95 | | | 10 | 100 | 5 | 4.3 | 4.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 97 | | | 10 | 100 | 3 | 7.2 | 6.2 | |
| | | | | | | 99 | | | 10 | 100 | 4 | 8.5 | 7.6 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 12.0 | 7.8 | |
| III/20/6-10 | ND-2507 | CAPY | pigmy caragana | 26-Apr | 88 | 88 | CONT | 5 | 4 | 80 | 3 | 0.7 | 1.4 | |
| | 9047228 | | *Caragana pygmaea* | | | 89 | | | 4 | 80 | 3 | 1.2 | 1.2 | |
| | | | NDFS Bottineau, ND | | | 90 | | | 4 | 80 | 2 | 2.0 | 2.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 4 | 80 | 3 | 4.1 | 3.1 | |
| | | | | | | 94 | | | 4 | 80 | 1 | 6.5 | 4.1 | |
| | | | | | | 97 | | | 4 | 80 | 1 | 8.2 | 4.8 | |
| | | | | | | 02 | | | 3 | 60 | 4 | 11.2 | 4.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/21/1-10 | PI-323957 | PHME13 | chokeberry | 26-Apr | 88 | 88 | CONT | 10 | 9 | 90 | 2 | 1.1 | 1.1 | |
| | | | *Photinia melanocarpa* | | | 89 | | | 10 | 100 | 2 | 2.3 | 2.1 | |
| | | | P.I. Sta., Ames, IA | | | 90 | | | 10 | 100 | 1 | 4.1 | 3.2 | |
| | | | McKenzie FEP, ND | | | 92 | | | 10 | 100 | 2 | 6.2 | 4.5 | |
| | | | | | | 94 | | | 10 | 100 | 1 | 7.8 | 5.4 | |
| | | | | | | 97 | | | 10 | 100 | 1 | 9.7 | 7.5 | |
| | | | | | | 02 | | | 10 | 100 | 1 | 14.0 | 9.2 | |
| III/22/1-10 | ND-3744 | BEKO | Korean barberry | 26-Apr | 88 | 88 | CONT | 10 | 5 | 50 | 2 | 0.7 | 0.8 | |
| | 9019577 | | *Berberis koreana* | | | 89 | | | 10 | 100 | 3 | 0.7 | 1.3 | |
| | | | NDSU | | | 90 | | | 10 | 100 | 3 | 1.4 | 2.4 | |
| | | | McKenzie FEP, ND | | | 92 | | | 10 | 100 | 4 | 3.5 | 3.7 | |
| | | | | | | 94 | | | 10 | 100 | 3 | 5.2 | 4.4 | |
| | | | | | | 97 | | | 9 | 90 | 2 | 8.3 | 6.4 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 13.5 | 8.2 | |
| III/23/1-5 | ND-2103 | VIOP | highbush cranberry | 26-Apr | 88 | 88 | CONT | 5 | 5 | 100 | 2 | 0.6 | 0.9 | |
| | PI-399414 | | *Viburnum opulus* | | | 89 | | | 4 | 80 | 5 | 1.1 | 0.9 | |
| | | | P.I. Sta., Ames, IA | | | 90 | | | 4 | 80 | 3 | 1.8 | 1.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 4 | 80 | 3 | 3.5 | 3.4 | |
| | | | | | | 94 | | | 4 | 80 | 1 | 6.8 | 6.2 | |
| | | | | | | 97 | | | 5 | 100 | 1 | 12.1 | 9.2 | |
| | | | | | | 02 | | | 5 | 100 | 1 | 14.0 | 9.8 | |
| III/23/6-10 | 9057409 | COAM | American hazel | 26-Apr | 88 | 88 | PLBR | 5 | 5 | 100 | 2 | 0.9 | 1.7 | |
| | | | *Corylus americana* | | | 89 | | | 5 | 100 | 5 | 1.0 | 1.6 | |
| | | | NDFS | | | 90 | | | 4 | 80 | 6 | 1.2 | 1.7 | drought stress |
| | | | Turtle Mtns., Bottineau Co., ND | | | 92 | | | 4 | 80 | 4 | 2.9 | 2.5 | |
| | | | | | | 94 | | | 4 | 80 | 2 | 5.3 | 4.5 | |
| | | | | | | 97 | | | 4 | 80 | 3 | 10.0 | 7.6 | |
| | | | | | | 02 | | | 4 | 80 | 3 | 16.0 | 10.1 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/24/1-10 | 'Meadowlark' | FOOV | forsythia | 26-Apr | 88 | 88 | CONT | 10 | 10 | 100 | 2 | 2.2 | 1.6 | |
| | 9005886 | | *Forsythia ovata x F. europaea* | | | 89 | | | 9 | 90 | 3 | 2.8 | 2.4 | |
| | | | P.I. Sta., Ames, IA | | | 90 | | | 10 | 100 | 2 | 4.1 | 3.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 92 | | | 10 | 100 | 2 | 5.9 | 5.6 | |
| | | | | | | 94 | | | 10 | 100 | 1 | 8.3 | 6.8 | |
| | | | | | | 97 | | | 10 | 100 | 1 | 9.8 | 7.9 | |
| | | | | | | 02 | | | 10 | 100 | 1 | 16.5 | 10.0 | |
| III/25/1-10 | 'Hedge King' | LOXY | honeysuckle | 26-Apr | 88 | 88 | PLBR | 10 | 8 | 80 | 6 | 1.0 | 1.6 | |
| | 9057407 | | *Lonicera xylosteoides* | | | 89 | | | 10 | 100 | 5 | 1.0 | 1.6 | |
| | | | Wedge Nursery, Albert Lea, MN | | | 90 | | | 10 | 100 | 5 | 1.6 | 1.9 | mildew on leaves |
| | | | | | | 92 | | | 10 | 100 | 3 | 2.1 | 2.1 | powdery mildew |
| | | | | | | 94 | | | 10 | 100 | 4 | 2.4 | 2.5 | |
| | | | | | | 97 | | | 10 | 100 | 3 | 2.9 | 3.1 | leaf blight |
| | | | | | | 02 | | | 10 | 100 | 4 | 3.0 | 4.1 | |
| III/26/1-5 | ND-2506 | CAMA | maximowicz caragana | 26-Apr | 88 | 88 | CONT | 5 | 3 | 60 | 4 | 0.7 | 0.7 | |
| | 9047227 | | *Caragana maximowicziana* | | | 89 | | | 3 | 60 | 3 | 2.0 | 1.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND Increase Block | | | 90 | | | 5 | 100 | 3 | 2.2 | 1.8 | |
| | | | | | | 92 | | | 4 | 80 | 4 | 4.3 | 2.8 | |
| | | | | | | 94 | | | 4 | 80 | 2 | 6.9 | 4.0 | |
| | | | | | | 97 | | | 3 | 60 | 5 | 9.4 | 4.8 | |
| | | | | | | 02 | | | 4 | 80 | 3 | 10.0 | 3.4 | |
| III/26/6-10 | 'Legacy' | SYVI | late lilac | 26-Apr | 88 | 88 | CONT | 5 | 4 | 80 | 3 | 1.0 | 1.5 | |
| | ND-83 | | *Syringa villosa* | | | 89 | | | 5 | 100 | 3 | 1.5 | 1.9 | |
| | 9006228 | | Res. Sta., Morden, CA | | | 90 | | | 5 | 100 | 3 | 2.5 | 2.5 | mildew on leaves |
| | PI-540443 | | Lincoln-Oakes Nursery, Bismarck, ND | | | 92 | | | 5 | 100 | 3 | 4.1 | 3.9 | |
| | | | | | | 94 | | | 5 | 100 | 1 | 6.5 | 6.2 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 9.7 | 8.1 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 12.5 | 9.8 | |
| IV/01/1-10 | ND-1480 | YUGL | yucca | 11-Apr | 78 | 78 | PLBR | 10 | 10 | 100 | 1 | 1.4 | 0.9 | |
| | 9012001 | | *Yucca glauca* | | | 79 | | | 10 | 100 | 4 | 1.5 | 1.1 | |
| | | | Haakon Co., Phillip, SD | | | 80 | | | 10 | 100 | | 1.5 | 1.5 | |
| | | | | | | 82 | | | 10 | 100 | | 3.8 | 2.6 | |
| | | | | | | 83 | | | 10 | 100 | | 4.2 | 2.7 | |

**Project No.: 38I315K Field Evaluation of Woody Plant Materials, Highmore, South Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/02/1-10 | ND-1729 | LASI* | Siberian larch | 11-Apr | 78 | 78 | CONT | 10 | 8 | 80 | 7 | 0.2 | 1.3 | |
| | 9005979 | | *Larix sibirica* | | | 79 | | | 9 | 90 | | 0.2 | 0.6 | |
| | | | NDFS State Nursery, Towner, ND | | | 80 | | | 2 | 20 | | 0.6 | 1.6 | |
| | | | | | | 82 | | | 2 | 20 | | 2.0 | 2.6 | |
| | | | | | | 83 | | | 1 | 10 | | 3.6 | 5.1 | |
| | | | | | | 84 | | | 1 | 10 | | 4.3 | 6.2 | |
| | | | | | | 87 | | | 1 | 10 | | 6.9 | 12.3 | |
| | | | | | | 92 | | | 2 | 20 | 3 | 11.2 | 16.0 | |
| | | | | | | 97 | | | 2 | 40 | 3 | 9.7 | 20.6 | |
| | | | | | | 02 | | | 2 | 20 | 2 | 19.0 | 22.8 | |
| IV/03/1-10 | SL-383-T. | LASI* | Siberian larch | 11-Apr | 78 | 78 | CONT | 10 | 9 | 90 | 7 | 0.2 | 1.9 | |
| | Pallet No. | | *Larix sibirica* | | | 79 | | | 8 | 80 | | 0.3 | 0.7 | |
| | 2382 | | Denbigh Experimental Forest | | | 80 | | | 8 | 80 | | 0.6 | 1.1 | |
| | 9005976 | | USDA, FS, Shelterbelt Laboratory, | | | 82 | | | 6 | 60 | | 1.8 | 2.8 | |
| | | | Bottineau, ND | | | 83 | | | 6 | 60 | | 3.0 | 5.3 | |
| | | | | | | 84 | | | 6 | 60 | | 3.7 | 6.7 | |
| | | | | | | 87 | | | 6 | 60 | | 7.7 | 11.5 | |
| | | | | | | 92 | | | 4 | 40 | | 12.3 | 14.8 | |
| | | | | | | 97 | | | 4 | 40 | 5 | 17.7 | 23.8 | |
| | | | | | | 02 | | | 4 | 40 | 2 | 19.6 | 24.9 | |
| IV/04/1-10 | ND-1765 | LASI* | Siberian larch | 11-Apr | 78 | 78 | CONT | 10 | 10 | 100 | 6 | 0.4 | 1.4 | |
| | Pallet No. 1889 | | *Larix sibirica* | | | 79 | | | 10 | 100 | | 0.5 | 0.8 | |
| | 9005980 | | USDA, FS, Shelterbelt Laboratory, | | | 80 | | | 10 | 100 | | 0.8 | 1.4 | |
| | | | Bottineau, ND | | | 82 | | | 9 | 90 | | 2.7 | 3.9 | |
| | | | | | | 83 | | | 9 | 90 | | 4.3 | 6.4 | |
| | | | | | | 84 | | | 9 | 90 | | 5.3 | 8.3 | |
| | | | | | | 87 | | | 9 | 90 | | 8.5 | 14.1 | |
| | | | | | | 92 | | | 7 | 70 | 3 | 12.5 | 17.6 | |
| | | | | | | 97 | | | 5 | 50 | 4 | 16.7 | 24.3 | |
| | | | | | | 02 | | | 5 | 50 | 4 | 17.4 | 27.8 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/05/1-5 | ND-1763 | PIPO | ponderosa pine | 11-Apr | 78 | 78 | CONT | 5 | 5 | 100 | 1 | 0.5 | 1.5 | |
| | Pallet No. | | *Pinus ponderosa* var. *ponderosa* | | | 79 | | | 4 | 80 | | 0.7 | 1.8 | |
| | 1261 | | 757-5 Rosebud, SD | | | 80 | | | 5 | 100 | | 1.2 | 2.3 | |
| | 9006043 | | USDA, FS, Shelterbelt Laboratory, | | | 82 | | | 5 | 100 | | 3.6 | 4.4 | |
| | | | Bottineau, ND | | | 83 | | | 5 | 100 | | 5.1 | 5.9 | |
| | | | | | | 84 | | | 5 | 100 | | 6.1 | 7.4 | |
| | | | | | | 87 | | | 5 | 100 | | 11.2 | 13.0 | |
| | | | | | | 92 | | | 5 | 100 | 2 | 16.8 | 18.3 | |
| | | | | | | 97 | | | 5 | 100 | 1 | 24.0 | 21.0 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 24.0 | 27.8 | |
| IV/06/1-5 | Mich-1841 | THOC | northern white cedar | 27-Apr | 83 | 83 | PLBR | 5 | 2 | 40 | | 0.2 | 0.2 | |
| | 9005060 | | *Thuja occidentalis* | | | 84 | | | 4 | 80 | 4 | 0.4 | 0.5 | |
| | | | USDA, NRCS, PMC, Rose Lake, MI | | | 85 | | | 4 | 80 | | 0.8 | 0.7 | |
| | | | | | | 87 | | | 4 | 80 | | 1.6 | 1.9 | |
| | | | | | | 89 | | | 4 | 80 | 5 | 2.4 | 2.2 | |
| | | | | | | 92 | | | 4 | 80 | 3 | 4.1 | 4.3 | |
| | | | | | | 97 | | | 5 | 100 | 1 | 8.5 | 8.2 | |
| | | | | | | 02 | | | 4 | 80 | 2 | 11.0 | 11.0 | |
| IV/06/6-10 | Mich-1468 | THOC | northern white cedar | 27-Apr | 83 | 83 | PLBR | 5 | 3 | 60 | | | 0.6 | |
| | 9005059 | | *Thuja occidentalis* | | | 84 | | | 5 | 100 | 3 | 0.6 | 1.0 | |
| | | | USDA, NRCS, PMC, Rose Lake, MI | | | 85 | | | 4 | 80 | | 1.2 | 0.9 | |
| | | | East Lansing, MI | | | 87 | | | 3 | 60 | | 1.7 | 1.3 | |
| | | | | | | 89 | | | 3 | 60 | 5 | 2.4 | 2.0 | |
| | | | | | | 92 | | | 3 | 60 | 3 | 3.3 | 4.2 | |
| | | | | | | 02 | | | 3 | 60 | 5 | 12.3 | 10.8 | |
| IV/07/1-10 | 9057413 | PIPO | ponderosa pine | 26-Apr | 88 | 88 | CONT | 10 | 9 | 90 | 3 | 0.6 | 0.9 | |
| | | | *Pinus ponderosa* | | | 89 | | | 9 | 90 | 3 | 1.4 | 1.8 | |
| | | | Glendive, MT | | | 90 | | | 9 | 90 | 2 | 1.4 | 2.1 | |
| | | | NDFS | | | 92 | | | 9 | 90 | 4 | 3.4 | 4.0 | |
| | | | | | | 94 | | | 9 | 90 | 2 | 5.5 | 6.5 | |
| | | | | | | 97 | | | 9 | 90 | 3 | 8.9 | 11.2 | |
| | | | | | | 02 | | | 9 | 90 | 4 | 14.3 | 19.4 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/08/1-10 | 9057411 | PICO | lodgepole pine | 26-Apr | 88 | 88 | CONT | 10 | 5 | 50 | | 0.6 | 0.8 | |
| | | | *Pinus contorta* | | | 89 | | | 5 | 50 | 5 | 1.1 | 1.0 | |
| | | | Edmonton, Alberta, Canada | | | 90 | | | 5 | 50 | 5 | 1.1 | 1.2 | |
| | | | NDFS | | | 92 | | | 5 | 50 | 4 | 2.3 | 2.3 | |
| | | | | | | 94 | | | 5 | 50 | 3 | 3.6 | 4.4 | |
| | | | | | | 97 | | | 5 | 50 | 2 | 6.8 | 8.4 | |
| | | | | | | 02 | | | 5 | 50 | 3 | 10.6 | 16.0 | |
| IV/09/1-5 | 9058862 | LALA | tamarack | 20-Apr | 90 | 90 | CONT | 5 | 5 | 100 | 3 | 1.1 | 1.7 | |
| | | | *Larix laricina* | | | 91 | | | 5 | 100 | 1 | 2.2 | 4.3 | |
| | | | Chippewa Farms Nursery | | | 92 | | | 5 | 100 | 2 | 3.5 | 6.2 | |
| | | | Grand Rapids, MN | | | 94 | | | 5 | 100 | 2 | 7.0 | 8.9 | |
| | | | | | | 96 | | | 5 | 100 | 1 | 11.0 | 12.9 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 15.8 | 18.1 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 22.0 | 22.3 | dieback on 1 |
| IV/11/1-5 | 9063156 | PISY | Scots pine | 15-Apr | 96 | 96 | CONT(P) | 3 | 3 | 100 | 2 | 0.7 | 1.0 | |
| | 14608 | | *Pinus sylvestris* var. *mongolica* | | | 97 | | | 3 | 100 | 1 | 1.4 | 1.7 | |
| | | | China | | | 98 | | | 3 | 100 | 2 | 2.2 | 2.9 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 3 | 100 | 1 | 5.6 | 5.6 | |
| | | | | | | 02 | | | 3 | 100 | 1 | 8.5 | 9.8 | |
| | | | | | | 05 | | | 3 | 60 | 1 | 13.0 | 13.6 | |
| IV/12/1-5 | 9063154 | PISY | Scots pine | 15-Apr | 96 | 96 | CONT(P) | 3 | 3 | 100 | 2 | 0.7 | 1.2 | |
| | 14607 | | *Pinus sylvestris* var. *mongolica* | | | 97 | | | 3 | 100 | 1 | 1.6 | 1.6 | |
| | | | China | | | 98 | | | 3 | 100 | 2 | 2.5 | 2.5 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 3 | 100 | 3 | 5.1 | 5.5 | |
| | | | | | | 02 | | | 3 | 100 | 1 | 8.3 | 8.8 | |
| | | | | | | 05 | | | 3 | 60 | 1 | 12.3 | 14.1 | |
| IV/13/1-5 | 9057412 | QUMA | bur oak | 26-Apr | 88 | 88 | CONT | 5 | 4 | 80 | 3 | 0.5 | 1.1 | |
| | | | *Quercus macrocarpa* | | | 89 | | | 5 | 100 | 5 | 0.8 | 1.5 | |
| | | | NDFS | | | 90 | | | 5 | 100 | 3 | 1.1 | 1.6 | |
| | | | Foster Co., ND | | | 92 | | | 5 | 100 | 3 | 3.2 | 5.2 | |
| | | | | | | 94 | | | 5 | 100 | 1 | 5.0 | 8.7 | |
| | | | | | | 97 | | | 5 | 100 | 1 | 8.0 | 10.9 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 14.2 | 15.4 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/14/1-5 | 9057410 | CEOC | hackberry | 26-Apr | 88 | 88 | CONT | 5 | 5 | 100 | 3 | 0.7 | 1.0 | |
| | | | *Celtis occidentalis* | | | 89 | | | 5 | 100 | 7 | 1.0 | 1.0 | |
| | | | NDFS | | | 90 | | | 5 | 100 | 3 | 2.0 | 1.6 | |
| | | | Bottineau Co., ND | | | 92 | | | 5 | 100 | 3 | 2.2 | 3.0 | twig/bud gall |
| | | | | | | 94 | | | 5 | 100 | 2 | 5.0 | 6.3 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 8.4 | 10.2 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 11.9 | 18.0 | |
| IV/15/1-5 | 9082609 | PIME | Meyer's spruce | | 01 | 01 | CONT | 5 | 3 | 60 | 6 | 0.5 | 0.5 | |
| | | | *Picea meyeri* | | | 02 | | | 2 | 40 | 3 | 0.6 | 0.8 | |
| | | | Itasca Greenhouse, Inc. | | | 03 | | | 4 | 80 | 4.5 | 0.8 | 0.8 | |
| | | | | | | 05 | | | 3 | 60 | 5 | 1.2 | 1.0 | |
| IV/16/1-5 | PMK-1407 | QUMA | bur oak | 19-Apr | 90 | 90 | PLBR | 5 | 3 | 60 | 2 | 1.0 | 1.2 | |
| | 9004392 | | *Quercus macrocarpa* | | | 91 | | | 3 | 60 | 3 | 1.9 | 2.4 | |
| | | | USDA, NRCS, PMC, Manhattan, KS | | | 92 | | | 3 | 60 | 3 | 3.5 | 3.2 | |
| | | | | | | 94 | | | 3 | 60 | 2 | 6.3 | 5.7 | |
| | | | | | | 96 | | | 3 | 60 | 2 | 9.1 | 7.0 | no leader on 2, poor form on 4 |
| | | | | | | 99 | | | 3 | 60 | 4 | 13.2 | 10.7 | |
| | | | | | | 04 | | | 3 | 60 | 5 | 17.5 | 14.1 | leaf fungus on all 3 |
| IV/17/1-5 | 9069089 | QURO | English oak | 28-Apr | 93 | 93 | PLBR | 5 | 5 | 100 | 3 | 0.8 | 1.6 | |
| | | | *Quercus robur* | | | 94 | | | 5 | 100 | 1 | 2.0 | 2.0 | |
| | | | TEC, Osseo, MN | | | 95 | | | 5 | 100 | 3 | 0.8 | 1.6 | |
| | | | | | | 97 | | | 5 | 100 | 6 | 4.3 | 5.4 | severe dieback 2, mildew on 5 |
| | | | | | | 99 | | | 5 | 100 | 5 | 7.5 | 6.4 | |
| | | | | | | 02 | | | 5 | 100 | 6 | 8.2 | 8.0 | |
| IV/18/1-5 | 9063116 | FRNI | black ash | 31-May | 95 | 95 | CONT(P) | 5 | 5 | 100 | 3 | 0.2 | 1.3 | |
| | | | *Fraxinus nigra* | | | 96 | | | 5 | 100 | 3 | 0.3 | 1.7 | |
| | | | Itasca State Park, MN | | | 97 | | | 5 | 100 | 3 | 1.8 | 3.1 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 3.3 | 6.6 | |
| | | | | | | 01 | | | 5 | 100 | 5 | 5.0 | 10.6 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 6.0 | 12.1 | Top dead on 4 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/19/1-5 | 9063148 | PHSA | corktree | 31-May | 95 | 95 | CONT(P) | 5 | 2 | 40 | 2 | 0.3 | 1.6 | |
| | | | *Phellodendron sachalinense* | | | 96 | | | 5 | 100 | 3 | 1.1 | 2.6 | |
| | | | Clay Co., MN | | | 97 | | | 5 | 100 | 3 | 3.6 | 4.3 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 10.1 | 9.6 | |
| | | | | | | 01 | | | 5 | 100 | 4 | 12.8 | 12.1 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 14.6 | 13.2 | |
| IV/21/1-5 | 9063115 | FRPE | green ash | 31-May | 95 | 95 | CONT(P) | 5 | 5 | 100 | 3 | 0.2 | 1.7 | |
| | | | *Fraxinus pennsylvanica* | | | 96 | | | 5 | 100 | 3 | 0.8 | 2.2 | |
| | | | Itasca State Park, MN | | | 97 | | | 5 | 100 | 3 | 2.7 | 3.3 | herbicide damage on 1 |
| | | | | | | 99 | | | 5 | 100 | 3 | 3.7 | 6.0 | |
| | | | | | | 01 | | | 5 | 100 | 4 | 4.9 | 10.2 | herbicide damage |
| | | | | | | 04 | | | 5 | 100 | 4 | 11.0 | 15.7 | |
| IV/22/1-5 | 9016318 | ULPU | Siberian elm | 31-May | 95 | 95 | PLBR | 5 | 5 | 100 | 2 | 2.4 | 2.5 | |
| | | | *Ulmus pumila* | | | 96 | | | 5 | 100 | 3 | 7.5 | 5.3 | |
| | | | USDA, NRCS, PMC, Bridger, MT | | | 97 | | | 5 | 100 | 1 | 10.6 | 8.3 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 16.9 | 16.4 | |
| | | | | | | 01 | | | 3 | 60 | 4 | 12.3 | 17.3 | |
| | | | | | | 04 | | | 2 | 40 | 4 | 24.0 | 25.1 | |
| IV/23/1-5 | 9054820 | ULPU | Siberian elm | 31-May | 95 | 95 | PLBR | 5 | 5 | 100 | 4 | 1.5 | 2.1 | |
| | | | *Ulmus pumila* | | | 96 | | | 5 | 100 | 2 | 5.0 | 6.4 | |
| | | | USDA, NRCS, PMC, Bridger, MT | | | 97 | | | 5 | 100 | 2 | 6.7 | 7.8 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 11.3 | 15.8 | |
| | | | | | | 01 | | | 5 | 100 | 4 | 12.0 | 14.6 | herbicide damage |
| | | | | | | 04 | | | 5 | 100 | 6 | 14.8 | 16.9 | |
| IV/25/1-10 | ND-170 | COIN16 | cotoneaster | 20-Apr | 90 | 90 | CONT | 9 | 9 | 100 | 3 | 1.1 | 1.4 | |
| | 9005728 | | *Cotoneaster integerrimus* | | | 91 | | | 10 | 100 | 2 | 3.0 | 2.8 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 10 | 100 | 2 | 6.3 | 3.4 | excellent, some fruit |
| | | | | | | 94 | | | 10 | 100 | 1 | 9.8 | 4.9 | |
| | | | | | | 96 | | | 10 | 100 | 1 | 9.3 | 5.6 | |
| | | | | | | 99 | | | 10 | 100 | 3 | 10.8 | 6.9 | sandbar willow moving in |
| | | | | | | 04 | | | 10 | 100 | 5 | 12.0 | 10.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/26/1-5 | 9005399 | LOKO | blueleaf honeysuckle | 23-May | 91 | 91 | PLBR | 5 | 5 | 100 | 3 | 2.6 | 2.6 | |
| | | | *Lonicera korolkowii* | | | 92 | | | 5 | 100 | 3 | 5.2 | 3.8 | |
| | | | USDA, NRCS, PMC, Bridger, MT | | | 93 | | | 5 | 100 | 4 | 5.3 | 4.4 | |
| | | | | | | 95 | | | 5 | 100 | 6 | 7.8 | 6.8 | shade, sbr. willow competition |
| | | | | | | 97 | | | 5 | 100 | 4 | 9.4 | 8.5 | |
| | | | | | | 00 | | | 5 | 100 | | 11.3 | 10.9 | |
| | | | | | | 05 | | | 5 | 100 | | 13.0 | 11.3 | |
| IV/27/1-10 | ND-3902 | SAIN | sandbar willow | 19-Apr | 90 | 90 | CONT | 10 | 10 | 100 | 2 | 5.8 | 2.5 | |
| | 9035212 | | *Salix interior* | | | 91 | | | 10 | 100 | 1 | 9.3 | 5.7 | looks excellent |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 10 | 100 | 1 | 12.9 | 8.0 | excellent, no dieback, |
| | | | | | | 94 | | | 10 | 100 | 1 | 20.3 | 11.8 | spreading to adjacent areas |
| | | | | | | 96 | | | 10 | 100 | 3 | 21.3 | 13.1 | have become quite leggy, |
| | | | | | | 99 | | | 10 | 100 | 2 | 26.7 | 13.6 | suckering over two rows north |
| | | | | | | 04 | | | 10 | 100 | 7 | 17.0 | 10.0 | all have dieback, regrowth |

**OFF-CENTER EVALUATIONS: TECHNICAL REPORT – 2006**

Study 38I316K North Dakota State University, Dickinson Research Extension Center, Dickinson, North Dakota.

Study Title: Field Evaluation of Woody Plant Materials.

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas were located in the three states served by the PMC. These sites provide planting locations under long-term land tenure, for assemblies of trees and shrubs to be evaluated under uniform culture and management. New material can be added on an annual basis. Comparisons are then made with previously released cultivars and area of adaptation determined.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use. Superior cultivars will be selected and released for increase by commercial nurseries.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the North Dakota State University, Dickinson Research Extension Center, Dickinson, North Dakota.

Location: This project is located on the west edge of Dickinson, North Dakota, on the NDSU Dickinson Branch Experiment Station. Legal description: NE 1/4 sec. 5, T. 139 N., R. 96 W., Stark County, North Dakota.

Major Land Resource Area: The site is located in Major Land Resource Area 54, Rolling Soft Shale Plain. This moderately dissected rolling plain is underlain by calcareous shales and sandstones. Strongly dissected areas of sharp local relief or badland topography border major streams and valleys in some areas. Elevation is 1,800 to 3,100 feet. Sixty percent of the area is rangeland.

Soils: The soil type is a Parshall fine sandy loam. The Parshall series consists of deep, well-drained soils formed in fine sandy loam alluvium on terraces and outwash plains and in upland swales. The surface layer and subsoil is dark grayish-brown fine sandy loam. The underlying material is dark grayish-brown fine sandy loam and loamy fine sand. Permeability is moderately rapid. The available water capacity is moderate. Organic matter is high and fertility is medium. This soil is in North Dakota windbreak suitability group 5.

Climate: For MLRA 054, the average annual precipitation is 13 to 19 inches; increasing from west to east for this semiarid area. Rainfall is highest from late spring to midsummer and very low during the rest of the year. Winter precipitation is snow. Average annual temperature is 40 to 45 degrees F. Average freeze-free period is 110 to 135 days. The plant hardiness zone is 4a, with an average annual minimum temperature of -30 to -20 degrees F. Climatic data for 2006 recorded at Dickinson Research Extension Center, Dickinson, North Dakota, is shown in Table DI-1.

**Methods and Materials**

Assembly: Refer to Table DI-2 for a list of woody species planted from 1978 through 2006.

Planting Plan: Plots are not randomized or replicated but systematically arranged for ease of evaluation and demonstration purposes. The planting site is approximately 500 feet long and 200 feet wide. The area is divided into five blocks. Each block consists of single row, non-replicated plots. Each plot contains a minimum of 5 plants. Row length is 100 feet and spacing between rows is 20 feet. Block 1A contains

primarily poplar accessions. Block 1B contains conifers. Block 2 contains shrubs and small trees. Block 3 contains medium sized trees. Block 4 contains tall trees. Refer to the plot map in Figure DI-1. All trees are spaced ten feet within row and shrubs are spaced five feet within row. All rows run from west to east. Like species and standards of comparison are established in adjacent plots whenever possible.

Plot Preparation: A clean, firm planting site is prepared annually by disking and harrowing.

Planting Method: All trees and shrubs were hand planted using approved forestry methods.

Planting Date: Refer to Table DI-2 for planting dates of woody species planted from 1978 through 2006. Replacement stock is planted after establishment year if available.

Fertilization: No fertilizer has been applied to planting area.

Weed Control: No herbicide has been applied to any plot during year of establishment or in succeeding years. Weeds were controlled by clean cultivating between rows, within row, and in fallow areas. Four to six tillage operations were performed each year in the months of May through August. A minimum of hand hoeing was done to control weeds in rows.

Pest Control: No animal repellent or insecticide was applied in 1978. In the fall 1979, an animal repellent, Arasan 50, was sprayed on fruit trees to discourage rodent damage.

1980-1981: On November 6, 1980, and October 29, 1981, Arasan 50 was applied to the trunks and lower limbs of fruit trees to deter rodents from damaging bark and cambium. Conifers also received this spray treatment to discourage animal browse. No insecticides were applied.

1982-1995: No animal repellents or insecticides have been applied.

Irrigation: Each year, newly planted materials were watered with a portable tank. No water was added following year of establishment. During the drought years of 1988-1991, the trees were watered in the summer.

Crop Residue Management: During 1990 and 1991, a cover crop was maintained to prevent soil erosion.

Silvicultural Practices: Extensive pruning was done in 1979-1980 to reshape trees damaged by animals. Dead trees and broken branches were cut and removed each year for sanitation. In 1988, some Russian olive accessions were treated with Tordon, using a hypo-hatchet, with unsuccessful results. In 1989, those treated accessions were cut down, but resprouted. These trees were removed by tractor in 1993. In June 2001, a front end loader was used to remove poorly performing accessions. Because of damage caused by a snowstorm in October 2005, considerable pruning was done on the trees, both in the fall and in the spring of 2006. The most damage at the site occurred in the southeast corner where the hackberry trees are planted.

**Evaluations and Measurements**

Previous years: Records of planting date, survival, vigor, canopy width, height, cold hardiness, animal damage, insect damage, disease symptoms, and unusual or outstanding features have been maintained since 1978 and are listed in Table DI-2.

Plant performance data is recorded on one or more accessions during the growing season for the first three years. After the third year, data is gathered according to a specific schedule. Select data appears in this report. Additional information can be requested from the PMC.

## Results

Plant Performance: Currently, 93 accessions of 65 species are under evaluation. This site is fairly well maintained by the Dickinson Experiment Station. Very little weed competition has occurred within row. A favorable microclimate is provided by surrounding shelterbelts. This undoubtedly reduces exposure to extreme temperatures and winds and desiccation and winter injury. Annual rainfall amounts are similar to Bismarck. The drought years of 1988 and 1989 have severely hampered establishment and performance. With the continued dry weather in 1990 and 1991, much of the original windbreak of spruce planted on the border died out. A number of planted accessions also died. After the drought, precipitation was above normal for several years. The soils at the plot are a Parshall fine sandy loam, which is in Windbreak Suitability Group (WSG) 5. Some of the trees planted here, such as the hybrid poplars that were planted in 1990 grew very well initially, especially with years of above average rainfall in 1993-1995. Now they have reached a point where they need to be removed. The white poplar seems to be more drought-resistant. Also, the closely related quaking aspen seems to be doing better than the hybrid poplars. Other trees that are growing well on this fine sandy loam are many of the conifers, especially the Siberian larch and ponderosa pine. The following accessions exhibit potential for further evaluation and use:

| Accession Number | Genus/Species Origin/Source | Plot Location |
|---|---|---|
| ND-1765<br>9005980 | Siberian larch<br>*Larix sibirica*<br>USDA, FS, Shelterbelt Lab., Bottineau, ND | 1/03/1-10 |
| ND-1873<br>9005648 | amur maple<br>*Acer ginnala*<br>Lincoln-Oakes Nursery, Bismarck, ND | 3/09/1-5 |
| SD-156<br>9005890 | green ash<br>*Fraxinus pennsylvanica*<br>Deuel Co., Clear Lake, SD | 4/01/1-5 |
| ND-1879<br>9011850<br>PI-503531 | honeylocust<br>*Gleditsia triacanthos*<br>ARS Field Station, Woodward, OK | 4/04/1-5 |
| SD-75<br>9005713 | hackberry<br>*Celtis occidentalis*<br>Potter Co., SD | 4/9/1-10 |
| 9069090 | quaking aspen<br>*Populus tremuloides*<br>Lee Nursery, Fertile, MN | 1A/5/6-10 |

## Figure DI-1. Dickinson FEP plot map

| | Block 1A | | Block 1B | | Block 2 | | Block 3 | | | | Block 4 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Row 1** | 14272 poplar | 14271 poplar | ND-1729 Siberian larch | | ND-313 red tatarian honeysuckle | ND-1730 red tatarian honeysuckle | 'Midwest' Manchurian crabapple | | 'Red Splendor' crabapple | | SD-156 green ash | ND-1734 green ash |
| **Row 2** | 9082885 aspen | 9082619 green ash | SL-383-T Siberian larch | | 9082684 smooth sumac | 9008183 Sheridan source chockecherry | ND-1731 Siberian crabapple | | 'McDermand' Ussurian pear | | 'Cardan' green ash | ND-1759 green ash |
| **Row 3** | 14392 Walker poplar | Canam Walker poplar | ND-1765 Siberian larch | | ND-26 honeysuckle/ ND-452 honeysuckle | ND-170 cotoneaster | 'Freedom' honey-suckle | 9063143 red tatarian honey-suckle | Survivor false indigo | 'Arnolds Red' honey-suckle | ND-647 black ash | ND-1432 Ohio buckeye |
| **Row 4** | ND-3796 white poplar | Raverdeau poplar | ND-1763 ponderosa pine | ND-1565 bristlecone pine | 9082711 winterberry euonymus | 'Regal' Russian almond | 'Konza' aromatic sumac | 'Scarlet' Mongolian cherry | | 'Legacy' late lilac | ND-1879 honeylocust | |
| **Row 5** | 9082640 Gambel oak | 9069090 quaking aspen | 9057413 ponderosa pine | 9069169 Siberian pine | ND-11 amur honeysuckle | 'Centennial' cotoneaster | 'Sakakawea' silver buffaloberry | | 'Magenta' crabapple | | 9063116 black ash | |
| **Row 6** | 9063146 Walker Poplar | Assiniboine poplar | 9069172 Scots pine | Silverscape R. olive X silverberry | 9057406 rugosa rose | 9082638 western blue elderberry | 9076726 tatarian maple | | 9091969 Russian peashrub | | 9063115 green ash | 9076724 Russian olive |
| **Row 7** | 9063141 eastern cottonwood | | | ND-3803 white poplar | 9076737 black cherry | 323957 chokeberry | 9076686 roundleaf hawthorn | | 9082653 skunkbush sumac | | ND-989 Japanese elm | 9069166 Russian olive |
| **Row 8** | Hunter ponderosa pine | Bridger-Select juniper | 9076722 European white birch | | 9063142 Japanese cherry | 9082713 Siberian peach | 'Prairie Red' plum | | ND-629 amur maple | | 'Oahe' hackberry | |
| **Row 9** | 9069164 Scots pine | 9069168 Siberian larch | 9063148 corktree | ND-21 nannyberry | 'Homestead' Arnold hawthorn | | ND-1873 amur maple | | ND-686 Pekin lilac | | SD-75 hackberry | |
| **Row 10** | 9082641 pinyon pine | 9082889 mugo pine | 9069081 littleleaf linden | 9063126 Japanese elm | mayday/ common juniper | salt tree/ bittersweet | 9069129 amur chokecherry | | | | | 9057410 hackberry |
| | **Block 1A** | | **Block 1B** | | **Block 2** | | **Block 3** | | | | **Block 4** | |

revised 9/06

**Table No. DI-1: 2006 Weather Summary - Official Station - Dickinson, North Dakota**

| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) | | |
|---|---|---|---|---|---|---|
| | | | | Actual | | Deviation from Normal |
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 28.4 | 12.0 | | 0.27 | 0.35 | -0.08 |
| February | 20.0 | 18.9 | | 0.09 | 0.37 | -0.28 |
| March | 28.6 | 28.7 | | 1.00 | 0.67 | 0.33 |
| April | 47.3 | 41.3 | | 2.51 | 1.63 | 0.88 |
| May | 54.3 | 53.4 | | 2.08 | 2.24 | -0.16 |
| June | 64.7 | 62.4 | | 0.68 | 3.57 | -2.89 |
| July | 74.3 | 68.1 | | 1.33 | 2.20 | -0.87 |
| August | 69.7 | 67.3 | | 1.07 | 1.65 | -0.58 |
| September | 54.6 | 55.4 | | 1.86 | 1.62 | 0.24 |
| October | 39.6 | 43.3 | | 1.48 | 1.31 | 0.17 |
| November | 30.0 | 27.3 | | 0.11 | 0.63 | -0.52 |
| December | 20.2 | 16.2 | | 0.29 | 0.37 | -0.08 |
| **Annual** | **44.3** | **41.2** | | **12.77** | **16.61** | **-3.84** |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |

| | 2006 |
|---|---|
| Last Frost (28 degrees) | 5-May |
| First Frost (28 degrees) | 19-Sep |
| Frost Free Period | 136 days |

**Key to Table DI-2. 38I316K Field Evaluation of Woody Plant Materials – Dickinson, North Dakota**

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table DI-2.**
**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA/01/1-5 | 9058870 | PDXP8 | poplar | 9-May | 90 | 90 | PLBR | 5 | 5 | 100 | 1 | 1.5 | 3.3 | |
| | 14272 | | *Populus deltoides x P. nigra* | | | 91 | | | 5 | 100 | 3 | 2.3 | 4.1 | |
| | | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 5 | 3.6 | 5.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 5 | 100 | 2 | 7.2 | 14.7 | |
| | | | | | | 96 | | | 5 | 100 | 2 | 10.0 | 24.6 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 10.6 | 35.6 | |
| | | | | | | 04 | | | 5 | 100 | 6 | 7.5 | 16.2 | one cut off & resprouting |
| IA/01/6-10 | 9058869 | PDXP8 | poplar | 9-May | 90 | 90 | PLBR | 5 | 5 | 100 | 3 | 1.1 | 3.1 | |
| | 14271 | | *Populus deltoides x P. nigra* | | | 91 | | | 1 | 20 | 6 | 0.3 | 1.8 | |
| | | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 20 | 4 | 1.7 | 3.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 5 | 100 | 3 | 5.6 | 10.6 | |
| | | | | | | 96 | | | 5 | 100 | 4 | 8.8 | 17.4 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 9.9 | 30.7 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 9.2 | 24.0 | |
| IA/02/1-5 | 9082885 | POTR5 | aspen | 11-May | 04 | 04 | | 5 | 5 | 100 | 4 | 0.8 | 1.9 | browsed off regrowing |
| | | | *Populus tremuloides* | | | 05 | | | 3 | 60 | 3 | 2.1 | 3.5 | |
| | | | NDFS Nursery, Towner, ND | | | 06 | | | 5 | 100 | 4 | 2.0 | 2.7 | |
| 1A/02/6-10 | 9082619 | FRPE | green ash | 16-May | 02 | 02 | CONT | 5 | 5 | 100 | 5 | 0.5 | 0.8 | 3,5 browsed by rabbit |
| | | | *Fraxinus pennsylvanica* | | | 03 | | | 3 | 60 | 4 | 0.5 | 1.3 | |
| | | | Jordan, MT | | | 04 | | | 5 | 100 | 3 | 0.9 | 2.4 | |
| | | | Valley Nursery, Helena, MT | | | 06 | | | 5 | 100 | 3 | 2.1 | 4.3 | |
| IA/03/1-5 | 'Manitou' | POPUL | poplar | 9-May | 90 | 90 | PLBR | 5 | 5 | 100 | 2 | 1.7 | 3.0 | |
| | 9058874 | | *Populus* | | | 91 | | | 5 | 100 | 4 | 2.5 | 4.1 | |
| | 14392 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 4 | 1.6 | 3.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 5 | 100 | 2 | 9.5 | 16.2 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 11.7 | 24.6 | anthracnose on leaves, |
| | | | | | | 99 | | | 5 | 100 | 3 | 12.2 | 35.2 | leaves dropping on all trees |
| | | | | | | 04 | | | 5 | 100 | 5 | 11.8 | 24.6 | |

**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA/03/6-10 | 'CanAm' | POPUL | poplar | 9-May | 90 | 90 | PLBR | 5 | 5 | 100 | 3 | 1.2 | 3.7 | |
| | 9058873 | | *Populus* | | | 91 | | | 1 | 20 | 5 | 1.0 | 2.0 | |
| | 14390 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 4 | 1.6 | 3.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 5 | 100 | 3 | 5.9 | 11.0 | |
| | | | | | | 96 | | | 5 | 100 | 4 | 10.8 | 16.7 | |
| | | | | | | 99 | | | 5 | 100 | 4 | 9.7 | 30.1 | |
| | | | | | | 05 | | | 4 | 80 | 4 | 14.4 | 29.3 | |
| IA/04/1-5 | 9030611 | POAL7 | white poplar | 15-May | 92 | 92 | CONT(P) | 5 | 4 | 80 | 4 | 1.6 | 1.6 | |
| | ND-3796 | | *Populus alba* | | | 93 | | | 5 | 100 | 2 | 3.8 | 3.7 | |
| | | | Turner Co., SD | | | 94 | | | 4 | 80 | 3 | 6.3 | 5.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 96 | | | 4 | 80 | 6 | 8.7 | 7.7 | dieback on all trees |
| | | | | | | 98 | | | 4 | 80 | 3 | 14.4 | 13.3 | |
| | | | | | | 02 | | | 4 | 80 | 7 | 17.0 | 13.5 | dieback from freezing on all |
| | | | | | | 06 | | | 4 | 80 | | 16.0 | 15.2 | |
| IA/04/6-10 | 'Raverdeau' | POPUL | hybrid poplar | 10-May | 93 | 93 | PLBR | 5 | 5 | 100 | 3 | 1.2 | 2.3 | |
| | 9069085 | | *Populus* | | | 94 | | | 5 | 100 | 3 | 3.9 | 6.3 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 2 | 8.0 | 12.6 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 11.9 | 16.8 | |
| | | | | | | 99 | | | 5 | 100 | 4 | 9.3 | 27.1 | |
| | | | | | | 02 | | | 5 | 100 | 7 | 12.0 | 15.0 | dieback from freezing on all |
| IA/05/1-5 | 9082640 | QUGA | Gambel oak | 13-May | 99 | 99 | CONT | 5 | 5 | 100 | 3 | 0.8 | 1.6 | |
| | | | *Quercus gambelii* | | | 00 | | | 3 | 60 | 4 | 0.9 | 1.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 3 | 60 | 3 | 2.1 | 2.3 | |
| | | | | | | 03 | | | 3 | 60 | 3 | 0.9 | 1.9 | browsed |
| | | | | | | 05 | | | 3 | 60 | 5 | 1.2 | 2.0 | |
| IA/05/6-10 | 9069090 | POTR5 | quaking aspen | 15-May | 93 | 93 | PLBR | 5 | 4 | 80 | 5 | 0.8 | 1.7 | |
| | | | *Populus tremuloides* | | | 94 | | | 5 | 100 | 3 | 1.7 | 4.1 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 3 | 3.4 | 6.2 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 5.8 | 9.9 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 8.8 | 17.3 | very colorful fall foliage |
| | | | | | | 02 | | | 5 | 100 | 1 | 12.5 | 22.6 | almost white bark on 5 |

**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA/06/1-5 | Walker | POPUL | hybrid poplar | 10-May | 93 | 93 | PLBR | 5 | 5 | 100 | 6 | 0.2 | 1.1 | |
| | 9063146 | | *Populus* | | | 94 | | | 5 | 100 | 4 | 2.3 | 4.7 | |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 95 | | | 5 | 100 | 2 | 6.0 | 10.8 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 11.3 | 20.8 | moderate leaf rust |
| | | | | | | 99 | | | 5 | 100 | 3 | 9.4 | 30.3 | |
| | | | | | | 02 | | | 5 | 100 | 5 | 13.0 | 28.4 | |
| IA/06/6-10 | Assiniboine | POPUL | hybrid poplar | 10-May | 93 | 93 | PLBR | 5 | 5 | 100 | 4 | 0.5 | 1.8 | |
| | 9063147 | | *Populus* | | | 94 | | | 5 | 100 | 3 | 3.7 | 6.1 | |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 95 | | | 5 | 100 | 3 | 7.9 | 11.4 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 11.7 | 17.1 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 11.5 | 27.8 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 14.0 | 31.4 | leaf disease on all |
| IA/07/1-5 | 9063141 | PODE3 | eastern cottonwood | 10-May | 93 | 93 | PLBR | 5 | 5 | 100 | 3 | 1.6 | 3.4 | |
| | | | *Populus deltoides* | | | 94 | | | 5 | 100 | 2 | 5.6 | 9.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 95 | | | 5 | 100 | 3 | 8.1 | 13.7 | severe leaf rust |
| | | | | | | 97 | | | 5 | 100 | 2 | 15.7 | 22.4 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 13.5 | 31.8 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 18.0 | 37.4 | 2,3,4,5 have some leaf disease |
| IA/08/1-5 | 'Hunter Germplasm' | PIPOS | ponderosa pine | 17-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.9 | 1.3 | |
| | | | *Pinus ponderosa* var. *scopulorum* | | | 06 | | | 5 | 100 | 3 | 1.1 | 1.8 | |
| | 9081843 | | USDA, NRCS, Bridger, MT | | | | | | | | | | | |
| 1A/08/6-10 | 9078631 | JUSC2 | Rocky Mountain juniper | 17-May | 05 | 05 | | 5 | 5 | 100 | 5 | 0.7 | 1.0 | one mowed off |
| | 'Bridger-Select' | | *Juniperus scopulorum* | | | 06 | | | 5 | 100 | 4 | 1.0 | 1.6 | |
| | | | Bridger PMC, MT | | | | | | | | | | | |
| IA/09/1-5 | 9069164 | PISY | Scots pine | 4-May | 98 | 98 | CONT | 5 | 4 | 80 | 4 | 0.8 | 1.2 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 99 | | | 4 | 80 | 4 | 1.0 | 1.5 | |
| | | | Heilongjiang Province, China | | | 00 | | | 4 | 80 | 3 | 1.6 | 2.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 4 | 80 | 3 | 3.0 | 4.0 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 4.2 | 5.7 | |

**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA/09/6-10 | 9069168 | LASI | Siberian larch | 4-May | 98 | 98 | CONT | 5 | 4 | 80 | 4 | 0.6 | 1.3 | |
| | | | *Larix sibirica* | | | 99 | | | 5 | 100 | 3 | 1.0 | 1.8 | |
| | | | Altai region, Russia | | | 00 | | | 1 | 20 | 2 | 1.4 | 2.8 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 1 | 20 | 1 | 3.0 | 6.5 | |
| | | | | | | 04 | | | 1 | 20 | 1 | 4.5 | 9.0 | |
| IA/10/1-5 | 9082641 | PIED | Pinyon pine | 13-May | 99 | 99 | CONT | 5 | 5 | 100 | 3 | 0.9 | 1.4 | |
| | | | *Pinus edulis* | | | 00 | | | 1 | 20 | 3 | 1.0 | 1.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 1 | 20 | 3 | 1.3 | 1.3 | |
| | | | | | | 03 | | | 1 | 20 | 2 | 1.3 | 1.8 | |
| | | | | | | 05 | | | 1 | 20 | 6 | 1.5 | 1.8 | |
| IA/10/6-10 | 9082889 | PIMU80 | Mugo pine | 11-May | 04 | 04 | | 5 | 1 | 20 | 3 | 0.8 | 1.3 | |
| | | | *Pinus mugo* | | | 05 | | | 2 | 40 | 6 | 0.8 | 0.7 | |
| | | | Big Sioux Nursery, Watertown SD | | | 06 | | | 3 | 60 | 4 | 1.2 | 1.0 | |
| IB/01/1-10 | ND-1729 | LASI* | Siberian larch | 16-May | 78 | 78 | PLBR | 10 | 9 | 90 | 3 | 0.7 | 2.0 | |
| | 9005979 | | *Larix sibirica* | | | 79 | | | 10 | 100 | | 0.7 | 1.4 | |
| | | | NDFS State Nursery, Towner, ND | | | 80 | | | 10 | 100 | 4 | 1.1 | 1.8 | |
| | | | | | | 82 | | | 8 | 80 | 8 | 1.0 | 1.5 | |
| | | | | | | 83 | | | 6 | 60 | 7 | 1.1 | 2.4 | 1 mowed off, moderate rodent |
| | | | | | | 84 | | | 6 | 60 | 4 | 1.3 | 3.0 | damage |
| | | | | | | 87 | | | 6 | 60 | 6 | 3.0 | 6.5 | |
| | | | | | | 92 | | | 5 | 50 | 4 | 7.7 | 11.4 | |
| | | | | | | 97 | | | 5 | 50 | 2 | 13.1 | 17.9 | |
| | | | | | | 02 | | | 5 | 50 | 2 | 17.5 | 25.8 | |
| IB/02/1-10 | SL-383-T | LASI* | Siberian larch | 17-May | 78 | 78 | PLBR | 10 | 10 | 100 | 3 | 0.6 | 2.2 | |
| | Pallet No. | | *Larix sibirica* | | | 79 | | | 10 | 100 | | 0.8 | 1.6 | |
| | 2392 | | Denbigh Exp. Forest | | | 80 | | | 10 | 100 | 4 | 1.4 | 2.0 | |
| | 9005976 | | USDA, FS, Shelterbelt Lab., | | | 82 | | | 9 | 90 | 6 | 1.5 | 2.3 | |
| | | | Bottineau, ND | | | 83 | | | 9 | 90 | 6 | 2.0 | 3.9 | 1 mowed off, moderate rodent |
| | | | | | | 84 | | | 8 | 80 | 2 | 2.6 | 5.6 | damage |
| | | | | | | 87 | | | 8 | 80 | 2 | 5.9 | 10.0 | |
| | | | | | | 92 | | | 8 | 80 | 8 | 9.9 | 16.4 | |
| | | | | | | 97 | | | 8 | 80 | 1 | 16.2 | 23.3 | |
| | | | | | | 02 | | | 8 | 80 | 2 | 19.0 | 32.0 | |

**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IB/03/1-10 | ND-1765 | LASI* | Siberian larch | 17-May | 78 | 78 | PLBR | 10 | 10 | 100 | 3 | 0.6 | 1.4 | |
| | 9005980 | | *Larix sibirica* | | | 79 | | | 10 | 100 | | 1.1 | 1.6 | |
| | | | USDA, FS, Shelterbelt Lab., | | | 80 | | | 10 | 100 | 4 | 1.8 | 2.7 | |
| | | | Bottineau, ND | | | 82 | | | 10 | 100 | 5 | 2.1 | 4.0 | |
| | | | | | | 83 | | | 10 | 100 | 5 | 2.6 | 4.9 | moderate rodent damage, best |
| | | | | | | 84 | | | 10 | 100 | 4 | 3.6 | 6.1 | accession of larch |
| | | | | | | 87 | | | 9 | 90 | 2 | 7.0 | 11.0 | |
| | | | | | | 92 | | | 9 | 90 | 2 | 10.4 | 17.5 | |
| | | | | | | 97 | | | 9 | 90 | 2 | 15.6 | 24.2 | |
| | | | | | | 02 | | | 9 | 90 | 2 | 22.0 | 32.0 | |
| IB/04/1-5 | ND-1763 | PIPO | ponderosa pine | 16-May | 78 | 78 | CONT | 5 | 5 | 100 | 1 | 0.5 | 1.7 | |
| | 9006043 | | *Pinus ponderosa* | | | 79 | | | 4 | 80 | | 0.5 | 1.1 | |
| | | | 757-5 Todd Co., SD | | | 80 | | | 5 | 100 | 4 | 1.5 | 2.0 | |
| | | | USDA, FS, Shelterbelt Lab., | | | 82 | | | 4 | 80 | 7 | 2.4 | 4.4 | |
| | | | Bottineau, ND | | | 83 | | | 4 | 80 | 5 | 2.9 | 3.6 | animal damage |
| | | | | | | 84 | | | 4 | 80 | 3 | 3.8 | 4.9 | |
| | | | | | | 87 | | | 3 | 60 | 3 | 5.2 | 7.5 | |
| | | | | | | 92 | | | 3 | 60 | 3 | 9.1 | 14.0 | |
| | | | | | | 97 | | | 3 | 60 | 1 | 15.4 | 21.7 | |
| | | | | | | 02 | | | 3 | 60 | 3 | 21.0 | 33.0 | |
| IB/04/6-10 | ND-1565 | PIAR | bristle cone pine | 16-May | 78 | 78 | CONT | 5 | 5 | 100 | 3 | 0.5 | 0.6 | |
| | 9006036 | | *Pinus aristata* | | | 79 | | | 5 | 100 | | 0.7 | 0.6 | |
| | | | USDA, FS, Shelterbelt Lab., | | | 80 | | | 5 | 100 | 5 | 1.0 | 0.8 | |
| | | | Bottineau, ND | | | 82 | | | 1 | 20 | 5 | 2.1 | 3.0 | |
| | | | | | | 83 | | | 4 | 80 | 8 | 1.0 | 0.8 | mower damage on plt 3 |
| | | | | | | 84 | | | 2 | 40 | 3 | 1.9 | 1.8 | |
| | | | | | | 87 | | | 2 | 40 | 6 | 2.3 | 2.0 | |
| | | | | | | 92 | | | 1 | 20 | 5 | 5.4 | 3.9 | |
| | | | | | | 97 | | | 1 | 20 | 1 | 8.2 | 7.7 | |
| | | | | | | 02 | | | 1 | 20 | 3 | 16.5 | 10.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IB/05/1-5 | 9057413 | PIPO | ponderosa pine | 11-May | 88 | 88 | CONT | 5 | 2 | 40 | 4 | 0.3 | 1.1 | |
| | | | *Pinus ponderosa* | | | 89 | | | 2 | 40 | 4 | 0.7 | 1.4 | |
| | | | Glendive, MT | | | 90 | | | 4 | 80 | 4 | 0.8 | 1.5 | |
| | | | NDFS | | | 92 | | | 4 | 80 | 4 | 1.2 | 2.2 | |
| | | | | | | 94 | | | 4 | 80 | 4 | 3.0 | 4.2 | |
| | | | | | | 97 | | | 4 | 80 | 2 | 7.2 | 9.3 | |
| | | | | | | 02 | | | 4 | 80 | 2 | 12.5 | 20.9 | |
| IB/05/6-10 | 9069169 | PINUS | Siberian pine | 14-May | 03 | 03 | | 5 | 5 | 100 | | | | |
| | | | *Pinus sibirica* | | | 04 | | | 5 | 100 | 3 | 0.6 | 0.8 | |
| | | | Altai | | | 05 | | | 5 | 100 | 4 | 1.0 | 0.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | | | | | | | | | |
| IB/06/1-5 | 9069172 | PISY | Scots pine | 6-May | 97 | 97 | CONT | 5 | 5 | 100 | 2 | 0.5 | 1.2 | |
| | | | *Pinus sylvestris* | | | 98 | | | 4 | 80 | 3 | 1.2 | 1.7 | |
| | | | Altai region, Russia | | | 99 | | | 5 | 100 | 1 | 1.3 | 2.6 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 01 | | | 5 | 100 | 2 | 2.5 | 4.9 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 4.2 | 7.7 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 6.4 | 12.4 | |
| IB/6/6-10 | 9092054 | ELAEA | Russian olive/silverberry hybrid *Elaeagnus X* 'Jefmorg' | | | 06 | CONT | 5 | 2 | 40 | 7 | 0.3 | 0.9 | 5 chewed by rabbits |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| IB/07/6-10 | ND-3803 | POAL7 | white poplar | 24-May | 94 | 94 | CONT | 5 | 5 | 100 | 3 | 2.0 | 3.1 | |
| | 9030612 | | *Populus alba* | | | 95 | | | 4 | 80 | 2 | 6.2 | 6.5 | |
| | | | USDA, PMC, Bismarck, ND | | | 96 | | | 4 | 80 | 5 | 4.4 | 4.4 | |
| | | | | | | 98 | | | 4 | 80 | 3 | 11.2 | 11.1 | |
| | | | | | | 00 | | | 4 | 80 | 2 | 14.0 | 17.3 | |
| | | | | | | 03 | | | 4 | 80 | 2 | 19.4 | 21.1 | |
| IB/09/1-5 | 9063148 | PHSA | corktree | 4-May | 95 | 95 | CONT | 5 | 5 | 100 | 4 | 0.7 | 1.3 | |
| | | | *Phellodendron sachalinense* | | | 96 | | | 4 | 80 | 3 | 1.7 | 2.2 | |
| | | | Clay Co., MN | | | 97 | | | 4 | 80 | 3 | 2.6 | 2.9 | |
| | | | | | | 99 | | | 3 | 60 | 2 | 5.2 | 5.7 | some hail damage |
| | | | | | | 01 | | | 3 | 60 | 3 | 10.8 | 8.3 | |
| | | | | | | 05 | | | 3 | 60 | 2 | 14.8 | 11.3 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IB/09/6-10 | ND-21 | VILE | nannyberry | 7-May | 86 | 86 | PLBR | 5 | 5 | 100 | 3 | 0.5 | 1.5 | |
| | 9034900 | | *Viburnum lentago* | | | 87 | | | 5 | 100 | 3 | 0.7 | 1.9 | |
| | | | USDA, ARS, Mandan, ND | | | 88 | | | 5 | 100 | 3 | 1.5 | 2.7 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 90 | | | 5 | 100 | 3 | 2.7 | 3.8 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 4.2 | 4.7 | |
| | | | | | | 95 | | | 5 | 100 | 2 | 6.5 | 7.4 | fruit on 1,2,4,5 |
| | | | | | | 00 | | | 5 | 100 | 5 | 9.7 | 10.3 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 12.0 | 11.2 | leaves quite dry on 1 |
| IB/10/1-5 | 9069081 | TICO | littleleaf linden | 10-May | 93 | 93 | CONT(P) | 5 | 5 | 100 | 5 | 0.7 | 1.3 | weedy |
| | | | *Tilia cordata* | | | 94 | | | 5 | 100 | 4 | 0.6 | 1.2 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 4 | 2.1 | 2.8 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 4.0 | 4.0 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 6.9 | 7.4 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 10.5 | 11.6 | |
| IB/10/6-10 | 9063126 | ULJA80 | Japanese elm | 15-May | 92 | 92 | CONT(P) | 5 | 3 | 60 | 4 | 1.7 | 1.7 | |
| | | | *Ulmus japonica* | | | 94 | | | 3 | 60 | 3 | 4.2 | 4.5 | |
| | | | Manchuria | | | 96 | | | 5 | 100 | 4 | 5.9 | 6.3 | 5 is sucker |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 98 | | | 4 | 80 | 5 | 12.0 | 10.7 | dieback on 2,3,4 |
| | | | | | | 01 | | | 4 | 80 | 4 | 14.8 | 11.7 | all have dead branches |
| | | | | | | 06 | | | 4 | 80 | 4 | 16.0 | 12.9 | dieback on 3,4; severe on 3 |
| II/01/1-10 | ND-313 | LOTAS* | red tatarian honeysuckle | 17-May | 78 | 78 | PLBR | 10 | 9 | 90 | 1 | 1.5 | 1.6 | |
| | 9005996 | | *Lonicera tatarica sibirica* | | | 79 | | | 9 | 90 | | 2.0 | 2.4 | |
| | PI-477999 | | USDA, ARS, Cheyenne, WY | | | 80 | | | 10 | 100 | 3 | 3.2 | 2.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 10 | 100 | 4 | 5.3 | 4.5 | |
| | | | | | | 83 | | | 10 | 100 | 3 | 5.9 | 5.4 | good fruit |
| | | | | | | 84 | | | 10 | 100 | 4 | 7.4 | 5.5 | moderate-severe insect |
| | | | | | | 87 | | | 10 | 100 | 3 | 5.6 | 6.7 | defoliation, honeysuckle aphid |
| | | | | | | 92 | | | 10 | 100 | 5 | 6.8 | 7.3 | |
| | | | | | | 97 | | | 10 | 100 | 5 | 15.3 | 9.0 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 15.5 | 11.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/01/11-20 | ND-1730 | LOTAS* | red tatarian honeysuckle | 17-May | 78 | 78 | PLBR | 10 | 10 | 100 | 1 | 1.6 | 1.7 | |
| | 9005994 | | *Lonicera tatarica sibirica* | | | 79 | | | 10 | 100 | | 2.2 | 2.8 | |
| | | | Lincoln-Oakes Nursery, | | | 80 | | | 10 | 100 | 1 | 3.4 | 3.0 | |
| | | | Bismarck, ND | | | 82 | | | 10 | 100 | 4 | 5.9 | 5.2 | |
| | | | | | | 83 | | | 10 | 100 | 3 | 6.7 | 6.5 | good vigor |
| | | | | | | 84 | | | 10 | 100 | 5 | 7.7 | 6.6 | slight insect defoliation |
| | | | | | | 87 | | | 10 | 100 | 3 | 6.5 | 7.2 | good fruit production, |
| | | | | | | 92 | | | 9 | 90 | 6 | 6.4 | 7.1 | snow damage, aphid damage |
| | | | | | | 97 | | | 9 | 90 | 5 | 15.3 | 8.2 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 15.5 | 11.5 | |
| II/02/1-5 | 9082684 | RHGL | smooth sumac | 14-May | 03 | 03 | | 5 | | | | | | weedy, poor survival |
| | | | *Rhus glabra* | | | 04 | | | 5 | 100 | 3 | 3.0 | 2.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 05 | | | 5 | 100 | 4 | 4.8 | 3.6 | |
| ll/02/6-10 | 9008183 | PRVI | common chokecherry | 17-May | 05 | 05 | | 5 | 4 | 100 | 4 | 1.0 | 2.3 | |
| | | | *Prunus virginiana* | | | 06 | | | 4 | 100 | 4 | 2.2 | 3.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck ND | | | | | | | | | | | |
| II/03/1-10 | ND-26 | LONIC | honeysuckle | 2-May | 79 | 79 | PLBR | 10 | 10 | 100 | | 1.1 | 1.4 | |
| | 9011852 | | *Lonicera* | | | 80 | | | 10 | 100 | 5 | 2.0 | 1.7 | |
| | | | USDA, ARS, Mandan, ND | | | 81 | | | 10 | 100 | | 2.6 | 2.9 | |
| | | | | | | 83 | | | 10 | 100 | 4 | 4.5 | 4.8 | leaf spot |
| | | | | | | 84 | | | 10 | 100 | 4 | 4.9 | 5.4 | witches broom on plts 3,5,8 |
| | | | | | | 88 | | | 10 | 100 | 4 | 7.5 | 7.0 | moderate insect defoliation, |
| | | | | | | 93 | | | 10 | 100 | 5 | 10.5 | 9.0 | grasshoppers, aphid damage |
| | | | | | | 98 | | | 10 | 100 | 4 | 15.4 | 10.5 | aphid damage on 3 |
| | | | | | | 03 | | | 10 | 100 | 4 | 21.0 | 11.8 | |
| II/03/11-15 | ND-452 | LOXYM* | honeysuckle | 2-May | 79 | 79 | PLBR | 5 | 5 | 100 | | 1.2 | 1.3 | |
| | 9019978 | | *Lonicera xylosteum mollis* | | | 80 | | | 5 | 100 | 3 | 2.3 | 1.5 | |
| | | | USDA, ARS, Cheyenne, WY | | | 81 | | | 5 | 100 | | 3.2 | 2.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 5 | 100 | 4 | 5.5 | 5.5 | witches broom on 1,2,3 |
| | | | | | | 84 | | | 5 | 100 | 3 | 6.5 | 5.5 | slight leaf spot, leaf |
| | | | | | | 88 | | | 5 | 100 | 5 | 7.5 | 6.7 | blight, aphid damage |
| | | | | | | 93 | | | 5 | 100 | 6 | 9.3 | 7.6 | |
| | | | | | | 98 | | | 5 | 100 | 6 | 11.5 | 8.4 | severe aphid damage on 1,2 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/03/16-20 | ND-170 | COIN | cotoneaster | 9-May | 90 | 90 | CONT | 5 | | | | | | |
| | 9005728 | | *Cotoneaster integerrimus* | | | 91 | | | 4 | 80 | 6 | 0.8 | 1.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 4 | 80 | 6 | 1.5 | 1.4 | |
| | | | | | | 94 | | | 4 | 80 | 4 | 4.1 | 3.0 | |
| | | | | | | 96 | | | 4 | 80 | 4 | 5.5 | 3.5 | |
| | | | | | | 99 | | | 4 | 80 | 4 | 5.1 | 3.5 | |
| | | | | | | 04 | | | 4 | 80 | 5 | 6.5 | 4.5 | fireblight on 2, 3 |
| II/04/1-5 | 9082711 | EUBU6 | winterberry euonymus | 16-May | 02 | 02 | PLBR | 5 | 4 | 80 | 4 | 1.0 | 1.7 | |
| | | | *Euonymus bungeanum* | | | 03 | | | 4 | 80 | 5 | 0.9 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 4 | 80 | 5 | 0.4 | 0.9 | cut off #4 |
| | | | | | | 06 | | | 4 | 80 | 5 | 0.3 | 1.4 | 2 chewed off, 3 heavily browsed |
| II/04/11-20 | 'Regal' | PRTE80 | Russian almond | 8-May | 80 | 80 | PLBR | 10 | 10 | 100 | 5 | 0.8 | 2.2 | |
| | ND-283 | | *Prunus tenella* | | | 81 | | | 7 | 70 | | 0.9 | 1.4 | |
| | 9006079 | | ND Game & Fish Dept. | | | 82 | | | 10 | 100 | 4 | 1.8 | 2.3 | |
| | PI-540442 | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 8 | 80 | 4 | 3.9 | 3.5 | few pests |
| | | | | | | 84 | | | 10 | 100 | 4 | 3.8 | 3.7 | |
| | | | | | | 86 | | | 9 | 90 | 4 | 5.2 | 4.5 | |
| | | | | | | 88 | | | 9 | 90 | 3 | 6.0 | 4.7 | |
| | | | | | | 89 | | | 9 | 90 | 4 | 4.2 | 4.8 | |
| | | | | | | 94 | | | 9 | 90 | 4 | 6.6 | 4.3 | |
| | | | | | | 99 | | | 5 | | 3 | 13.1 | 6.6 | |
| | | | | | | 04 | | | 10 | 100 | 3 | 13.0 | 7.0 | |
| II/05/1-10 | ND-11 | LOMA6 | amur honeysuckle | 7-May | 81 | 81 | CONT | 10 | 10 | 100 | | 0.7 | 0.6 | |
| | 9005993 | | *Lonicera maackii* | | | 82 | | | 10 | 100 | 4 | 1.4 | 1.4 | |
| | PI-477998 | | Res. Sta., Morden, MB, Canada | | | 83 | | | 6 | 60 | 6 | 1.6 | 1.8 | slight insect |
| | | | | | | 84 | | | 10 | 100 | 4 | 2.1 | 1.8 | defoliation (grasshoppers) |
| | | | | | | 86 | | | 10 | 100 | 4 | 4.2 | 4.6 | |
| | | | | | | 87 | | | 10 | 100 | 3 | 8.5 | 5.6 | |
| | | | | | | 88 | | | 10 | 100 | 4 | 7.4 | 5.6 | |
| | | | | | | 90 | | | 10 | 100 | 4 | 5.7 | 5.7 | |
| | | | | | | 95 | | | 10 | 100 | 4 | 7.1 | 8.5 | |
| | | | | | | 00 | | | 10 | 100 | 4 | 8.4 | 10.0 | |
| | | | | | | 05 | | | 10 | 100 | 2 | 16.1 | 12.2 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/05/11-20 | 'Centennial' | COIN | cotoneaster | 8-May | 85 | 85 | PLBR | 10 | | | | | | no data |
| | ND-177 | | *Cotoneaster integerrimus* | | | 86 | | | 8 | 80 | 4 | 2.3 | 2.2 | |
| | 9005729 | | Lincoln-Oakes Nursery, Bismarck, ND | | | 87 | | | 7 | 70 | 3 | 4.0 | 3.3 | |
| | PI-113095 | | | | | 88 | | | 10 | 100 | 4 | 3.2 | 3.0 | |
| | | | | | | 89 | | | 8 | 80 | 4 | 4.5 | 3.5 | |
| | | | | | | 91 | | | 7 | 70 | 5 | 5.3 | 4.3 | |
| | | | | | | 94 | | | 7 | 70 | 4 | 7.5 | 7.6 | |
| | | | | | | 99 | | | 7 | 70 | 4 | 12.5 | 10.2 | |
| | | | | | | 04 | | | 7 | 70 | 5 | 12.0 | 10.5 | fireblight on all 5 |
| II/06/1-5 | 9057406 | RORU | rugosa rose | 16-May | 02 | 02 | CONT | 5 | 5 | 100 | 5 | 1.0 | 1.4 | |
| | | | *Rosa rugosa* | | | 03 | | | 3 | 60 | 3 | 0.8 | 1.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 3 | 1.8 | 1.6 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 3.2 | 2.4 | |
| II/06/11-15 | 9082638 | SANIC5 | western blue elderberry | 13-May | 99 | 99 | CONT | 5 | | | | | | |
| | | | *Sambucus nigra* ssp. *cerulea* | | | 00 | | | 5 | 100 | 4 | 1.5 | 2.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 5 | 100 | 3 | 4.9 | 5.5 | |
| | | | | | | 03 | | | 5 | 100 | 2 | 7.0 | 6.0 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 12.7 | 9.0 | |
| II/07/1-5 | 9076737 | PRSE2 | black cherry | 6-May | 97 | 97 | PLBR | 5 | 4 | 80 | 3 | 1.1 | 1.7 | |
| | | | *Prunus serotina* | | | 98 | | | 5 | 100 | 4 | 2.8 | 3.0 | |
| | | | Apple Valley FEP, ND | | | 00 | | | 5 | 100 | 3 | 6.6 | 7.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 5 | 100 | 2 | 12.4 | 12.5 | |
| | | | | | | 06 | | | 5 | 100 | 2 | 16.0 | 15.0 | |
| II/07/6-10 | 323957 | PHME13 | chokeberry | 23-May | 00 | 00 | PLBR | 5 | 5 | 100 | 3 | 0.9 | 1.7 | |
| | | | *Photinia melanocarpa* | | | 01 | | | 5 | 100 | 4 | 1.8 | 1.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 02 | | | 5 | 100 | 3 | 0.9 | 1.7 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 4.3 | 3.6 | |
| | | | | | | 06 | | | 5 | 100 | 2 | 5.4 | 4.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/08/1-5 | 9063142 | PRUNU | Japanese cherry | 10-May | 93 | 93 | PLBR | 5 | 5 | 100 | 4 | 1.2 | 2.0 | |
| | | | *Prunus* | | | 94 | | | 5 | 100 | 4 | 1.7 | 2.6 | |
| | | | Bottineau FEP, ND | | | 95 | | | 4 | 80 | 4 | 2.6 | 3.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 97 | | | 3 | 60 | 6 | 1.6 | 2.3 | |
| | | | | | | 99 | | | 2 | 40 | 4 | 3.0 | 3.3 | |
| | | | | | | 02 | | | 2 | 40 | 5 | 5.1 | 3.0 | 1,4 have some dieback |
| II/08/6-10 | 9082713 | PRPEP2 | Siberian peach | 16-May | 02 | 02 | PLBR | 5 | 5 | 100 | 2 | 1.6 | 2.7 | |
| | | | *Prunus persica* var. *persica* | | | 03 | | | 5 | 100 | 4 | 4.1 | 4.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 4 | 80 | 2 | 6.1 | 5.8 | |
| | | | | | | 06 | | | 4 | 80 | 4 | 7.8 | 6.8 | |
| II/09/1-10 | 'Homestead' | CRAN6 | Arnold hawthorn | 9-May | 84 | 84 | CONT | 10 | 10 | 100 | 4 | 0.7 | 0.3 | |
| | ND-20 | | *Crataegus X anomala* | | | 86 | | | 10 | 100 | 4 | 1.7 | 2.7 | |
| | 9005731 | | USDA, NRCS, PMC, Bismarck, ND | | | 88 | | | 10 | 100 | 3 | 3.8 | 4.8 | |
| | PI-503530 | | | | | 90 | | | 10 | 100 | 4 | 4.0 | 6.0 | |
| | | | | | | 93 | | | 9 | 90 | 3 | 6.2 | 8.9 | |
| | | | | | | 98 | | | 9 | 90 | 2 | 13.1 | 13.0 | |
| | | | | | | 03 | | | 9 | 90 | 2 | 18.0 | 15.4 | |
| II/10/1-5 | SD-131 | PRPA5 | mayday | 8-May | 85 | 85 | PLBR | 10 | | | | | | no data |
| | 9006073 | | *Prunus padus* | | | 86 | | | 10 | 100 | 3 | 1.5 | 2.8 | |
| | PI-536048 | | Brookings Co., SD | | | 87 | | | 10 | 100 | 3 | 2.3 | 4.7 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 89 | | | 10 | 100 | 4 | 6.0 | 7.6 | |
| | | | | | | 91 | | | 3 | 30 | 5 | 5.6 | 8.7 | |
| | | | | | | 94 | | | 3 | 30 | 4 | 11.0 | 14.1 | |
| | | | | | | 99 | | | 3 | 30 | 2 | 14.8 | 19.6 | |
| | | | | | | 04 | | | 1 | 10 | 8 | 20.5 | 20.3 | |
| II/10/2-6 | ND-3742 | JUNIP | common juniper | 4-May | 06 | 06 | CONT | 5 | 5 | 100 | 4 | 1.6 | 1.0 | |
| | 9019593 | | *Juniperus communis* | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/10/6-10 | 9057438 | HAHA8 | Siberian salt tree | 11-May | 94 | 94 | CONT | 5 | 1 | 20 | 3 | 0.3 | 1.1 | |
| | | | *Halimodendron halidendron* | | | 95 | | | 4 | 80 | 4 | 0.6 | 1.3 | |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 96 | | | 4 | 80 | 4 | 0.8 | 1.6 | soil shallow to bedrock |
| | | | | | | 98 | | | 5 | 60 | 5 | 0.9 | 2.0 | |
| | | | | | | 03 | | | 1 | 20 | 2 | 1.8 | 3.5 | many pods left from 2002 |
| II/10/11-15 | 9082712 | CESC | bittersweet | 16-May | 02 | 02 | PLBR | 5 | 4 | 80 | 4 | 0.4 | 1.1 | |
| | | | *Celastrus scandens* | | | 03 | | | 5 | 100 | 4 | 0.7 | 1.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 3 | 0.7 | 1.4 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 2.0 | 2.1 | |
| II/10/16-20 | 9082678 | AMCA6 | leadplant | 16-May | 02 | 02 | PLBR | 5 | 5 | 100 | 6 | 0.4 | 0.5 | |
| | | | *Amorpha canescens* | | | 03 | | | 3 | 60 | 7 | | | too short to measure |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 1 | 20 | 8 | 0.3 | 0.3 | |
| | | | | | | 06 | | | 0 | 0 | | | | died out |
| III/01/1-5 | 'Midwest' | MAMA37 | Manchurian crabapple | 17-May | 78 | 78 | PLBR | 5 | 3 | 60 | 2 | 0.5 | 2.0 | |
| | 9006003 | | *Malus mandshurica* | | | 79 | | | 5 | 100 | | 0.9 | 2.1 | |
| | PI-478000 | | Echo Manchuria/Res. Sta. | | | 80 | | | 5 | 100 | 3 | 1.9 | 2.8 | |
| | | | Morden, MB, Canada | | | 82 | | | 5 | 100 | 3 | 4.7 | 5.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 5 | 100 | 2 | 6.0 | 6.9 | fall webworm on 1, few |
| | | | | | | 84 | | | 5 | 100 | 4 | 7.7 | 8.5 | pests, good vigor, |
| | | | | | | 87 | | | 5 | 100 | 3 | 9.4 | 11.4 | snow damage on 1,2,3 |
| | | | | | | 92 | | | 2 | 40 | 8 | 6.0 | 7.3 | |
| | | | | | | 97 | | | 2 | 40 | 3 | 13.8 | 13.9 | |
| | | | | | | 02 | | | 2 | 40 | 4 | 15.5 | 14.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/01/6-10 | 'Red Splendor' | MABA* | flowering crabapple | 17-May | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 1.6 | 2.2 | |
| | | | *Malus X* | | | 79 | | | 5 | 100 | | 2.5 | 3.8 | |
| | 9006004 | | Lee Nursery, Fertile, MN | | | 80 | | | 5 | 100 | 2 | 3.5 | 4.7 | |
| | | | | | | 82 | | | 5 | 100 | 3 | 5.9 | 8.4 | |
| | | | | | | 83 | | | 5 | 100 | 3 | 7.0 | 9.1 | good fruit production, few pests |
| | | | | | | 84 | | | 5 | 100 | 3 | 8.6 | 10.9 | snow damage 1,2; webworm 3,5 |
| | | | | | | 87 | | | 5 | 100 | 2 | 10.3 | 12.2 | |
| | | | | | | 92 | | | 5 | 100 | 6 | 9.3 | 11.2 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 13.8 | 14.0 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 14.5 | 15.6 | |
| III/02/1-5 | ND-1731 | MABA* | Siberian crabapple | 17-May | 78 | 78 | PLBR | 5 | 4 | 80 | 2 | 1.9 | 2.2 | |
| | 9006001 | | *Malus baccata* | | | 79 | | | 5 | 100 | | 2.8 | 3.1 | |
| | | | Lincoln-Oakes Nursery, | | | 80 | | | 5 | 100 | 3 | 4.1 | 4.1 | |
| | | | Bismarck, ND | | | 82 | | | 5 | 100 | 3 | 5.8 | 8.2 | |
| | | | | | | 83 | | | 5 | 100 | 2 | 7.5 | 10.5 | good growth & vigor, |
| | | | | | | 84 | | | 5 | 100 | 2 | 10.1 | 10.8 | few pests, fall webworm |
| | | | | | | 87 | | | 5 | 100 | 3 | 10.6 | 13.9 | on 1,4,5 |
| | | | | | | 92 | | | 5 | 100 | 6 | 9.2 | 13.7 | |
| | | | | | | 97 | | | 5 | 100 | 6 | 13.7 | 14.4 | |
| | | | | | | 02 | | | 5 | 100 | 5 | 15.5 | 16.8 | |
| III/02/6-10 | 'McDermand' | PYUS2 | Ussurian pear | 17-May | 78 | 78 | PLBR | 5 | 5 | 100 | 6 | 0.9 | 2.5 | |
| | ND-14 | | *Pyrus ussuriensis* | | | 79 | | | 5 | 100 | | 1.8 | 3.6 | |
| | 9006095 | | Harbin, Manchuria/Res. Sta. | | | 80 | | | 5 | 100 | 1 | 3.0 | 4.6 | |
| | PI-478004 | | Morden, MB, Canada | | | 82 | | | 5 | 100 | 3 | 6.4 | 8.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 5 | 100 | 1 | 8.0 | 11.0 | good growth & vigor |
| | | | | | | 84 | | | 5 | 100 | 2 | 9.3 | 12.4 | |
| | | | | | | 87 | | | 5 | 100 | | 12.4 | 15.8 | snow damage on 4 |
| | | | | | | 92 | | | 5 | 100 | 6 | 10.9 | 13.2 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 18.7 | 17.2 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 25.0 | 22.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/03/1-5 | 'Freedom' | LOKO2 | honeysuckle | 9-May | 90 | 90 | PLBR | 5 | 5 | 100 | 5 | 1.0 | 1.1 | |
| | 9057424 | | *Lonicera korolkowii* | | | 91 | | | 5 | 100 | 4 | 1.4 | 1.6 | |
| | | | Univ. of MN | | | 92 | | | 5 | 100 | 3 | 3.3 | 3.1 | |
| | | | | | | 94 | | | 5 | 100 | 3 | 6.6 | 6.1 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 8.5 | 7.8 | minor dieback |
| | | | | | | 99 | | | 5 | 100 | 2 | 14.1 | 11.2 | |
| | | | | | | 04 | | | 5 | 100 | 2 | 17.0 | 12.3 | |
| III/03/6-10 | 9063143 | LOTA | tatarian honeysuckle | 10-May | 93 | 93 | PLBR | 5 | 5 | 100 | 4 | 1.1 | 1.4 | |
| | | | *Lonicera tatarica* | | | 94 | | | 5 | 100 | 3 | 1.1 | 1.8 | |
| | | | Iowa | | | 95 | | | 5 | 100 | 4 | 2.2 | 2.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 97 | | | 5 | 100 | 3 | 3.5 | 4.2 | |
| | | | | | | 99 | | | 5 | 100 | 4 | 4.3 | 6.1 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 6.5 | 6.5 | |
| III/03/11-15 | 'Survivor' | AMFR | false indigo | 6-May | 87 | 87 | PLBR | 5 | 4 | 80 | | 1.3 | 1.7 | |
| | 9008041 | | *Amorpha fruticosa* | | | 88 | | | 5 | 100 | 5 | 2.8 | 2.1 | |
| | | | USDA, NRCS, PMC, Aberdeen, ID | | | 89 | | | 5 | 100 | 5 | 3.1 | 2.7 | |
| | | | | | | 91 | | | 5 | 100 | 4 | 5.3 | 3.3 | |
| | | | | | | 93 | | | 5 | 100 | 3 | 7.0 | 4.3 | |
| | | | | | | 96 | | | 5 | 100 | 4 | 6.6 | 5.0 | |
| | | | | | | 01 | | | 5 | 100 | 3 | 11.0 | 5.0 | |
| | | | | | | 06 | | | | | | | | mostly dead, overgrown with other volunteers |
| III/03/16-20 | 'Arnolds Red' | LOTA | red tatarian honeysuckle | 10-May | 93 | 93 | PLBR | 5 | 5 | 100 | 4 | 0.9 | 1.1 | |
| | 9069080 | | *Lonicera tatarica* | | | 94 | | | 5 | 100 | 4 | 1.3 | 1.9 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 5 | 100 | 3 | 2.3 | 3.1 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 3.6 | 4.7 | |
| | | | | | | 99 | | | 5 | 100 | 3 | 4.5 | 6.5 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 6.5 | 7.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/04/1-5 | 'Konza' | RHAR4 | aromatic sumac | 6-May | 87 | 87 | PLBR | 5 | 4 | 80 | | 1.7 | 2.5 | |
| | PI-477981 | | *Rhus aromatica* | | | 88 | | | 4 | 80 | 3 | 3.4 | 3.1 | |
| | | | USDA, NRCS, PMC, Manhattan, KS | | | 89 | | | 4 | 80 | 4 | 3.8 | 3.7 | |
| | | | | | | 91 | | | 4 | 80 | 3 | 5.7 | 4.4 | |
| | | | | | | 93 | | | 4 | 80 | 2 | 9.6 | 6.3 | |
| | | | | | | 96 | | | 4 | 80 | 4 | 9.2 | 6.7 | |
| | | | | | | 01 | | | 4 | 80 | 1 | 16.0 | 8.0 | solid thicket |
| | | | | | | 06 | | | 5 | 100 | 3 | 17.0 | 8.0 | |
| III/04/6-15 | 'Scarlet' | PRFR2 | Mongolian cherry | 9-May | 90 | 90 | PLBR | 10 | 9 | 90 | 3 | 0.6 | 1.6 | |
| | PI-478003 | | *Prunus fruticosa* | | | 91 | | | 9 | 90 | 5 | 0.8 | 1.3 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 9 | 90 | 4 | 1.3 | 1.7 | |
| | | | | | | 94 | | | 9 | 90 | 4 | 2.2 | 2.3 | |
| | | | | | | 96 | | | 8 | 80 | 4 | 3.1 | 2.6 | |
| | | | | | | 99 | | | 3 | 30 | 3 | 5.2 | 3.3 | |
| | | | | | | 04 | | | | | | | | orignal row gone, suckers on each side |
| III/04/16-20 | 'Legacy' | SYVI3 | late lilac | 11-May | 88 | 88 | PLBR | 5 | 2 | 40 | 6 | 1.0 | 1.7 | |
| | ND-83 | | *Syringa villosa* | | | 89 | | | 2 | 40 | 6 | 0.4 | 1.1 | |
| | 9006228 | | USDA, NRCS, PMC, Bismarck, ND | | | 90 | | | 5 | 100 | 5 | 0.7 | 1.1 | |
| | PI-540443 | | Lincoln-Oakes Nursery, Bismarck, ND | | | 92 | | | 3 | 60 | 4 | 1.9 | 1.9 | |
| | | | | | | 94 | | | 3 | 60 | 3 | 4.2 | 4.4 | |
| | | | | | | 97 | | | 3 | 60 | 3 | 8.1 | 6.9 | |
| | | | | | | 02 | | | 3 | 60 | 2 | 11.0 | 10.0 | |
| III/05/1-10 | 'Sakakawea' | SHAR | silver buffaloberry | 9-May | 90 | 90 | PLBR | 10 | 3 | 30 | 3 | 0.7 | 2.2 | |
| | ND-10 | | *Shepherdia argentea* | | | 91 | | | 4 | 40 | 4 | 0.5 | 1.9 | |
| | PI-478005 | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 8 | 80 | 4 | 0.9 | 1.7 | |
| | | | | | | 94 | | | 8 | 80 | 3 | 3.0 | 3.7 | |
| | | | | | | 96 | | | 8 | 80 | 2 | 5.9 | 7.0 | |
| | | | | | | 99 | | | 8 | 80 | 3 | 8.4 | 11.3 | |
| | | | | | | 04 | | | 8 | 80 | 3 | 13.0 | 11.8 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/05/11-15 | 'Magenta' | MALUS | crabapple | 15-May | 92 | 92 | PLBR | 5 | 5 | 100 | 5 | 0.5 | 1.1 | |
| | PI-514275 | | *Malus* sp. | | | 93 | | | 4 | 80 | 3 | 1.6 | 3.0 | |
| | | | USDA, NRCS, PMC, E. Lansing, MI | | | 94 | | | 5 | 100 | 3 | 2.2 | 3.6 | |
| | | | | | | 96 | | | 5 | 100 | 5 | 3.9 | 5.2 | fireblight on 2,3,5; dieback on 1 |
| | | | | | | 98 | | | 5 | 100 | 3 | 4.4 | 6.9 | webworms on 4 |
| | | | | | | 01 | | | 5 | 100 | 4 | 9.0 | 10.0 | |
| III/06/1-5 | 9076726 | ACTA80 | tatarian maple | 13-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.0 | 0.9 | |
| | | | *Acer tataricum* | | | 97 | | | 5 | 100 | 5 | 2.2 | 1.7 | |
| | | | USDA, ARS, Mandan, ND | | | 98 | | | 5 | 100 | 4 | 2.8 | 2.0 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 3.5 | 2.3 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 5.5 | 4.0 | Canada thistle 1 |
| | | | | | | 05 | | | 4 | 80 | | 8.2 | 6.5 | |
| lll/06/6-10 | 9091969 | CAFR80 | Russian peashrub | 17-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.8 | 3.4 | |
| | | | *Caragana frutex* | | | 06 | | | 5 | 100 | 6 | 0.6 | 2.6 | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| III/07/1-5 | 9076686 | CRCH | roundleaf hawthorn | 11-May | 04 | 04 | | 5 | 2 | 40 | 6 | 0.3 | 0.4 | #5 browsed |
| | | | *Crataegus chrysocarpa* | | | 05 | | | 1 | 20 | 8 | 0.2 | 0.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 4 | 80 | 6 | 0.2 | 0.9 | |
| III/07/6-10 | 9082653 | RHTR | skunkbush sumac | 14-May | 03 | 03 | | 5 | 5 | 100 | | | | |
| | | | *Rhus trilobata* | | | 04 | | | 5 | 100 | 3 | 1.4 | 1.4 | |
| | | | Harding Co., SD | | | 05 | | | 4 | 80 | 4 | 2.0 | 1.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 06 | | | 5 | 100 | 3 | 3.4 | 2.0 | |
| III/08/1-5 | 'Prairie Red' | PRUNU | plum | 8-May | 85 | 85 | PLBR | 5 | | | | | | no data |
| | ND-1134 | | *Prunus* | | | 86 | | | 5 | 100 | 8 | 0.5 | 1.3 | |
| | 9047203 | | Miller, SD | | | 87 | | | 3 | 60 | 4 | 1.9 | 3.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 89 | | | 3 | 60 | 5 | 3.5 | 4.1 | |
| | | | | | | 91 | | | 2 | 40 | 4 | 6.6 | 5.7 | |
| | | | | | | 94 | | | 2 | 40 | 4 | 8.5 | 7.9 | |
| | | | | | | 99 | | | 2 | 40 | 3 | 11.5 | 10.0 | |
| | | | | | | 04 | | | 1 | 10 | 2 | 17.0 | 11.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/08/6-10 | ND-629 | ACGI | amur maple | 2-May | 79 | 79 | PLBR | 5 | 5 | 100 | | 1.0 | 1.5 | |
| | 9005645 | | *Acer ginnala* | | | 80 | | | 0 | | | | | |
| | PI-477992 | | Res. Sta., Morden, MB, Canada | | | 81 | | | 4 | 80 | | 1.3 | 1.9 | |
| | | | | | | 83 | | | 4 | 80 | 3 | 6.0 | 6.0 | |
| | | | | | | 84 | | | 4 | 80 | 4 | 9.9 | 7.5 | |
| | | | | | | 88 | | | 4 | 80 | 4 | 13.0 | 10.8 | |
| | | | | | | 93 | | | 3 | 60 | 5 | 13.1 | 12.0 | |
| | | | | | | 98 | | | 3 | 60 | 3 | 18.4 | 17.4 | |
| | | | | | | 03 | | | 3 | 60 | 3 | 24.5 | 16.4 | |
| III/09/1-5 | ND-1873 | ACGI | amur maple | 2-May | 79 | 79 | PLBR | 5 | 5 | 100 | | 1.6 | 2.2 | |
| | 9005648 | | *Acer ginnala* | | | 80 | | | 5 | 100 | 3 | 2.8 | 3.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 81 | | | 5 | 100 | | 4.2 | 4.3 | |
| | | | | | | 83 | | | 5 | 100 | 2 | 7.2 | 7.4 | good seed production |
| | | | | | | 84 | | | 5 | 100 | 3 | 10.0 | 8.8 | |
| | | | | | | 88 | | | 5 | 100 | 4 | 13.2 | 11.7 | |
| | | | | | | 93 | | | 5 | 100 | 4 | 10.0 | 9.9 | |
| | | | | | | 98 | | | 5 | 100 | 3 | 16.1 | 13.4 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 19.9 | 14.6 | |
| III/09/6-10 | ND-686 | SYREP | pekin lilac | 2-May | 79 | 79 | PLBR | 5 | 5 | 100 | | 0.7 | 2.3 | |
| | 9006225 | | *Syringa reticulata* ssp. *pekinensis* | | | 80 | | | 2 | 40 | 7 | 1.5 | 2.7 | |
| | PI-478008 | | ND Game & Fish Dept. | | | 81 | | | 2 | 40 | | 1.5 | 2.8 | |
| | | | | | | 83 | | | 3 | 60 | 5 | 3.3 | 3.8 | |
| | | | | | | 84 | | | 5 | 100 | 5 | 3.1 | 2.9 | |
| | | | | | | 88 | | | 3 | 60 | 4 | 8.3 | 8.3 | |
| | | | | | | 93 | | | 3 | 60 | 4 | 10.1 | 9.9 | |
| | | | | | | 98 | | | 3 | 60 | 3 | 15.5 | 14.2 | |
| | | | | | | 03 | | | 3 | 60 | 3 | 18.5 | 16.5 | |
| III/10/1-5 | 9069129 | PRMA | Amur chokecherry | 11-May | 94 | 94 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 2.2 | |
| | | | *Prunus maackii* | | | 96 | | | 5 | 100 | 2 | 4.1 | 6.4 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 98 | | | 5 | 100 | 3 | 7.7 | 10.7 | |
| | | | | | | 00 | | | 5 | 100 | 4 | 9.1 | 12.7 | |
| | | | | | | 03 | | | 5 | 100 | 4 | 11.2 | 12.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/01/1-5 | SD-156 | FRPE | green ash | 17-May | 78 | 78 | PLBR | 5 | 5 | 100 | 1 | 0.5 | 2.6 | |
| | 9005890 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 1.3 | 3.6 | |
| | | | Deuel Co., SD | | | 80 | | | 5 | 100 | 2 | 2.2 | 4.4 | |
| | | | | | | 82 | | | 5 | 100 | 3 | 5.6 | 7.6 | |
| | | | | | | 83 | | | 5 | 100 | 3 | 7.3 | 9.7 | slight leaf scorch |
| | | | | | | 84 | | | 5 | 100 | 3 | 8.0 | 10.8 | |
| | | | | | | 87 | | | 5 | 100 | 3 | 8.6 | 14.2 | snow damage on 1 |
| | | | | | | 92 | | | 5 | 100 | 4 | 8.9 | 15.8 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 13.5 | 18.3 | |
| | | | | | | 02 | | | 5 | 100 | 6 | 17.0 | 25.5 | |
| IV/01/6-10 | ND-1734 | FRPE | green ash | 17-May | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 0.4 | 2.1 | |
| | 9005891 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 1.0 | 3.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | 4 | 1.9 | 3.7 | |
| | | | | | | 82 | | | 5 | 100 | 4 | 4.7 | 7.3 | |
| | | | | | | 83 | | | 5 | 100 | 4 | 5.7 | 8.8 | competition from |
| | | | | | | 84 | | | 5 | 100 | 4 | 6.4 | 10.3 | shelterbelt at east end |
| | | | | | | 87 | | | 5 | 100 | 4 | 7.1 | 13.8 | |
| | | | | | | 92 | | | 5 | 100 | 5 | 8.3 | 14.0 | |
| | | | | | | 97 | | | 5 | 100 | 4 | 12.8 | 20.3 | |
| IV/02/1-5 | 'Cardan' | FRPE | green ash | 17-May | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 0.3 | 2.3 | |
| | MDN-12002 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 1.7 | 3.4 | |
| | 9005895 | | Wibaux Co., MT | | | 80 | | | 5 | 100 | 3 | 3.0 | 5.1 | |
| | PI-469226 | | USDA, ARS, Mandan, ND | | | 82 | | | 5 | 100 | 3 | 7.5 | 10.1 | |
| | | | | | | 83 | | | 5 | 100 | 2 | 8.4 | 11.4 | good vigor |
| | | | | | | 84 | | | 5 | 100 | 3 | 9.7 | 13.8 | |
| | | | | | | 87 | | | 5 | 100 | 3 | 9.5 | 18.1 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 10.9 | 22.5 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 15.1 | 25.1 | |

**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/02/6-10 | ND-1759 | FRPE | green ash | 17-May | 78 | 78 | PLBR | 5 | 5 | 100 | 1 | 0.4 | 2.5 | |
| | 9005893 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | | 1.6 | 4.1 | |
| | | | SD-156 X MDN-12002 | | | 80 | | | 5 | 100 | 3 | 3.1 | 5.2 | |
| | | | USDA, NRCS, PMC, Bismarck, nD | | | 82 | | | 5 | 100 | 4 | 5.8 | 8.1 | |
| | | | | | | 83 | | | 5 | 100 | 3 | 7.9 | 10.7 | competition from |
| | | | | | | 84 | | | 5 | 100 | 3 | 8.9 | 13.4 | shelterbelt at north end |
| | | | | | | 87 | | | 5 | 100 | 3 | 9.0 | 15.8 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 10.2 | 19.0 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 15.6 | 25.1 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 17.0 | 29.4 | |
| IV/03/1-5 | ND-647 | FRNI | black ash | 17-May | 78 | 78 | PLBR | 5 | 5 | 100 | 1 | 0.1 | 0.9 | |
| | 9005887 | | *Fraxinus nigra* | | | 79 | | | 5 | 100 | | 0.4 | 1.9 | |
| | | | Res. Sta., Morden, MB, Canada | | | 80 | | | 5 | 100 | 6 | 1.2 | 2.7 | |
| | | | | | | 82 | | | 5 | 100 | 4 | 4.1 | 8.0 | |
| | | | | | | 83 | | | 5 | 100 | 4 | 4.8 | 10.5 | heat stress |
| | | | | | | 84 | | | 5 | 100 | 4 | 4.2 | 11.4 | leaf scorch |
| | | | | | | 87 | | | 5 | 100 | 3 | 5.6 | 18.4 | sun scald |
| | | | | | | 92 | | | 5 | 100 | 7 | 5.6 | 15.2 | |
| | | | | | | 97 | | | 5 | 100 | 5 | 12.3 | 19.3 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 14.0 | 26.8 | |
| IV/03/6-10 | ND-1432 | AEGL | Ohio buckeye | 17-May | 78 | 78 | PLBR | 5 | 3 | 60 | 8 | 0.0 | 0.2 | |
| | 9005658 | | *Aesculus glabra* | | | 79 | | | 3 | 60 | | 0.1 | 0.5 | |
| | | | Res. Sta., Morden, MB, Canada | | | 80 | | | 3 | 60 | 9 | 0.5 | 0.4 | |
| | | | | | | 82 | | | 1 | 20 | 6 | 1.5 | 2.1 | |
| | | | | | | 83 | | | 1 | 20 | 6 | 1.6 | 2.3 | |
| | | | | | | 84 | | | 1 | 20 | 6 | 3.3 | 3.3 | |
| | | | | | | 87 | | | 1 | 20 | 6 | 6.2 | 5.4 | |
| | | | | | | 92 | | | 1 | 20 | 5 | 7.9 | 7.2 | |
| | | | | | | 97 | | | 1 | 20 | | 12.8 | 10.5 | |
| | | | | | | 02 | | | 1 | 20 | 4 | 12.5 | 15.5 | |

**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/04/1-5 | ND-1879 | GLSI | honeylocust | 8-May | 80 | 80 | PLBR- | 5 | 1 | 20 | 9 | 0.3 | 0.5 | |
| | 9011850 | | *Gleditsia triacanthos* | | | 81 | CONT | | 2 | 40 | | 0.1 | 0.8 | |
| | PI-503531 | | Woodward, OK | | | 82 | | | 5 | 100 | 4 | 1.4 | 2.2 | |
| | | | USDA, ARS, Mandan, ND | | | 83 | | | 5 | 100 | 2 | 2.5 | 3.9 | good vigor |
| | | | | | | 84 | | | 5 | 100 | 3 | 3.2 | 5.7 | |
| | | | | | | 86 | | | 5 | 100 | 3 | 7.5 | 9.1 | |
| | | | | | | 89 | | | 4 | 80 | 4 | 8.1 | 12.8 | |
| | | | | | | 95 | | | 5 | 100 | 4 | 16.4 | 17.4 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 19.2 | 26.5 | |
| IV/05/1-5 | 9063116 | FRNI | black ash | 11-May | 94 | 94 | CONT | 5 | 5 | 100 | 4 | 0.3 | 1.2 | |
| | | | *Fraxinus nigra* | | | 95 | | | 5 | 100 | 4 | 0.9 | 1.4 | |
| | | | Itasca State Park, MN | | | 96 | | | 4 | 80 | 4 | 1.1 | 1.7 | broken leader on 4 |
| | | | | | | 98 | | | 4 | 80 | 3 | 2.0 | 3.6 | |
| | | | | | | 00 | | | 4 | 80 | 4 | 3.2 | 6.5 | |
| | | | | | | 03 | | | 3 | 60 | 4 | 5.3 | 10.2 | |
| IV/06/1-5 | 9063115 | FRPE | green ash | 11-May | 94 | 94 | CONT | 5 | 5 | 100 | 3 | 0.7 | 1.7 | |
| | | | *Fraxinus pennsylvanica* | | | 95 | | | 5 | 100 | 3 | 1.5 | 3.3 | |
| | | | Itasca State Park, MN | | | 96 | | | 5 | 100 | 2 | 2.5 | 4.5 | |
| | | | | | | 98 | | | 5 | 100 | 2 | 7.1 | 9.7 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 8.9 | 13.4 | |
| | | | | | | 03 | | | 5 | 100 | | 13.6 | 19.4 | |
| IV/06/6-10 | 9076724 | ELAN | Russian olive | 13-May | 96 | 96 | PLBR | 5 | 4 | 80 | 3 | 2.2 | 2.3 | |
| | | | *Elaeagnus angustifolia* | | | 97 | | | 4 | 80 | 3 | 3.3 | 3.4 | |
| | | | USDA, ARS, Mandan, ND | | | 98 | | | 4 | 80 | 3 | 5.4 | 5.5 | |
| | | | | | | 00 | | | 4 | 80 | 4 | 7.9 | 8.4 | |
| | | | | | | 02 | | | 4 | 80 | 5 | 11.0 | 9.5 | needs a new stake |
| | | | | | | 05 | | | 4 | 80 | 4 | 11.7 | 12.5 | |
| IV/07/1-5 | 9019624 | ULJA80 | Japanese elm | 11-May | 94 | 94 | CONT | 5 | 4 | 80 | 4 | 1.0 | 1.4 | |
| | ND-989 | | *Ulmus japonica* | | | 95 | | | 5 | 100 | 3 | 2.8 | 3.6 | |
| | | | USDA ARS, Mandan, ND | | | 96 | | | 4 | 80 | 3 | 5.6 | 6.2 | |
| | | | | | | 98 | | | 4 | 80 | 4 | 9.8 | 9.7 | |
| | | | | | | 00 | | | 4 | 80 | 2 | 8.3 | 11.8 | |
| | | | | | | 03 | | | 3 | 60 | 5 | 11.7 | 13.3 | |

**Project No.: 38I316K Field Evaluation of Woody Plant Materials, Dickinson, North Dakota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/07/6-10 | 9069166 | ELAN | Russian olive | 13-May | 96 | 96 | CONT(S) | 5 | 1 | 20 | 5 | 0.5 | 0.7 | 1-4 destroyed by cultivation |
| | | | *Elaeagnus angustifolia* | | | 97 | | | 4 | 80 | 3 | 1.0 | 1.3 | |
| | | | USDA, ARS, Mandan, ND | | | 98 | | | 2 | 40 | 6 | 1.4 | 3.0 | |
| | | | | | | 00 | | | 2 | 40 | 5 | 2.3 | 4.1 | |
| | | | | | | 02 | | | 2 | 40 | 6 | 4.8 | 7.5 | |
| | | | | | | 05 | | | 2 | 40 | 5 | 6.6 | 8.2 | |
| IV/08/1-10 | 'Oahe' | CEOC | hackberry | 8-May | 80 | 80 | PLBR | 10 | 10 | 100 | | 0.5 | 2.0 | |
| | MDN-12003 | | *Celtis occidentalis* | | | 81 | | | 9 | 90 | | 0.1 | 0.5 | |
| | 9005725 | | USDA, ARS, Mandan, ND | | | 82 | | | 8 | 80 | 6 | 1.3 | 1.6 | |
| | PI-476982 | | | | | 83 | | | 8 | 80 | 6 | 1.9 | 3.0 | |
| | | | | | | 84 | | | 7 | 70 | 4 | 2.9 | 4.6 | |
| | | | | | | 86 | | | 4 | 40 | 3 | 9.2 | 10.3 | |
| | | | | | | 89 | | | 5 | 50 | 4 | 8.7 | 11.7 | |
| | | | | | | 95 | | | 5 | 50 | 4 | 14.3 | 19.0 | |
| | | | | | | 99 | | | 5 | 50 | 5 | 14.0 | 20.3 | |
| | | | | | | 04 | | | 5 | 50 | 4 | 16.8 | 25.4 | |
| IV/09/1-10 | SD-75 | CEOC | hackberry | 7-May | 81 | 81 | PLBR | 10 | 10 | 100 | | 0.1 | 1.2 | |
| | 9005713 | | *Celtis occidentalis* | | | 82 | | | 7 | 70 | 6 | 0.9 | 1.4 | |
| | | | Potter Co., SD | | | 83 | | | 6 | 60 | 3 | 2.9 | 3.0 | |
| | | | | | | 84 | | | 7 | 70 | 5 | 3.5 | 4.1 | |
| | | | | | | 85 | | | 6 | 60 | 4 | 6.7 | 5.9 | |
| | | | | | | 87 | | | 7 | 70 | 4 | 8.1 | 10.4 | |
| | | | | | | 90 | | | 7 | 70 | 4 | 9.2 | 12.3 | |
| | | | | | | 95 | | | 7 | 70 | 3 | 12.7 | 19.7 | |
| | | | | | | 00 | | | 7 | 70 | 3 | 14.4 | 23.1 | |
| | | | | | | 05 | | | 7 | 70 | 3 | 22.2 | 26.0 | |
| IV/10/6-10 | 9057410 | CEOC | hackberry | 11-May | 88 | 88 | CONT | 5 | 2 | 40 | 8 | 0.2 | 0.2 | |
| | | | *Celtis occidentalis* | | | 89 | | | 1 | 20 | 8 | 0.2 | 0.5 | |
| | | | Bottineau Co., ND | | | 90 | | | 3 | 60 | 8 | 0.2 | 0.7 | |
| | | | NDFS | | | 92 | | | 4 | 80 | 7 | 0.5 | 0.5 | |
| | | | | | | 94 | | | 2 | 40 | 6 | 1.0 | 2.4 | |
| | | | | | | 97 | | | 2 | 40 | 4 | 3.5 | 5.6 | |
| | | | | | | 02 | | | 2 | 40 | 6 | 4.0 | 6.8 | |

**OFF-CENTER EVALUATIONS: TECHNICAL REPORT – 2006**

Study 38I318K University of Minnesota, West Central Research and Outreach Center, Morris, Minnesota.

Study Title: Field Evaluation of Woody Plant Materials.

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas were located in the three states served by the PMC. These sites provide planting locations under long-term land tenure, for assemblies of trees and shrubs to be evaluated under uniform culture and management. New material can be added on an annual basis. Comparisons are then made with previously released cultivars and area of adaptation determined.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use. Superior cultivars will be selected and released for increase by commercial nurseries.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with University of Minnesota, West Central Research and Outreach Center, Morris, Minnesota.

Location: Morris, Minnesota. Legal description: Sec. 31, T. 125 N., R. 41 W., Stevens County, Minnesota.

Major Land Resource Area: The site is located in Major Land Resource Area 102A, Rolling Till Prairie. This is nearly level to rolling glacial plain mantled by loess except in the north. Slopes are long, smooth, and gentle except the hilly to steep slopes bordering some of the larger stream valleys. Relief is mainly in a few feet to a few tens of feet. Elevation is 1,000 to 2,000 feet.

Soils: The soils at this site are Barnes-Buse loams (BbB2). These series consist of deep, well-drained soils formed in loamy calcareous glacial till under prairie grasses on moraines and uplands. For Barnes, the surface layer is black loam 7 inches thick. The subsoil is dark brown and olive-brown loam 12 inches thick and the substratum is olive-brown loam. For Buse, the surface is very dark gray loam 7 inches thick. The underlying material is light brownish-gray and light yellowish-brown loam. These soils are in conservation tree/shrub group 3.

The Barnes soil makes up 60 to 70 percent of the mapped area. Runoff is medium, erosion hazard moderate, and fertility medium. Slopes are 2 to 6 percent.

The Barnes soils in this group are well-drained, moderately deep to deep loamy soils. If moisture is conserved, these soils are well-suited to all types of windbreaks and other plantings. Wind and water erosion are the only hazards.

The Buse soils in this group are deep, well-drained, and loamy. Available water capacity is high, but excessive runoff restricts water intake and the amount of moisture available to trees and shrubs. These soils are not suited to field windbreaks, but are suited to wildlife, recreation, and beautification plantings. Species and planting sites should be carefully selected.

Climate: For MLRA 102A, the average annual precipitation is 20 to 30 inches; increasing from north to south and from west to east. About three-fourths falls from midspring to early autumn. The sparse winter precipitation is snow. The average annual temperature is 40 to 50 degrees F, increasing from north to south. The average freeze-free period is 140 to 160 days. The plant hardiness zone is 4a with an average

annual minimum temperature of -30 to -20 degrees F. Climatic data recorded at Morris, Minnesota, for 2006 is shown in Table MO-1.

## Methods and Materials

Assembly: Refer to Table MO-2 for a list of woody species planted from 1978 through 2006.

Planting Plan: The plots are not randomized or replicated but organized systematically for evaluation and demonstration purposes. The site is divided into 4 blocks. Block 1 is planted to shrubs, Block 2 medium trees, Block 3 tall trees, and Block 4 conifers (Refer to Figure MO-1 for the plot map). Each block is arranged into single row, non-replicated plots. Each plot contains from 1 to 20 plants. Spacing is 20 feet between rows and 5 feet within row for shrubs; 10 feet within row for medium-tall trees. Row length is 100 feet. Like species and standards of comparison are planted in adjacent plots whenever possible.

Plot Preparation: A clean, firm planting site is prepared annually by disking.

Planting Method: All trees and shrubs were hand planted using approved forestry methods.

Planting Date: Refer to Table MO-2 for planting dates of woody species planted from 1978 through 2006. Replacements are planted the year after establishment if available.

Fertilization: No fertilizer has been applied to planting area.

Weed Control: Herbicides and mechanical weed control measures were applied to control weeds between and within rows and in fallow areas. Hand hoeing was done as needed to control weeds in rows.

Biological Control: No insecticides have been applied. In some years, an animal repellent, Arasan 50, has been applied to discourage rodents from damaging tree trunks and lower limbs.

Irrigation: Each year, newly planted materials were hand watered from a portable tank. No water was added following year of establishment.

Crop Residue Management: No cover crop has been seeded. A mixture of 50 percent Bad River blue grama and 50 percent Pierre sideoats grama was broadcast seeded on May 7, 2002.

Silvicultural Practices: Dead trees and broken branches were cut and removed annually for sanitation. All the Russian olive accessions have been removed. All new plants are mulched with wood chips. Major renovation occurred in 1997 when a backhoe was used to remove dead and poor performing entries.

Evaluations and Measurements: Records of planting date, survival, vigor, canopy width, and plant height have been maintained since 1978. Cold hardiness, insect and disease resistance, and animal damage were considered. Plant performance data is recorded on one or more accessions during the growing season for three years. After the third year, data is gathered according to a specific schedule. Select data appears in this report. Additional information can be requested from the PMC. In 2003, a report summarizing the first 25 years of evaluation was published.

## Results

Plant Performance: One hundred twenty-six accessions of 90 species are currently under evaluation. In 1995, evaluation of the conifers in Block 4 was discontinued due to poor adaptation to the heavy soils. This site receives slight to moderate weed competition. Rainfall and humidity are higher than evaluation sites in the Dakotas. This compensates somewhat for increased competition, but increases the disease

potential for species adapted to semiarid regions. Mean data for individual accessions of trees and shrubs is shown in Table MO-2. The following numbered accessions exhibit potential for further evaluation.

| Accession Number | Genus/Species Origin/Source | Plot Location |
|---|---|---|
| ND-170<br>9005728 | cotoneaster<br>*Cotoneaster integerrimus*<br>USDA, NRCS, PMC, Bismarck, ND | 01/07/11-20 |
| Silver Sands Germplasm<br>ND-3902<br>9035212 | sandbar willow<br>*Salix interior*<br>NDSU<br>McKenzie Slough FEP, ND/Charles City, IA | 01/09/1-10 |
| ND-21<br>PI-560908 | nannyberry<br>*Viburnum lentago*<br>USDA, ARS, Mandan, ND | 02/07/1-10 |
| ND-647<br>9005887 | black ash<br>*Fraxinus nigra*<br>Res. Sta., Morden, MB, Canada | 03/05/1-10 |
| 9057409 | American hazel<br>*Corylus americana*<br>Turtle Mountains, Bottineau Co., ND<br>NDFS | 1/19/1-10 |
| 9076722 | European white birch<br>*Betula pendula*<br>Russia<br>USDA, ARS, Mandan, ND | II/16/1-5 |
| ND-2103<br>PI-399414 | highbush cranberry<br>*Viburnum opulus*<br>P.I. Station, Ames, IA/Yugoslavia<br>NDSU Experiment Station, Dickinson, ND | I/17/11-20 |
| 9082642 | wayfaring tree<br>*Viburnum lantana*<br>Lincoln-Oakes Nursery, Bismarck, ND | I/03/11-20 |
| 9076718 | Scotch pine<br>*Pinus sylvestris* var. *mongolica*<br>USDA, NRCS, PMC, Bismarck, ND | II/14/1-5 |
| 9076719 | Scotch pine<br>*Pinus sylvestris* var. *mongolica*<br>USDA, NRCS, PMC, Bismarck, ND | II14/6-10 |

## Figure MO-1. Morris Woody Field Evaluation Planting – Plot Layout

| | | | ← N | |
|---|---|---|---|---|
| **BLOCK II MEDIUM TREES** | | **BLOCK I SHRUBS** | | **Row** |
| | | | | |
| open | open | <---------- | 'Centennial' cotoneaster | 1 |
| (leave open) ----------> | | 9063143 t. honeysuckle | 'Arnolds Red' honeysuckle | 2 |
| <---------- | ND-1731 S. crabapple | 9082642 wayfaring tree | 9082632 Mongolian peashrub | 3 |
| <---------- | 'McDermand' pear | <---------- | 'Scarlet' Mongolian cherry | 4 |
| <---------- | 'Streamco' willow | peashrub\|9008183 chokecherry | 9069128 r.t. honeysuckle | 5 |
| open | open | <---------- | 'Legacy' late lilac | 6 |
| <---------- | ND-21 nannyberry | rugosa rose \| redleaf rose | ND-170 cotoneaster | 7 |
| Libbon willow \| staghorn sumac | Meyer's spruce | leadplant \| 9091971 chokeberry | Euonymus \| (leave open) | 8 |
| 9069129 amur chokecherry | 'Prairie Red' plum \| olive hybrid | black currant \| bittersweet | ND-3902 sandbar willow | 9 |
| <---------- | ND-2102 apricot | <---------- | 'Regal' Russian almond | 10 |
| 9082886 aspen (LON) | 9082885 aspen (Towner) | 'Freedom' honeysuckle\|rosetree ( | ND-11 amur honeysuckle | 11 |
| 9091974 red oak | 9082631 Japanese birch | gray dogwood\| | 'Indigo' silky dogwood | 12 |
| 9091973 red oak | 9082635 black locust | M.gooseberry\|prairie rose | (leave open) | 13 |
| 9076719 Scotch pine | 9076718 Scotch pine | smooth sumac\| gray dogwood | ninebark \| mugo pine | 14 |
| 9069163 Dahurian larch | 9076737 black cherry | Am. hazelnut\| r.l. hawthorn | shadblow serviceberry\|pin cherry | 15 |
| 9069121 mayday | 9076722 European white birch | ND-3744 Korean barberry | chokeberry \| '' Konza' sumac | 16 |
| 9076725 smoothbark elm | 9069170 English oak | ND-2103 highbush cranberry | 'Meadowlark' forsythia | 17 |
| 9082610 Siberian larch | 9069168 Siberian larch | 9091976 arrowwood \| open | ND-2507 pigmy caragana | 18 |
| 9092051 catalpa | 9063126 Japanese elm | 'Hedgeking' honeysuckle | 9057409 American hazel | 19 |
| 9092052 swamp white oak | 9082666 black birch | | | 20 |
| <---------- | 'Flame' amur maple | | | 21 |
| <---------- | ND-1752 amur maple | | | 22 |
| <---------- | ND-629 amur maple | SOD | | 23 |
| <---------- | ND-1873 amur maple | | | 24 |
| ND-686 Pekin lilac | open | | | 25 |
| <---------- | 'Homestead' Arnold hawthorn | | | 26 |
| <---------- | open | | | 27 |
| <----------roadway----------> | | <----------roadway----------> | | |
| | | | | |
| | | | | |
| | | | (revised 6/06) | |

**Figure MO-1(continued). Morris Woody Field Evaluation Planting – Plot Layout**

| BLOCK III TALL TREES | | Row |
|---|---|---|
| <---------- | SD-156 green ash | 1 |
| ND-1734 green ash | ND-1753 green ash | 2 |
| <---------- | 'Cardan' green ash | 3 |
| <---------- | ND-1759 green ash | 4 |
| <---------- | ND-647 black ash | 5 |
| 9063120 Ohio buckeye | ND-1432 Ohio buckeye | 6 |
| <---------- | 9057410 hackberry | 7 |
| open \| open | 9063148 corktree | 8 |
| 9082674 sugar maple\| open | 9082668 European ash \| open | 9 |
| (leave open) | Clone C Austree | 10 |
| 14272 poplar | 14271 poplar | 11 |
| 14274 poplar | 14273 poplar | 12 |
| 9082667 gray birch \| open | 'Canam' hybrid poplar | 13 |
| 9076746 Ohio buckeye | 9082892 white poplar \| open | 14 |
| <---------- | 'Oahe' hackberry | 15 |
| SD-211 hackberry | SD-75 hackberry | 16 |
| 9082650 Soongarica poplar | 9082675 Manchurian ash | 17 |
| 9063098 black walnut | 9076723 Siberian elm | 18 |
| 9076724 Russian olive | open | 19 |
| 9069166 Russian olive | open | 20 |
| ND-428 black walnut | 9054820 Siberian elm | 21 |

N

**Table No. MO-1: 2006 Weather Summary - Official Station - Morris, Minnesota**

| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) | | |
|---|---|---|---|---|---|---|
| | | | | Actual | | Deviation from Normal |
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 22.9 | 8.4 | | 0.17 | 0.85 | -0.68 |
| February | 10.7 | 15.4 | | 0.41 | 0.69 | -0.28 |
| March | 28.7 | 28.1 | | 0.85 | 1.52 | -0.67 |
| April | 48.6 | 44.1 | | 2.79 | 2.01 | 0.78 |
| May | 57.5 | 57.9 | | 2.94 | 2.84 | 0.10 |
| June | 67.6 | 66.9 | | 1.84 | 3.97 | -2.13 |
| July | 73.4 | 71.1 | | 0.74 | 3.95 | -3.21 |
| August | 68.9 | 69.0 | | 1.38 | 3.30 | -1.92 |
| September | 56.8 | 59.0 | | 4.67 | 2.16 | 2.51 |
| October | 43.2 | 46.1 | | 0.84 | 2.30 | -1.46 |
| November | 31.4 | 29.0 | | 0.35 | 1.22 | -0.87 |
| December | 25.1 | 14.6 | | 1.22 | 0.58 | 0.64 |
| **Annual** | **44.6** | **42.5** | | **18.20** | **25.39** | **-7.19** |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |
| | | 2006 | | | | |
| Last Frost (28 degrees) | | 8-Apr | | | | |
| First Frost (28 degrees) | | 11-Oct | | | | |
| Frost Free Period | | 185 days | | | | |

**Key to Table MO-2. 38I318K Field Evaluation of Woody Plant Materials – Morris, Minnesota**

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table MO-2.**
**Project No.: 38I318K University of Minnesota, West Central Research and Outreach Center, Morris, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/01/1-20 | 'Centennial' | COIN* | cotoneaster | 10-May | 78 | 78 | PLBR | 20 | 12 | 60 | 3 | 1.4 | 1.5 | |
| | ND-177 | | *Cotoneaster integerrimus* | | | 79 | | | 17 | 85 | 4 | 3.5 | 3.2 | |
| | 9005729 | | USDA, ARS, Cheyenne, WY | | | 80 | | | 17 | 85 | | 5.2 | 3.4 | |
| | PI-113095 | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 17 | 85 | | 9.7 | 5.9 | |
| | | | | | | 83 | | | 17 | 85 | | 11.1 | 6.6 | |
| | | | | | | 84 | | | 17 | 85 | 2 | 12.6 | 7.4 | |
| | | | | | | 87 | | | 17 | 85 | 2 | 14.6 | 9.7 | |
| | | | | | | 92 | | | 17 | 85 | 1 | 16.5 | 9.4 | |
| | | | | | | 97 | | | 17 | 85 | 1 | 21.3 | 12.0 | |
| | | | | | | 02 | | | | 85 | | 24.0 | 11.0 | |
| I/02/1-10 | 'Arnolds Red' | LOTA | red tatarian honeysuckle | 27-Apr | 93 | 93 | PLBR | 10 | 10 | 100 | 4 | 0.9 | 1.2 | |
| | 9069080 | | *Lonicera tatarica sibirica* | | | 94 | | | 8 | 80 | 5 | 1.8 | 2.3 | |
| | | | Lee Nursery, Fertile, MN | | | 95 | | | 10 | 100 | 4 | 2.3 | 3.5 | |
| | | | | | | 97 | | | 10 | 100 | 2 | 5.1 | 5.9 | |
| | | | | | | 99 | | | 10 | 100 | 4 | 5.6 | 7.0 | |
| | | | | | | 02 | | | | 10 | 3 | 6.8 | 8.4 | |
| I/02/11-20 | 9063143 | LOTA | red tatarian honeysuckle | 27-Apr | 93 | 93 | PLBR | 10 | 9 | 90 | 5 | 0.9 | 1.5 | |
| | | | *Lonicera tatarica sibirica* | | | 94 | | | 9 | 90 | 4 | 1.7 | 2.4 | |
| | | | Iowa | | | 95 | | | 9 | 90 | 5 | 2.9 | 3.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 97 | | | 10 | 100 | 2 | 5.2 | 5.8 | |
| | | | | | | 99 | | | 9 | 90 | 3 | 6.1 | 6.9 | |
| | | | | | | 02 | | | 9 | 2.7 | | | 8.7 | |
| 1/03/1-10 | 9082632 | CAIN | Mongolian peashrub | 29-Apr | 99 | 99 | PLBR | 10 | 9 | 90 | 5 | 1.0 | 1.3 | |
| | | | *Caragana intermedia* | | | 00 | | | 9 | 90 | 4 | 2.5 | 1.8 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 9 | 90 | 5.1 | 3.8 | 3.1 | |
| | | | | | | 03 | | | 7 | 70 | 4 | 4.6 | 3.8 | |
| | | | | | | 05 | | | 7 | 70 | 4 | 5.1 | 5.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/03/11-20 | 9082642 | VILE | wayfaring tree | 29-Apr | 99 | 99 | PLBR | 10 | 10 | 100 | 4 | 0.7 | 1.2 | |
| | | | *Viburnum lantana* | | | 00 | | | 10 | 100 | 2 | 2.0 | 2.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 10 | 100 | 3 | 3.3 | 3.6 | |
| | | | | | | 03 | | | 10 | 100 | 4 | 4.0 | 4.9 | |
| | | | | | | 05 | | | 10 | 100 | 4 | 5.7 | 4.5 | red color 4, unusual fruit 6, some dead on 8, pruned 10 |
| I/04/1-20 | 'Scarlet' | PRFR2 | Mongolian cherry | 10-May | 78 | 78 | PLBR | 20 | 20 | 100 | 3 | 0.7 | 1.3 | |
| | ND-3 | | *Prunus fruticosa* | | | 79 | | | 19 | 95 | 4 | 1.9 | 2.3 | |
| | 9006072 | | Res. Sta. Morden, Manitoba, Canada | | | 80 | | | 20 | 100 | | 3.0 | 3.2 | |
| | PI-478003 | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 20 | 100 | 4 | 4.7 | 4.6 | |
| | | | | | | 83 | | | 20 | 100 | | 5.6 | 4.9 | |
| | | | | | | 84 | | | 20 | 100 | 3 | 6.4 | 5.6 | |
| | | | | | | 87 | | | 19 | 95 | 1 | 7.6 | 6.6 | |
| | | | | | | 92 | | | 20 | 100 | 1 | 12.3 | 7.9 | |
| | | | | | | 97 | | | 20 | 100 | 2 | 17.1 | 10.5 | stand weakening |
| | | | | | | 02 | | | 18 | 90 | | 18.0 | | |
| I/05/1-10 | 9069128 | LOTA | red tatarian honeysuckle | 26-Apr | 95 | 95 | PLBR | 10 | 10 | 100 | 6 | 1.1 | 2.2 | |
| | | | *Lonicera tatarica* | | | 96 | | | 10 | 100 | 3 | 3.1 | 3.5 | blight on 2, mites on 4 |
| | | | Big Sioux Nursery, Watertown, SD | | | 97 | | | 10 | 100 | 1 | 5.3 | 6.8 | very uniform |
| | | | | | | 99 | | | 10 | 100 | 2 | 6.3 | 9.3 | |
| | | | | | | 01 | | | 10 | 100 | 3 | 8.3 | 1.2 | |
| | | | | | | 04 | | | 10 | 100 | 3 | 10.3 | 14.8 | |
| I/5/6-10 | 9008183 | PRVI | common chokecherry | 11-May | 05 | 05 | | 5 | 5 | 100 | 5 | 0.5 | 1.5 | |
| | | | *Prunus virginiana* | | | 06 | | | 5 | 100 | 6 | 0.7 | 1.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 1/05/10-15 | 9082664 | COAL | Siberian dogwood | 2-May | 00 | 00 | | 5 | 5 | 100 | 4 | 0.8 | 1.9 | browsed |
| | | | *Cornus alba 'sibirica'* | | | 01 | | | 5 | 100 | 5 | 1.2 | 1.3 | browsed |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 4 | 80 | | 1.6 | 1.9 | |
| | | | | | | 04 | | | 3 | 60 | 5 | 3.0 | 2.9 | deer browse |
| | | | | | | 06 | | | 0 | 0 | | | | removed 2005 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/05/15-20 | 9082663 | CAMI | littleleaf peashrub | 2-May | 00 | 00 | | 5 | 5 | 100 | 4 | 1.3 | 2.7 | |
| | | | *Caragana microphylla* | | | 01 | | | 5 | 100 | 4 | 2.0 | 4.0 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 5 | 100 | 4 | 3.4 | 4.6 | |
| | | | | | | 05 | | | 5 | 100 | | 4.9 | 5.7 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 5.9 | 5.5 | |
| I/06/1-20 | 'Legacy' | SYVI | late lilac | 4-May | 88 | 88 | PLBR | 20 | 12 | 60 | 4 | 0.5 | 1.4 | |
| | ND-83 | | *Syringa villosa* | | | 89 | | | 20 | 100 | 3 | 0.9 | 1.7 | |
| | 9006228 | | Res. Sta., Morden, Manitoba, Canada | | | 90 | | | 18 | 90 | 4 | 1.8 | 2.5 | |
| | PI-540443 | | Lincoln-Oakes Nursery, Bismarck, ND | | | 92 | | | 20 | 100 | 3 | 3.8 | 4.0 | seed production in all plants |
| | | | | | | 94 | | | 20 | 100 | 3 | 6.3 | 6.3 | |
| | | | | | | 97 | | | 20 | 100 | 2 | 12.1 | 8.6 | snow damage on 9-12,14 |
| | | | | | | 02 | | | | 95 | | 17.3 | 11.0 | variation in height |
| I/07/1-10 | ND-170 | COIN80 | cotoneaster | 1-May | 90 | 90 | CONT | 10 | 9 | 90 | 3 | 1.5 | 1.9 | |
| | 9005728 | | *Cotoneaster integerrimus* | | | 91 | | | 10 | 100 | 3 | 2.7 | 2.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 92 | | | 10 | 100 | 3 | 4.6 | 3.0 | fruit production on all |
| | | | | | | 94 | | | 10 | 100 | 2 | 7.2 | 4.1 | |
| | | | | | | 96 | | | 10 | 100 | 4 | 8.7 | 4.8 | |
| | | | | | | 99 | | | 9 | 90 | 5 | 8.5 | 4.5 | fireblight on all, contamination |
| | | | | | | 04 | | | 6 | 60 | 6 | 7.0 | 7.0 | serious contam.; half dead, fire blig |
| I/07/11-15 | 9057406 | RORU | rugosa rose | | 01 | 01 | PLBR | 5 | 5 | 100 | 4 | 1.7 | 1.7 | |
| | | | *Rosa rugosa* | | | 02 | | | 5 | 100 | 4 | 2.5 | 1.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 5 | 100 | 4 | 3.4 | 1.8 | |
| | | | | | | 05 | | | 3 | 60 | 5 | 3.8 | 3.0 | chlorosis, some dead |
| I/07/16-20 | 9082685 | RORU2 | redleaf rose | | 01 | 01 | PLBR | 5 | 5 | 100 | 3 | 1.6 | 1.4 | |
| | | | *Rosa rubrifolia* | | | 02 | | | 5 | 100 | 1 | 2.8 | 2.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 5 | 100 | 6 | 3.5 | 3.3 | |
| | | | | | | 05 | | | 5 | 100 | 5 | 3.4 | 3.1 | sparse leaves |
| I/8/6-10 | 9082711 | EUBU6 | winterberry euonymus | 7-May | 02 | 02 | PLBR | 5 | 5 | 100 | 7 | 0.5 | 0.5 | mowed |
| | | | *Euonymus bungeanum* | | | 03 | | | 5 | 100 | 8 | 0.6 | 0.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 4 | 0.9 | 1.8 | browse on all |
| | | | | | | 06 | | | 5 | 100 | 3 | 2.2 | 3.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/8/11-15 | 9082713 | PRPEP2 | Siberian peach | 7-May | 02 | 02 | PLBR | 5 | 5 | 100 | 4 | 2.4 | 2.6 | one broke off/damaged |
| | | | *Prunus persica* | | | 03 | | | 5 | 100 | 3 | 3.5 | 3.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 2 | 3.7 | 4.2 | |
| | | | | | | 06 | | | 0 | 0 | | | | removed |
| I/8/11-15 | 9091971 | PHME13 | black chokeberry | 11-May | 05 | 05 | | 5 | 5 | 100 | 3 | 1.7 | 2.1 | |
| | | | *Photinia melanocarpa* | | | 06 | | | 5 | 100 | 4 | 1.1 | 1.5 | |
| | | | Bailey Nurseries, Inc., St. Paul, MN | | | | | | | | | | | |
| I/8/16-20 | 9082678 | AMCA6 | leadplant | 7-May | 02 | 02 | PLBR | 5 | 5 | 100 | 6 | 0.6 | 1.5 | |
| | | | *Amorpha canescens* | | | 03 | | | 5 | 100 | 4 | 1.0 | 0.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 4 | 1.7 | 1.9 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 2.3 | 2.1 | |
| I/09/1-10 | 'Silver Sands' | SAIN3 | sandbar willow | 1-May | 90 | 90 | CONT | 10 | 10 | 100 | 2 | 4.4 | 3.5 | |
| | ND-3902 | | *Salix interior* | | | 91 | | | 10 | 100 | 2 | 6.8 | 5.0 | |
| | 9035212 | | NDSU | | | 92 | | | 9 | 90 | 1 | 9.9 | 7.5 | |
| | | | McKenzie Slough FEP | | | 94 | | | 10 | 100 | 1 | 19.1 | 11.2 | |
| | | | | | | 96 | | | 10 | 100 | | 24.3 | 13.1 | |
| | | | | | | 99 | | | 10 | 100 | 2 | 30.5 | 16.1 | good growth and vigor |
| | | | | | | 04 | | | 10 | 100 | | 30.0 | 16.0 | minimum dieback |
| I/9/11-15 | 9082712 | CESC | bittersweet | 7-May | 02 | 02 | PLBR | 5 | 5 | 100 | | 0.8 | 1.2 | mowed |
| | | | *Celastrus scandens* | | | 03 | | | 5 | 100 | 3 | 1.2 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 3 | 1.7 | 3.1 | suckers |
| | | | | | | 06 | | | 5 | 100 | | 3.4 | 2.7 | |
| I/9/11-15 | 9082687 | RIAM | black currant | | 01 | 01 | PLBR | 5 | 5 | 100 | 4 | 0.8 | 1.5 | |
| | | | *Ribes americanum* | | | 02 | | | 5 | 100 | | 2.6 | 2.0 | browsed |
| | | | Big Sioux Nursery, Watertown, SD | | | 03 | | | 5 | 100 | 3 | 3.8 | 2.4 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 4.4 | 2.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/10/1-20 | Regal' | PRTE* | Russian almond | 29-Apr | 80 | 80 | PLBR | 20 | 19 | 95 | | 0.7 | 1.8 | |
| | ND-283 | | *Prunus tenella* | | | 81 | | | 20 | 100 | | 1.8 | 2.7 | |
| | 9006079 | | ND Game & Fish Dept. | | | 82 | | | 17 | 85 | 5 | 2.5 | 3.3 | |
| | PI-540442 | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 17 | 85 | | 3.5 | 3.6 | |
| | | | Increase Block | | | 84 | | | 19 | 95 | 2 | 4.8 | 4.0 | |
| | | | | | | 87 | | | 17 | 85 | 2 | 6.6 | 5.7 | |
| | | | | | | 88 | | | 17 | 85 | 3 | 7.1 | 5.8 | |
| | | | | | | 89 | | | 17 | 85 | 4 | 7.9 | 6.0 | variable leaf size, color, |
| | | | | | | 94 | | | 20 | 100 | 3 | 12.0 | 6.8 | form |
| | | | | | | 99 | | | 20 | 100 | | 15.1 | 6.7 | |
| I/11/1-10 | ND-11 | LOMA6 | amur honeysuckle | 28-Apr | 81 | 81 | CONT | 10 | 10 | 100 | | 0.7 | 1.1 | |
| | 9005993 | | *Lonicera maackii* | | | 82 | | | 10 | 100 | 6 | 0.9 | 1.2 | |
| | PI-477998 | | Res. Sta., Morden, Manitoba, Canada | | | 83 | | | 9 | 90 | | 1.6 | 1.8 | |
| | | | | | | 84 | | | 10 | 100 | 3 | 3.7 | 3.1 | |
| | | | | | | 85 | | | 10 | 100 | 4 | 4.9 | 4.7 | |
| | | | | | | 87 | | | 10 | 100 | 2 | 7.3 | 6.8 | |
| | | | | | | 88 | | | 9 | 90 | 2 | 8.9 | 7.0 | excellent, heavy fruit crop, |
| | | | | | | 90 | | | 9 | 90 | 3 | 10.2 | 7.8 | mildew on leaves |
| | | | | | | 95 | | | 9 | 90 | 3 | 14.0 | 10.4 | |
| | | | | | | 00 | | | 9 | 90 | | 18.1 | 13.8 | |
| | | | | | | 05 | | | 8 | 80 | | 20.0 | 12.8 | good seed; some mildew |
| 1/11/11-15 | 9082634 | PRTI | rose tree of China | 29-Apr | 99 | 99 | PLBR | 5 | 4 | 80 | 5 | 1.1 | 1.7 | |
| | | | *Prunus triloba* | | | 00 | | | 4 | 80 | 6 | 2.1 | 1.7 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 2 | 40 | 3 | 4.0 | 3.6 | |
| | | | | | | 03 | | | 2 | 40 | 3 | 6.4 | 5.4 | |
| | | | | | | 05 | | | 2 | 40 | 3 | 8.8 | 6.8 | dieback on 2 |
| 1/11/16-20 | 'Freedom' | LOKO2 | honeysuckle | | 03 | 03 | PLBR | 5 | 5 | 100 | 3 | 3.5 | 3.4 | |
| | | | *Lonicera korolkowii* | | | 04 | | | 5 | 100 | 2 | 4.7 | 5.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | 05 | | | 5 | 100 | 2 | 6.0 | 5.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/12/1-10 | 'Indigo' | COAM2 | silky dogwood | 3-May | 83 | 83 | PLBR | 10 | 9 | 90 | | 0.9 | 1.8 | |
| | Mich-765 | | *Cornus amomum* | | | 84 | | | 10 | 100 | 2 | 3.8 | 3.1 | |
| | 9004971 | | USDA, NRCS, PMC, Rose Lake, MI | | | 85 | | | 10 | 100 | 2 | 5.6 | 4.9 | |
| | PI-468117 | | | | | 87 | | | 10 | 100 | 1 | 10.0 | 7.4 | |
| | | | | | | 92 | | | 10 | 100 | 2 | 13.5 | 9.3 | |
| | | | | | | 97 | | | 10 | 100 | 1 | 21.3 | 10.5 | excellent |
| 1/12/16-20 | 9082738 | CORA6 | gray dogwood | | 03 | 03 | PLBR | 5 | 5 | 100 | 4 | 0.5 | 1.3 | |
| | | | *Cornus racemosa* | | | 04 | | | 5 | 100 | 4 | 1.0 | 1.5 | browse on all |
| | | | Wisconsin | | | 05 | | | 5 | 100 | 3 | 2.0 | 1.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 1/13/10-15 | 9082706 | ROAR3 | prairie rose | | 03 | 03 | PLBR | 5 | 5 | 100 | 3 | 1.2 | 1.0 | |
| | | | *Rosa arkansana* | | | 04 | | | 5 | 100 | | 1.6 | 1.8 | |
| | | | Bismarck | | | 05 | | | 5 | 100 | 5 | 2.2 | 1.8 | 1 mowed, 5 wood rose contam. |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | | | | | | | | | |
| 1/13/16-20 | 9082746 | RIMI | Missouri gooseberry | | 03 | 03 | PLBR | 5 | 5 | 100 | 3 | 1.4 | 1.2 | |
| | | | *Ribes missouriense* | | | 04 | | | 5 | 100 | 4 | 2.5 | 3.0 | fall color, burgundy |
| | | | Big Sioux River | | | 05 | | | 5 | 100 | 4 | 3.6 | 3.1 | red, good color |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| I/14/1-5 | 9082889 | PIMU80 | mugo pine | 19-May | 04 | 04 | PLBR | 5 | 2 | 40 | 4 | 1.0 | 1.1 | |
| | | | *Pinus mugo* | | | 05 | | | 4 | 80 | 6 | 0.7 | 1.0 | replaced 1-3 |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 3 | 60 | 3 | 0.9 | 1.3 | 5 upright |
| I/14/6-10 | 9082891 | PHOP | common ninebark | 19-May | 04 | 04 | PLBR | 5 | 5 | 100 | 5 | 0.6 | 1.1 | browse on 1 |
| | | | *Physocarpus opulifolius* | | | 05 | | | 4 | 80 | 4 | 3.5 | 2.8 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 4 | 80 | 3 | 2.5 | 2.9 | leaf blight on 1 |
| I/14/11-15 | 9082890 | CORA6 | gray dogwood | 19-May | 04 | 04 | PLBR | 5 | 5 | 100 | 5 | 0.5 | 1.3 | heavy leaf spot |
| | | | *Cornus racemosa* | | | 05 | | | 5 | 100 | 5 | 1.5 | 1.5 | heavy leaf spot |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 5 | 100 | 5 | 1.5 | 2.1 | |
| 1/14/16-20 | 9082684 | RHGL | smooth sumac | | 03 | 03 | PLBR | 5 | 2 | 40 | 4 | 1.5 | 1.4 | |
| | | | *Rhus glabra* | | | 04 | | | 3 | 60 | | 1.8 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | 05 | | | 5 | 100 | 5 | 1.5 | 2.2 | leaf spot |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/15/1-5 | 9091967 | PRPE2 | pin cherry | 11-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.9 | 1.8 | |
| | | | *Prunus pensylvanica* | | | 06 | | | 5 | 100 | 5 | 0.5 | 1.6 | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| I/15/6-10 | 9091975 | AMELA | serviceberry | 11-May | 05 | 05 | | 5 | 5 | 100 | 5 | 0.9 | 1.5 | |
| | | | *Amelanchier lamarckii* | | | 06 | | | 5 | 100 | 7 | 0.3 | 0.8 | heavy browse 1 |
| | | | Lincoln-Oakes Nursery, Bismarck ND | | | | | | | | | | | |
| I/15/11-15 | 9076686 | CRCH | roundleaf hawthorn | 19-May | 04 | 04 | | 5 | 5 | 100 | 5 | 0.4 | 0.6 | |
| | | | *Crataegus chrysocarpa* | | | 05 | | | 5 | 100 | 4 | 0.8 | 1.0 | deer browse |
| | | | Lincoln-Oakes Nursery, Bismarck ND | | | 06 | | | 5 | 100 | 6 | 0.5 | 1.1 | chlorosis, browse 1 |
| I/15/16-20 | 9082888 | COAM3 | American hazelnut | 19-May | 04 | 04 | | 5 | 5 | 100 | 4 | 0.6 | 1.2 | |
| | | | *Corylus americana* | | | 05 | | | 5 | 100 | 5 | 0.9 | 1.3 | scald on leaves |
| | | | Lincoln-Oakes Nursery, Bismarck ND | | | 06 | | | 5 | 100 | 4 | 1.1 | 1.3 | |
| I/16/1-5 | 'Konza' | RHAR | aromatic sumac | 28-Apr | 87 | 87 | CONT | 5 | 5 | 100 | | 0.8 | 1.2 | |
| | PI-477981 | | *Rhus aromatica* | | | 88 | | | 5 | 100 | 3 | 1.2 | 1.7 | |
| | | | USDA, NRCS, PMC, Manhattan, KS | | | 89 | | | 3 | 60 | 2 | 3.1 | 2.8 | |
| | | | | | | 91 | | | 2 | 40 | 2 | 6.6 | 4.3 | |
| | | | | | | 93 | | | 2 | 40 | 3 | 9.8 | 5.8 | |
| | | | | | | 96 | | | 2 | 40 | 4 | 13.5 | 6.1 | |
| | | | | | | 01 | | | 1 | 20 | 3 | 12.0 | 8.5 | |
| | | | | | | 06 | | | 1 | 20 | 3 | 16.0 | 9.0 | |
| I/16/11-20 | ND-3744 | BEKO | Korean barberry | 4-May | 88 | 88 | CONT | 10 | 0 | 0 | | | | |
| | 9019577 | | *Berberis koreana* | | | 89 | | | 10 | 100 | 4 | 0.7 | 0.9 | |
| | | | NDSU | | | 90 | | | 10 | 100 | 3 | 1.4 | 2.0 | |
| | | | McKenzie FEP, ND | | | 92 | | | 10 | 100 | 4 | 3.5 | 3.0 | |
| | | | | | | 94 | | | 10 | 100 | 3 | 4.5 | 4.8 | |
| | | | | | | 97 | | | 10 | 100 | 3 | 6.8 | 5.7 | |
| | | | | | | 02 | | | 10 | 100 | | 10.5 | 8.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/17/1-10 | 'Meadowlark' | FOOV | forsythia | 4-May | 88 | 88 | CONT | 10 | 9 | 90 | 4 | 1.2 | 1.4 | |
| | 9005886 | | *Forsythia ovata x europaea* | | | 89 | | | 10 | 100 | 1 | 3.1 | 2.6 | |
| | | | P.I. Sta., Ames, IA | | | 90 | | | 9 | 90 | 2 | 4.4 | 4.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 92 | | | 9 | 90 | 2 | 6.0 | 6.6 | |
| | | | | | | 94 | | | 9 | 90 | 1 | 9.1 | 7.8 | |
| | | | | | | 97 | | | 10 | 100 | 1 | 14.3 | 9.5 | very uniform |
| | | | | | | 02 | | | 9 | 90 | 2 | 16.0 | 11.0 | uniform |
| I/17/11-20 | ND-2103 | VIOP | highbush cranberry | 4-May | 88 | 88 | POTD | 10 | 0 | 0 | | | | |
| | PI-399414 | | *Viburnum opulus* | | | 89 | | | 8 | 80 | 3 | 0.7 | 1.0 | |
| | | | P.I. Sta., Ames, IA | | | 90 | | | 5 | 50 | 3 | 1.7 | 2.2 | |
| | | | NDSU, Exp. Sta., Dickinson, ND | | | 92 | | | 4 | 40 | 3 | 3.6 | 4.3 | |
| | | | | | | 94 | | | 4 | 40 | 4 | 6.5 | 6.4 | |
| | | | | | | 97 | | | 4 | 40 | 1 | 12.0 | 8.0 | |
| | | | | | | 02 | | | 4 | 40 | 2 | 15.0 | 11.8 | |
| I/18/1-10 | ND-2507 | CAPY | pigmy caragana | 4-May | 88 | 88 | POTD | 10 | 9 | 90 | 7 | 0.2 | 0.5 | |
| | 9047228 | | *Caragana pygmaea* | | | 89 | | | 6 | 60 | 5 | 0.6 | 0.8 | |
| | | | NDFS, Bottineau, ND | | | 90 | | | 8 | 80 | 3 | 0.9 | 1.2 | |
| | | | USDA, SCS, PMC, Bismarck, ND | | | 92 | | | 7 | 70 | 3 | 2.8 | 2.3 | |
| | | | | | | 94 | | | 7 | 70 | 3 | 4.2 | 3.6 | |
| | | | | | | 97 | | | 7 | 70 | 3 | 6.4 | 4.3 | |
| | | | | | | 02 | | | 4 | 40 | 4 | 7.5 | 5.3 | |
| I/18/11-15 | 9091976 | VIDE | arrowwood viburnum | 11-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.8 | 1.4 | |
| | | | *Viburnum dentatum* | | | 06 | | | 5 | 100 | 4 | 0.7 | 1.4 | all browsed |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| I/19/1-10 | 9057409 | COAM3 | American hazel | 4-May | 88 | 88 | PLBR | 10 | 1 | 10 | 9 | 0.2 | 1.1 | |
| | | | *Corylus americana* | | | 89 | | | 8 | 80 | 4 | 0.6 | 1.1 | |
| | | | Turtle Mtns., Bottineau Co., ND | | | 90 | | | 6 | 60 | 5 | 1.1 | 1.2 | |
| | | | NDFS | | | 92 | | | 6 | 60 | 3 | 2.0 | 2.0 | |
| | | | | | | 94 | | | 6 | 60 | 3 | 4.1 | 3.8 | |
| | | | | | | 97 | | | 6 | 60 | 1 | 7.0 | 5.8 | |
| | | | | | | 02 | | | 6 | 60 | 4 | 11.5 | 8.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/19/11-20 | 'Hedge King' | LOXY | honeysuckle | 4-May | 88 | 88 | PLBR | 10 | 8 | 80 | 7 | 0.5 | 0.9 | |
| | 9057407 | | *Lonicera xylosteoides* | | | 89 | | | 9 | 90 | 5 | 0.7 | 1.0 | |
| | | | Wedge Nursery, Albert Lea, MN | | | 90 | | | 8 | 80 | 3 | 1.1 | 1.2 | |
| | | | | | | 92 | | | 8 | 80 | 3 | 1.5 | 1.8 | |
| | | | | | | 94 | | | 8 | 80 | 5 | 1.8 | 2.3 | |
| | | | | | | 97 | | | 8 | 80 | 1 | 2.4 | 3.2 | |
| | | | | | | 02 | | | 5 | 50 | 5 | 3.8 | 5.6 | |
| II/03/1-10 | ND-1731 | MABA | Siberian crabapple | 10-May | 78 | 78 | PLBR | 10 | 10 | 100 | 5 | 1.0 | 2.2 | standard |
| | 9006001 | | *Malus baccata* | | | 79 | | | 10 | 100 | 3 | 2.2 | 3.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 10 | 100 | | 3.9 | 5.0 | |
| | | | | | | 82 | | | 10 | 100 | | 5.5 | 8.0 | |
| | | | | | | 83 | | | 9 | 90 | | 6.2 | 8.7 | fire blight |
| | | | | | | 84 | | | 9 | 90 | 7 | 8.1 | 10.4 | |
| | | | | | | 87 | | | 9 | 90 | 4 | 11.2 | 14.2 | |
| | | | | | | 88 | | | 9 | 90 | 4 | 13.1 | 13.9 | |
| | | | | | | 92 | | | 9 | 90 | 4 | 16.7 | 15.4 | |
| | | | | | | 97 | | | 9 | 90 | 1 | 27.2 | 19.7 | |
| | | | | | | 02 | | | 9 | 90 | 3 | 32.0 | 28.0 | |
| II/04/1-10 | 'McDermand' | PYUS | Ussurian pear | 10-May | 78 | 78 | PLBR | 10 | 10 | 100 | 5 | 0.7 | 2.0 | |
| | ND-14 | | *Pyrus ussuriensis* | | | 79 | | | 10 | 100 | 5 | 1.6 | 2.6 | |
| | 9006095 | | Harbin Manchuria/Res. Sta. | | | 80 | | | 10 | 100 | | 2.2 | 4.1 | |
| | PI-478004 | | Morden, Manitoba, Canada | | | 82 | | | 10 | 100 | | 2.9 | 5.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 6 | 60 | | 4.0 | 6.9 | |
| | | | | | | 84 | | | 6 | 60 | | 5.0 | 8.4 | |
| | | | | | | 87 | | | 6 | 60 | 5 | 7.9 | 11.9 | |
| | | | | | | 88 | | | 6 | 60 | 3 | 11.6 | 13.9 | |
| | | | | | | 92 | | | 6 | 60 | 3 | 16.3 | 16.4 | |
| | | | | | | 97 | | | 6 | 60 | 1 | 24.6 | 23.0 | |
| | | | | | | 02 | | | 6 | 60 | 1 | 26.0 | 26.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/05/1-10 | 'Streamco' | SAPU2 | purpleosier willow | 1-May | 90 | 90 | PLBR | 10 | 10 | 100 | 3 | 5.2 | 2.6 | |
| | 434309 | | *Salix purpurea* | | | 91 | | | 10 | 100 | 3 | 7.5 | 4.1 | |
| | | | USDA, NRCS, PMC, Big Flats, NY | | | 92 | | | 10 | 100 | 4 | 10.7 | 8.3 | tipping by deer |
| | | | | | | 94 | | | 10 | 100 | 2 | 17.1 | 12.1 | |
| | | | | | | 96 | | | 10 | 100 | | 9.5 | 15.4 | |
| | | | | | | 99 | | | 10 | 100 | 2 | 22.0 | 17.7 | |
| | | | | | | 04 | | | 10 | 100 | 4 | 27.0 | 19.0 | deer browse line |
| II/07/1-10 | ND-21 | VILE | nannyberry | 29-Apr | 86 | 86 | PLBR | 10 | 10 | 100 | | 0.8 | 1.5 | |
| | 9034900 | | *Viburnum lentago* | | | 87 | | | 10 | 100 | 3 | 1.4 | 2.9 | |
| | | | USDA, ARS, Mandan, ND | | | 88 | | | 10 | 100 | 3 | 2.1 | 3.8 | |
| | | | | | | 90 | | | 10 | 100 | 3 | 4.5 | 5.0 | |
| | | | | | | 92 | | | 10 | 100 | 3 | 5.4 | 6.2 | some suckering on all |
| | | | | | | 95 | | | 10 | 100 | 2 | 7.7 | 7.8 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 10.5 | 10.1 | mildew |
| | | | | | | 05 | | | 10 | 100 | 3 | 13.0 | 13.0 | average moderate mildew |
| II/8/1-5 | 9082609 | PICEA | Meyer's spruce | | 01 | 01 | CONT | 5 | 4 | 80 | 5 | 0.5 | 0.7 | |
| | | | *Picea meyeri* | | | 02 | | | 4 | 80 | 2 | 0.7 | 0.9 | |
| | | | Itasca Greenhouse, Inc. | | | 03 | | | 4 | 80 | 3 | 1.3 | 1.4 | |
| | | | | | | 05 | | | 4 | 80 | 5 | 2.0 | 2.7 | |
| II/08/6-10 | 9076741 | SAMA13 | Libbon willow | 30-Apr | 96 | 96 | HDCU | 5 | 5 | 100 | 4 | 2.6 | 2.4 | severe deer browse |
| | | | *Salix matsudana x* | | | 97 | | | 5 | 100 | 9 | 1.9 | 2.5 | |
| | | | George Libbon, Stevens Co., MN | | | 98 | | | 3 | 60 | 7 | 2.7 | 3.8 | |
| | | | | | | 00 | | | 1 | 20 | 2 | 13.4 | 22.3 | |
| | | | | | | 02 | | | 1 | 20 | 3 | 18.0 | 26.0 | compact growth |
| | | | | | | 06 | | | 1 | 20 | 2 | 30.0 | 39.3 | |
| II/8/6-10 | 9092053 | RHTY | staghorn sumac | 3-May | 06 | 06 | PLBR | 5 | 3 | 60 | 4 | 1.6 | 1.9 | |
| | | | *Rhus typhina* | | | | | | | | | | | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 11/09/1-5 | 9092053 | ELAEA | Russian olive/Silverberry hybrid | 3-May | 06 | 06 | PLBR | 5 | 5 | 100 | 2 | 1.3 | 3.1 | |
| | | | *Elaeagnus X* 'Jefmorg' | | | | | | | | | | | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/09/6-10 | 9069129 | PRMA | amur chokecherry | 26-Apr | 95 | 95 | PLBR | 5 | 5 | 100 | 3 | 0.9 | 2.0 | |
| | | | *Prunus maackii* | | | 96 | | | 4 | 80 | 3 | 1.3 | 2.4 | deer browse on all |
| | | | Big Sioux Nursery, Watertown, SD | | | 97 | | | 4 | 80 | 4 | 1.6 | 3.1 | browsed |
| | | | | | | 99 | | | 3 | 60 | 5 | 2.0 | 3.6 | browsed |
| | | | | | | 01 | | | 3 | 60 | 4 | 5.0 | 8.6 | |
| | | | | | | 04 | | | 6 | 60 | 4 | 7.8 | 13.3 | |
| II/09/6-10 | 'Prairie Red' 9047203 | PRUNU | plum *Prunus* sp. Big Sioux Nursery, Watertown, SD | 3-May | 06 | 06 | | | 5 | 100 | 8 | 0.5 | 1.1 | |
| II/10/1-10 | ND-2102 | PRAR3 | apricot | 29-Apr | 86 | 86 | PLBR | 10 | 10 | 100 | | 1.2 | 1.6 | |
| | 9036029 | | *Prunus armeniaca* | | | 87 | | | 10 | 100 | 3 | 2.5 | 3.1 | |
| | | | Hand Co., SD | | | 88 | | | 10 | 100 | 5 | 3.2 | 4.3 | |
| | | | | | | 90 | | | 10 | 100 | 3 | 5.9 | 7.1 | |
| | | | | | | 92 | | | 10 | 100 | 4 | 9.2 | 11.3 | canker, deer browse on all |
| | | | | | | 95 | | | 10 | 100 | 3 | 13.9 | 14.4 | |
| | | | | | | 00 | | | 8 | 80 | 5 | 18.4 | 15.1 | |
| | | | | | | 05 | | | 6 | 60 | | 27.5 | 17.8 | |
| II/11/1-5 | 9082885 | POTR5 | aspen | 19-May | 04 | 04 | PLBR | 5 | 2 | 40 | 7 | 0.3 | 1.5 | |
| | | | *Populus tremuloides* | | | 05 | | | 5 | 100 | 5 | 0.6 | 1.6 | |
| | | | NDFS Nursery, Towner, ND | | | 06 | | | 5 | 100 | | 0.4 | 1.7 | 1 black leaves |
| II/11/6-10 | 9082886 | POTR5 | aspen | 19-May | 04 | 04 | PLBR | 5 | 5 | 100 | 5 | 0.3 | 1.3 | leaf deep on all |
| | | | *Populus tremuloides* | | | 05 | | | 5 | 100 | | 0.2 | 0.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 3 | 60 | 8 | 0.3 | 0.7 | |
| II/12/1-5 | 9082631 | BEPLJ | Japanese birch | 29-Apr | 99 | 99 | PLBR | 5 | 5 | 100 | 3 | 0.7 | 2.6 | |
| | | | *Betula platyphylla japonica* | | | 00 | | | 5 | 100 | 3 | 3.3 | 4.4 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 5 | 100 | 2 | 5.7 | 7.5 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 8.5 | 13.1 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 9.4 | 16.5 | |
| II/12/5-10 | 9091974 | QURU | red oak | 11-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.4 | 1.5 | chlorotic |
| | | | *Quercus rubra* | | | 06 | | | 5 | 100 | 5 | | 1.9 | 3 top dead |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/13/1-5 | 9082635 | ROPS | black locust | 29-Apr | 99 | 99 | PLBR | 5 | 5 | 100 | 3 | 2.4 | 4.2 | |
| | | | *Robinia pseudoacacia* | | | 00 | | | 5 | 100 | 5 | 2.7 | 3.9 | |
| | | | Lawyer Nursery, Plains,MT | | | 01 | | | 5 | 100 | 6 | 3.8 | 4.5 | |
| | | | | | | 03 | | | 2 | 40 | 6 | 10.0 | 8.9 | |
| | | | | | | 06 | | | 2 | 40 | 3 | 18.3 | 17.9 | multi-stemmed |
| II/13/6-10 | 9091973 | QURU | red oak | 11-May | 05 | 05 | | 5 | 5 | 100 | 5 | 0.5 | 1.4 | |
| | | | *Quercus rubra* | | | 06 | | | 5 | 100 | | | 1.5 | 1,3 dead top; leaf disease on all |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| II/14/1-5 | 9076718 | PISYM | Scots pine | 29-Apr | 99 | 99 | CONT | 5 | 5 | 100 | 3 | 0.7 | 1.2 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 00 | | | 5 | 100 | 3 | 1.5 | 1.8 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 01 | | | 5 | 100 | 2 | 2.5 | 3.0 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 5.0 | 6.8 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 7.2 | 10.6 | |
| II/14/6-10 | 9076719 | PISYM | Scots pine | 29-Apr | 99 | 99 | CONT | 5 | 5 | 100 | 2 | 1.0 | 1.3 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 00 | | | 5 | 100 | 3 | 1.6 | 1.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 01 | | | 5 | 100 | 2 | 2.3 | 2.9 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 4.8 | 6.0 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 7.2 | 10.0 | |
| II/15/1-5 | 9076737 | PRSE | black cherry | 12-May | 97 | 97 | PLBR | 5 | 4 | 80 | 8 | 0.3 | 0.5 | |
| | | | *Prunus serotina* | | | 98 | | | 2 | 40 | 8 | 0.8 | 0.8 | |
| | | | Apple Valley FEP | | | 99 | | | 1 | 20 | | 1.8 | 2.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 1 | 20 | 5 | 4.1 | 4.3 | |
| | | | | | | 01 | | | 1 | 20 | | 5.5 | 6.5 | |
| | | | | | | 03 | | | 1 | 20 | 3 | 8.0 | 12.0 | |
| | | | | | | 06 | | | 1 | 20 | 2 | 11.5 | 17.2 | |
| II/15/6-10 | 9069163 | LARIX | Dahurian larch | 2-May | 00 | 00 | | 5 | 5 | 100 | 7 | 0.8 | 1.1 | |
| | | | *Larix olgensis* | | | 01 | | | 4 | 80 | 6 | 0.9 | 1.6 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 3 | 60 | 2 | 1.5 | 2.0 | |
| | | | | | | 04 | | | 3 | 60 | | 2.2 | 3.1 | |
| | | | | | | 06 | | | 3 | 60 | 5 | 4.1 | 4.5 | deer rub |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/16/1-5 | 9076722 | BEPE3 | European white birch | 30-Apr | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 2.4 | 2.8 | |
| | | | *Betula pendula* | | | 97 | | | 5 | 100 | 2 | 3.5 | 4.6 | |
| | | | Russia | | | 98 | | | 4 | 80 | 3 | 7.0 | 9.2 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 5 | 100 | 2 | 10.2 | 15.8 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 16.0 | 21.0 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 14.8 | 27.5 | |
| II/16/6-10 | 9069121 | PRPA5 | mayday | 30-Apr | 96 | 96 | CONT | 5 | 5 | 100 | 4 | 0.5 | 0.9 | |
| | | | *Prunus padus* | | | 97 | | | 5 | 100 | 3 | 0.8 | 1.2 | |
| | | | Norway | | | 98 | | | 5 | 100 | 7 | 1.1 | 1.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 00 | | | 2 | 40 | 3 | 2.8 | 3.9 | |
| | | | | | | 02 | | | 2 | 40 | 4 | 4.2 | 6.6 | |
| | | | | | | 05 | | | 2 | 40 | 4 | 5.4 | 9.5 | |
| II/17/1-5 | 9069170 | QURO2 | English oak | 30-Apr | 96 | 96 | PLBR | 5 | 4 | 80 | 4 | 0.9 | 1.0 | |
| | | | *Quercus robur* | | | 97 | | | 5 | 100 | 3 | 1.1 | 1.3 | |
| | | | Russia | | | 98 | | | 5 | 100 | 6 | 1.2 | 1.3 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 5 | 100 | 7 | 1.0 | 1.1 | |
| | | | | | | 02 | | | 4 | 80 | 8 | 2.4 | 2.6 | |
| | | | | | | 05 | | | 4 | 80 | 6 | 3.3 | 4.5 | |
| II/17/6-10 | 9076725 | ULCA | smoothbark elm | 30-Apr | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 2.3 | 2.0 | deer browse on all |
| | | | *Ulmus carpinifolia* | | | 97 | | | 5 | 100 | 2 | 3.6 | 2.5 | all browsed |
| | | | Russia | | | 98 | | | 5 | 100 | 4 | 5.3 | 3.9 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 3 | 60 | 3 | 8.9 | 11.8 | |
| | | | | | | 02 | | | 3 | 60 | 4 | 15.0 | 17.7 | |
| | | | | | | 05 | | | 2 | 40 | 2 | 23.5 | 27.5 | good form on both |
| II/18/1-5 | 9069168 | LASI | Siberian larch | 2-May | 00 | 00 | CONT | 5 | 5 | 100 | 5 | 0.6 | 1.4 | |
| | | | *Larix sibirica* | | | 01 | | | 4 | 80 | 4 | 0.9 | 1.8 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 4 | 80 | 3 | 1.3 | 2.3 | |
| | | | | | | 04 | | | 3 | 60 | 5 | 2.6 | 3.8 | deer rub |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/18/6-10 | 9082610 | LASI | Siberian larch | 2-May | 00 | 00 | CONT | 5 | 5 | 100 | 6 | 0.6 | 1.1 | |
| | | | *Larix sibirica* | | | 01 | | | 4 | 80 | 5 | 0.8 | 1.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 5 | 1.1 | 1.4 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 1.2 | 2.4 | |
| | | | | | | 06 | | | 5 | 100 | 5 | 2.1 | 2.2 | |
| II/19/1-5 | 9063126 | ULJA | Japanese elm | 28-Apr | 92 | 92 | CONT | 5 | 5 | 100 | 4 | 1.1 | 1.3 | |
| | | | *Ulmus japonica* | | | 93 | | | 4 | 80 | 3 | 1.3 | 1.2 | |
| | | | Manchuria | | | 94 | | | 4 | 80 | 5 | 2.6 | 2.2 | |
| | | | PRFA, Indianhead, Saskatchewan, Canada | | | 96 | | | 4 | 80 | 4 | 4.3 | 3.2 | deer browse 1, leaf blight 3 |
| | | | | | | 98 | | | 4 | 80 | 5 | 4.2 | 4.9 | |
| | | | | | | 01 | | | 4 | 80 | 5 | 7.8 | 8.1 | heavy browse |
| | | | | | | 06 | | | 4 | 80 | 4 | 11.1 | 12.9 | |
| II/19/6-10 | 9082665 | ALRU | speckled alder | 2-May | 00 | 00 | CONT | 5 | 5 | 100 | 5 | 0.7 | 2.4 | |
| | | | *Alnus rugosa* | | | 01 | | | 2 | 40 | 8 | 0.6 | 1.4 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 1 | 20 | 3 | 1.8 | 2.2 | |
| | | | | | | 06 | | | 0 | 0 | | | | |
| II/19/6-10 | 9092051 | CASP8 | northern catalpa | 3-May | 06 | 06 | PLBR | 5 | 5 | 100 | 3 | 0.6 | 0.9 | leaf edge burn |
| | | | *Catalpa speciosa* | | | | | | | | | | | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| II/20/1-5 | 9082666 | BEDA | black birch | | 01 | 01 | PLBR | 5 | 5 | 100 | 2 | 2.0 | 1.9 | |
| | | | *Betula davurica* | | | 02 | | | 5 | 100 | 3 | 2.8 | 3.0 | |
| | | | Lawyer Nursery, Plains, MT | | | 03 | | | 4 | 80 | 4 | 4.4 | 5.2 | |
| | | | | | | 05 | | | 4 | 80 | 5 | 5.7 | 8.3 | |
| II/20/6-10 | 9092052 | QUBI | swamp white oak | 3-May | 06 | 06 | PLBR | 5 | 5 | 100 | 3 | 0.7 | 1.1 | |
| | | | *Quercus bicolor* | | | | | | | | | | | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/21/1-10 | 'Flame' | ACGI | amur maple | 29-Apr | 80 | 80 | PLBR | 10 | 10 | 100 | 5 | 2.8 | 3.3 | |
| | MI-891 | | *Acer ginnala* | | | 81 | | | 10 | 100 | | 4.7 | 4.6 | |
| | 9005157 | | USDA, NRCS, PMC, Elsberry, MO | | | 82 | | | 10 | 100 | | 6.5 | 6.0 | |
| | | | | | | 83 | | | 10 | 100 | | 7.0 | 6.3 | |
| | | | | | | 84 | | | 9 | 90 | 4 | 12.2 | 8.6 | chlorosis |
| | | | | | | 87 | | | 8 | 80 | 2 | 16.8 | 12.9 | |
| | | | | | | 92 | | | 8 | 80 | 3 | 22.2 | 15.8 | |
| | | | | | | 97 | | | 7 | 70 | 2 | 26.2 | 18.4 | |
| | | | | | | 02 | | | 5 | 50 | 4 | 31.0 | 23.5 | |
| II/22/1-10 | ND-1752 | ACGI | amur maple | 23-May | 78 | 78 | PLBR | 10 | 9 | 90 | 5 | 0.6 | 1.2 | standard |
| | 9005646 | | *Acer ginnala* | | | 79 | | | 8 | 80 | 4 | 1.9 | 2.6 | |
| | | | Gurney Seed & Nursery Co., Yankton, SD | | | 80 | | | 10 | 100 | 6 | 3.2 | 3.4 | |
| | | | | | | 82 | | | 8 | 80 | | 8.1 | 7.0 | |
| | | | | | | 83 | | | 8 | 80 | | 11.0 | 8.1 | |
| | | | | | | 84 | | | 8 | 80 | 2 | 12.9 | 10.5 | chlorosis |
| | | | | | | 87 | | | 8 | 80 | 2 | 16.5 | 13.1 | |
| | | | | | | 92 | | | 8 | 80 | 2 | 20.4 | 15.2 | |
| | | | | | | 97 | | | 8 | 80 | 4 | 20.8 | 20.0 | |
| | | | | | | 02 | | | 6 | 60 | 5 | 16.3 | 17.7 | |
| II/22/11-20 | ND-629 | ACGI | amur maple | 14-May | 79 | 79 | PLBR | 10 | 10 | 100 | 3 | 0.9 | 1.8 | |
| | 9005645 | | *Acer ginnala* | | | 80 | | | 10 | 100 | 5 | 2.2 | 3.5 | |
| | PI-477992 | | Res. Sta. Morden, Manitoba, Canada | | | 81 | | | 10 | 100 | | 4.3 | 5.1 | |
| | | | | | | 83 | | | 10 | 100 | | 7.2 | 7.1 | |
| | | | | | | 84 | | | 9 | 90 | 3 | 12.5 | 9.7 | |
| | | | | | | 85 | | | 9 | 90 | 3 | 13.5 | 10.7 | chlorosis |
| | | | | | | 87 | | | 9 | 90 | 3 | 16.9 | 13.7 | |
| | | | | | | 93 | | | 9 | 90 | 3 | 21.2 | 17.3 | |
| | | | | | | 98 | | | 9 | 90 | 5 | 23.7 | 20.2 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/23/1-10 | ND-1873 | ACGI | amur maple | 15-May | 79 | 79 | PLBR | 10 | 9 | 90 | 3 | 0.7 | 1.4 | |
| | 9005648 | | *Acer ginnala* | | | 80 | | | 10 | 100 | 6 | 1.2 | 2.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 81 | | | 10 | 100 | | 2.2 | 0.3 | |
| | | | | | | 83 | | | 10 | 100 | | 3.8 | 3.7 | |
| | | | | | | 84 | | | 9 | 90 | 4 | 6.2 | 5.2 | |
| | | | | | | 85 | | | 8 | 80 | 6 | 8.0 | 6.5 | |
| | | | | | | 87 | | | 8 | 80 | 5 | 9.9 | 9.1 | |
| | | | | | | 88 | | | 8 | 80 | 4 | 9.9 | 8.8 | |
| | | | | | | 93 | | | 8 | 80 | 4 | 14.3 | 13.2 | |
| | | | | | | 98 | | | 8 | 80 | 6 | 14.2 | 14.7 | |
| | | | | | | 04 | | | 2 | 20 | | 22.5 | 19.5 | chlorotic |
| II/24/1-10 | ND-686 | SYREP | pekin lilac | 14-May | 79 | 79 | PLBR | 10 | 9 | 90 | 4 | 0.5 | 1.0 | |
| | 9006225 | | *Syringa reticulata* ssp. *pekinensis* | | | 80 | | | 10 | 100 | 7 | 0.6 | 1.0 | |
| | PI-478008 | | Res. Sta., Morden, Manitoba, Canada | | | 81 | | | 9 | 90 | | 1.2 | 1.3 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 83 | | | 9 | 90 | | 2.5 | 2.5 | |
| | | | | | | 84 | | | 9 | 90 | 4 | 4.0 | 3.2 | |
| | | | | | | 85 | | | 6 | 60 | 4 | 6.6 | 5.4 | |
| | | | | | | 88 | | | 6 | 60 | | 8.9 | 8.0 | |
| | | | | | | 93 | | | 6 | 60 | 2 | 15.7 | 13.5 | |
| | | | | | | 98 | | | 6 | 60 | 3 | 17.4 | 14.4 | |
| II/26/1-10 | ND-19 | CRAR | Arnold hawthorn | 1-May | 84 | 84 | CONT | 10 | 10 | 100 | 3 | 0.5 | 1.0 | |
| | 9005731 | | *Crataegus arnoldiana* | | | 85 | | | 10 | 100 | 3 | 0.8 | 1.3 | |
| | | | Res. Sta., Morden, Manitoba, Canada | | | 86 | | | 10 | 100 | | 1.1 | 1.7 | |
| | | | | | | 87 | | | 10 | 100 | 3 | 1.4 | 2.1 | |
| | | | | | | 88 | | | 10 | 100 | 5 | 1.6 | 2.8 | |
| | | | | | | 90 | | | 10 | 100 | 4 | 2.9 | 4.1 | |
| | | | | | | 93 | | | 10 | 100 | 4 | 4.5 | 7.0 | |
| | | | | | | 98 | | | 10 | 100 | 6 | 6.7 | 9.8 | |
| | | | | | | 04 | | | 10 | 100 | 5 | 7.4 | 9.9 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/01/1-10 | SD-156 | FRPE | green ash | 10-May | 78 | 78 | PLBR | 10 | 8 | 80 | 3 | 0.8 | 2.5 | |
| | 9005890 | | *Fraxinus pennsylvanica* | | | 79 | | | 10 | 100 | 5 | 2.3 | 2.7 | |
| | | | Deuel Co., Clear Lake, SD | | | 80 | | | 10 | 100 | | 2.7 | 4.7 | |
| | | | | | | 82 | | | 10 | 100 | | 6.8 | 8.9 | |
| | | | | | | 83 | | | 10 | 100 | | 6.5 | 9.9 | |
| | | | | | | 84 | | | 10 | 100 | | 8.3 | 12.4 | |
| | | | | | | 87 | | | 10 | 100 | 2 | 11.6 | 18.2 | |
| | | | | | | 92 | | | 10 | 100 | 2 | 15.7 | 23.8 | |
| | | | | | | 97 | | | 10 | 100 | 1 | 24.9 | 31.3 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 32.0 | 46.0 | |
| III/02/1-5 | ND-1753 | FRPE | green ash | 10-May | 78 | 78 | PLBR | 5 | 5 | 100 | 2 | 0.9 | 2.3 | standard |
| | 9005892 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | 5 | 2.3 | 3.2 | |
| | | | Gurney Seed & Nursery Co., Yankton, SD | | | 80 | | | 5 | 100 | | 3.2 | 4.9 | |
| | | | | | | 82 | | | 5 | 100 | | 5.8 | 8.7 | |
| | | | | | | 83 | | | 5 | 100 | | 5.7 | 9.8 | |
| | | | | | | 84 | | | 5 | 100 | | 7.3 | 12.0 | |
| | | | | | | 87 | | | 5 | 100 | 2 | 10.7 | 18.6 | |
| | | | | | | 92 | | | 5 | 100 | 3 | 14.2 | 24.0 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 24.0 | 32.2 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 30.0 | 45.0 | |
| III/02/6-10 | ND-1734 | FRPE | green ash | 10-May | 78 | 78 | PLBR | 5 | 5 | 100 | 3 | 0.8 | 2.0 | standard |
| | 9005891 | | *Fraxinus pennsylvanica* | | | 79 | | | 5 | 100 | 5 | 1.7 | 2.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 80 | | | 5 | 100 | | 2.1 | 4.0 | |
| | | | | | | 82 | | | 5 | 100 | | 5.1 | 8.4 | |
| | | | | | | 83 | | | 5 | 100 | | 4.4 | 9.4 | |
| | | | | | | 84 | | | 5 | 100 | | 6.2 | 12.0 | |
| | | | | | | 87 | | | 5 | 100 | 3 | 10.6 | 18.2 | |
| | | | | | | 92 | | | 5 | 100 | 1 | 14.6 | 23.7 | |
| | | | | | | 97 | | | 5 | 100 | 3 | 17.4 | 30.0 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 30.0 | 46.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/03/1-10 | 'Cardan' | FRPE | green ash | 10-May | 78 | 78 | PLBR | 10 | 10 | 100 | 2 | 0.7 | 2.3 | |
| | MDN-12002 | | *Fraxinus pennsylvanica* | | | 79 | | | 10 | 100 | 5 | 1.9 | 3.2 | |
| | 9005895 | | Carlyle, MT | | | 80 | | | 10 | 100 | | 2.7 | 4.8 | |
| | PI-469226 | | USDA, ARS, Mandan, ND | | | 82 | | | 10 | 100 | | 5.8 | 8.7 | |
| | | | | | | 83 | | | 10 | 100 | | 5.1 | 9.7 | |
| | | | | | | 84 | | | 10 | 100 | | 6.5 | 11.5 | |
| | | | | | | 87 | | | 10 | 100 | 3 | 11.3 | 17.7 | |
| | | | | | | 92 | | | 10 | 100 | 2 | 15.4 | 23.5 | |
| | | | | | | 97 | | | 10 | 100 | 3 | 17.7 | 30.1 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 30.0 | 46.0 | |
| III/04/1-10 | ND-1759 | FRPE | green ash | 10-May | 78 | 78 | PLBR | 10 | 10 | 100 | 2 | 0.8 | 2.2 | |
| | 9005893 | | *Fraxinus pennsylvanica* | | | 79 | | | 10 | 100 | 6 | 1.7 | 2.7 | |
| | | | PM-SD-156 X MDN-12002 | | | 80 | | | 10 | 100 | | 2.4 | 4.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 82 | | | 10 | 100 | | 3.9 | 7.6 | |
| | | | | | | 83 | | | 9 | 90 | | 4.7 | 9.1 | |
| | | | | | | 84 | | | 9 | 90 | | 5.8 | 11.3 | regrowth on 5 |
| | | | | | | 87 | | | 9 | 90 | 3 | 10.6 | 16.9 | |
| | | | | | | 92 | | | 9 | 90 | 1 | 14.4 | 23.5 | |
| | | | | | | 97 | | | 9 | 90 | | 17.9 | 31.2 | |
| | | | | | | 02 | | | 9 | 90 | 3 | 30.0 | 46.0 | |
| III/05/1-10 | ND-647 | FRNI | black ash | 10-May | 78 | 78 | PLBR | 10 | 8 | 80 | 5 | 0.5 | 1.0 | |
| | 9005887 | | *Fraxinus nigra* | | | 79 | | | 9 | 90 | 9 | 0.8 | 0.9 | |
| | | | Res. Sta. Morden, Manitoba, Canada | | | 80 | | | 9 | 90 | 7 | 0.7 | 1.3 | |
| | | | | | | 82 | | | 8 | 80 | | 2.2 | 3.7 | |
| | | | | | | 83 | | | 8 | 80 | | 2.7 | 4.6 | |
| | | | | | | 84 | | | 6 | 60 | | 2.4 | 7.3 | |
| | | | | | | 87 | | | 6 | 60 | 3 | 4.6 | 12.1 | |
| | | | | | | 92 | | | 5 | 50 | 2 | 10.1 | 20.0 | |
| | | | | | | 97 | | | 5 | 50 | 3 | 18.2 | 25.5 | |
| | | | | | | 02 | | | 5 | 50 | 3 | 25.0 | 40.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/06/1-10 | ND-1432 | AEGL | Ohio buckeye | 10-May | 78 | 78 | PLBR | 10 | 7 | 70 | 7 | 0.3 | 0.7 | |
| | 9005658 | | *Aesculus glabra* | | | 79 | | | 1 | 10 | 9 | 0.7 | 0.7 | |
| | | | Res. Sta. Morden, Manitoba, Canada | | | 80 | | | 1 | 10 | 5 | 0.7 | 1.0 | |
| | | | | | | 82 | | | 1 | 10 | | 2.0 | 3.1 | |
| | | | | | | 83 | | | 1 | 10 | | 1.6 | 4.4 | |
| | | | | | | 84 | | | 1 | 10 | | 2.3 | 5.7 | |
| | | | | | | 87 | | | 1 | 10 | 2 | 5.9 | 9.8 | |
| | | | | | | 92 | | | 1 | 10 | 1 | 11.6 | 13.6 | |
| | | | | | | 97 | | | 1 | 10 | 2 | 15.1 | 16.2 | |
| | | | | | | 02 | | | 1 | 10 | 2 | 20.0 | 20.0 | |
| III/06/6-10 | 9063120 | AEGL | Ohio buckeye | 29-Apr | 99 | 99 | CONT | 5 | 5 | 100 | 7 | 0.2 | 0.8 | |
| | | | *Aesculus glabra* | | | 00 | | | 2 | 40 | 8 | 0.1 | 0.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 01 | | | 1 | 20 | 8 | 0.8 | 1.0 | |
| | | | | | | 03 | | | 1 | 20 | 6 | 2.0 | 2.0 | |
| | | | | | | 05 | | | 1 | 20 | | 1.6 | 1.6 | |
| III/07/1-10 | 9057410 | CEOC | hackberry | 4-May | 88 | 88 | CONT | 10 | 10 | 100 | 5 | 0.6 | 1.0 | |
| | | | *Celtis occidentalis* | | | 89 | | | 9 | 90 | 5 | 0.6 | 0.9 | browsing |
| | | | Bottineau Co., ND | | | 90 | | | 8 | 80 | 4 | 1.1 | 1.6 | |
| | | | NDFS | | | 92 | | | 8 | 80 | 5 | 1.2 | 1.8 | |
| | | | | | | 94 | | | 8 | 80 | 4 | 1.6 | 2.8 | |
| | | | | | | 97 | | | 7 | 70 | 6 | 1.6 | 2.1 | deer browse on all |
| | | | | | | 02 | | | 7 | 70 | 5 | 3.5 | 4.4 | |
| III/08/1-5 | 9063148 | PHSA | corktree | 26-Apr | 95 | 95 | CONT(I | 5 | 5 | 100 | 4 | 0.2 | 1.0 | |
| | | | *Phellodendron sachalinense* | | | 96 | | | 5 | 100 | 3 | 3.0 | 3.2 | deer browse on 1 |
| | | | Clay Co., MN | | | 97 | | | 5 | 100 | 1 | 4.3 | 5.0 | |
| | | | | | | 99 | | | 5 | 100 | 4 | 11.4 | 8.8 | |
| | | | | | | 01 | | | 5 | 100 | 3 | 14.5 | 12.7 | |
| | | | | | | 04 | | | 5 | 100 | 4 | 21.0 | 17.5 | |
| III/9/1-5 | 9082668 | FREX | European ash | 2-May | 00 | 00 | CONT | 5 | 5 | 100 | 6 | 0.6 | 2.1 | |
| | | | *Fraxinus excelsior* | | | 01 | | | 5 | 100 | 6 | 1.1 | 1.8 | browsed |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 5 | 100 | 5 | 1.8 | 2.8 | |
| | | | | | | 04 | | | 5 | 100 | 6 | 1.1 | 2.0 | |
| | | | | | | 06 | | | 5 | 100 | 6 | 1.4 | 2.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/9/6-10 | 9082674 | ACSA | sugar maple | 2-May | 00 | 00 | CONT | 5 | 5 | 100 | 8 | 0.3 | 1.1 | |
| | | | *Acer saccharum* | | | 01 | | | 5 | 100 | 9 | 0.2 | 1.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 02 | | | 2 | 40 | 8 | 0.5 | 0.5 | |
| | | | | | | 04 | | | 2 | 40 | | 0.9 | 1.1 | |
| | | | | | | 06 | | | 1 | 20 | 8 | 0.8 | 0.8 | |
| III/10/1-5 | 9058896 | SALIX | Austree | 1-May | 90 | 90 | PLBR | 5 | 2 | 40 | 3 | 1.8 | 4.1 | |
| | Clone C | | *Salix matsudana x alba* | | | 91 | | | 3 | 60 | 4 | 2.7 | 5.2 | |
| | | | Austree, Inc., Pescadero, CA | | | 92 | | | 3 | 60 | 3 | 4.1 | 7.7 | |
| | | | | | | 94 | | | 3 | 60 | 6 | 9.2 | 13.5 | |
| | | | | | | 97 | | | 2 | 40 | 2 | 19.8 | 30.8 | |
| | | | | | | 99 | | | 2 | 40 | 2 | 23.1 | 39.4 | |
| | | | | | | 04 | | | 2 | 40 | 3 | 30.0 | 49.0 | |
| III/11/1-5 | 9058869 | PDXP8 | poplar | 1-May | 90 | 90 | PLBR | 5 | 5 | 100 | 3 | 2.1 | 4.9 | |
| | 14271 | | *Populus deltoides x P. nigra* | | | 91 | | | 5 | 100 | 3 | 4.4 | 7.3 | |
| | 'Italica' #78102 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 3 | 5.8 | 10.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 5 | 100 | 3 | 10.6 | 18.8 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 14.0 | 30.4 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 15.1 | 44.9 | |
| | | | | | | 04 | | | 5 | 100 | 4 | 18.0 | 58.6 | |
| III/11/6-10 | 9058870 | PDXP8 | poplar | 1-May | 90 | 90 | PLBR | 5 | 5 | 100 | 3 | 3.1 | 5.0 | |
| | 14272 | | *Populus deltoides x P. nigra* | | | 91 | | | 5 | 100 | 5 | 4.1 | 6.5 | |
| | 'Italica' #78101 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 5 | 5.9 | 9.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 4 | 80 | 4 | 10.0 | 17.0 | |
| | | | | | | 96 | | | 4 | 80 | 4 | 13.6 | 24.4 | |
| | | | | | | 99 | | | 4 | 80 | 3 | 14.8 | 42.6 | |
| | | | | | | 04 | | | 4 | 80 | 3 | 21.0 | 63.3 | |
| III/12/1-5 | 9058871 | PDXP8 | poplar | 1-May | 90 | 90 | PLBR | 5 | 5 | 100 | 2 | 2.8 | 5.1 | |
| | 14273 | | *Populus deltoides x P. nigra* | | | 91 | | | 5 | 100 | 3 | 6.0 | 9.6 | |
| | 'Italica' #7899 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 3 | 9.0 | 13.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 5 | 100 | 3 | 15.3 | 22.2 | |
| | | | | | | 96 | | | 5 | 100 | 3 | 17.4 | 33.4 | |
| | | | | | | 99 | | | 5 | 100 | 2 | 19.0 | 45.9 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 21.0 | 61.2 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/12/6-10 | 9058872 | PDXP8 | poplar | 1-May | 90 | 90 | PLBR | 5 | 5 | 100 | 3 | 3.7 | 4.6 | |
| | 14274 | | *Populus deltoides x P. nigra* | | | 91 | | | 5 | 100 | 3 | 7.5 | 9.1 | |
| | 'Italica' #7873 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 3 | 8.5 | 10.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 5 | 100 | 5 | 12.7 | 18.2 | |
| | | | | | | 96 | | | 5 | 100 | 5 | 15.5 | 26.8 | leaf spot on 1 |
| | | | | | | 99 | | | 5 | 100 | | 14.4 | 40.3 | |
| | | | | | | 04 | | | 3 | 60 | 5 | 20.0 | 34.7 | |
| III/13/1-5 | 'Canam' | POPUL | poplar | 1-May | 90 | 90 | PLBR | 5 | 5 | 100 | 4 | 3.1 | 4.2 | |
| | 9058873 | | *Populus* | | | 91 | | | 5 | 100 | 5 | 6.0 | 8.8 | |
| | 14390 | | USDA, ARS, Mandan, ND | | | 92 | | | 5 | 100 | 4 | 5.6 | 9.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 94 | | | 3 | 60 | 6 | 9.4 | 19.2 | |
| | | | | | | 96 | | | 3 | 60 | 6 | 11.2 | 24.0 | |
| | | | | | | 99 | | | 3 | 60 | 4 | 12.0 | 36.5 | |
| | | | | | | 04 | | | 3 | 60 | 3 | 18.0 | 54.7 | |
| III/13/6-10 | 9082667 | BEPO | gray birch | 2-May | 00 | 00 | CONT | 5 | 2 | 20 | 6 | 0.4 | 2.4 | |
| | | | *Betula populifera* | | | 01 | | | 2 | 40 | 8 | 0.3 | 1.3 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 1 | 20 | 6 | 1.0 | 1.5 | |
| | | | | | | 05 | | | 2 | 40 | 8 | 0.1 | 0.1 | |
| | | | | | | 06 | | | 0 | 0 | | | | all dead |
| III/14/1-5 | 9082982 | POAL | white poplar | 19-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 0.6 | 1.7 | |
| | | | *Populus alba* | | | 05 | | | 5 | 100 | 6 | 1.0 | 1.7 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 4 | 80 | 4 | 1.3 | 1.9 | |
| III/14/6-10 | 9076746 | AEGL | Ohio buckeye | 2-May | 00 | 00 | CONT | 5 | 5 | 100 | 7 | 0.3 | 0.7 | |
| | | | *Aesculus glabra* | | | 01 | | | 3 | 60 | | 0.0 | 0.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 3 | 60 | 4 | 1.5 | 1.5 | |
| | | | | | | 04 | | | 3 | 60 | 3 | 2.0 | 2.7 | |
| | | | | | | 06 | | | 3 | 60 | 3 | 3.7 | 4.5 | |

**Project No.: 38I318K University of Minnesota, West Central Research and Outreach Center, Morris, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/15/1-10 | 'Oahe' | CEOC | hackberry | 29-Apr | 80 | 80 | PLBR | 10 | 10 | 100 | 6 | 0.4 | 1.9 | |
| | MDN-12003 | | *Celtis occidentalis* | | | 81 | | | 10 | 100 | | 1.4 | 2.1 | |
| | 9005725 | | USDA, ARS, Mandan, ND | | | 82 | | | 10 | 100 | | 3.0 | 3.6 | |
| | PI-476982 | | | | | 83 | | | 10 | 100 | | 4.9 | 5.2 | |
| | | | | | | 84 | | | 10 | 100 | 3 | 5.3 | 7.3 | |
| | | | | | | 86 | | | 10 | 100 | 4 | 9.4 | 10.1 | |
| | | | | | | 89 | | | 10 | 100 | 2 | 13.5 | 15.8 | plt 2 stunted, deer browse |
| | | | | | | 94 | | | 10 | 100 | 3 | 14.5 | 20.7 | |
| | | | | | | 99 | | | 10 | 100 | 2 | 18.0 | 26.4 | |
| | | | | | | 04 | | | 10 | 100 | 3 | 18.0 | 32.2 | |
| III/16/1-5 | SD-75 | CEOC | hackberry | 28-Apr | 81 | 81 | PLBR | 5 | 5 | 100 | | 0.7 | 1.8 | |
| | 9005713 | | *Celtis occidentalis* | | | 82 | | | 4 | 80 | | 3.6 | 3.4 | |
| | | | Potter Co., SD | | | 83 | | | 5 | 100 | | 5.2 | 4.0 | |
| | | | | | | 84 | | | 5 | 100 | 4 | 5.1 | 6.5 | |
| | | | | | | 85 | | | 5 | 100 | 5 | 5.6 | 7.6 | |
| | | | | | | 87 | | | 5 | 100 | 3 | 10.9 | 12.6 | |
| | | | | | | 90 | | | 5 | 100 | 4 | 12.5 | 15.0 | |
| | | | | | | 95 | | | 5 | 100 | 2 | 16.7 | 24.4 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 20.0 | 27.2 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 21.0 | 35.0 | average |
| III/16/6-10 | SD-211 | CEOC | hackberry | 28-Apr | 81 | 81 | PLBR | 5 | 4 | 80 | | 0.5 | 0.8 | |
| | 9005714 | | *Celtis occidentalis* | | | 82 | | | 5 | 100 | | 2.6 | 2.0 | |
| | | | Sanborn Co., SD | | | 83 | | | 5 | 100 | | 5.1 | 4.6 | |
| | | | | | | 84 | | | 5 | 100 | 4 | 3.7 | 6.3 | Plt 7 broken down |
| | | | | | | 85 | | | 5 | 100 | 5 | 7.4 | 7.4 | |
| | | | | | | 87 | | | 5 | 100 | 2 | 12.7 | 13.3 | |
| | | | | | | 90 | | | 5 | 100 | 4 | 14.7 | 15.1 | |
| | | | | | | 95 | | | 5 | 100 | 2 | 19.5 | 23.2 | |
| | | | | | | 00 | | | 5 | 100 | 2 | 25.9 | 27.6 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 21.0 | 39.0 | average |

**Project No.: 38I318K University of Minnesota, West Central Research and Outreach Center, Morris, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/17/1-5 | 9082675 | FRMA | Manchurian ash | 2-May | 00 | 00 | CONT | 5 | 5 | 100 | 7 | 0.4 | 1.3 | |
| | | | *Fraxinus mandshurica* | | | 01 | | | 5 | 100 | 7 | 0.7 | 1.3 | heavily browsed |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 02 | | | 5 | 100 | 5 | 1.5 | 2.0 | browsed |
| | | | | | | 04 | | | 5 | 100 | 5 | 1.0 | 2.4 | browse |
| | | | | | | 06 | | | 5 | 100 | 5 | 1.2 | 3.0 | dead leaves on 3 |
| III/17/6-10 | 9082650 | POPUL | Soongarica poplar | 2-May | 00 | 00 | CONT | 5 | 4 | 80 | 4 | 1.1 | 1.8 | |
| | | | *Populus* | | | 01 | | | 5 | 100 | 6 | 1.6 | 2.7 | |
| | | | Valley Nursery, Helena, MT | | | 02 | | | 5 | 100 | 5 | 2.2 | 3.5 | |
| | | | | | | 04 | | | 5 | 100 | 6 | 2.2 | 3.3 | leader deer rubbed on 4 |
| | | | | | | 06 | | | 4 | 80 | | 2.4 | 2.6 | |
| III/18/1-5 | 9076723 | ULPU | Siberian elm | 30-Apr | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 2.3 | 2.5 | deer browse on all |
| | | | *Ulmus pumila* | | | 97 | | | 5 | 100 | 3 | 3.6 | 3.6 | deer browse on all |
| | | | USSR | | | 98 | | | 5 | 100 | 5 | 5.7 | 5.4 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 2 | 20 | 3 | 17.1 | 13.5 | |
| | | | | | | 02 | | | 2 | 40 | 3 | 24.5 | 19.0 | |
| | | | | | | 05 | | | 2 | 40 | 4 | 25.0 | 30.5 | |
| III/18/6-10 | 9063098 | JUNI | black walnut | 21-May | 91 | 91 | PLBR | 5 | 5 | 100 | 5 | 0.9 | 1.8 | |
| | | | *Juglans nigra* | | | 92 | | | 5 | 100 | 6 | 0.8 | 1.8 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 93 | | | 5 | 100 | 6 | 0.9 | 1.6 | |
| | | | | | | 94 | | | 4 | 80 | 3 | 3.3 | 3.2 | |
| | | | | | | 95 | | | 4 | 80 | 4 | 3.0 | 3.4 | |
| | | | | | | 97 | | | 4 | 80 | 5 | 5.5 | 5.2 | poor site |
| | | | | | | 00 | | | 4 | 80 | 4 | 11.1 | 10.0 | |
| | | | | | | 05 | | | 3 | 60 | | 17.0 | 30.0 | |
| III/19/6-10 | 9076724 | ELAN | Russian olive | 30-Apr | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 4.6 | 3.8 | |
| | | | *Elaeagnus angustifolia* | | | 97 | | | 5 | 100 | 1 | 7.6 | 6.2 | |
| | | | USSR | | | 98 | | | 5 | 100 | | 10.5 | 8.7 | |
| | | | | | | 00 | | | 5 | 100 | 4 | 14.6 | 14.3 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 18.0 | 17.0 | |
| | | | | | | 05 | | | 4 | 80 | 5 | | 18.3 | |

**Project No.: 38I318K University of Minnesota, West Central Research and Outreach Center, Morris, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/20/6-10 | 9069166 | ELAN | Russian olive | 30-Apr | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.8 | 2.6 | |
| | | | *Elaeagnus angustifolia* | | | 97 | | | 5 | 100 | 4 | 3.4 | 4.0 | very poor site, |
| | | | USSR | | | 98 | | | 5 | 100 | 4 | 6.7 | 7.2 | mech. damage on 4 |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 4 | 80 | 5 | 12.7 | 14.1 | |
| | | | | | | 02 | | | 4 | 80 | 6 | 12.8 | 16.8 | |
| | | | | | | 05 | | | 1 | 20 | 3 | 18.0 | 24.0 | |
| III/21/1-5 | 9054820 | ULPU | Siberian elm | 26-Apr | 95 | 95 | PLBR | 5 | 5 | 100 | 3 | 1.7 | 2.2 | deer browse on all |
| | | | *Ulmus pumila* | | | 96 | | | 5 | 100 | 3 | 3.8 | 3.8 | |
| | | | USDA, NRCS, PMC, Bridger, MT | | | 97 | | | 5 | 100 | 3 | 5.7 | 5.7 | deer browse on all |
| | | | | | | 99 | | | 5 | 100 | 3 | 9.9 | 12.3 | |
| | | | | | | 01 | | | 5 | 100 | 4 | 13.6 | 16.0 | |
| | | | | | | 04 | | | 5 | 100 | 4 | 16.0 | 18.8 | browse |
| III/21/1-10 | ND-428 | JUNI | black walnut | 30-Apr | 85 | 85 | PLBR | 10 | 10 | 100 | 4 | 0.5 | 0.9 | |
| | 9005970 | | *Juglans nigra* | | | 86 | | | 5 | 50 | | 1.2 | 1.1 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 87 | | | 5 | 50 | | 0.4 | 0.9 | |
| | | | | | | 89 | | | 4 | 40 | 4 | 2.6 | 2.1 | |
| | | | | | | 91 | | | 4 | 40 | 4 | 4.3 | 4.1 | |
| | | | | | | 94 | | | 3 | 30 | 4 | 8.3 | 5.8 | |
| | | | | | | 99 | | | 2 | 20 | | 15.6 | 15.6 | |
| | | | | | | 04 | | | 2 | 20 | 6 | 24.0 | 21.5 | |

**OFF-CENTER EVALUATIONS: TECHNICAL REPORT – 2006**

Study 38I346K University of Minnesota, North Central Research and Outreach Center, Grand Rapids, Minnesota.

Study Title: Field Evaluation of Woody Plant Materials.

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas are located in the three states served by the PMC. These sites provide planting locations under long-term land tenure for assemblies of trees and shrubs to be evaluated under uniform culture and management. New material can be added on an annual basis. Comparisons are made with previously released cultivars and area of adaptation determined.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use. Superior cultivars will be selected and released for increase by commercial nurseries.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the University of Minnesota, North Central Research and Outreach Center, Grand Rapids, Minnesota.

Location: University of Minnesota, North Central Experiment Station, Grand Rapids, Minnesota. Legal Description: NW ¼ SW ¼ sec. 14, T. 55 N., R. 25 W.

Major Land Resource Area: This site is located in Major Land Resource Area 88, Northern Minnesota Glacial Lake Basins. More than 80 percent of this area is forested, with the remainder used for growing feed grains and forage. The area is nearly level, with elevations ranging from 980 to 1,300 feet.

Soils: The soils at this site are Morph and Rosy very fine sandy loams. The Morph very fine sandy loam is poorly drained, with seasonal high water table at a depth of 1-3 feet. The Rosy very fine sandy loam is moderately well drained, with a seasonal high water table at a depth of 3-5 feet. These are woodland soils. These soils are well suited to aspen, balsam fir, and black ash. Morph soil is in the Conservation Tree/Shrub Suitability Group 2, and Rosy soil is in Group 3.

Climate: The average annual precipitation for MLRA 88 is from 20 to 27 inches, with 40 to 50 inches of snowfall in the winter. The average annual temperature is 35 to 40 degrees F, with an average freeze-free period of 95 to 105 days. The plant hardiness zone for this site is 3, with an average annual minimum temperature of -30 to -40 degrees F. Climatic data for 2006 at Grand Rapids, Minnesota, the nearest official weather station, is shown in Table GR-1.

**Methods and Materials**

Assembly: Refer to Table GR-2 for a list of woody species planted from 1998 to 2006. Some of the accessions were moved from the old site.

Planting Plan: The plots are not randomized or replicated but organized systematically for evaluation and demonstration purposes. The site is divided into four blocks (refer to Figure GR-1). Block 1 is planted to shrubs, Block 2 to medium trees, Block 3 to tall trees, and Block 4 to conifers. Each block is arranged into single row, non-replicated plots. Each plot contains 1 to 10 plants. Spacing is 20 feet between rows and 5 feet within row for shrubs and 10 feet within row for trees. Row length is 100 feet. Like species and standards of comparison are planted in adjacent plots whenever possible.

Plot Preparation: A clean, firm planting site was prepared by application of Glyphosate and roto-tilling.

Planting Method: All trees and shrubs were hand planted using approved forestry methods. Accessions from the old FEP were moved using a tree spade.

Planting Date: Refer to Table GR-2 for planting dates of woody species planted from 1998 to 2005.

Fertilization: No fertilizer has been applied to the planting area.

Weed Control: Mechanical weed control, rotary mowing between row, and rototilling and hand hoeing in row.

Biological Control: No insecticides have been applied. There has been some damage by deer browsing.

Irrigation: Trees were not watered at time of establishment.

Crop Residue Management: No cover crop has been seeded; a perennial grass cover is maintained between rows.

Silvicultural Practices: Minor pruning has been done each year to remove dead or damaged branches.

Evaluations and Measurements: Plant performance data is recorded on one or more accessions during the growing season for the first three years. After the third year, data is gathered according to a specific schedule. The trees and shrubs were evaluated for survival, canopy width, plant height, vigor, insect and disease, and animal damage. Select data appears in this report. Additional information can be requested from the PMC.

## Results

Plant Performance: Eighty-one accessions of 65 species have been evaluated. Maintenance on this site is good. The previous site was poorly drained causing lack of vigor in many species. Due to those site conditions, that study was terminated 12/31/95 and relocated to a more suitable site. The following accessions exhibit potential for further evaluation and use:

| Accession Number | Genus/Species Origin/Source | Plot Location |
|---|---|---|
| ND-2103<br>PI-399414 | highbush cranberry<br>*Viburnum opulus*<br>P.I. Station, Ames, IA<br>USDA, NRCS, PMC, Bismarck, ND | II/07/1-5 |
| PI-323957 | chokeberry<br>*Photinia melanocarpa*<br>P. I. Station, Ames, IA<br>USDA, NRCS, PMC, Bismarck, ND | II/06/11-20 |
| Survivor Germplasm<br>9008041 | false indigo<br>*Amorpha fruticosa*<br>USDA, NRCS, PMC, Aberdeen, ID<br>USDA, NRCS, PMC, Bismarck, ND | II/03/11-20 |

| Accession Number | Genus/Species Origin/Source | Plot Location |
|---|---|---|
| ND-21<br>9034900 | nannyberry<br>*Viburnum lentago*<br>USDA, NRCS, PMC, Bismarck, ND<br>Lincoln-Oakes Nursery, Bismarck, ND | III/05/1-9 |
| ND-428<br>9005970 | black walnut<br>*Juglans nigra*<br>NDSU/USDA, NRCS, PMC, Bismarck, ND | IV/5/6-10 |
| 9063158 | Scotch pine<br>*Pinus sylvestris* var. *mongolica*<br>China<br>NRCS, PMC, Bismarck, ND | I/5/1-5 |
| Arnolds Red | red tatarian honeysuckle<br>*Lonicera tatarica*<br>Lee Nursery, Fertile, MN<br>NRCS, PMC, Bismarck, ND | II/1/1-5 |
| Silver Sands Germplasm<br>ND-3902<br>9035212 | sandbar willow<br>*Salix interior*<br>NRCS, PMC, Bismarck, ND | II/5/1-10 |
| 9063126 | Japanese elm<br>*Ulmus japonica*<br>PFRA, Indianhead, Saskatchewan, Canada<br>NRCS, PMC, Bismarck, ND | IV/3/1-5 |
| ND-3791<br>9030302 | Norway spruce<br>*Picea abies*<br>U of MN, St. Paul, MN<br>Grand Rapids, MN FEP | I/6/6-10 |
| 9063151 | Dahurian larch<br>*Larix olgensis*<br>China<br>NRCS, PMC, Bismarck, ND | II/6/1-5 |
| 'Indigo' | silky dogwood<br>*Cornus ammomum*<br>NRCS, PMC, Rose Lake, MI<br>Lincoln-Oakes Nursery, Bismarck, ND | II/2/11-20 |
| 9069170 | English oak<br>*Quercus robur*<br>Russia<br>USDA, ARS, Mandan, ND | IV/3/6-10 |

## Figure GR-1. Grand Rapids Woody Field Evaluation Planting – Plot Layout

| Row | BLOCK I CONIFERS | | BLOCK II SHRUBS | | |
|---|---|---|---|---|---|
| 12 | | | | | |
| 11 | | | | | |
| 10 | | | | | N |
| 9 | 9019593 juniper | 9082609 Meyer's spruce | winterberry\|bittersweet\|leadplant\|gr dogwd\|'Freedom' hnysuckle\|r.l.hawthorn\|ninebark | | |
| 8 | 9069162 Dahurian larch | 9069163 Dahurian larch | highbush cranberry/silky willow | Siberian dogwood \| gray dogwood \| | |
| 7 | 9069172 Scots pine | 9069164 Scots pine | ND-2103 highbush cranberry | hazel hybrids\|Bailey chokeberry | |
| 6 | 9063151 Dahurian larch | ND-3791 Norway spruce | 9066143 r.t.honeysuckle | 323957 chokeberry | |
| 5 | 9063158 Scots pine | 9063156 Scots pine | ND-3902 sandbar willow | 9019576 juneberry | |
| 4 | <----------9058847 black spruce ----------> | | redleaf rose\|rugosa rose | 9076734 sea buckthorn | |
| 3 | 9069168 Siberian larch | 9082610 Siberian larch | 'Legacy' late lilac | 9008041 false indigo | |
| 2 | open (too wet) | 9082611 Siberian larch | 'Centennial 'cotoneaster | 'Indigo' silky dogwood | |
| 1 | open (too wet) | 9076718 Scots pine | 'Arnolds Red' \| 'Regal' Russian almond | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

| Row | BLOCK III MEDIUM TREES | | BLOCK IV TALL TREES | | |
|---|---|---|---|---|---|
| 12 | | | | | |
| 11 | | | | | |
| 10 | | | | | |
| 9 | | | | | |
| 8 | | arrowwood\|open | | | |
| 7 | 9082631 Japanese birch | ND-624 wafer ash | 9082639 N. pin oak | 9092051 northern catalpa | open |
| 6 | 9076737 black cherry \| shadblow svcbry \| Sheridan chokecherry | | 9082630 Norway maple | 9082633 black ash | 9092052 swamp white oak |
| 5 | <----------ND-21 nannyberry----------> | | 9057412 bur oak | 9005970 black walnut | 9082674 sugar maple |
| 4 | 9076722 Euro. white birch | 9047209 chokecherry | 9076742 butternut | 9076743 chestnut | 9082667 gray birch |
| 3 | 'Midwest' Manch. crabapple | 9069129 amur chokecherry | 9063126 Japanese elm | 9069170 English oak | 9082675 Manchurian ash |
| 2 | 'McDermand' Ussurian pear | 'Magenta' crabapple | 9069177 bur oak | 9063115 green ash | 9082650 S. poplar |
| 1 | 'Homestead' a. hawthorn | 9069165 European birch | 'Oahe' hackberry | 'Cardan' green ash | 9082892 white poplar |

revised 06/06

**Table No. GR-1: 2006 Weather Summary - Official Station - Grand Rapids, Minnesota**

| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) | | |
|---|---|---|---|---|---|---|
| | | | | Actual | | Deviation from Normal |
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 24.5 | 6.4 | | 0.42 | 1.01 | -0.59 |
| February | 12.5 | 14.0 | | 1.05 | 0.61 | 0.44 |
| March | M | 26.4 | | 0.00M | 1.25 | M |
| April | M | 41.1 | | 0.00M | 1.84 | M |
| May | M | 54.3 | | 0.00M | 2.90 | M |
| June | M | 62.9 | | 0.00M | 4.60 | M |
| July | M | 67.4 | | 0.00M | 4.60 | M |
| August | M | 65.0 | | 0.00M | 3.70 | M |
| September | M | 54.9 | | 0.00M | 3.08 | M |
| October | 41.3 | 43.7 | | 1.56 | 2.74 | -1.18 |
| November | 32.0 | 26.9 | | 1.05 | 1.59 | -0.54 |
| December | M | 12.1 | | 0.00M | 0.86 | M |
| **Annual** | **M** | **39.6** | | **4.08M** | **28.78** | **M** |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |
| M=missing data | | | | | | |

| | 2006 |
|---|---|
| Last Frost (28 degrees) | M |
| First Frost (28 degrees) | M |
| Frost Free Period | M |

**Key to Table GR-2. 38I346K Field Evaluation of Woody Plant Materials – Grand Rapids, Minnesota**

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table GR-2.**
**Project No.: 38I346K Field Evaluation of Woody Plant Materials, Grand Rapids, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/1/6-10 | 9076718 | PISYM | Scots pine | 25-May | 99 | 99 | CONT | 5 | 5 | 100 | 2 | 0.8 | 1.0 | healthy plants, good bud set |
| | | | *Pinus sylvestris* var. *mongolica* | | | 00 | | | 5 | 100 | 2 | 1.4 | 1.9 | |
| | | | China | | | 01 | | | 5 | 100 | 2 | 2.7 | 3.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 03 | | | 5 | 100 | 3 | 4.2 | 5.8 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 6.3 | 9.0 | |
| I/2/6-10 | 9082611 | LASI | Siberian larch | 30-Apr | 98 | 98 | CONT(S) | 5 | 5 | 100 | 3 | 0.4 | 1.0 | |
| | | | *Larix sibirica* | | | 99 | | | 4 | 80 | 4 | 0.8 | 1.4 | needle tips brown |
| | | | NDFS, Towner, ND | | | 00 | | | 3 | 60 | 5 | 1.1 | 2.0 | |
| | | | | | | 02 | | | 3 | 60 | 4 | 2.3 | 3.6 | |
| | | | | | | 04 | | | 3 | 60 | 4 | 2.9 | 7.4 | |
| I/3/1-5 | 9069168 | LASI | Siberian larch | 30-Apr | 98 | 98 | CONT(P) | 5 | 0 | 0 | | | | |
| | | | *Larix sibirica* | | | 99 | | | 4 | 80 | 6 | 1.0 | 1.8 | |
| | | | Russia | | | 00 | | | 4 | 80 | 2 | 1.0 | 2.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 04 | | | 4 | 80 | 4 | 4.6 | 8.6 | |
| I/3/6-9 | 9082610 | LASI | Siberian larch | 30-Apr | 98 | 98 | CONT(S) | 4 | 4 | 100 | 3 | 0.6 | 1.4 | |
| | | | *Larix sibirica* | | | 99 | | | 4 | 100 | 4 | 1.2 | 1.8 | |
| | | | NDFS, Towner, ND | | | 00 | | | 4 | 80 | 2 | 1.8 | 2.9 | |
| | | | | | | 02 | | | 4 | 80 | | 4.2 | 5.6 | |
| | | | | | | 04 | | | 4 | 80 | 3 | 6.1 | 9.7 | |
| I/4/1-8 | 9058847 | PIMA | black spruce | 29-May | 96 | 96 | tree | 8 | 8 | 100 | 4 | 3.1 | 5.8 | |
| | | | *Picea mariana* | | | 97 | spade by | | 8 | 100 | 2 | 3.5 | 6.6 | light seed production on all |
| | | | U of MN, Cloquet, MN | | | 98 | IRRRB | | 8 | 100 | 2 | 4.1 | 7.3 | light cone production |
| | | | Grand Rapids, MN FEP | | | 00 | | | 8 | 100 | 2 | 5.8 | 10.6 | all have cones |
| | | | | | | 02 | | | 8 | 100 | 2 | 5.8 | 10.6 | |
| | | | | | | 05 | | | 8 | 100 | 2 | 8.8 | 17.4 | mod-heavy cones |
| I/5/1-5 | 9063158 | PISYM | Scots pine | 15-May | 96 | 96 | CONT(S) | 5 | 5 | 100 | 3 | 0.6 | 0.8 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 97 | | | 5 | 100 | 1 | 1.1 | 1.4 | |
| | | | China | | | 98 | | | 5 | 100 | 1 | 1.7 | 2.3 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 2 | 4.3 | 5.1 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 4.3 | 5.1 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 10.2 | 14.7 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/5/6-10 | 9063156 | PISY | Scots pine | 15-May | 96 | 96 | CONT(S) | 5 | 5 | 100 | 3 | 0.7 | 0.8 | |
| | | | *Pinus sylvestris* | | | 97 | | | 5 | 100 | 2 | 1.1 | 1.3 | |
| | | | Russia, Altai region | | | 98 | | | 5 | 100 | 1 | 1.9 | 2.3 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 2 | 4.7 | 5.8 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 4.7 | 5.8 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 8.9 | 15.8 | double stem 4,5 |
| I/6/1-5 | 9063151 | LAOL | Dahurian larch | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 1.6 | |
| | | | *Larix olgensis* | | | 97 | | | 5 | 100 | 3 | 1.6 | 2.3 | |
| | | | China | | | 98 | | | 5 | 100 | 2 | 3.1 | 4.2 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 6.0 | 8.4 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 6.0 | 8.4 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 12.5 | 20.6 | |
| I/6/6-10 | ND-3791 | PIAB | Norway spruce | 29-May | 96 | 96 | tree | 5 | 5 | 100 | 3 | 5.0 | 7.7 | |
| | 9030302 | | *Picea abies* | | | 97 | spade by | | 5 | 100 | 2 | 5.5 | 8.6 | |
| | | | U of MN, St. Paul, MN | | | 98 | IRRRB | | 5 | 100 | 2 | 6.0 | 10.2 | few cones |
| | | | Grand Rapids, MN FEP | | | 00 | | | 5 | 100 | 2 | 8.9 | 15.3 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 8.9 | 15.3 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 14.4 | 21.9 | |
| I/7/1-5 | 9069172 | PISY | Scots pine | 15-May | 97 | 97 | CONT(P) | 5 | 5 | 100 | 3 | 0.5 | 0.6 | |
| | | | *Pinus sylvestris* | | | 98 | | | 5 | 100 | 3 | 1.0 | 1.3 | |
| | | | Altai Region, Russia | | | 99 | | | 5 | 100 | 3 | 1.9 | 2.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 01 | | | 5 | 100 | 3 | 4.0 | 6.1 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 6.8 | 9.6 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 11.2 | 13.8 | |
| I/7/6-10 | 9069164 | PISY | Scots pine | 30-Apr | 98 | 98 | CONT(P) | 5 | 5 | 100 | 3 | 0.6 | 1.1 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 99 | | | 5 | 100 | 3 | 1.5 | 1.9 | |
| | | | China | | | 00 | | | 5 | 100 | 3 | 2.7 | 3.3 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 3 | 5.2 | 6.3 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 9.3 | 12.3 | few cones |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/8/1-5 | 9069162 | LAOL | Dahurian larch | 30-Apr | 98 | 98 | CONT(P) | 5 | 4 | 80 | 3 | 1.7 | 2.3 | |
| | | | *Larix olgensis* | | | 99 | | | 5 | 100 | 3 | 2.0 | 2.7 | |
| | | | China | | | 00 | | | 5 | 100 | 3 | 2.8 | 4.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 3 | 5.6 | 8.2 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 8.7 | 13.5 | dead leader 2,5 |
| I/8/6-10 | 9069163 | LAOL | Dahurian larch | 30-Apr | 98 | 98 | CONT(P) | 5 | 1 | 20 | 5 | 1.1 | 2.0 | |
| | | | *Larix olgensis* | | | 99 | | | 2 | 40 | 4 | 1.6 | 2.8 | |
| | | | China | | | 00 | | | 5 | 100 | 6 | 1.3 | 3.3 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 4 | 3.7 | 5.0 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 6.9 | 10.2 | |
| I/9/1-5 | 9019593 | JUCO6 | common juniper | 24-May | 05 | 05 | | 5 | 5 | 100 | 3 | 1.3 | 1.0 | |
| | | | *Juniperus communis* | | | 06 | | | 5 | 100 | 4 | 1.4 | 1.0 | |
| | | | Wilton Mine site, Wilton, ND | | | | | | | | | | | |
| 1/9/6-10 | 9082609 | PICEA | Meyer spruce | 18-May | 01 | 01 | | 5 | 5 | 100 | 3 | 0.9 | 0.9 | |
| | | | *Picea meyeri* | | | 02 | | | 5 | 100 | 6 | 1.0 | 1.0 | |
| | | | Itasca Greenhouse, Cohasset, MN | | | 03 | | | 5 | 100 | 3 | 1.2 | 1.4 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 2.5 | 2.3 | |
| II/1/1-5 | 'Arnolds Red' | LOTA | red tatarian honeysuckle | 15-May | 96 | 96 | CONT(P) | 5 | 2 | 40 | 3 | 1.4 | 1.9 | |
| | 9069080 | | *Lonicera tatarica* | | | 97 | | | 2 | 40 | 1 | 2.1 | 2.6 | |
| | | | Lee Nursery, Fertile, MN | | | 98 | | | 2 | 40 | 1 | 3.3 | 4.4 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 2 | 40 | 2 | 4.5 | 6.2 | |
| | | | | | | 02 | | | 2 | 40 | 2 | 4.5 | 6.2 | |
| | | | | | | 05 | | | 2 | 40 | 5 | 6.8 | 8.7 | |
| II/1/6-20 | 'Regal' | PRTE | Russian almond | 15-May | 96 | 96 | PLBR | 15 | 15 | 100 | 4 | 0.7 | 1.7 | |
| | 9006079 | | *Prunus tenella* | | | 97 | | | 15 | 100 | 4 | 0.9 | 1.5 | pear slug on 7,12,14 |
| | PI-540042 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 15 | 100 | 5 | 1.1 | 1.9 | blight on 8 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 15 | 100 | 5 | 2.8 | 2.5 | lots of almonds on 12 |
| | | | | | | 02 | | | 8 | 54 | 4 | 4.5 | 3.5 | some plants are going out |
| | | | | | | 05 | | | 8 | 54 | 5 | 6.8 | 4.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/2/1-10 | 'Centennial' | COIN16 | European cotoneaster | 15-May | 96 | 96 | PLBR | 10 | 9 | 90 | 4 | 1.0 | 1.9 | leaf wilt and spotty on 6 |
| | PI-113095 | | *Cotoneaster integerrimus* | | | 97 | | | 6 | 60 | 4 | 2.0 | 2.3 | pear slug on all |
| | 9005729 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 6 | 60 | 4 | 4.8 | 4.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 6 | 60 | 4 | 7.7 | 6.8 | lots of fruit on 2-5,7 |
| | | | | | | 02 | | | 7 | 70 | 2 | 11.5 | 8.0 | heavy fruit |
| | | | | | | 05 | | | 5 | 50 | 3 | 12.2 | 8.9 | good fruit |
| II/2/11-20 | 'Indigo' | COAM2 | silky dogwood | 15-May | 96 | 96 | PLBR | 10 | 6 | 60 | 3 | 1.4 | 1.9 | |
| | | | *Cornus amomum* | | | 97 | | | 7 | 70 | 2 | 4.2 | 3.3 | |
| | | | NRCS, PMC, Rose Lake, MI | | | 98 | | | 7 | 70 | 2 | 7.4 | 5.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 7 | 70 | 1 | 11.1 | 8.0 | heavy fruit on all |
| | | | | | | 02 | | | 7 | 70 | 2 | 13.5 | 10.0 | excellent vigor |
| | | | | | | 05 | | | 7 | 70 | 2 | 14.0 | 11.8 | good fruit, dense inrow suckering |
| II/3/1-10 | 'Legacy' | SYVI3 | late lilac | 15-May | 96 | 96 | PLBR | 10 | 10 | 100 | 4 | 0.6 | 1.4 | |
| | ND-83 | | *Syringa villosa* | | | 97 | | | 10 | 100 | 4 | 0.7 | 1.2 | |
| | PI-540443 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 4 | 1.6 | 2.1 | chlorosis on all, caused |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 5 | 4.1 | 4.3 | by drainage |
| | | | | | | 02 | | | 10 | 100 | 4 | 7.0 | 6.8 | variable height |
| | | | | | | 05 | | | 10 | 100 | | 8.4 | 7.5 | variable height, vigor |
| II/3/11-20 | 'Survivor Germplasm' | AMFR | false indigo | 15-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.5 | 2.6 | 3,4 chlorotic |
| | | | *Amorpha fruticosa* | | | 97 | | | 10 | 100 | 3 | 2.6 | 2.6 | |
| | 9008041 | | NRCS, PMC, Aberdeen, ID | | | 98 | | | 10 | 100 | 3 | 5.1 | 3.6 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 9 | 90 | 2 | 9.0 | 4.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 02 | | | 10 | 100 | 3 | 11.0 | 5.5 | annual dieback/ good regrowth |
| | | | | | | 05 | | | 10 | 100 | 4 | 5.0 | 5.0 | decline, winterkill, fair regrowth |
| II/4/1-10 | ND-170 | COIN16 | European cotoneaster | 15-May | 96 | 96 | PLBR | 10 | 9 | 90 | 6 | 1.1 | 1.6 | |
| | 9005728 | | *Cotoneaster integerrimus* | | | 97 | | | 8 | 80 | 6 | 1.0 | 1.3 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 7 | 1.0 | 1.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 6 | 1.2 | 1.6 | removed - low vigor |
| | | | | | | 01 | | | 0 | 0 | | | | |
| II/4/1-5 | 9082685 | RORU2 | redleaf rose | 18-May | 01 | 01 | PLBR | 5 | 5 | 100 | 5 | 0.9 | 1.7 | |
| | | | *Rosa rubrifolia* | | | 02 | | | 5 | 100 | 4 | 1.2 | 2.2 | 1 not red |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 5 | 100 | 5 | 1.6 | 2.8 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 05 | | | 4 | 80 | 4 | 3.5 | 4.5 | dieback on 2 |
| II/4/6-10 | 9057406 | RORU | rugosa rose | 18-May | 01 | 01 | PLBR | 5 | 5 | 100 | 6 | 1.0 | 1.0 | |
| | | | *Rosa rugosa* | | | 02 | | | 4 | 80 | 4 | 1.6 | 1.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 4 | 80 | 4 | 2.0 | 2.2 | |
| | | | | | | 05 | | | 4 | 80 | | 4.5 | 3.4 | 4,5 winter dieback |
| II/4/11-20 | 9076734 | HIRH80 | seaberry | 15-May | 96 | 96 | PLBR | 10 | 10 | 100 | 4 | 0.6 | 1.1 | |
| | | | *Hippophae rhamnoides* | | | 97 | | | 10 | 100 | 4 | 0.9 | 1.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 5 | 1.4 | 2.1 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 4.0 | 4.4 | |
| | | | | | | 02 | | | 9 | 90 | 2 | 8.5 | 8.3 | good vigor, some short |
| | | | | | | 05 | | | 7 | 70 | 4 | 11.0 | 10.4 | varied height |
| II/5/1-10 | 'Silver Sands Germplasm' | SAIN3 | sandbar willow | 15-May | 96 | 96 | CONT(S) | 10 | 9 | 90 | 3 | 3.1 | 3.5 | |
| | | | *Salix interior* | | | 97 | | | 10 | 100 | 1 | 5.2 | 4.5 | leaf rust all, no suckering yet |
| | ND-3902 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 1 | 8.4 | 7.4 | |
| | 9035212 | | | | | 00 | | | 10 | 100 | 1 | 11.8 | 8.8 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 15.0 | 11.0 | excellent vigor |
| | | | | | | 05 | | | 8 | 80 | 4 | 11.3 | 9.8 | 25% winterkill |
| II/5/11-20 | 9019576 | AMAL2 | juneberry | 15-May | 96 | 96 | PLBR | 10 | 9 | 90 | 3 | 1.0 | 1.2 | |
| | | | *Amelanchier alnifolia* | | | 97 | | | 10 | 100 | 2 | 1.6 | 1.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 3 | 3.0 | 2.2 | powdery mildew on 5,6 |
| | | | | | | 00 | | | 10 | 100 | 4 | 5.0 | 3.0 | |
| | | | | | | 02 | | | 10 | 100 | 4 | 4.5 | 3.8 | browsed |
| | | | | | | 05 | | | 10 | 100 | | 7.0 | 4.4 | average fruit, leaf rust on 20% |
| II/6/1-10 | 9063143 | LOTA | red tatarian honeysuckle | 29-May | 96 | 96 | hand | 10 | 10 | 100 | 5 | 1.5 | 2.0 | |
| | | | *Lonicera tatarica* | | | 97 | transplant | | 10 | 100 | 5 | 1.6 | 2.4 | severe girdling by rabbits |
| | | | Grand Rapids FEP | | | 98 | from FEP | | 10 | 100 | 3 | 2.3 | 2.7 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 4.1 | 5.0 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 5.5 | 7.5 | excellent vigor |
| | | | | | | 05 | | | 10 | 100 | 2 | 9.2 | 8.9 | excellent vigor |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/6/11-20 | PI-323957 | PHME13 | chokeberry | 29-May | 96 | 96 | tree | 9 | 9 | 90 | 3 | 1.9 | 1.8 | |
| | | | *Photinia melanocarpa* | | | 97 | spade | | 9 | 90 | 3 | 2.1 | 2.1 | pear slug on 5-9 |
| | | | PI Station, Ames, IA | | | 98 | by IRRRB | | 10 | 100 | 2 | 2.6 | 2.4 | |
| | | | old FEP site, Grand Rapids, MN | | | 00 | | | 9 | 90 | 2 | 4.1 | 3.7 | |
| | | | | | | 02 | | | 8 | 95 | 1 | 7.2 | 4.5 | excellent vigor |
| | | | | | | 05 | | | 8 | 95 | 3 | 7.3 | 6.7 | |
| II/7/1-5 | ND-2103 | VIOP | highbush cranberry | 29-May | 96 | 96 | tree | 10 | 5 | 100 | 3 | 3.6 | 2.7 | |
| | | | *Viburnum opulus* | | | 97 | spade | | 5 | 100 | 3 | 4.2 | 3.9 | leaf spot on 3,4 |
| | | | P.I. Station, Ames, IA | | | 98 | by IRRRB | | 5 | 100 | 1 | 2.4 | 2.4 | leaf spot on all |
| | | | old FEP site, Grand Rapids, MN | | | 00 | | | 5 | 100 | 2 | 5.9 | 6.0 | |
| | | | | | | 02 | | | 5 | 100 | 5 | 5.8 | 6.2 | 2 dieback |
| | | | | | | 05 | | | 4 | 80 | 4 | 5.7 | 6.2 | |
| II/7/11-20 | 10 new | CORYL | hazel hybrids | 29-May | 96 | 96 | CONT | 10 | 10 | 100 | 4 | 0.3 | 0.4 | leaf damage on 6,7,8 |
| | accessions | | *Corylus* | | | 97 | | | 10 | 100 | 4 | 0.7 | 1.2 | |
| | | | Badgersett Research Farm, Canton, MN | | | 98 | | | 10 | 100 | 4 | 1.8 | 2.1 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 4.0 | 4.2 | |
| | | | | | | 02 | | | 10 | 100 | 4 | 5.6 | 5.1 | variable heights |
| | | | | | | 05 | | | 10 | 100 | 5 | 5.8 | 6.7 | |
| II/7/21-25 | 9091971 | PHME13 | black chokeberry | 24-May | 05 | 05 | | 5 | | | | | | data missing |
| | | | *Photinia melanocarpa* | | | 06 | | | 5 | 100 | 3 | 1.9 | 2.6 | |
| | | | Bailey Nurseries, St. Paul, MN | | | | | | | | | | | |
| II/8/1-10 | 9082623 | CARAG | Mongolian peashrub | 25-May | 99 | 99 | PLBR | 10 | 9 | 90 | 4 | 0.6 | 1.2 | |
| | | | *Caragana intermedia* | | | 00 | | | 10 | 100 | 4 | 0.9 | 1.5 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 8 | 80 | 4 | 1.4 | 2.1 | |
| | | | | | | 03 | | | 8 | 80 | 5 | 2.1 | 2.6 | |
| | | | | | | 05 | | | 2 | 20 | | 2.4 | 3.4 | |
| II/8/1-5 | 9082747 | VIOPA2 | American cranberrybush | 15-May | 06 | 06 | CONT | 5 | 5 | 100 | 3 | 0.7 | 1.2 | |
| | | | *Viburnum opulus* var. *americanum* | | | | | | | | | | | |
| | | | Bottineau Co., ND | | | | | | | | | | | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/8/6-10 | 9069052 | SALIX | silky willow | 15-May | 06 | 06 | | 5 | 4 | 80 | 4 | 1.0 | 1.5 | |
| | Riverbend germplasm | | *Salix* | | | | | | | | | | | |
| | | | USDA, NRCS, PMC, East Lansing, MI | | | | | | | | | | | |
| II/8/11-15 | 9082664 | COAL | Siberian dogwood | 10-May | 00 | 00 | PLBR | 5 | 5 | 100 | 3 | 0.7 | 2.5 | |
| | | | *Cornus alba 'sibirica'* | | | 01 | | | 5 | 100 | 3 | 3.7 | 2.5 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 5 | 100 | | 4.8 | 3.8 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 6.6 | 5.5 | |
| | | | | | | 06 | | | 5 | 100 | 5 | 8.0 | 6.1 | |
| ll/8/16-20 | 9082738 | CORA6 | gray dogwood | | | 03 | PLBR | 5 | 5 | 100 | 3 | 1.1 | 1.8 | |
| | | | *Cornus racemosa* | | | 04 | | | 5 | 100 | | 1.8 | 2.2 | |
| | | | Wisconsin (Lawyer) | | | | | | | | | | | |
| | | | Lincoln-Oakes Nursery,Bismarck, ND | | | | | | | | | | | |
| II/9/1-5 | 9082711 | EUBU6 | winterberrry euonymus | | 02 | 02 | PBLR | 5 | 5 | 100 | 4 | 1.0 | 2.6 | |
| | | | *Euonymus bungeanum* | | | 03 | | | 5 | 100 | 5 | 1.1 | 2.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck | | | 04 | | | 5 | 100 | 3 | 2.0 | 2.9 | dieback 5 |
| | | | | | | 06 | | | 5 | 100 | | 3.4 | 3.9 | |
| II/9/6-10 | 9082712 | CESC | bittersweet | | 02 | 02 | PLBR | 5 | 5 | 100 | 2 | 1.0 | 1.4 | |
| | | | *Celastrus scandens* | | | 03 | | | 5 | 100 | 4 | 0.8 | 1.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck | | | 04 | | | 5 | 100 | 3 | 0.8 | 2.2 | |
| | | | | | | 06 | | | 3 | 60 | | 2.3 | 2.6 | |
| ll/9/11-15 | 9082678 | AMCA6 | leadplant | | 02 | 02 | PLBR | 5 | 5 | 100 | 6 | 0.7 | 0.8 | |
| | | | *Amorpha canescens* | | | 03 | | | 4 | 80 | 5 | 0.7 | 1.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck | | | 04 | | | 4 | 80 | | 0.8 | 1.3 | |
| | | | | | | 06 | | | 4 | 80 | | 1.7 | 2.1 | |
| II/9/16-20 | 9082890 | CORA6 | gray dogwood | | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 0.8 | 1.9 | |
| | | | *Cornus racemosa* | | | 05 | | | 5 | 100 | 4 | 1.8 | 2.7 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 5 | 100 | 4 | 1.6 | 2.4 | |
| ll/9/21-25 | 'Freedom' | LOKO | honeysuckle | | 03 | 03 | PLBR | 5 | 4 | 80 | 3 | 2.2 | 2.5 | |
| | | | *Lonicera korolkowii* | | | 04 | | | 4 | 80 | | 3.2 | 3.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | 05 | | | 4 | 80 | 3 | 5.1 | 5.4 | |

**Project No.: 38I346K Field Evaluation of Woody Plant Materials, Grand Rapids, Minnesota**
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/9/26-30 | 9076686 | CRCH | roundleaf hawthorn | 25-May | 04 | 04 | PLBR | 5 | 2 | 40 | 4 | 0.4 | 1.1 | |
| | | | *Crataegus chrysocarpa* | | | 05 | | | 3 | 60 | 5 | 0.9 | 1.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | 06 | | | 5 | 100 | 5 | 1.1 | 1.7 | |
| II/9/31-35 | 9082891 | PHOP | common ninebark | 25-May | 04 | 04 | PLBR | 4 | 4 | 100 | | 0.7 | 1.9 | |
| | | | *Physocarpus opulifolius* | | | 05 | | | 4 | 100 | | 2.6 | 3.8 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 4 | 100 | | 5.9 | 5.0 | |
| III/1/1-5 | 'Homestead' | CRAN6 | arnold hawthorn | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.0 | 1.6 | |
| | PI-503530 | | *Crataegus X anomala* | | | 97 | | | 5 | 100 | 3 | 1.6 | 2.3 | pear slug 1,2,5 |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 3 | 2.8 | 4.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 2 | 5.8 | 8.7 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 9.0 | 11.0 | very nice fruit on all, no apple rust |
| | | | | | | 05 | | | 5 | 100 | 2 | 10.0 | 14.5 | |
| III/1/6-10 | 9069165 | BEPE | European birch | 30-Apr | 98 | 98 | CONT(P) | 5 | 0 | 0 | | | | |
| | | | *Betula pendula* | | | 99 | | | 5 | 100 | 3 | 1.0 | 1.6 | |
| | | | Russia | | | 00 | | | 5 | 100 | 3 | 3.2 | 4.7 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 8.0 | 12.5 | brown leaves on 5 |
| | | | | | | 04 | | | 5 | 100 | 3 | 11.3 | 15.0 | |
| III/2/1-5 | 'McDermand' | PYUS2 | Ussurian pear | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.2 | 2.4 | leaf miner on 5 |
| | PI-478004 | | *Pyrus ussuriensis* | | | 97 | | | 5 | 100 | 3 | 1.8 | 3.2 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 3 | 3.2 | 5.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 7.0 | 9.8 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 9.5 | 12.3 | no fruit on 2 |
| | | | | | | 05 | | | 5 | 100 | 2 | 15.0 | 19.4 | |
| III/2/6-10 | 'Magenta' | MABA | hybrid crabapple | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 0.9 | 1.9 | |
| | | | *Malus* sp. | | | 97 | | | 5 | 100 | 3 | 1.8 | 2.5 | |
| | | | NRCS, PMC, East Lansing, MI | | | 98 | | | 5 | 100 | 4 | 3.1 | 3.7 | |
| | | | | | | 00 | | | 5 | 100 | 4 | 6.0 | 6.7 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 8.0 | 9.1 | 1 heavy fruit, 3 poor, 4 blue fruit |
| | | | | | | 05 | | | 5 | 100 | 5 | 9.6 | 12.9 | 5 half dead |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/3/1-5 | 'Midwest' | MAMA37 | Manchurian crabapple | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 1.4 | 2.3 | |
| | PI-478000 | | *Malus mandshurica* | | | 97 | | | 5 | 100 | 1 | 3.1 | 3.4 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 2 | 5.2 | 5.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 10.1 | 10.1 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 13.7 | 14.2 | 1 broke main stem, 3 v. good fruit |
| | | | | | | 05 | | | 5 | 100 | 3 | 12.8 | 16.3 | |
| III/3/6-10 | 9069129 | PRMA9 | amur chokecherry | 15-May | 96 | 96 | CONT(P) | 5 | 5 | 100 | 3 | 2.5 | 3.4 | mech. damage on 4 |
| | | | *Prunus maackii* | | | 97 | | | 5 | 100 | 2 | 3.2 | 4.0 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 98 | | | 5 | 100 | 3 | 4.4 | 6.1 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 7.5 | 9.6 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 11.9 | 13.8 | 4- nice form |
| | | | | | | 05 | | | 5 | 100 | 2 | 12.4 | 18.8 | clean leaves, no disease |
| III/4/1-5 | 9076722 | BEPE3 | European white birch | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 2.5 | 3.6 | leaf miner on 3 |
| | | | *Betula pendula* | | | 97 | | | 5 | 100 | 3 | 4.0 | 5.0 | |
| | | | USDA, ARS, Mandan, ND | | | 98 | | | 5 | 100 | 2 | 7.0 | 7.8 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 12.2 | 13.3 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 15.0 | 17.7 | |
| | | | | | | 05 | | | 5 | 100 | 5 | 12.4 | 22.5 | dead tops on 3 and 4 |
| III/4/6-10 | 9047209 | PRVI | chokecherry | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 5 | 0.9 | 1.9 | |
| | | | *Prunus virginiana* | | | 97 | | | 5 | 100 | 3 | 1.5 | 2.4 | shot hole on 1 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 5 | 100 | 4 | 2.7 | 4.0 | 2 suckering |
| | | | | | | 00 | | | 5 | 100 | 5 | 4.9 | 6.7 | shot hole on 1, blackknot on 3 |
| | | | | | | 02 | | | 5 | 100 | 4 | 8.6 | 10.2 | 1&3 leaf dmg; 2,3,4,5 blackknot |
| | | | | | | 05 | | | 4 | 80 | 6 | 8.5 | 14.8 | blackknot & shot hole disease |
| III/5/1-9 | ND-21 | VILE | nannyberry | 29-May | 96 | 96 | tree | 9 | 9 | 100 | 4 | 3.0 | 5.3 | leaf rust on 2 |
| | 9034900 | | *Viburnum lentago* | | | 97 | spade by | | 9 | 100 | 4 | 3.4 | 5.2 | mod-severe leaf rust on all |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | IRRRB | | 9 | 100 | 3 | 3.6 | 5.2 | |
| | | | Grand Rapids, MN FEP | | | 00 | | | 9 | 100 | 4 | 4.5 | 5.8 | |
| | | | | | | 02 | | | 8 | 89 | 4 | 5.4 | 6.1 | fruit on 1 |
| | | | | | | 05 | | | 8 | 89 | 4 | 5.4 | 8.1 | powder mildew on 3 & 4 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/6/1-5 | 9076737 | PRSE2 | black cherry | 15-May | 97 | 97 | PLBR | 5 | 5 | 100 | 3 | 0.9 | 1.5 | |
| | | | *Prunus serotina* | | | 98 | | | 5 | 100 | 4 | 2.7 | 3.5 | |
| | | | Apple Valley FEP | | | 99 | | | 5 | 100 | 4 | 3.9 | 4.8 | leaf spot |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 5 | 100 | 4 | 6.4 | 7.5 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 8.0 | 11.3 | |
| III/6/6-10 | 9091975 | AMELA | serviceberry | 24-May | 05 | 05 | | 5 | 5 | 100 | 3 | 0.9 | 2.3 | 1 browsed |
| | | | *Amelanchier lamarckii* | | | 06 | | | 5 | 100 | 4 | 10.5 | 14.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| III/6/11-15 | 9008183 | PRVI | common chokecherry | 24-May | 05 | 05 | | 5 | 5 | 100 | 3 | 1.0 | 2.5 | |
| | | | *Prunus virginiana* | | | 06 | | | 5 | 100 | 3 | 1.0 | 2.8 | |
| | | | Lincoln-Oakes Nursery,Bismarck, ND | | | | | | | | | | | |
| III/7/1-5 | 9082631 | BEPLJ | Japanese birch | 25-May | 99 | 99 | PLBR | 5 | 4 | 80 | 2 | 1.1 | 3.0 | |
| | | | *Betula platyphylla* var. *japonica* | | | 00 | | | 5 | 100 | 3 | 3.2 | 5.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 01 | | | 5 | 100 | 2 | 6.5 | 8.0 | |
| | | | | | | 03 | | | 3 | 100 | 3 | 10.6 | 17.2 | |
| | | | | | | 05 | | | 5 | 100 | 1 | 12.2 | 19.2 | no disease |
| III/7/6-10 | 9006094 | PTTR | wafer ash | 25-May | 99 | 99 | PLBR | 5 | 5 | 100 | 2 | 1.1 | 2.0 | very healthy, glossy leaves |
| | ND-624 | | *Ptelea trifoliata* | | | 00 | | | 5 | 100 | 2 | 1.9 | 2.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 5 | 100 | 3 | 4.3 | 4.1 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 7.0 | 5.8 | |
| | | | | | | 05 | | | 4 | 80 | 3 | 7.0 | 7.5 | no disease |
| III/8/6-10 | 9091976 | VIDE | arrowwood viburnum | 24-May | 05 | 05 | | 5 | 3 | 60 | 3 | 1.0 | 1.9 | Two are dead with leaves on |
| | | | *Viburnum dentatum* | | | 06 | | | 5 | 100 | 8 | 0.3 | 1.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| IV/1/1-5 | 'Oahe' | CEOC | hackberry | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 1.1 | 2.4 | |
| | PI-476982 | | *Celtis occidentalis* | | | 97 | | | 5 | 100 | 3 | 1.6 | 2.4 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 4 | 3.1 | 3.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 4 | 5.6 | 7.4 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 8.2 | 11.6 | 1 very nice tree; 2,3,5 leaf spot; 3 dead leaf tips |
| | | | | | | 05 | | | 5 | 100 | 3 | 8.6 | 14.8 | high variation |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/1/6-10 | 'Cardan' | FRPE | green ash | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.1 | 2.1 | |
| | | | *Fraxinus pennsylvanica* | | | 97 | | | 5 | 100 | 2 | 1.9 | 3.4 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 4 | 3.9 | 5.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 8.9 | 10.2 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 13.5 | 15.3 | slight defoliation on all |
| | | | | | | 05 | | | 5 | 100 | 3 | 11.2 | 21.2 | |
| IV/1/11/15 | 9082892 | POAL7 | white poplar | 25-May | 04 | 04 | PLBR | 5 | 5 | 100 | 5 | 0.6 | 1.9 | |
| | | | *Populus alba* | | | 05 | | | 5 | 100 | 4 | 2.1 | 4.2 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 5 | 100 | 5 | 4.8 | 7.4 | |
| IV/2/1-5 | 9069177 | QUMA2 | bur oak | 30-Apr | 98 | 98 | CONT(P) | 5 | 5 | 100 | 6 | 0.6 | 0.8 | |
| | | | *Quercus macrocarpa* | | | 99 | | | 4 | 80 | 6 | 1.5 | 2.0 | |
| | | | E.T. Jacobson, MN | | | 00 | | | 5 | 100 | 5 | 1.9 | 2.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 6 | 3.7 | 4.3 | remove per Mike O. |
| | | | | | | 04 | | | 5 | 100 | 6 | 4.3 | 6.3 | |
| IV/2/6-10 | 9063115 | FRPE | green ash | 15-May | 96 | 96 | CONT(P) | 5 | 5 | 100 | 5 | 0.7 | 1.4 | |
| | | | *Fraxinus pennsylvanica* | | | 97 | | | 5 | 100 | 3 | 0.9 | 2.3 | |
| | | | Itasca State Park, MN | | | 98 | | | 5 | 100 | 4 | 3.4 | 4.3 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 2 | 7.1 | 10.9 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 11.7 | 15.8 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 12.4 | 22.5 | |
| IV/2/11-15 | 9082650 | POPUL | Soongarica poplar | 10-May | 00 | 00 | CONT | 5 | 5 | 100 | 3 | 1.4 | 3.5 | |
| | | | *Populus* | | | 01 | | | 5 | 100 | 3 | 5.2 | 7.8 | 5 blew over, roots curled |
| | | | Valley Nursery, Helena, MT | | | 02 | | | 5 | 100 | 2 | 8.5 | 12.7 | |
| | | | | | | 05 | | | 5 | 100 | 3 | | 28.1 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 12.9 | 31.7 | 3 top missing |
| IV/3/1-5 | 9063126 | ULJA | Japanese elm | 15-May | 96 | 96 | CONT(P) | 5 | 5 | 100 | 3 | 3.0 | 3.0 | |
| | | | *Ulmus japonica* | | | 97 | | | 5 | 100 | 2 | 4.7 | 4.5 | |
| | | | PFRA, Indianhead, Saskatchewan, Canada | | | 98 | | | 5 | 100 | 2 | 7.7 | 6.3 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 2 | 12.5 | 11.8 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 15.5 | 14.5 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 20.0 | 20.1 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/3/6-10 | 9069170 | QURO2 | English oak | 15-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 0.9 | |
| | | | *Quercus robur* | | | 97 | | | 5 | 100 | 3 | 1.2 | 1.5 | deer browse on 1,3,4,5 |
| | | | Russia | | | 98 | | | 5 | 100 | 3 | 3.6 | 3.6 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 5 | 100 | 3 | 8.1 | 10.4 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 10.6 | 15.2 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 14.2 | 20.7 | |
| IV/3/11-15 | 9082675 | FRMA5 | Manchurian ash | 10-May | 00 | 00 | PLBR | 5 | 5 | 100 | | 0.7 | 2.1 | |
| | | | *Fraxinus mandshurica* | | | 01 | | | 4 | 80 | 4 | 1.5 | 2.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 02 | | | 4 | 80 | 4 | 1.5 | 2.4 | leaf spots on 3 |
| | | | | | | 04 | | | 4 | 80 | 3 | 2.4 | 7.5 | leaf wilt on 3, double leader 4,5 |
| | | | | | | 06 | | | 4 | 80 | 4 | 4.9 | 11.4 | |
| IV/4/1-5 | 9076742 | JUCI | butternut | 29-May | 96 | 96 | CONT | 5 | 4 | 80 | 5 | 0.8 | 1.6 | |
| | | | *Juglans cinerea* | | | 97 | | | 3 | 60 | 3 | 0.7 | 1.7 | |
| | | | Aitkin Co., MN | | | 98 | | | 4 | 80 | 4 | 2.4 | 1.9 | |
| | | | Itasca Greenhouse, Cohasset, MN | | | 00 | | | 4 | 80 | 5 | 4.2 | 3.9 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 6.9 | 6.6 | |
| | | | | | | 05 | | | 4 | 80 | 4 | 10.2 | 11.8 | |
| IV/4/6-10 | 9076743 | CADE12 | chestnut | 29-May | 96 | 96 | CONT | 5 | 2 | 40 | 3 | 1.0 | 1.5 | |
| | | | *Castanea dentata* | | | 97 | | | 2 | 40 | 3 | 0.7 | 1.8 | |
| | | | Itasca Greenhouse, Cohasset, MN | | | 98 | | | 2 | 40 | 3 | 1.7 | 2.2 | |
| | | | | | | 00 | | | 2 | 40 | 4 | 3.3 | 4.2 | |
| | | | | | | 02 | | | 2 | 40 | 4 | 5.2 | 6.2 | |
| | | | | | | 05 | | | 2 | 40 | 7 | 4.5 | 9.4 | struggling |
| IV/4/11-15 | 9082667 | BEPO | gray birch | 10-May | 00 | 00 | | 5 | 5 | 100 | 4 | 1.2 | 3.2 | |
| | | | *Betula populifera* | | | 01 | | | 4 | 80 | 4 | 3.4 | 4.5 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 4 | 80 | 4 | 3.4 | 4.5 | |
| | | | | | | 04 | | | 4 | 80 | 4 | 8.1 | 12.3 | |
| | | | | | | 06 | | | 4 | 80 | 2 | 11.6 | 18.3 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/5/1-5 | 9057412 | QUMA2 | bur oak | 29-May | 96 | 96 | tree | 4 | 4 | 100 | 4 | 2.0 | 2.5 | |
| | | | *Quercus macrocarpa* | | | 97 | spade by | | 4 | 100 | 3 | 2.4 | 3.3 | |
| | | | Foster Co., ND | | | 98 | IRRRB | | 4 | 100 | 3 | 5.2 | 5.3 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 4 | 100 | 3 | 8.0 | 7.9 | |
| | | | | | | 02 | | | 4 | 100 | 3 | 9.6 | 10.2 | |
| | | | | | | 05 | | | 4 | 100 | 4 | 10.2 | 13.6 | |
| IV/5/6-10 | 9005970 | JUNI | black walnut | 29-May | 96 | 96 | tree | 5 | 5 | 100 | 5 | 2.8 | 2.9 | |
| | | | *Juglans nigra* | | | 97 | spade by | | 5 | 100 | 2 | 1.7 | 2.6 | |
| | | | NDSU | | | 98 | IRRRB | | 5 | 100 | 3 | 5.3 | 4.4 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 7.3 | 6.6 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 8.6 | 8.8 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 8.2 | 12.3 | |
| IV/5/11-15 | 9082674 | ACSA3 | sugar maple | 10-May | 00 | 00 | PLBR | 5 | 5 | 100 | 3 | 1.0 | 1.8 | |
| | | | *Acer saccharum* | | | 01 | | | 2 | 40 | 5 | 1.5 | 1.8 | |
| | | | Polk Co., MN | | | 02 | | | 5 | 100 | 6 | 1.4 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 4 | 80 | 4 | 1.8 | 4.3 | |
| | | | | | | 06 | | | 3 | 60 | 5 | 3.4 | 7.2 | |
| IV/6/1-5 | 9082630 | ACPL | Norway maple | 25-May | 99 | 99 | PLBR | 5 | 5 | 100 | 5 | 0.4 | 1.4 | leaf rust |
| | | | *Acer platanoides* | | | 00 | | | 5 | 100 | 5 | 0.6 | 1.4 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 5 | 100 | 5 | 1.2 | 1.6 | |
| | | | | | | 03 | | | 5 | 100 | 5 | 1.4 | 1.6 | |
| | | | | | | 05 | | | 5 | 100 | 6 | 2.8 | 3.1 | |
| IV/6/5-10 | 9082633 | FRNI | black ash | 25-May | 99 | 99 | PLBR | 5 | 5 | 100 | 6 | 0.5 | 1.0 | |
| | | | *Fraxinus nigra* | | | 00 | | | 5 | 100 | 5 | 0.8 | 1.3 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 4 | 80 | 4 | 1.4 | 2.0 | |
| | | | | | | 03 | | | 4 | 80 | 3 | 2.3 | 3.1 | |
| | | | | | | 05 | | | 4 | 80 ? | | 3.3 | 5.8 | |
| IV/6/11-15 | 9092052 | QUBI | swamp white oak | 15-May | 06 | 06 | PLBR | 5 | 5 | 100 | 3 | 0.8 | 1.4 | |
| | | | *Quercus bicolor* | | | | | | | | | | | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/7/6-10 | 9092051 | CASP8 | northern catalpa<br>*Catalpa speciosa*<br>Big Sioux Nursery, Watertown, SD | 15-May | 06 | 06 | PLBR | 5 | 5 | 100 | | 0.6 | 0.8 | |

**OFF-CENTER EVALUATION PLANTINGS: TECHNICAL REPORT – 2006**

Study 38I347K University of Minnesota, Sand Plain Experimental Research Farm, Becker, Minnesota.

Study Title: Field Evaluation of Woody Plant Materials.

Introduction: There is a need to evaluate the performance of shrub and tree species/cultivars for windbreaks, wildlife, and recreational plantings under diverse soil and climatic conditions. To meet this need, field evaluation planting sites representative of the major land resource areas are located in the three states served by the PMC. These sites provide planting locations under long-term land tenure for assemblies of trees and shrubs to be evaluated under uniform culture and management. New material can be added on an annual basis. Comparisons are made with previously released cultivars and area of adaptation determined.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use. Superior cultivars will be selected and released for increase by commercial nurseries.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the University of Minnesota, Sand Plain Experimental Research Farm, Becker, Minnesota.

Location: University of Minnesota, Sand Plain Experimental Research Farm, Becker, Minnesota. Legal Description: NW 1/4 SW 1/4 sec. 31, T. 34 N., R. 28 W.

Major Land Resource Area: This site is located in Major Land Resource Area 91, Wisconsin and Minnesota Sandy Outwash. About 90 percent of this area is in farms. The area is nearly level, with elevations averaging around 980 feet above sea level.

Soils: The soils at this site are a Hubbard-Mosford complex. Hubbard is formed from leached coarse and medium sand outwash. Drought and wind erosion are major management problems. Hubbard and Mosford soils are in Conservation Tree/Shrub Suitability Group 7.

Climate: The average annual precipitation for Sherburne County is 26 to 30 inches. The average annual temperature is 40 to 45 degrees F, with an average freeze-free period of 135 days. The plant hardiness zone for this site is 3, with an average annual minimum temperature of -30 to -40 degrees F. Climatic data for 2006 at the nearest official weather station, Becker, Minnesota, is shown in Table BE-1.

**Methods and Materials**

Assembly: Refer to Table BE-2 for a list of woody species planted from 1998 to 2006.

Planting Plan: The plots are not randomized or replicated but organized systematically for evaluation and demonstration purposes. The site is divided into four blocks (refer to Figure BE-1). Block 1 is planted to shrubs, Block 2 to medium trees, Block 3 to tall trees, and Block 4 to conifers. Each block is arranged into single row, non-replicated plots. Each plot contains 1 to 10 plants. Spacing is 20 feet between rows and 5 feet within row for shrubs and 10 feet within row for trees. Row length is 100 feet. Like species and standards of comparison are planted in adjacent plots whenever possible.

Plot Preparation: A clean, firm planting site was prepared by roto-tilling.

Planting Method: All trees and shrubs were hand planted using approved forestry methods.

Planting Date: Refer to Table BE-2 for planting dates of woody species planted from 1998 to 2006.

Fertilization: No fertilizer has been applied to the planting area.

Weed Control: Mechanical weed control, rotary mowing between row, and rototilling and hand hoeing in row.

Biological Control: No insecticides have been applied. There has been very minor deer browse damage.

Irrigation: Trees have been hand watered at time of planting.

Crop Residue Management: On May 20, 2003, Block I (shrubs) was seeded to a cover of 50 percent Bad River blue grama and 50 percent Pierre sideoats grama.

Silvicultural Practices: Minor pruning has been done each year to remove dead or damaged branches.

Evaluations and Measurements: Plant performance data is recorded on one or more accessions during the growing season for three years. After the third year, data is gathered according to a specific schedule. The trees and shrubs were evaluated for survival, canopy width, plant height, vigor, insect and disease, and animal damage. Select data appears in this report. Additional information can be requested from the PMC.

## Results

Plant Performance: One hundred and five accessions of 86 species are being evaluated. Maintenance on this site is excellent. Trees and shrubs that have performed exceptionally well include the following:

| Accession Number | Genus/Species<br>Origin/Source | Plot Location |
|---|---|---|
| 'Schubert' | chokecherry<br>*Prunus virginiana*<br>Lincoln-Oakes Nursery, Bismarck, ND | II/1/6-10 |
| 9076722 | European white birch<br>*Betula pendula*<br>Russia<br>USDA, ARS, Mandan, ND | III/9/6-10 |
| 9082631 | Japanese birch<br>*Betula platyphylla*<br>Lawyer Nursery, Plains, MT | III/14/6-10 |
| 9069172 | Scots pine<br>*Pinus sylvestris*<br>Russia<br>USDA, NRCS, PMC, Bismarck, ND | IV/4/1-5 |
| 9069162 | Dahurian larch<br>*Larix olgensis*<br>China<br>USDA, NRCS, PMC, Bismarck, ND | IV/2/6-10 |
| 323957 | black chokeberry<br>*Photina melanocarpa*<br>Lincoln-Oakes Nursery, Bismarck, ND | IA/3/1-5 |

## Figure BE-1. Becker Woody Field Evaluation Planting – Plot Layout

| BLOCK IV CONIFERS | | | |
|---|---|---|---|
| | | | |
| 9069172 Scots pine | Canaan fir | | |
| 9069163 Dahurian larch | 9069164 Scots pine | | |
| 9069168 Siberian larch | 9069162 Dahurian larch | | |
| 9082610 Siberian larch | 9082611 Siberian larch | | |
| | | | |
| **BLOCK III TALL TREES** | | | |
| 9063152 Japanese birch | 9082631 Japanese birch | | |
| 9082639 northern pin oak | cedar | | |
| 9082886 aspen (LON) | Scots pine | | |
| ND-686 Pekin lilac | 9076725 smoothbark elm | | |
| 9082885 aspen (Towner) | 9082633 black ash | | |
| 9082609 Meyer's spruce | 9076722 E. white birch | | |
| 9076735 Ohio buckeye | 9076737 black cherry | | |
| 9069178 red pine | 9076731 bur oak | | |
| 'Hunter' ponderosa pine | 9063148 amur corktree | | |
| 9063127 white ash | 9076730 silver maple | | |
| 9063115 green ash | 9063116 black ash | | |
| 'Cardan' green ash | 9019586 green ash | | |
| 'Oahe' hackberry | 9019578 hackberry | | |
| 9076739 oak hybrid | 9069177 bur oak | | |
| | | | |
| **BLOCK II MEDIUM TALL TREES** | | | |
| 9082667 gray birch | 9092051 northern catalpa | | |
| 9092052 swamp white oak | 9082675 Manchurian ash | | |
| 9069129 amur chokecherry | 9082666 black birch | | |
| 'Homestead' arnold hawthorn | 9069121 mayday | | |
| 'McDermand' Ussurian pear | 9076733 nannyberry | | |
| ND614 Kentucky coffeetree | 9092055 Am. chestnut | | |
| 9047209 chokecherry | ND-1733 plum | | |
| 9030971 amur maple | 'Schubert' chokecherry | | |
| 'Roselow' sarg. crabapple | 'Midwest' Manch. crabapple | | |
| | | | |
| **BLOCK I SHRUBS** | | **BLOCK 1A SHRUBS** | |
| Legacy' late lilac | 9019621 lilac | | |
| 'Scarlet' Mongolian cherry | 9019579 Sib. pea shrub | ninebark\|Am. hazelnut\|'Pr Red' plum\|staghorn sumac | |
| 'Konza' aromatic sumac | 'Regal' Russian almond | mugo pine\|seaberry\|wayfaring bush\|roundleaf hawthorn | |
| 9019576 juneberry | shadblow svcbry\|arrowwood | pr. rose\|M. gooseberry | pin cherry\|b.l. honeysuckle |
| 9019581 Pekin cotoneaster | 9019605 sand cherry | leadplant\|chokeberry | chokechry\|'Red River' pr.cordgr. |
| 'Centennial' E. cotoneaster | ND-170 Euro. cotoneaster | 'Nero' chokbry\|'Viking' ch. | winterberry E.\| bittersweet |
| 9019618 s. buffaloberry | 9063123 s. buffaloberry | redleaf rose\|rugosa rose | black currant\|cupplant |
| 9076729 gray dogwood | 'Sakakawea' s. buffaloberry | chokeberry\|Sib.dogwood | slough sedge \| sweetgrass |
| 9019580 redosier dogwood | 'Indigo' silky dogwood | 9008041 false indigo | 9082632 Mong. pea shrub |
| 'Arnolds Red' honeysuckle | 9063143 r.t. honeysuckle | 9019611 golden currant | ND-3902 sandbar willow |

revised 06/06

| Table No. BE-1: 2006 Weather Summary - Official Station - Santiago, Minnesota | | | | | | |
|---|---|---|---|---|---|---|
| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) Actual | | Deviation from Normal |
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 27.0 | 11.1 | | 0.34 | 1.11 | -0.77 |
| February | 16.4 | 18.6 | | 0.28 | 0.86 | -0.58 |
| March | 33.1 | 30.5 | | 0.48 | 1.71 | -1.23 |
| April | 51.4 | 45.6 | | 3.06 | 2.37 | 0.69 |
| May | 59.2 | 58.7 | | 1.67 | 3.22 | -1.55 |
| June | 66.7 | 66.7 | | 4.13 | 4.44 | -0.31 |
| July | 75.2 | 71.1 | | 1.36 | 4.15 | -2.79 |
| August | 69.7 | 68.7 | | 4.78 | 4.59 | 0.19 |
| September | 57.5 | 59.5 | | 3.26 | 2.87 | 0.39 |
| October | 44.9 | 47.8 | | 1.35 | 2.48 | -1.13 |
| November | 34.7 | 30.9 | | 0.99 | 1.86 | -0.87 |
| December | M | 16.8 | | 0.00M | 0.89 | -0.89M |
| **Annual** | **44.6M** | **43.8** | | **21.70** | **30.55** | **-8.85M** |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |
| M=missing data | | | | | | |
| | | 2006 | | | | |
| Last Frost (28 degrees) | | M | | | | |
| First Frost (28 degrees) | | M | | | | |
| Frost Free Period | | M | | | | |

**Key to Table BE-2. 38I347K Field Evaluation of Woody Plant Materials – Becker, Minnesota**

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table BE-2.**
**Project No.: 38I347K Field Evaluation of Woody Plant Materials, Becker, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/1/1-10 | 'Arnolds Red' | LOTA | red tatarian honeysuckle | 1-May | 96 | 96 | CONT(P) | 10 | 10 | 100 | 4 | 2.0 | 2.1 | |
| | 9069080 | | *Lonicera tatarica* | | | 97 | | | 10 | 100 | 5 | 1.8 | 2.1 | |
| | | | Lee Nursery, Fertile, MN | | | 98 | | | 10 | 100 | 2 | 2.6 | 4.1 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 10 | 100 | 4 | 4.4 | 5.3 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 4.8 | 6.1 | All fair fruit; yellow leaf tips |
| | | | | | | 05 | | | 10 | 100 | 4 | 5.0 | 7.3 | |
| I/1/11-20 | 'Hawkeye' | LOTA | red tatarian honeysuckle | 1-May | 96 | 96 | CONT(P) | 10 | 10 | 100 | 3 | 1.7 | 1.9 | |
| | 9063143 | | *Lonicera tatarica* | | | 97 | | | 10 | 100 | 4 | 1.5 | 2.4 | |
| | | | Iowa | | | 98 | | | 10 | 100 | 2 | 2.2 | 3.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 2 | 5.1 | 5.2 | |
| | | | NRCS, PMC, Bismarck, ND | | | 02 | | | 10 | 100 | 2 | 5.8 | 6.5 | |
| | | | | | | 05 | | | 10 | 100 | 3 | 6.7 | 7.7 | good vigor |
| I/2/1-10 | 9019580 | COST | redosier dogwood | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.2 | 2.5 | browse on 3,4 |
| | | | *Cornus stolonifera* | | | 97 | | | 9 | 90 | 2 | 2.6 | 3.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 9 | 90 | 2 | 5.1 | 4.0 | |
| | | | | | | 00 | | | 9 | 90 | | 8.4 | 5.8 | |
| | | | | | | 02 | | | 10 | 100 | 1 | 7.7 | 5.6 | some leaf rust throughout all |
| | | | | | | 05 | | | 9 | 90 | 3 | 9.0 | 6.9 | |
| I/2/11-20 | 'Indigo' | COAM | silky dogwood | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 4 | 1.7 | 2.1 | |
| | 468117 | | *Cornus amomum* | | | 97 | | | 9 | 90 | 2 | 3.2 | 2.9 | |
| | | | USDA, NRCS, PMC, E. Lansing, MI | | | 98 | | | 9 | 90 | 1 | 7.2 | 4.8 | |
| | | | | | | 00 | | | 9 | 90 | 2 | 9.6 | 6.4 | |
| | | | | | | 02 | | | 9 | 90 | 3 | 9.8 | 7.3 | |
| | | | | | | 05 | | | 10 | 100 | 5 | 10.5 | 7.3 | dieback on 1,2; resprout on 4 |
| I/3/1-10 | 9076729 | CORA | gray dogwood | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.4 | 1.9 | browse on 2,3 |
| | | | *Cornus racemosa* | | | 97 | | | 10 | 100 | 3 | 2.2 | 2.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 2 | 5.4 | 4.9 | |
| | | | | | | 00 | | | 10 | 100 | 2 | 7.8 | 6.5 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 8.0 | 7.4 | |
| | | | | | | 05 | | | 10 | 100 | 4 | 7.0 | 7.5 | |

**Project No.: 38I347K Field Evaluation of Woody Plant Materials, Becker, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/3/11-20 | 'Sakakawea' | SHAR | silver buffaloberry | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 0.7 | 1.7 | |
| | 478005 | | *Shepherdia argentea* | | | 97 | | | 9 | 90 | 5 | 0.9 | 2.0 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 9 | 90 | 4 | 2.1 | 3.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 9 | 90 | 4 | 4.7 | 4.9 | |
| | | | | | | 02 | | | 9 | 90 | 3 | 5.4 | 5.6 | |
| | | | | | | 05 | | | 7 | 70 | 6 | 6.0 | 5.4 | poor vigor |
| I/4/1-10 | 9019618 | SHAR | silver buffaloberry | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.0 | 1.6 | |
| | | | *Shepherdia argentea* | | | 97 | | | 10 | 100 | 6 | 1.0 | 2.0 | |
| | | | North Dakota | | | 98 | | | 10 | 100 | 4 | 2.3 | 2.7 | top kill on 2 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 4 | 4.6 | 4.2 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 5.7 | 5.0 | |
| | | | | | | 05 | | | 10 | 100 | 7 | 5.0 | 4.5 | 1 is mostly dead |
| I/4/11-20 | 9063123 | SHAR | silver buffaloberry | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 4 | 1.0 | 1.6 | |
| | | | *Shepherdia argentea* | | | 97 | | | 10 | 100 | 5 | 1.1 | 1.9 | chlorosis on 10 |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 4 | 2.6 | 3.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 3 | 5.8 | 5.4 | |
| | | | | | | 02 | | | 9 | 90 | 3 | 6.6 | 5.9 | |
| | | | | | | 05 | | | 8 | 80 | 6 | 5.5 | 4.9 | |
| I/5/1-10 | 'Centennial' | COIN16 | European cotoneaster | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 5 | 1.6 | 1.6 | browse on 7 |
| | 113095 | | *Cotoneaster intergerrimus* | | | 97 | | | 9 | 90 | 4 | 1.6 | 1.6 | some dieback on 2,7 |
| | 9005729 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 9 | 90 | 4 | 4.0 | 3.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 9 | 90 | 3 | 8.5 | 5.2 | |
| | | | | | | 02 | | | 9 | 90 | 3 | 8.6 | 6.0 | |
| | | | | | | 05 | | | 10 | 100 | 2 | 9.5 | 5.5 | excellent fruit |
| I/5/11-20 | ND-170 | COIN16 | European cotoneaster | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.8 | 2.0 | |
| | 9005728 | | *Cotoneaster intergerrimus* | | | 97 | | | 10 | 100 | 5 | 2.1 | 2.0 | leaf spots |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 4 | 3.7 | 2.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 2 | 7.3 | 4.1 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 7.2 | 4.5 | |
| | | | | | | 05 | | | 10 | 100 | 3 | 6.3 | 4.5 | |

**Project No.: 38I347K Field Evaluation of Woody Plant Materials, Becker, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/6/1-10 | 9019581 | COAC | Pekin cotoneaster | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 5 | 1.0 | 1.6 | |
| | | | *Cotoneaster acutifolia* | | | 97 | | | 10 | 100 | 3 | 1.7 | 2.2 | dieback |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 3 | 3.9 | 3.6 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 6.3 | 4.9 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 6.9 | 5.6 | |
| | | | | | | 05 | | | 10 | 100 | 5 | 6.5 | 5.5 | fireblight on 6,7 |
| I/6/11-20 | 9019605 | PRBE | sand cherry | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.8 | 2.4 | |
| | | | *Prunus besseyi* | | | 97 | | | 10 | 100 | 3 | 4.2 | 2.7 | powdery mildew on 2,4,7,9 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 4 | 5.9 | 2.9 | fungus |
| | | | | | | 00 | | | 10 | 100 | 3 | 8.5 | 3.6 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 7.9 | 3.9 | |
| | | | | | | 05 | | | 10 | 100 | 3 | 9.0 | 4.1 | highly variable |
| I/7/1-10 | 9019576 | AMAL | juneberry | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 5 | 1.0 | 1.0 | |
| | | | *Amelanchier alnifolia* | | | 97 | | | 10 | 100 | 5 | 1.4 | 1.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 4 | 1.7 | 1.7 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 5.2 | 2.4 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 6.1 | 2.8 | |
| | | | | | | 05 | | | 10 | 100 | 4 | 5.5 | 3.3 | all are grown together |
| 1/7/6-10 | 9091975 | AMELA | serviceberry | 12-May | 05 | 05 | | 5 | 5 | 100 | 6 | 0.6 | 1.2 | 1,4 browsed |
| | | | *Amelanchier lamarckii* | | | 06 | | | 4 | 80 | 7 | 0.4 | 1.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck ND | | | | | | | | | | | |
| I/7/11-20 | 9076738 | RHTR | skunkbush sumac | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.7 | 2.1 | |
| | | | *Rhus trilobata* | | | 97 | | | 10 | 100 | 8 | 2.2 | 2.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 6 | 3.0 | 2.9 | leaf fungus |
| | | | | | | 00 | | | 10 | 100 | 4 | 4.5 | 3.4 | |
| | | | | | | 02 | | | 10 | 100 | 8 | 4.8 | 3.9 | |
| | | | | | | 04 | | | 0 | 0 | | | | removed 2004 |
| 1/7/11-15 | 9091976 | VIDE | arrowwood viburnum | 12-May | 05 | 05 | | 5 | 5 | 100 | 6 | 0.6 | 1.7 | dead leaves on 1,4 |
| | | | *Viburnum dentatum* | | | 06 | | | 2 | 40 | 5 | 0.8 | 1.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |

**Project No.: 38I347K Field Evaluation of Woody Plant Materials, Becker, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/8/1-10 | 'Konza' | RHAR | aromatic sumac | 1-May | 96 | 96 | PLBR | 10 | 7 | 70 | 6 | 0.7 | 1.1 | |
| | 477981 | | *Rhus aromatica* | | | 97 | | | 7 | 70 | 4 | 1.9 | 1.9 | top dieback - winter injury |
| | | | NRCS, PMC, Manhattan, KS | | | 98 | | | 7 | 70 | 3 | 5.2 | 3.5 | leaf fungus on 5,6,7,9 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 7 | 70 | | 8.3 | 4.2 | |
| | | | | | | 02 | | | 7 | 70 | 4 | 9.2 | 4.8 | |
| | | | | | | 05 | | | 9 | 90 | 4 | 9.5 | 5.1 | |
| I/8/11-20 | 'Regal' | PRTE | Russian almond | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 5 | 0.7 | 1.7 | |
| | 540442 | | *Prunus tenella* | | | 97 | | | 10 | 100 | 4 | 1.1 | 2.1 | all suckering except 5 |
| | 9006079 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 5 | 1.7 | 2.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 4 | 32.6 | 2.3 | |
| | | | | | | 02 | | | 10 | 100 | 4 | 4.1 | 2.4 | |
| | | | | | | 05 | | | 10 | 100 | 5 | 4.0 | 2.5 | highly variable |
| I/9/1-10 | 'Scarlet' | PRFR | Mongolian cherry | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 1.1 | 1.3 | |
| | 478003 | | *Prunus fruticosa* | | | 97 | | | 10 | 100 | 4 | 1.6 | 1.8 | severe rabbit damage on 1 |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 3 | 2.9 | 2.7 | all suckering |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 3 | 6.8 | 3.2 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 6.8 | 3.8 | |
| | | | | | | 05 | | | 10 | 100 | 4 | 7.3 | 4.4 | variable heights |
| I/9/11-20 | 9019579 | CAAR | Siberian pea shrub | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 5 | 0.8 | 2.0 | browse on all |
| | | | *Caragana arborescens* | | | 97 | | | 10 | 100 | 6 | 1.1 | 2.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 5 | 2.0 | 3.7 | insect damage 4,5 |
| | | | | | | 00 | | | 10 | 100 | 4 | 4.2 | 5.0 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 6.1 | 6.2 | |
| | | | | | | 05 | | | 10 | 100 | 5 | 6.5 | 6.9 | leaf defoliation |
| I/10/1-10 | 'Legacy' | SYVI | late (villosa) lilac | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 6 | 0.6 | 1.1 | resprout on 7,9 |
| | ND-83 | | *Syringa villosa* | | | 97 | | | 10 | 100 | 10 | 0.7 | 1.3 | |
| | 540443 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 4 | 1.3 | 1.9 | |
| | 9006228 | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 4 | 3.5 | 3.2 | |
| | | | | | | 02 | | | 10 | 100 | 4 | 4.6 | 4.1 | |
| | | | | | | 05 | | | 10 | 100 | 5 | 4.5 | 4.2 | variable heights |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| I/10/11-20 | 9019621 | SYVU | common lilac | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 5 | 1.0 | 1.6 | better than late lilac |
| | | | *Syringa vulgaris* | | | 97 | | | 10 | 100 | 5 | 1.1 | 2.2 | mildew on 1,8 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 3 | 1.9 | 2.9 | |
| | | | | | | 00 | | | 10 | 100 | 4 | 4.1 | 4.0 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 5.2 | 5.2 | |
| | | | | | | 05 | | | 10 | 100 | 4 | 5.3 | 6.3 | variable heights |
| IA/1/1-10 | 9019611 | RIAU | golden currant | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 4 | 1.2 | 2.1 | |
| | | | *Ribes aureum* | | | 97 | | | 10 | 100 | 6 | 2.0 | 2.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 10 | 100 | 7 | 3.0 | 3.7 | |
| | | | | | | 00 | | | 10 | 100 | 3 | 5.2 | 4.2 | |
| | | | | | | 02 | | | 10 | 100 | 4 | 5.6 | 4.4 | |
| | | | | | | 05 | | | 10 | 100 | 5 | 4.7 | 4.5 | leaves mostly gone-leaf spot |
| IA/1/11-20 | 'Silver Sands Germplasm' | SAIN | sandbar willow | 1-May | 96 | 96 | CONT(S) | 10 | 0 | 0 | | | | |
| | | | *Salix interior* | | | 97 | | | 3 | 30 | 5 | 1.1 | 2.0 | |
| | ND-3902 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 8 | 80 | 6 | 0.8 | 1.3 | rabbit browse on all |
| | 9035212 | | | | | 00 | | | 10 | 100 | 2 | 8.4 | 5.2 | |
| | | | | | | 02 | | | 10 | 100 | 2 | 9.1 | 6.4 | |
| | | | | | | 05 | | | 10 | 100 | 2 | 9.0 | 7.5 | |
| IA/2/1-10 | 'Survivor Germplasm' | AMFR | false indigo | 1-May | 96 | 96 | PLBR | 10 | 10 | 100 | 3 | 2.3 | 2.7 | browse on all |
| | | | *Amorpha fruticosa* | | | 97 | | | 10 | 100 | 4 | 3.0 | 2.2 | |
| | 9008041 | | NRCS, PMC, Bismarck, ND | | | 98 | | | 10 | 100 | 3 | 6.3 | 3.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 10 | 100 | 3 | 8.2 | 4.4 | |
| | | | | | | 02 | | | 10 | 100 | 3 | 9.6 | 5.0 | |
| | | | | | | 05 | | | 10 | 100 | 2 | 10.0 | 5.5 | |
| 1A/2/11-20 | 9082632 | CAIN | Mongolian peashrub | 29-Apr | 99 | 99 | PLBR | 10 | 10 | 100 | 3 | 0.8 | 1.0 | |
| | | | *Caragana intermedia* | | | 00 | | | 10 | 100 | 3 | 2.1 | 1.7 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 9 | 90 | 4 | 3.6 | 2.6 | |
| | | | | | | 03 | | | 9 | 90 | 4 | 4.8 | 3.4 | |
| | | | | | | 05 | | | 9 | 90 | 3 | 6.0 | 3.9 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A/3/1-5 | 323957 | PHME13 | black chokeberry | 3-May | 00 | 00 | PLBR | 5 | 5 | 100 | 2 | 1.6 | 1.7 | |
| | | | *Photinia melanocarpa* | | | 01 | | | 5 | 100 | 3 | 2.3 | 2.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 02 | | | 5 | 100 | 2 | 3.6 | 2.9 | |
| | | | | | | 04 | | | 5 | 100 | 2 | 4.1 | 3.2 | |
| | | | | | | 06 | | | 5 | 100 | 2 | 6.4 | 4.2 | |
| 1A/3/6-10 | 9082664 | COAL | Siberian dogwood | 5-May | 00 | 00 | PLBR | 5 | 5 | 100 | 2 | 1.5 | 2.7 | |
| | | | *Cornus alba 'sibirica'* | | | 01 | | | 5 | 100 | 3 | 3.9 | 3.1 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 5 | 100 | 2 | 5.8 | 4.4 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 5.6 | 5.3 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 6.8 | 5.3 | |
| IA/4/1-5 | 9082685 | RORU2 | redleaf rose | 16-May | 01 | 01 | PLBR | 5 | 5 | 100 | 3 | 1.8 | 1.7 | |
| | | | *Rosa rubrifolia* | | | 02 | | | 5 | 100 | 3 | 2.3 | 2.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 5 | 100 | 4 | 2.6 | 2.6 | |
| | | | | | | 05 | | | 5 | 100 | 5 | 2.0 | 2.3 | dieback on all |
| 1A/4/6-10 | 9057406 | RORU | rugosa rose | 16-May | 01 | 01 | PLBR | 5 | 5 | 100 | 4 | 1.2 | 1.2 | |
| | | | *Rosa rugosa* | | | 02 | | | 5 | 100 | 3 | 2.7 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 5 | 100 | 3 | 3.6 | 2.2 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 5.3 | 3.0 | good vigor |
| 1A/4/11-15 | 9082687 | RIAM2 | black currant | 16-May | 01 | 01 | PLBR | 5 | 5 | 100 | | 1.5 | 1.9 | |
| | | | *Ribes americanum* | | | 02 | | | 5 | 100 | 3 | 4.0 | 2.6 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 03 | | | 5 | 100 | 3 | 3.6 | 3.2 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 5.5 | 3.5 | |
| 1A/4/16-20 | 9082714 | SIPEP | cupplant | | 02 | 02 | CONT | 5 | 5 | 100 | 3 | 0.6 | 0.3 | |
| | | | *Silphium perfoliatum* | | | 03 | | | 5 | 100 | 3 | 1.1 | 3.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 04 | | | 5 | 100 | | | | all five okay, height varies |
| | | | | | | 05 | | | 5 | 100 | | | 3.5 | all five okay, flowering |
| 1A/5/1-5 | 'Nero' | PHME13 | chokeberry | | 02 | 02 | PLBR | 5 | 5 | 100 | 3 | 1.0 | 1.5 | |
| | 9082719 | | *Photinia melanocarpa* | | | 03 | | | 5 | 100 | 4 | 1.4 | 1.9 | |
| | | | Northwoods Nursery, Molalla, OR | | | 04 | | | 5 | 100 | 4 | 1.7 | 2.0 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 3.2 | 3.0 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A/5/6-10 | 'Viking' | PHME13 | chokeberry | | 02 | 02 | PLBR | 5 | 5 | 100 | 3 | 1.1 | 1.4 | |
| | 9082720 | | *Photinia melanocarpa* | | | 03 | | | 5 | 100 | 3 | 1.8 | 2.0 | |
| | | | Northwoods Nursery, Molalla, OR | | | 04 | | | 5 | 100 | 3 | 2.3 | 2.1 | |
| | | | | | | 06 | | | 5 | 100 | 2 | 4.0 | 3.2 | |
| 1A/5/11-15 | 9082711 | EUBU6 | winterberry euonymus | | 02 | 02 | PLBR | 5 | 5 | 100 | 3 | 0.5 | 2.6 | |
| | | | *Euonymus bungeanum* | | | 03 | | | 5 | 100 | 3 | 1.4 | 3.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 4 | 2.6 | 3.2 | 3 has seed |
| | | | | | | 06 | | | 5 | 100 | 4 | 4.1 | 4.1 | dark pink fruit on 3 |
| 1A/5/16/20 | 9082712 | CESC | bittersweet | | 02 | 02 | PLBR | 5 | 5 | 100 | 3 | 0.5 | 1.0 | |
| | | | *Celastrus scandens* | | | 03 | | | 5 | 100 | 3 | 1.2 | 2.4 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 4 | 1.2 | 3.2 | berries on 4 |
| | | | | | | 06 | | | 5 | 100 | 3 | 2.6 | 3.4 | |
| 1A/6/1-5 | 9082678 | AMCA6 | leadplant | | 02 | 02 | PLBR | 5 | 5 | 100 | 2 | 0.6 | 1.0 | |
| | | | *Amorpha canescens* | | | 03 | | | 5 | 100 | | 1.4 | 1.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 4 | 1.5 | 1.3 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 1.9 | 2.2 | |
| 1A/6/6-10 | 9082713 | PRPEP2 | Siberian peach | | 02 | 02 | PLBR | 5 | 5 | 100 | 3 | 2.6 | 2.8 | |
| | | | *Prunus persica* | | | 03 | | | 5 | 100 | 3 | 4.2 | 4.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 2 | 40 | 4 | 5.3 | 4.6 | 1-3 out, possible animal damage |
| | | | | | | 06 | | | 0 | 0 | | | | removed 2005 |
| 1A/6/6-10 | 9091971 | PHME13 | black chokeberry | 12-May | 05 | 05 | | 5 | 5 | 100 | 3 | 1.5 | 2.1 | |
| | | | *Photinia melanocarpa* | | | 06 | | | 5 | 100 | 2 | 2.1 | 2.4 | |
| | | | Bailey Nurseries, Inc. | | | | | | | | | | | |
| 1A/6/11-15 | 9008183 | PRVI | common chokecherry | 12-May | 05 | 05 | | 5 | 5 | 100 | 3 | 0.8 | 1.8 | |
| | | | *Prunus virginiana* | | | 06 | | | 5 | 100 | 5 | 1.5 | 2.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 1A/7/1-5 | 9082706 | ROAR | prairie rose | | 03 | 03 | | 5 | 5 | 100 | 4 | 1.2 | 1.2 | |
| | | | *Rosa arkansana* | | | 04 | | | 5 | 100 | 6 | 0.7 | 0.6 | |
| | | | Bismarck, ND | | | 05 | | | 3 | 60 | 5 | 2.3 | 1.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1A/7/6-10 | 9082746 | RIMI | Missouri gooseberry | | 03 | 03 | PLBR | 5 | 5 | 100 | 6 | 1.4 | 1.4 | |
| | | | *Ribes missouriensis* | | | 04 | | | 5 | 100 | 5 | 1.4 | 1.6 | |
| | | | Big Sioux River, Watertown, SD | | | 05 | | | 5 | 100 | ? | 2.5 | 2.0 | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| 1A/7/11-15 | 9091967 | PRPE2 | pin cherry | 12-May | 05 | 05 | | 5 | 5 | 100 | 3 | 1.5 | 2.2 | |
| | | | *Prunus pensylvanica* | | | 06 | | | 5 | 100 | 4 | 2.5 | 3.1 | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| 1A/7/16-20 | 'Freedom' | LOKO | blueleaf honeysuckle | | 03 | 03 | PLBR | 5 | 5 | 100 | 4 | 2.2 | 2.2 | |
| | | | *Loniceral korolkowii* | | | 04 | | | 5 | 100 | 3 | 4.7 | 4.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 05 | | | 5 | 100 | 2 | 5.5 | 4.9 | clean leaves, no disease |
| 1A/8/1-5 | 9082889 | PIMU80 | Mugo pine | 12-May | 04 | 04 | PLBR | 5 | 5 | | | | | no measurements taken |
| | | | *Pinus mugo* | | | 05 | | | 4 | 80 | 5 | 0.4 | 0.4 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 4 | 80 | 4 | 0.9 | 0.7 | |
| 1A/8/6-10 | 9082887 | HIRH80 | seaberry | 20-May | 04 | 04 | PLBR | 5 | 5 | 100 | 4 | 0.6 | 1.6 | |
| | | | *Hippophae rhamnoides* | | | 05 | | | 5 | 100 | 4 | 1.1 | 1.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 4 | 80 | 4 | 1.5 | 1.9 | |
| 1A/8/11-15 | 9082642 | VILA | wayfaring bush | 20-May | 04 | 04 | PLBR | 5 | 5 | 100 | 5 | 0.9 | 1.3 | |
| | | | *Viburnum lantana* | | | 05 | | | 5 | 100 | 5 | 0.8 | 1.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 4 | 0.8 | 1.2 | winter injury on 4,5 |
| 1A/8/16-20 | 9076686 | CRCH | roundleaf hawthorn | 20-May | 04 | 04 | PLBR | 5 | 4 | 80 | 4 | 0.6 | 0.7 | |
| | | | *Crataegus chrysocarpa* | | | 05 | | | 5 | 100 | 4 | 0.8 | 0.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 5 | 1.0 | 1.4 | cedar apple rust on all, wooly aphids on 3 |
| 1A/9/1-5 | 9082891 | PHOP | common ninebark | 20-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 1.3 | 1.6 | |
| | | | *Physocarpus opulifolius* | | | 05 | | | 5 | 100 | 4 | 2.5 | 1.9 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 5 | 100 | 3 | 4.6 | 3.2 | |
| 1A/9/6-10 | 9082888 | COAM3 | American hazelnut | 20-May | 04 | 04 | PLBR | 5 | 4 | 80 | 4 | 0.7 | 1.1 | |
| | | | *Corylus americana* | | | 05 | | | 5 | 100 | 4 | 1.0 | 1.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 3 | 1.6 | 1.7 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IA/9/11-15 | Prairie Red' 9047203 | PRUNU | hybrid plum *Prunus* sp. Big Sioux Nursery, Watertown, SD | 4-May | 06 | 06 | PLBR | 5 | 5 | 100 | 3 | 0.8 | 1.6 | |
| IA/9/16-20 | 9092053 | | staghorn sumac *Rhus typhina* Lincoln-Oakes Nursery, Bismarck, ND | 4-May | 06 | 06 | PLBR | 5 | 5 | 100 | 2 | 3.9 | 3.9 | |
| II/1/1-5 | 'Roselow' PI-477986 | MASA | Sargent crabapple *Malus sargenti* NRCS, PMC, East Lansing, MI Lincoln-Oakes Nursery, Bismarck, ND | 1-May | 96 | 96 | PLBR | 5 | 4 | 80 | 4 | 1.4 | 2.0 | browse on 4 |
| | | | | | | 97 | | | 4 | 80 | 2 | 2.0 | 2.3 | |
| | | | | | | 98 | | | 4 | 80 | 3 | 3.5 | 3.4 | |
| | | | | | | 00 | | | 4 | 80 | 3 | 6.7 | 5.5 | |
| | | | | | | 02 | | | 4 | 80 | 3 | 7.1 | 6.9 | no leaf diseases |
| | | | | | | 05 | | | 4 | 80 | 3 | 6.0 | 8.1 | |
| II/1/6-10 | 'Midwest' 478000 | MAMA37 | Manchurian crabapple *Malus mandshurica* NRCS, PMC, Bismarck, ND Lincoln-Oakes Nursery, Bismarck, ND | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.6 | 2.5 | browse on 1,3 |
| | | | | | | 97 | | | 5 | 100 | 2 | 3.4 | 3.6 | |
| | | | | | | 98 | | | 5 | 100 | 1 | 5.0 | 6.4 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 7.8 | 9.1 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 9.0 | 10.2 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 9.8 | 13.3 | |
| II/2/1-5 | 9030971 | ACGI | amur maple *Acer ginnala* Lincoln-Oakes Nursery, Bismarck, ND | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.1 | 1.8 | |
| | | | | | | 97 | | | 5 | 100 | 2 | 1.6 | 1.9 | |
| | | | | | | 98 | | | 5 | 100 | 2 | 3.1 | 4.1 | |
| | | | | | | 00 | | | 5 | 100 | 4 | 7.9 | 7.0 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 9.2 | 8.1 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 10.0 | 13.9 | |
| II/1/6-10 | 'Schubert' 9012608 | PRVI | chokecherry *Prunus virginiana* Lincoln-Oakes Nursery, Bismarck, ND | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 2.1 | |
| | | | | | | 97 | | | 5 | 100 | 1 | 1.5 | 2.6 | |
| | | | | | | 98 | | | 5 | 100 | 1 | 2.4 | 3.5 | |
| | | | | | | 00 | | | 5 | 100 | 2 | 5.8 | 6.5 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 8.1 | 9.0 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 10.0 | 11.8 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/3/1-5 | 9047209 | PRVI | chokecherry | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 0.7 | 2.0 | |
| | | | *Prunus virginiana* | | | 97 | | | 5 | 100 | 3 | 1.5 | 3.5 | insect damage on 4 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 5 | 100 | 1 | 2.5 | 5.3 | some suckers on 3,4 |
| | | | | | | 00 | | | 5 | 100 | 4 | 6.8 | 8.1 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 9.1 | 10.8 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 12.0 | 13.2 | yellow fruit on 1 |
| II/3/6-10 | ND-1733 | PRAM | plum | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.3 | 2.4 | |
| | 9006060 | | *Prunus americana* | | | 97 | | | 5 | 100 | 3 | 2.8 | 3.4 | insect, disease damage |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 5 | 100 | 3 | 4.0 | 6.3 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 10.7 | 9.0 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 11.4 | 10.5 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 9.9 | 11.9 | |
| II/4/1-5 | ND-614 | GYDI | Kentucky coffeetree | 29-Apr | 99 | 99 | CONT | 5 | 5 | 100 | 4 | 1.5 | 1.8 | |
| | | | *Gymnocladus dioicus* | | | 00 | | | 5 | 100 | 2 | 1.6 | 2.6 | |
| | | | MCKenzie FEP, ND | | | 01 | | | 5 | 100 | 3 | 2.9 | 3.4 | |
| | | | NRCS, PMC, Bismarck, ND | | | 03 | | | 5 | 100 | 4 | 2.8 | 4.4 | |
| | | | | | | 05 | | | 5 | 100 | | 1.5 | 4.0 | |
| II/4/6-10 | 9092055 | CADE12 | American chestnut | 4-May | 06 | 06 | POTD | 5 | 2 | 40 | 8 | 0.4 | 0.9 | |
| | | | *Castanea dentata* | | | | | | | | | | | |
| | | | Itasca Greenhouse, Cohasset, MN | | | | | | | | | | | |
| II/5/1-5 | 'McDermand' | PYUS | Ussurian pear | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.0 | 2.5 | browse on 1 |
| | 478004 | | *Pyrus ussuriensis* | | | 97 | | | 5 | 100 | 3 | 2.4 | 3.3 | leaf damage |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 2 | 2.9 | 5.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 7.3 | 9.4 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 10.0 | 11.8 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 12.0 | 13.6 | |
| II/5/6-10 | 9076733 | VILE | nannyberry | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 5 | 0.3 | 0.7 | |
| | | | *Viburnum lentago* | | | 97 | | | 5 | 100 | 5 | 0.8 | 1.3 | |
| | | | Turtle Mountains, ND | | | 98 | | | 5 | 100 | 3 | 1.3 | 2.9 | mildew on leaves |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 4 | 3.9 | 4.7 | |
| | | | | | | 02 | | | 5 | 100 | 5 | 4.4 | 5.4 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 3.8 | 5.8 | red color on 3-5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/6/1-5 | 'Homestead' | CRAN6 | Arnold hawthorn | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 5 | 0.5 | 1.5 | browse on 3,5 |
| | 9005731 | | *Crataegus X anomala* | | | 97 | | | 4 | 80 | 7 | 0.4 | 1.4 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 4 | 80 | 8 | 0.3 | 1.4 | severe rabbit damage - all |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 4 | 80 | 7 | 1.2 | 1.6 | |
| | | | | | | 02 | | | 4 | 80 | 6 | 2.2 | 2.5 | |
| | | | | | | 05 | | | 2 | 40 | 6 | 1.8 | 3.0 | |
| II/6/6-10 | 9069121 | PRPA | mayday | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 5 | 0.4 | 0.6 | browse on 4,5 |
| | | | *Prunus padus* | | | 97 | | | 5 | 100 | 4 | 1.1 | 1.7 | |
| | | | Norway | | | 98 | | | 5 | 100 | 3 | 1.6 | 3.2 | insect damage on 3,4 |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 3.7 | 6.1 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 5.4 | 9.2 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 5.7 | 10.3 | |
| II/7/1-5 | 9069129 | PRMA | amur chokecherry | 1-May | 96 | 96 | CONT(P) | 5 | 5 | 100 | 1 | 2.2 | 4.1 | |
| | | | *Prunus maackii* | | | 97 | | | 5 | 100 | 1 | 4.4 | 5.6 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 98 | | | 5 | 100 | 1 | 6.3 | 8.6 | moderate deer rub |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 2 | 10.6 | 11.5 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 13.2 | 12.4 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 11.5 | 11.9 | 3 is mostly dead |
| II/7/6-10 | 9082666 | BETUL | Asian black birch | 16-May | 01 | 01 | CONT | 5 | 5 | 100 | 3 | 1.0 | 1.3 | |
| | | | *Betula davurica* | | | 02 | | | 5 | 100 | 3 | 2.3 | 2.9 | |
| | | | Lawyer Nursery, Plains, MT | | | 03 | | | 5 | 100 | 3 | 3.2 | 5.4 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 4.0 | 7.9 | 1 is browsed |
| II/8/1-5 | 9082892 | POAL7 | white poplar | 20-May | 04 | 04 | PLBR | 5 | 5 | 100 | 5 | 0.7 | 1.6 | |
| | | | *Populus alba* | | | 05 | | | 5 | 100 | 4 | 1.5 | 2.1 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 0 | 0 | | | | removed |
| II/8/1-5 | 9092052 | QUBI | swamp white oak | 4-May | 06 | 06 | PLBR | 5 | 4 | 80 | 3 | 0.6 | 1.2 | 5 chewed off |
| | | | *Quercus bicolor* | | | | | | | | | | | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| II/8/6-10 | 9082675 | FRMA | Manchurian ash | 3-May | 00 | 00 | PLBR | 5 | 5 | 100 | 2 | 0.8 | 2.2 | |
| | | | *Fraxinus mandshurica* | | | 01 | | | 5 | 100 | 4 | 1.2 | 2.3 | |
| | | | Lincoln-Oakes Nursery Bismarck, ND | | | 02 | | | 5 | 100 | 4 | 2.0 | 4.0 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 1.9 | 5.7 | |
| | | | | | | 06 | | | 5 | 100 | 5 | 2.6 | 6.4 | |
| II/9/1-5 | 9082667 | BEPO | gray birch | 3-May | 00 | 00 | PLBR | 5 | 5 | 100 | 2 | 1.3 | 3.6 | |
| | | | *Betula populifera* | | | 01 | | | 5 | 100 | | 3.7 | 6.4 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 5 | 100 | 2 | 5.4 | 9.8 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 8.1 | 14.5 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 9.6 | 16.4 | drought stress |
| II/9/6-10 | 9082674 | ACSA | sugar maple | 3-May | 00 | 00 | PLBR | 5 | 5 | 100 | 2 | 1.0 | 2.0 | |
| | | | *Acer saccharum* | | | 01 | | | 5 | 100 | 3 | 1.3 | 3.1 | |
| | | | Polk Co., MN | | | 02 | | | 5 | 100 | 5 | 1.4 | 4.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 7 | 1.1 | 3.4 | |
| | | | | | | 06 | | | 0 | 0 | | | | removed |
| II/9/6-10 | 9092051 | CASP8 | northern catalpa | 4-May | 06 | 06 | PLBR | 5 | 5 | 100 | 3 | 0.6 | 0.8 | |
| | | | *Catalpa speciosa* | | | | | | | | | | | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| III/1/1-5 | 9076739 | QUERC | oak hybrid | 30-Apr | 98 | 98 | CONT(P) | 5 | 5 | 100 | 4 | 0.6 | 1.7 | |
| | | | *Quercus* | | | 99 | | | 4 | 80 | 6 | 1.2 | 2.4 | browse on 4 |
| | | | E.T. Jacobson, MN | | | 00 | | | 4 | 80 | 3 | 2.4 | 3.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 4 | 80 | 5 | 3.9 | 6.2 | |
| | | | | | | 04 | | | 4 | 80 | 6 | 4.5 | 7.3 | acorns on 3 |
| III/1/6-10 | 9069177 | QUMA | bur oak | 30-Apr | 98 | 98 | CONT(P) | 5 | 5 | 100 | 6 | 0.5 | 1.0 | browse on 3 |
| | | | *Quercus macrocarpa* | | | 99 | | | 4 | 80 | 6 | 0.8 | 1.2 | |
| | | | E.T. Jacobson, MN | | | 00 | | | 5 | 100 | 5 | 1.4 | 1.7 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 5 | 3.9 | 4.8 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 3.2 | 5.4 | stem gall on 5 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/2/1-5 | 'Oahe' | CEOC | hackberry | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 5 | 1.0 | 2.7 | |
| | 476982 | | *Celtis occidentalis* | | | 97 | | | 5 | 100 | 5 | 1.7 | 2.7 | 4 browsed |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 5 | 2.1 | 3.7 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 4 | 6.6 | 8.1 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 7.9 | 11.7 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 7.6 | 13.4 | |
| III/2/6-10 | 9019578 | CEOC | hackberry | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 6 | 0.5 | 1.7 | browse on 2,3,5 |
| | | | *Celtis occidentalis* | | | 97 | | | 5 | 100 | 6 | 1.7 | 2.8 | browse on 3,4,5 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 5 | 100 | 4 | 2.5 | 3.9 | |
| | | | | | | 00 | | | 5 | 100 | 4 | 6.2 | 7.1 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 10.3 | 13.2 | leaf gall |
| | | | | | | 05 | | | 5 | 100 | 4 | 10.4 | 14.7 | |
| III/3/1-5 | 'Cardan' | FRPE | green ash | 1-May | 96 | 96 | PLBR | 5 | 4 | 80 | 5 | 0.4 | 1.6 | |
| | 469226 | | *Fraxinus pennsylvanica* | | | 97 | | | 5 | 100 | 3 | 1.4 | 2.2 | |
| | | | NRCS, PMC, Bismarck, ND | | | 98 | | | 5 | 100 | 4 | 3.0 | 4.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 4 | 7.6 | 8.1 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 9.4 | 12.4 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 10.2 | 14.9 | |
| III/3/6-10 | 9019586 | FRPE | green ash | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.0 | 2.6 | |
| | | | *Fraxinus pennsylvanica* | | | 97 | | | 5 | 100 | 3 | 2.8 | 3.7 | 2 browsed |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 5 | 100 | 3 | 5.3 | 6.7 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 9.3 | 11.2 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 11.5 | 14.9 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 10.4 | 17.1 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 12.4 | 18.3 | |
| III/4/1-5 | 9063115 | FRPE | green ash | 1-May | 96 | 96 | CONT(P) | 5 | 5 | 100 | 5 | 0.2 | 0.9 | browse on 1,2,3,5 |
| | | | *Fraxinus pennsylvanica* | | | 97 | | | 5 | 100 | 3 | 1.0 | 2.0 | leaf damage on 2 |
| | | | Itasca State Park, MN | | | 98 | | | 5 | 100 | 4 | 2.3 | 3.9 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 6.3 | 7.5 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 9.2 | 13.8 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 9.1 | 17.1 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/4/6-10 | 9063116 | FRNI | black ash | 1-May | 96 | 96 | CONT(P) | 5 | 5 | 100 | 5 | 0.3 | 1.3 | browse on 2 |
| | | | *Fraxinus nigra* | | | 97 | | | 2 | 40 | 7 | 0.7 | 1.0 | browse on 1 |
| | | | Itasca State Park, MN | | | 98 | | | 2 | 40 | 6 | 1.5 | 2.3 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 2 | 40 | 4 | 2.4 | 5.4 | |
| | | | | | | 02 | | | 2 | 40 | 5 | 4.2 | 8.6 | |
| | | | | | | 05 | | | 2 | 40 | 6 | 4.1 | 9.9 | leaves yellowing-stress |
| III/5/1-5 | 9063127 | FRAM | white ash | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 5 | 0.2 | 1.4 | |
| | | | *Fraxinus americana* | | | 97 | | | 5 | 100 | 4 | 1.6 | 2.3 | slight insect damage on 2 |
| | | | Wisconsin | | | 98 | | | 5 | 100 | 4 | 2.1 | 3.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 5 | 100 | 5 | 4.5 | 8.9 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 7.6 | 12.9 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 7.3 | 14.9 | |
| III/5/6-10 | 9076730 | ACSA | silver maple | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 1.2 | 3.1 | |
| | | | *Acer saccharinum* | | | 97 | | | 5 | 100 | 1 | 3.8 | 5.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 5 | 100 | 3 | 8.7 | 9.5 | |
| | | | | | | 00 | | | 5 | 100 | 3 | 14.2 | 15.7 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 13.3 | 16.9 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 12.9 | 19.0 | broke off stump sprout on 2 |
| III/6/1-5 | 'Hunter Germplasm' 9081843 | PIPOS | ponderosa pine | 12-May | 05 | 05 | | 5 | 5 | 100 | 2 | 0.6 | 1.2 | |
| | | | *Pinus ponderosa* var. *scopulorum* | | | 06 | | | 5 | 100 | 2 | 1.2 | 1.6 | |
| | | | USDA, ARS, Bridger, MT | | | | | | | | | | | |
| III/6/6-10 | 9063148 | PHAM | amur corktree | 1-May | 96 | 96 | CONT(P) | 5 | 5 | 100 | 5 | 0.4 | 1.2 | browse on 5 |
| | | | *Phellodendron amurense* | | | 97 | | | 5 | 100 | 3 | 2.8 | 2.6 | |
| | | | Clay County, MN | | | 98 | | | 5 | 100 | 3 | 4.9 | 4.8 | |
| | | | NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 8.5 | 6.8 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 10.4 | 8.7 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 10.5 | 9.9 | tractor damage on trunk of 5 |
| III/7/1-5 | 9069178 | PIRE | red pine | 29-Apr | 99 | 99 | | 5 | 5 | 100 | 4 | 1.0 | 1.3 | |
| | | | *Pinus resinosa* | | | 00 | | | 5 | 100 | 4 | 1.0 | 1.3 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 01 | | | 5 | 100 | 3 | 2.9 | 3.0 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 4.7 | 5.4 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 6.2 | 8.5 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/7/6-10 | 9076731 | QUMA | bur oak | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 5 | 0.2 | 1.3 | browse on 1,2 |
| | | | *Quercus macrocarpa* | | | 97 | | | 4 | 80 | 6 | 0.8 | 1.3 | |
| | | | Black Hills, SD | | | 98 | | | 4 | 80 | 5 | 1.6 | 2.1 | mod-severe rabbit damage |
| | | | | | | 00 | | | 4 | 80 | 4 | 2.6 | 4.3 | |
| | | | | | | 02 | | | 4 | 80 | 5 | 4.3 | 6.5 | leaf spot |
| | | | | | | 05 | | | 4 | 80 | 5 | 4.8 | 6.9 | acorns, leaf spot on all; top dieback on 5 |
| III/8/1-5 | 9076735 | AEGL | Ohio buckeye | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 4 | 0.2 | 0.6 | |
| | | | *Aesculus glabra* | | | 97 | | | 5 | 100 | 8 | 0.7 | 0.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 5 | 100 | 6 | 0.7 | 1.0 | |
| | | | | | | 00 | | | 5 | 100 | 4 | 1.6 | 1.5 | |
| | | | | | | 02 | | | 5 | 100 | 6 | 1.9 | 1.8 | |
| | | | | | | 05 | | | 5 | 100 | 6 | 1.0 | 1.4 | leaf burns/dieback on all |
| III/8/6-10 | 9076737 | PRSE | black cherry | 1-May | 96 | 96 | PLBR | 5 | 4 | 80 | 3 | 1.0 | 1.9 | |
| | | | *Prunus serotina* | | | 97 | | | 4 | 80 | 4 | 1.9 | 2.2 | |
| | | | Apple Valley FEP | | | 98 | | | 4 | 80 | 3 | 4.3 | 5.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 00 | | | 4 | 80 | 3 | 8.7 | 10.1 | |
| | | | | | | 02 | | | 4 | 80 | 3 | 11.1 | 12.9 | |
| | | | | | | 05 | | | 4 | 80 | 4 | 10.8 | 15.1 | |
| III/9/1-5 | 9082609 | PICEA | Meyer's spruce | 16-May | 01 | 01 | CONT | 5 | 3 | 60 | 5 | 0.8 | 0.7 | |
| | | | *Picea meyeri* | | | 02 | | | 3 | 60 | | 1.0 | 0.9 | |
| | | | Itasca Greenhouse, Cohasset, MN | | | 03 | | | 3 | 60 | | 1.2 | 1.1 | |
| | | | | | | 05 | | | 3 | 60 | 3 | 1.6 | 1.4 | |
| III/9/6-10 | 9076722 | BEPE | European white birch | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 1 | 3.2 | 4.4 | |
| | | | *Betula pendula* | | | 97 | | | 5 | 100 | 2 | 4.6 | 6.1 | |
| | | | Russia | | | 98 | | | 5 | 100 | 1 | 7.5 | 11.1 | |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 5 | 100 | 2 | 12.5 | 17.2 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 10.8 | 20.2 | |
| | | | | | | 05 | | | 5 | 100 | 5 | 9.6 | 20.8 | dead tops on 1, 3, 5 |
| III/10/1-5 | 9082885 | POTR5 | aspen | 20-May | 04 | 04 | PLBR | 5 | 3 | 60 | 4 | 0.7 | 2.1 | |
| | | | *Populus tremuloides* | | | 05 | | | 4 | 80 | 5 | 1.1 | 1.9 | |
| | | | NDFS Nursery, Towner, ND | | | 06 | | | 5 | 100 | | 1.4 | 2.2 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/10/6-10 | 9082633 | FRNI | black ash | 29-Apr | 99 | 99 | | 5 | 5 | 100 | 6 | 0.3 | 0.7 | browse on 4 |
| | | | *Fraxinus nigra* | | | 00 | | | 4 | 80 | 4 | 0.9 | 1.0 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 4 | 80 | 4 | 1.0 | 2.1 | |
| | | | | | | 03 | | | 4 | 80 | 4 | 1.1 | 3.2 | |
| | | | | | | 05 | | | 4 | 80 | 5 | 1.7 | 3.5 | |
| III/11/1-5 | ND-686 | SYREP | Pekin lilac | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 2.3 | 2.9 | |
| | 478008 | | *Syringa reticulata* ssp. *pekinensis* | | | 97 | | | 4 | 80 | 5 | 2.4 | 2.3 | winter damage |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 98 | | | 4 | 80 | 3 | 4.6 | 3.7 | |
| | | | | | | 00 | | | 4 | 80 | 4 | 6.9 | 5.9 | |
| | | | | | | 02 | | | 4 | 80 | | 8.1 | 6.9 | |
| | | | | | | 05 | | | 4 | 80 | 6 | 7.0 | 6.9 | |
| III/11/6-10 | 9076725 | ULCA | smooth bark elm | 1-May | 96 | 96 | PLBR | 5 | 5 | 100 | 3 | 2.6 | 3.1 | |
| | | | *Ulmus carpinifolia* | | | 97 | | | 5 | 100 | 6 | 3.5 | 3.6 | sev. rabbit damage 1,3,4,5 |
| | | | Russia | | | 98 | | | 5 | 100 | 3 | 5.1 | 5.6 | rabbit damage on trunk 3,4 |
| | | | USDA, ARS, Mandan, ND | | | 00 | | | 5 | 100 | 4 | 9.0 | 9.1 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 12.5 | 13.9 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 11.4 | 17.2 | |
| III/12/1-5 | 9082886 | POTR5 | aspen | 20-May | 04 | 04 | PLBR | 5 | 5 | 100 | 4 | 0.8 | 2.0 | |
| | | | *Populus tremuloides* | | | 05 | | | 5 | 100 | 5 | 1.1 | 2.2 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 4 | 80 | | 1.9 | 2.3 | |
| III/13/1-5 | 9082639 | QUEL | northern pin oak | 29-Apr | 99 | 99 | PLBR | 5 | 2 | 40 | 8 | 0.3 | 0.5 | |
| | | | *Quercus ellipsoidalis* | | | 00 | | | 2 | 40 | 6 | 1.1 | 0.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 2 | 40 | 6 | 1.0 | 2.5 | |
| | | | | | | 03 | | | 2 | 40 | 4 | 2.4 | 4.1 | |
| | | | | | | 05 | | | 2 | 40 | ? | 2.3 | 5.6 | leaf galls, army worms/galls |
| III/14/1-5 | 9063152 | BEPL | Japanese birch | 30-Apr | 98 | 98 | CONT(S) | 5 | 3 | 60 | 4 | 0.9 | 1.6 | |
| | | | *Betula platyphylla* | | | 99 | | | 5 | 100 | 4 | 1.5 | 2.9 | browse on 2 |
| | | | NDFS Nursery, Towner, ND | | | 00 | | | 5 | 100 | 4 | 3.4 | 5.7 | |
| | | | | | | 02 | | | 5 | 100 | 3 | 6.4 | 12.6 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 10.9 | 11.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| III/14/6-10 | 9082631 | BEPL | Japanese birch | 7-May | 99 | 99 | PLBR | 5 | 3 | 60 | | 1.5 | 3.5 | |
| | | | *Betula platyphylla* | | | 00 | | | 5 | 100 | 4 | 3.1 | 4.9 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 5 | 100 | 3 | 4.7 | 8.0 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 7.1 | 14.4 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 8.2 | 15.8 | top dying on 4 |
| IV/1/1-5 | 9082610 | LASI | Siberian larch | 30-Apr | 98 | 98 | CONT(S) | 5 | 5 | 100 | 4 | 0.5 | 1.0 | |
| | | | *Larix sibirica* | | | 99 | | | 5 | 100 | 6 | 0.8 | 1.5 | |
| | | | NDFS Nursery, Towner, ND | | | 00 | | | 5 | 100 | 5 | 1.3 | 2.1 | |
| | | | | | | 02 | | | 5 | 100 | 4 | 3.1 | 5.0 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 3.9 | 6.9 | |
| IV/1/6-10 | 9082611 | LASI | Siberian larch | 30-Apr | 98 | 98 | CONT(S) | 5 | 5 | 100 | 3 | 0.5 | 1.2 | |
| | | | *Larix sibirica* | | | 99 | | | 5 | 100 | 6 | 0.7 | 1.4 | |
| | | | NDFS Nursery, Towner, ND | | | 00 | | | 5 | 100 | 5 | 1.0 | 1.6 | |
| | | | | | | 02 | | | 5 | 100 | 5 | 1.8 | 2.7 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 2.4 | 3.7 | |
| IV/2/1-5 | 9069168 | LASI | Siberian larch | 30-Apr | 98 | 98 | CONT(P) | 5 | 1 | 20 | 4 | 0.3 | 1.3 | |
| | | | *Larix sibirica* | | | 99 | | | 4 | 80 | 6 | 0.7 | 1.4 | |
| | | | Russia | | | 00 | | | 4 | 80 | 5 | 1.1 | 1.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 4 | 80 | 4 | 2.6 | 4.0 | |
| | | | | | | 04 | | | 4 | 80 | 4 | 3.2 | 6.6 | |
| IV/2/6-10 | 9069162 | LARIX | Dahurian larch | 30-Apr | 98 | 98 | CONT(P) | 5 | 3 | 60 | 3 | 0.9 | 1.7 | |
| | | | *Larix olgensis* | | | 99 | | | 4 | 80 | 4 | 2.1 | 2.2 | |
| | | | China | | | 00 | | | 5 | 100 | 4 | 2.9 | 3.6 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 3 | 5.4 | 5.9 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 7.0 | 8.1 | chlorotic, no leader on 4, upright new growth on 5 |
| IV/3/1-5 | 9069163 | LARIX | Dahurian larch | 30-Apr | 98 | 98 | CONT(P) | 5 | 0 | 0 | | | | |
| | | | *Larix olgensis* | | | 99 | | | 1 | 20 | 5 | 1.0 | 2.0 | |
| | | | China | | | 00 | | | 4 | 80 | 5 | 1.3 | 2.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 4 | 80 | 5 | 2.6 | 3.8 | |
| | | | | | | 04 | | | 4 | 80 | 6 | 4.2 | 6.8 | |

**Project No.: 38I347K Field Evaluation of Woody Plant Materials, Becker, Minnesota**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| IV/3/6-10 | 9069164 | PISYM | Scots pine | 30-Apr | 98 | 98 | CONT(P) | 5 | 2 | 40 | 4 | 0.6 | 1.0 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 99 | | | 5 | 100 | 4 | 1.3 | 1.8 | |
| | | | China | | | 00 | | | 5 | 100 | 3 | 2.4 | 2.7 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 3 | 5.2 | 6.2 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 7.9 | 10.9 | |
| IV/4/1-5 | 9069172 | PISY | Scots pine | 30-Apr | 98 | 98 | CONT(P) | 5 | 0 | 0 | | | | |
| | | | *Pinus sylvestris* | | | 99 | | | 5 | 100 | 3 | 1.4 | 2.1 | |
| | | | Russia | | | 00 | | | 5 | 100 | 3 | 2.2 | 2.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 3 | 5.1 | 6.2 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 7.7 | 10.9 | |

**OFF-CENTER EVALUATION PLANTINGS: TECHNICAL REPORT – 2006**

Study 38A345K Apple Creek Township, Burleigh County, North Dakota

Study Title: Field Evaluation of Woody Plant Materials

Introduction: There is a need for tree cultivars with superior winter hardiness, growth rate, and resistance to disease and insects for use in field and farmstead windbreaks as well as recreational, wildlife, and beautification plantings. Shrub species are needed to supplement or replace those currently being used for field windbreaks, multiple-row windbreaks and in recreational, wildlife, barrier, and beautification plantings and developments. Many tree and shrub varieties commercially available are not adapted or have characteristics that make them unsuitable for use in the Northern Great Plains. The Apple Valley site serves as the new central or initial screening location for any and all new woody materials that come through the plant materials evaluation system at Bismarck.

Objective: The objective is to assemble and evaluate woody plant materials for conservation use in the Northern Great Plains. The goal of this and other OCEPs is to provide, under uniform culture and management, a diversity of long-term testing locations for the comparative field evaluation of new cultivars, standards, and promising accessions obtained from local, regional, and foreign sources.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the USDI Fish and Wildlife Service.

Location: Waterfowl Production Area, approximately 5 miles east and 1 mile south of Bismarck, North Dakota, on Old Highway 10. Legal Description: N 1/2 sec. 1, T. 138 N., R.79 W.; S ½ sec. 31, T. 139N., R. 78 W.

Major Land Resource Area: The site is located in Major Land Resource Area 53B, Central Dark Brown Glaciated Plains. Most soils are derived from calcareous glacial till. Elevation is 1,500 to 3,000 feet. The gently rolling plain includes some areas of kames and moraines that have irregular topography. Forty percent of the area is rangeland.

Soils: There are four different soils mapping units in the planting area:

RoA - Roseglen silt loam, 0 to 3 percent slope.
PaA - Parshall, fine sandy loam or sandy loam, 0 to 3 percent slope.
TeC, TeA - Telfer fine sandy loams or sandy loam, 3 to 6 percent slope.
Ty, Tyl – Tally fine sandy loam or sandy loam, 0 to 3 percent slope.

The Roseglen series consists of deep, moderately well-drained soils formed in loamy sediments on glacial lake plains. The surface layer is dark grayish-brown silt loam 8 inches thick. The subsoil is dark grayish-brown and grayish-brown silt loam 26 inches thick. The substratum is light yellowish-brown and light brownish-gray silt loam. Permeability is moderate. Available water capacity, the organic matter content, and fertility are high. Slopes are 0-9 percent. These soils are in North Dakota windbreak suitability group 1.

The Parshall series consists of deep, well-drained soils formed in fine sandy loam alluvium on terraces and outwash plains and in upland swales. The surface layer is dark grayish-brown fine sandy loam 14 inches thick. The subsoil is dark grayish-brown, very friable fine sandy loam in the upper 17 inches and grayish-brown fine sandy loam in the lower 6 inches. The underlying material is light brownish-gray fine sandy loam in the upper 12 inches and grayish-brown sandy loam buried surface layer in the lower 13 inches. Permeability is moderately rapid. The available water capacity is moderate. The organic matter content is

high and fertility is medium. Slopes are 0-15 percent. These soils are in North Dakota windbreak suitability group 5.

The Telfer series consists of deep, excessively and somewhat excessively drained soils formed in sandy sediments in terraces and uplands. The surface layer is dark grayish-brown loamy sand 6 inches thick. The next 8 inches is grayish-brown fine sand. The underlying material is light olive brown fine sand. Permeability is rapid. Available water capacity is low. Organic matter content is moderate and fertility is low. Slopes are 0-20 percent. These soils are in North Dakota windbreak suitability group 7.

The Tally series consists of deep, well-drained soils that formed in material derived from eolian deposits, alluvium, or glacial outwash material. These soils are on terraces, fans, and foot slopes of hills in uplands. The upper 14 inches is a dark brown sandy loam. The next horizons, down to 38 inches, are a brown sandy loam. These soils are in North Dakota windbreak suitability group 5.

Climate: MLRA 53B. The average annual precipitation is 15 to 18 inches; highest in the growing season. Rainfall is low and somewhat erratic. The average annual temperature is 40 to 60 degrees F. Average freeze-free period is 105 to 140 days. The plant hardiness zone is 3b with an average annual minimum temperature of -40 to -30 degrees F. For the 2006 weather summary at Bismarck, see Table AV-1.

Assembly: Refer to Table AV-2 for a list of woody species planted from 1997-2006.

Planting Plan: These plots are not randomized or replicated but are organized in a systematic design for evaluation and demonstration purposes (see Figure AV-1). There are 4 blocks prepared. Block I is for shrubs; Block II is for small trees; Block III is primarily conifers; and Block IV is tall trees. Fallow strips are rototilled one year before planting. All trees are planted by hand.

Planting Date: Refer to Table AV-2 for planting dates of woody species planted from 1997-2006.

Weed Control: 1997-2006: Grass strips between rows were kept mowed and mechanical cultivation was performed within the rows. Hand hoeing was done as needed. Pendimethalin herbicide was applied on April 26, 2006.

Plot Maintenance: 1997-2006: Pruning was done as needed to remove dead and broken limbs. Dead trees were removed. A few trees have had cages constructed around them to stop deer rubbing. During extended dry spells, water was hauled from Bismarck and applied to some of the smallest trees.

Evaluation and Measurements: 1998-2006: Plant performance data is recorded on one or more accessions during the growing season for three years. After the third year, data is gathered according to a specific schedule. Records of planting date, survival, vigor, fruit (seed) amount, canopy width, plant height, winter injury, disease symptoms, and insect damage have been maintained since 1998. Select data appears in this report. Additional information can be requested from the PMC.

## Results

Plant Performance: This site currently contains 64 species, with a total of 82 different accessions.

**Figure AP-1. APPLE VALLEY WOODY FIELD EVALUATION PLANTING**


| | BLOCK 1 SHRUBS | | BLOCK 2 MEDIUM TREES | | |
|---|---|---|---|---|---|
| 1 | 'Sakakawea'\|'Legacy'\|'Scarlet'\|'Prairie Red' | | 'McDermand'\|'Midwest'\|'Homestead'\|'Survivor' | 'Silver Sands' 9082678 leadplant | 1 |
| 2 | 384493 bearberry honeysuckle | 9076749 juniper \| 9082724 buffaloberry | 9076748 tat.maple\|Russ. almond | 9019593 juniper \| 9082726 beaked hazel | 2 |
| 3 | 9082615 pale dogwood | \|9082651 skunkbush sumac | 9063120 Ohio buckeye | 9082638 western blue elderberry | 3 |
| 4 | 9082647 Bud's yellow dogwood | 9082623 Mongolian peashrub | 9082642 wayfaring tree | 9008183 chokecherry \| 9091976 arrowwood | 4 |
| 5 | 9082648 spoil ax | 9019622 spoil ax | 9082649 nannyberry | ND-624 hoptree | 5 |
| 6 | 9082663 little leaf peashrub | 9082676 rose peashrub | 'Viking' chokeberry\| serviceberry | 9091978 white poplar \| 9082667 gray birch | 6 |
| 7 | 9082673 three leaf sumac | 9082653 skunkbush sumac | 'Nero' chokeberry\| pin cherry | \|9076746 Ohio buckeye | 7 |
| 8 | 9082685 redleaf rose | 9057406 rugosa rose | 9082746 Missouri gooseberry | 9091971 chokeberry \| 9091977 chokeberry | 8 |
| 9 | 9082687 American currant | 9091969 Russian pea shrub | 9082738 gray dogwood | 9082711 winterberry | 9 |
| 10 | 9092054 Silverscape | 9082747 American cranberry | 'Freedom' honeysuckle\|r.l. hawthorn | common ninebark\| | 10 |
| 11 | | | Am. hazelnut\|seaberry | Amur chokecherry\|gray dogwood\|chokeberry | 11 |
| Row | 200 ft | | 200 ft | | Row |
| | **BLOCK 3 TALL TREES** | | **BLOCK 4 TALL TREES** | | |
| 1 | 'Oahe'\|'Cardan'\| | \| bittersweet | | | 1 |
| 2 | 'Hunter' ponderosa pine | 9063156 Scots pine | | 9063152 Japanese birch | 2 |
| 3 | 9069162 Dahurian larch | 9082611 Siberian larch | 9069177 bur oak | 9076739 hybrid oak | 3 |
| 4 | 9082610 Siberian larch | 9069168 Siberian larch | 9069170 English oak | | 4 |
| 5 | 9069163 Dahurian larch | 9069164 Scots pine | 9082636 black cottonwood | 9076737 black cherry | 5 |
| 6 | 9076718 Scots pine | 9069173 Scots pine | 9082886 aspen | 9082885 aspen | 6 |
| 7 | 9076719 Scots pine | 9069178 red pine | 9082631 Japanese birch | 9082650 Soongarica poplar | 7 |
| 8 | 9082889 mugo pine | 'Bridger-Select' juniper | 9082713 Siberian peach | 9091968 Kentucky coffeetree | 8 |
| 9 | 9069169 Siberian pine | ND-500 Siberian larch | 9082619 green ash | ND-614 Kentucky coffeetree | 9 |

revised 6/06

**Table No. 1: 2006 Weather Summary - Official Station - Bismarck, North Dakota**

| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) Actual | | Deviation from Normal |
|---|---|---|---|---|---|---|
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 26.8 | 10.2 | | 0.18 | 0.45 | -0.27 |
| February | 20.1 | 18.1 | | 0.20 | 0.51 | -0.31 |
| March | 31.4 | 29.7 | | 0.54 | 0.85 | -0.31 |
| April | 49.8 | 43.3 | | 0.73 | 1.46 | -0.73 |
| May | 57.5 | 56.0 | | 1.77 | 2.22 | -0.45 |
| June | 67.8 | 64.7 | | 0.83 | 2.59 | -1.76 |
| July | 77.2 | 70.4 | | 0.58 | 2.58 | -2.00 |
| August | 71.6 | 69.0 | | 2.50 | 2.15 | 0.35 |
| September | 57.0 | 57.7 | | 1.74 | 1.61 | 0.13 |
| October | 41.5 | 45.2 | | 1.11 | 1.28 | -0.17 |
| November | 29.8 | 28.0 | | 0.09 | 0.70 | -0.61 |
| December | 23.4 | 15.2 | | 0.83 | 0.44 | 0.39 |
| **Annual** | **46.2** | **42.3** | | **11.10** | **16.84** | **-5.74** |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |

| | 2006 |
|---|---|
| Last Frost (28 degrees) | 12-May |
| First Frost (28 degrees) | 28-Sep |
| Frost Free Period | 138 days |

**Key to Table AV-2. 38A345K Field Evaluation of Woody Plant Materials – Apple Valley, North Dakota**

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table AV-2.**
**Project No.: 38A345K Field Evaluation of Woody Plant Materials, Apple Valley, ND**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/2/1-5 | 384493 | LOCA | bearberry honeysuckle | 6-May | 98 | 98 | CONT | 5 | 5 | 100 | 4 | 1.4 | 0.7 | |
| | | | *Lonicera caerulea* | | | 99 | | | 5 | 100 | 4 | 1.4 | 0.7 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 00 | | | 5 | 100 | 3 | 1.8 | 0.9 | |
| | | | | | | 02 | | | 4 | 80 | 5 | 1.6 | 0.9 | |
| | | | | | | 04 | | | 4 | 80 | 4 | 1.9 | 1.0 | |
| 1/2/6-8 | 9076749 | JUNIP | juniper | 6-May | 98 | 98 | CONT | 3 | 3 | 100 | 2 | 1.3 | 0.7 | |
| | | | *Juniperus* sp. | | | 99 | | | 3 | 100 | 2 | 2.8 | 0.7 | |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 00 | | | 3 | 100 | 2 | 3.6 | 0.9 | |
| | | | | | | 02 | | | 3 | 100 | 1 | 6.1 | 0.6 | |
| | | | | | | 04 | | | 3 | 100 | 1 | 4.9 | 0.8 | |
| 1/2/09 | 9082724 | SHAR | buffaloberry | 13-May | 02 | 02 | CONT | 3 | 1 | 33 | 7 | 0.2 | 0.5 | |
| | | | *Shepherdia argentea* | | | 03 | | | 1 | 33 | 4 | 0.6 | 1.8 | |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 04 | | | 1 | 33 | 3 | 1.0 | 1.8 | transplanted May 20, 2005 |
| | | | | | | 06 | | | 1 | 33 | 3 | 1.0 | 2.2 | |
| 1/3/1-5 | 9082615 | COAMO | pale dogwood | 29-May | 98 | 98 | CONT | 5 | 5 | 100 | 5 | 0.9 | 1.5 | 1-3 browsed |
| | | | *Cornus amomum* ssp. *obliqua* | | | 99 | | | 5 | 100 | 3 | 2.1 | 2.0 | 1-3 browsed |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 00 | | | 5 | 100 | 3 | 4.1 | 3.0 | |
| | | | | | | 02 | | | 3 | 60 | 3 | 4.3 | 4.2 | |
| | | | | | | 04 | | | 3 | 60 | 4 | 4.0 | 3.8 | dieback on all |
| 1/3/7-10 | 9082651 | RHTR | skunkbush sumac | 20-May | 05 | 05 | CONT | 4 | 4 | 100 | 3 | 2.4 | 1.6 | |
| | | | *Rhus trilobata* | | | 06 | | | 4 | 100 | 4 | 2.3 | 1.5 | |
| | | | N. Cave Hills, SD | | | | | | | | | | | |
| 1/4/1-5 | 9082647 | COSES | Bud's yellow dogwood | 12-May | 99 | 99 | CONT | 5 | 4 | 80 | 4 | 1.1 | 1.6 | 1 browsed |
| | | | *Cornus sericea* ssp. *sericea* | | | 00 | | | 4 | 80 | 3 | 2.4 | 2.8 | |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 01 | | | 4 | 80 | 4 | 2.6 | 2.3 | winter damage |
| | | | | | | 03 | | | 3 | 60 | 4 | 2.8 | 2.5 | 1 mostly dead |
| | | | | | | 05 | | | 2 | 40 | 6 | 2.8 | 2.0 | lots of dead stems on 5 |

**Project No.: 38A345K Field Evaluation of Woody Plant Materials, Apple Valley, ND**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/4/6-10 | 9082632 | CAIN | Mongolian peashrub | 18-May | 99 | 99 | PLBR | 5 | 5 | 80 | 4 | 1.2 | 1.4 | |
| | | | *Caragana intermedia* | | | 00 | | | 4 | 80 | 3 | 2.4 | 2.5 | |
| | | | Lawyer Nursery, Plains, MT | | | 01 | | | 2 | 40 | 2 | 4.1 | 3.4 | |
| | | | | | | 04 | | | 2 | 40 | 2 | 8.3 | 5.9 | |
| | | | | | | 05 | | | 2 | 40 | 2 | 9.8 | 6.2 | |
| 1/5/1-5 | 9082648 | SESU | spoilax | 14-May | 99 | 99 | CONT | 5 | 5 | 80 | 4 | 1.2 | 1.5 | |
| | | | *Securinga suffruticosa* | | | 00 | | | 5 | 100 | 3 | 2.8 | 2.6 | |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 01 | | | 5 | 100 | 3 | 4.0 | 3.0 | |
| | | | | | | 03 | | | 5 | 100 | 2 | 6.4 | 4.5 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 7.1 | 4.9 | nice yellow fall color many seed pods |
| 1/5/6-10 | 9019622 | SESU | spoilax | 14-May | 99 | 99 | CONT | 5 | 5 | 100 | 4 | 1.0 | 1.2 | |
| | | | *Securinga suffruticosa* | | | 00 | | | 5 | 100 | 4 | 2.2 | 2.2 | |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 01 | | | 5 | 100 | 5 | 2.7 | 2.2 | |
| | | | NDG&F Dept., McKenzie GMA, McKenzie, ND | | | 03 | | | 4 | 80 | 4 | 4.8 | 3.8 | |
| | | | | | | 05 | | | 4 | 80 | 4 | 6.7 | 4.4 | nice yellow fall color |
| 1/6/1-5 | 9082663 | CAMI | little leaf peashrub | 8-May | 00 | 00 | PLBR | 5 | 5 | 100 | 4 | 1.5 | 1.4 | |
| | | | *Caragana microphylla* | | | 01 | | | 5 | 100 | 4 | 1.8 | 1.8 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 5 | 100 | 4 | 1.8 | 1.8 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 5.7 | 4.5 | |
| | | | | | | 06 | | | 5 | 100 | 2 | 7.5 | 5.5 | |
| 1/6/6-10 | 9082676 | CARO | rose peashrub | 8-May | 00 | 00 | CONT | 5 | 5 | 100 | 5 | 2.0 | 2.5 | |
| | | | *Caragana rosea* | | | 01 | | | 3 | 60 | 3 | 2.8 | 3.2 | |
| | | | P.I. Station, Ames, IA | | | 02 | | | 3 | 60 | 4 | 3.5 | 3.4 | |
| | | | | | | 04 | | | 3 | 60 | 4 | 4.9 | 3.9 | dieback on 2 |
| | | | | | | 05 | | | 3 | 60 | 4 | 5.2 | 4.2 | |
| 1/7/1-5 | 9082673 | RHTR | three leaf sumac | 25-Apr | 00 | 00 | PLBR | 5 | 5 | 100 | 3 | 1.8 | 2.4 | |
| | | | *Rhus trilobata* | | | 01 | | | 5 | 100 | 4 | 2.9 | 2.8 | |
| | | | Lewis and Clark County, MT | | | 02 | | | 5 | 100 | 3 | 4.9 | 3.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 4 | 5.2 | 3.9 | slight dieback on 1,2,3 |
| | | | | | | 06 | | | 5 | 100 | 3 | 6.8 | 4.3 | |

**Project No.: 38A345K Field Evaluation of Woody Plant Materials, Apple Valley, ND**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1/7/6-10 | 9082653 | RHTR | skunkbush sumac | 12-May | 03 | 03 | CONT | 5 | 5 | 100 | 3 | 1.5 | 1.3 | |
| | | | *Rhus trilobata* | | | 04 | | | 5 | 100 | 3 | 2.5 | 1.8 | |
| | | | Harding Co., SD | | | 05 | | | 5 | 100 | 3 | 4.4 | 2.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | | | | | | | | | |
| 1/8/1-5 | 9082685 | RORU | redleaf rose | 23-May | 01 | 01 | PLBR | 5 | 4 | 80 | 4 | 1.8 | 1.9 | |
| | | | *Rosa rubrifolia* | | | 02 | | | 4 | 80 | 4 | 2.3 | 1.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 4 | 80 | 3 | 3.2 | 2.8 | |
| | | | | | | 05 | | | 4 | 80 | 7 | 2.4 | 2.1 | many dead stems |
| 1/8/6-10 | 9057406 | RORU | rugosa rose | 23-May | 01 | 01 | PLBR | 5 | 5 | 100 | 5 | 1.4 | 1.4 | |
| | | | *Rosa rugosa* | | | 02 | | | 5 | 100 | 5 | 2.1 | 1.1 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 03 | | | 5 | 100 | 3 | 2.9 | 1.5 | |
| | | | | | | 05 | | | 3 | 60 | 4 | 2.3 | 1.9 | |
| 1/9/1-5 | 9082687 | RIAM | American currant | 24-May | 01 | 01 | PLBR | 5 | 3 | 60 | 5 | 0.9 | 0.8 | |
| | | | *Ribes americanum* | | | 02 | | | 3 | 60 | 6 | 1.3 | 1.5 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 03 | | | 5 | 100 | 4 | 1.8 | 1.5 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 3.7 | 2.0 | |
| 1/9/6-10 | 9091969 | CAFR80 | Russian peashrub | 20-May | 05 | 05 | PLBR | 5 | 5 | 100 | 5 | 0.7 | 2.7 | |
| | | | *Caragana frutex* | | | 06 | | | 5 | 100 | 4 | 0.8 | 2.6 | some dieback on 4,5 |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| 1/10/1-5 | 'Silverscape' | ELAEA | Russian olive/silverberry hybrid | 17-May | 06 | 06 | POTD | 5 | 1 | 20 | 6 | 0.3 | 1.0 | |
| | | | *Elaeagnus X* 'Jefmorg' | | | | | | | | | | | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 1/10/6-10 | 9082747 | VIOPA2 | American cranberrybush | 15-May | 06 | 06 | | 5 | 0 | 0 | | | | all dead, drought |
| | | | *Viburnum opulus* var. *americanum* | | | | | | | | | | | |
| 2/1 | 9082678 | AMCA6 | leadplant | 15-May | 02 | 02 | PLBR | 5 | 3 | 60 | 5 | 0.7 | 0.8 | |
| | | | *Amorpha canescens* | | | 03 | | | 5 | 100 | 5 | 1.1 | 1.1 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 04 | | | 4 | 80 | 4 | 1.8 | 1.5 | |
| | | | | | | 06 | | | 4 | 80 | 4 | 2.6 | 2.1 | |

**Project No.: 38A345K Field Evaluation of Woody Plant Materials, Apple Valley, ND**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/2/1-3 | 9076748 | ACTAG | tatarian maple | May | 97 | 98 | CONT | 3 | 3 | 100 | 3 | 1.4 | 1.8 | |
| | | | *Acer tataricum* ssp. *ginnala* | | | 99 | | | 3 | 100 | 3 | 2.4 | 2.1 | nice red leaf color |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 00 | | | 3 | 100 | 3 | 3.1 | 3.6 | |
| | | | | | | 02 | | | 3 | 100 | 3 | 4.7 | 4.3 | some dieback |
| | | | | | | 04 | | | 3 | 100 | 3 | 5.2 | 5.3 | |
| | | | | | | 06 | | | 3 | 100 | 3 | 4.9 | 5.1 | nice leaf color 1,2; some dieback 3 |
| 2/2/4-8 | 9082884 | PRTE5 | Russian almond | May | 04 | 04 | CONT | 5 | 2 | 40 | 4 | 0.8 | 1.2 | several suckers, |
| | | | *Prunus tenella* | | | 05 | | | 4 | 80 | 5 | 0.9 | 0.9 | only a few leaves |
| | | | USDA, ARS, P.I. Station, Ames, IA | | | 06 | | | 4 | 80 | 4 | 1.1 | 1.1 | |
| 2/2/9-11 | 9019593 | JUCO6 | common juniper | 17-May | 06 | 06 | CONT | 3 | 3 | 100 | 3 | 1.0 | 0.8 | |
| | | | *Juniperus communis* | | | | | | | | | | | |
| | | | Wilton Mine, ND/McKenzie FEP | | | | | | | | | | | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | | | | | | | | | |
| 2/2/11-13 | 9082726 | COCO6 | beaked hazel | 15-May | 02 | 02 | PLBR | 3 | 2 | 67 | 6 | 0.5 | 1.5 | |
| | | | *Corylus cornuta* | | | 03 | | | 2 | 67 | 6 | 0.7 | 0.8 | |
| | | | Bottineau Co., ND | | | 04 | | | 1 | 33 | 5 | 1.0 | 1.0 | some dieback |
| | | | | | | 06 | | | 2 | 67 | 4 | 0.9 | 1.0 | some dieback |
| 2/3/1-5 | 9063120 | AEGL | Ohio buckeye | 12-May | 99 | 99 | CONT | 5 | 3 | 60 | 4 | 0.7 | 1.3 | |
| | | | *Aesculus glabra* | | | 00 | | | 4 | 80 | 4 | 0.5 | 1.3 | |
| | | | Ransom County, ND | | | 01 | | | 3 | 60 | 5 | 0.5 | 1.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 03 | | | 2 | 40 | 4 | 2.0 | 2.7 | |
| | | | | | | 05 | | | 2 | 40 | 4 | 3.5 | 4.1 | |
| 2/3/6-10 | 9082638 | SACE | western blue elderberry | 18-May | 99 | 99 | PLBR | 5 | 5 | 100 | 2 | 2.0 | 1.9 | |
| | | | *Sambucus cerulea* | | | 00 | | | 5 | 100 | 3 | 4.7 | 4.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 5 | 100 | 3 | 5.2 | 4.1 | |
| | | | | | | 03 | | | 5 | 100 | 2 | 7.8 | 7.4 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 9.0 | 8.7 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/4/1-5 | 9082642 | VILA | wayfaring tree | 18-May | 99 | 99 | PLBR | 5 | 5 | 100 | 4 | 0.9 | 1.2 | |
| | | | *Viburnum lantana* | | | 00 | | | 3 | 100 | 3 | 2.0 | 2.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 5 | 100 | 4 | 2.6 | 2.6 | |
| | | | | | | 03 | | | 5 | 100 | 4 | 3.4 | 2.7 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 3.9 | 3.6 | |
| 2/4/6-10 | 9008183 | PRVI | chokecherry | 20-May | 05 | 05 | PLBR | 5 | 5 | 100 | 3 | 0.9 | 2.1 | |
| | | | *Prunus virginiana* | | | 06 | | | 5 | 100 | 4 | 1.4 | 2.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 2/4/11-15 | 9091976 | VIDE | Arrowwood viburnum | 20-May | 05 | 05 | PLBR | 5 | 5 | 100 | 3 | 0.8 | 1.9 | 1 has some suckers, |
| | | | *Viburnum dentatum* | | | 06 | | | 4 | 80 | 6 | 0.8 | 1.2 | 5 has a couple of suckers |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 2/5/1-5 | 9082649 | VILE | nannyberry | 18-May | 99 | 99 | CONT | 5 | 5 | 100 | 4 | 0.9 | 1.3 | 1 has mildew on leaves |
| | | | *Viburnum lentago* | | | 00 | | | 5 | 100 | 4 | 1.1 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 5 | 100 | 3 | 1.6 | 2.6 | |
| | | | | | | 03 | | | 5 | 100 | 3 | 3.5 | 4.2 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 4.0 | 4.7 | |
| 2/5/6-10 | 9006094 | PTTR | wafer ash | 18-May | 99 | 99 | PLBR | 5 | 5 | 100 | 4 | 0.8 | 1.8 | |
| | | | *Ptelea trifoliata* | | | 00 | | | 5 | 100 | 4 | 2.0 | 3.4 | 4 broke off |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 01 | | | 5 | 100 | 4 | 3.3 | 4.3 | |
| | | | | | | 03 | | | 5 | 100 | 4 | 4.4 | 5.2 | dead stems on all |
| | | | | | | 05 | | | 5 | 100 | 4 | 5.5 | 5.4 | sprouts 4; diff. form on 5 |
| 2/6/1-5 | 'Viking' | PHME13 | chokeberry | 13-May | 02 | 02 | PLBR | 5 | 4 | 80 | 5 | 1.3 | 1.3 | |
| | 9082720 | | *Photinia melanocarpa* | | | 03 | | | 4 | 80 | 4 | 1.7 | 1.6 | |
| | | | Northwoods Nurs., Mollala, OR | | | 04 | | | 4 | 80 | 4 | 2.3 | 1.9 | 2 spreading out, 3 browsed |
| | | | | | | 06 | | | 4 | 80 | 2 | 3.2 | 2.9 | some deer browse 3,4 |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/6/5-9 | 9091975 | AMLA | serviceberry | 20-May | 05 | 05 | PLBR | 5 | 3 | 60 | 5 | 0.8 | 1.5 | 1,2 poor, not recorded |
| | | | *Amelanchier lamarckii* | | | 06 | | | 5 | 100 | 5 | 0.8 | 1.4 | dieback 3,4 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| 2/6/6-10 | 9082667 | BEPO | gray birch | 8-May | 00 | 00 | PLBR | 5 | 3 | 60 | 3 | 1.3 | 3.7 | |
| | | | *Betula populifera* | | | 01 | | | 2 | 40 | 4 | 1.6 | 3.0 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 2 | 40 | 4 | 2.0 | 2.3 | |
| | | | | | | 04 | | | 2 | 40 | 5 | 4.2 | 4.2 | |
| | | | | | | 06 | | | 2 | 40 | 6 | 5.4 | 5.4 | multiple stemmed |
| 2/6/10-12 | 9091978 | POAL7 | white poplar | 20-May | 05 | 05 | CONT | 3 | 3 | 100 | 3 | 1.8 | 3.7 | deer rub |
| | | | *Populus alba* | | | 06 | | | 3 | 100 | 4 | 2.7 | 3.3 | multiple stems on all plants |
| | | | ARS, Ames, IA | | | | | | | | | | | |
| 2/7/1-5 | 'Nero' | PHME13 | chokeberry | 13-May | 02 | 02 | PLBR | 5 | 4 | 80 | 6 | 0.9 | 1.2 | |
| | 9082719 | | *Photinia melanocarpa* | | | 03 | | | 3 | 60 | 4 | 1.3 | 1.7 | |
| | | | Northwoods Nursery, Mollala, OR | | | 04 | | | 3 | 60 | 4 | 1.8 | 1.7 | 1 browsed, 3 some fruit |
| | | | | | | 06 | | | 2 | 40 | 4 | 2.8 | 2.6 | |
| 2/7/5-9 | 9091967 | PRPE2 | pin cherry | 20-May | 05 | 05 | PLBR | 5 | 5 | 100 | 4 | 0.8 | 1.9 | |
| | | | *Prunus pensylvanica* | | | 06 | | | 5 | 100 | 4 | 1.7 | 2.2 | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| 2/7/6-10 | 9076746 | AEGL | Ohio buckeye | 8-May | 00 | 00 | CONT | 5 | 4 | 80 | 4 | 0.3 | 1.2 | |
| | | | *Aesculus glabra* | | | 01 | | | 4 | 80 | 5 | 0.3 | 1.1 | |
| | | | Ransom County, ND | | | 02 | | | 3 | 60 | 8 | 0.3 | 1.4 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 04 | | | 3 | 60 | 4 | 1.5 | 1.8 | |
| | | | | | | 06 | | | 3 | 60 | 5 | 1.4 | 2.7 | |
| 2/8/1-5 | 9082746 | RIMI | Missouri gooseberry | 2-May | 03 | 03 | | 5 | 5 | 100 | 3 | 1.7 | 1.8 | |
| | | | *Ribes missouriense* | | | 04 | | | 5 | 100 | 3 | 2.7 | 2.0 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 05 | | | 5 | 100 | 3 | 2.9 | 2.5 | |
| 2/8/6-10 | 9091971 | PHME13 | chokeberry | 20-May | 05 | 05 | PLBR | 5 | 5 | 100 | 4 | 1.5 | 1.7 | fairly upright stems |
| | | | *Photinia melanocarpa* | | | 06 | | | 5 | 100 | 4 | 1.8 | 1.8 | |
| | | | Bailey Nursery, St. Paul, MN | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/8/11-15 | 'Morton' | PHME13 | chokeberry | 20-May | 05 | 05 | CONT | 5 | 5 | 100 | 4 | 1.8 | 1.6 | sprawling growth form |
| | 9091977 | | *Photinia melanocarpa* | | | 06 | | | 5 | 100 | 4 | 1.6 | 1.5 | a few berries on 3 |
| | | | USDA, ARS, Ames, IA | | | | | | | | | | | |
| 2/9/1-5 | 9082738 | CORA6 | gray dogwood | 2-May | 03 | 03 | PLBR | 5 | 5 | 100 | 5 | 0.8 | 1.5 | |
| | | | *Cornus racemosa* | | | 04 | | | 5 | 100 | 5 | 1.0 | 1.3 | slight dieback on all |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 05 | | | 4 | 80 | 6 | 1.0 | 1.3 | some dieback on 5 |
| 2/9/6-10 | 9082711 | EUBU6 | winterberry euonymus | 23-May | 02 | 02 | PLBR | 5 | 5 | 100 | 7 | 0.8 | 2.0 | 3 has new little leaves |
| | | | *Euonymus bungeanum* | | | 03 | | | 5 | 100 | 5 | 1.0 | 2.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 3 | 1.6 | 2.7 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 3.6 | 3.8 | |
| 2/10/1-5 | 'Freedom' | LOKO | honeysuckle | 12-May | 03 | 03 | | 5 | 5 | 100 | 4 | 2.4 | 2.3 | |
| | 9057424 | | *Lonicera korolkowii* | | | 04 | | | 4 | 80 | 3 | 3.5 | 2.7 | |
| | | | University of Minnesota, St. Paul, MN | | | 05 | | | 4 | 80 | 3 | 3.1 | 3.4 | |
| 2/10/6-10 | 9076686 | CRCH | roundleaf hawthorn | 6-May | 04 | 04 | PLBR | 5 | 4 | 80 | 7 | 3.0 | 0.5 | |
| | | | *Crataegus chrysocarpa* | | | 05 | | | 3 | 60 | 6 | 0.6 | 1.0 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 4 | 1.0 | 1.4 | |
| 2/10/11-16 | 9082891 | PHOP | common ninebark | 6-May | 04 | 04 | PLBR | 5 | 4 | 80 | 4 | 1.1 | 1.6 | |
| | | | *Physocarpus opulifolius* | | | 05 | | | 3 | 60 | 5 | 1.1 | 1.1 | grass coming into plot |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 3 | 60 | 4 | 1.1 | 1.1 | |
| 2/11/1-5 | 9082888 | COAM3 | American hazelnut | 6-May | 04 | 04 | PLBR | 5 | 5 | 100 | 4 | 0.7 | 0.8 | |
| | | | *Corylus americana* | | | 05 | | | 4 | 80 | 6 | 0.4 | 0.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 4 | 80 | 7 | 0.4 | 0.4 | |
| 2/11/6-10 | 9082887 | HIRH80 | seaberry | 6-May | 04 | 04 | PLBR | 5 | 5 | 100 | 5 | 0.6 | 1.4 | 4 is browsed |
| | | | *Hippophae rhamnoides* | | | 05 | | | 3 | 60 | 5 | 1.0 | 1.6 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 4 | 80 | 3 | 1.9 | 2.6 | some dieback 2 |
| 2/11/11-15 | 9082853 | PRMA9 | Amur chokecherry | 6-May | 04 | 04 | PLBR | 5 | 2 | 40 | 4 | 0.8 | 1.0 | dieback on both |
| | | | *Prunus maackii* | | | 05 | | | 3 | 60 | 3 | 0.9 | 1.8 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 4 | 80 | 4 | 1.1 | 2.1 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2/11/16-20 | 9082890 | CORA6 | gray dogwood | 6-May | 04 | 04 | | 5 | 5 | 100 | 4 | 0.8 | 1.6 | |
| | | | *Cornus racemosa* | | | 05 | | | 4 | 80 | 6 | 0.4 | 0.8 | serious dieback on 1 |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 0 | 0 | | | | very poor condition |
| 2/11/16-20 | 323957 | PHME13 | black chokeberry | 23-May | 06 | 06 | PLBR | 5 | 5 | 100 | 4 | 1.1 | 1.2 | |
| | | | *Photinia melanocarpa* | | | | | | | | | | | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| 3/1 | 9082712 | CESC | bittersweet | 23-May | 02 | 02 | | 5 | 5 | 100 | 5 | 1.0 | 1.0 | |
| | | | *Celastrus scandens* | | | 03 | | | 4 | 80 | 4 | 0.9 | 1.3 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 4 | 80 | 3 | 1.6 | 1.5 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 2.8 | 2.5 | |
| 3/2/1-5 | 9081843 | PIPO | ponderosa pine | 16-May | 05 | 05 | CONT | 5 | 5 | 100 | 3 | 0.7 | 1.0 | |
| | 'Hunter' | | *Pinus ponderosa* | | | 06 | | | 5 | 100 | 3 | 1.2 | 1.4 | multiple leader on 3 |
| | | | USDA, NRCS, PMC, Bridger, MT | | | | | | | | | | | |
| 3/2/6-10 | 9063156 | PISYM | Scots pine | May | 97 | 98 | CONT | 5 | 5 | 100 | 2 | 1.6 | 2.0 | double leader on 3,5 |
| | | | *Pinus sylvestris* var. *mongolica* | | | 99 | | | 5 | 100 | 3 | 2.4 | 2.4 | deer damage on 1; 4 caged |
| | | | PRC, Bayan Co., Heishan Forest Farm | | | 00 | | | 5 | 100 | 3 | 3.3 | 3.6 | |
| | | | | | | 02 | | | 5 | 100 | 2 | 5.0 | 6.4 | deer damage 2, poor form 5 |
| | | | | | | 04 | | | 5 | 100 | 2 | 6.4 | 9.0 | |
| | | | | | | 06 | | | 5 | 100 | 2 | 9.3 | 11.7 | |
| 3/3/1-5 | 9069162 | LAOL | Dahurian larch | May | 98 | 98 | CONT | 5 | 4 | 80 | 4 | 0.7 | 1.2 | |
| | | | *Larix olgensis* | | | 99 | | | 5 | 100 | 3 | 1.2 | 1.9 | |
| | | | PRC, An-Tu Co., Ji-lin Province | | | 00 | | | 5 | 100 | 2 | 2.8 | 4.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 4 | 3.4 | 3.4 | dieback 2,5; two leaders 3 |
| | | | | | | 04 | | | 5 | 100 | 5 | 4.1 | 3.9 | deer damage 4 trees all broke off by cows |
| 3/3/6-10 | 9082611 | LASI | Siberian larch | 6-May | 98 | 98 | CONT | 5 | 4 | 80 | 4 | 0.7 | 1.2 | |
| | | | *Larix sibirica* | | | 99 | | | 4 | 80 | 4 | 1.1 | 1.5 | |
| | | | Minusinsk, Khakaskaya Obl., Siberia | | | 00 | | | 5 | 100 | 4 | 1.2 | 1.8 | |
| | | | USDA, ARS, Mandan, ND/NDFS Nursery, Towner, ND | | | 02 | | | 4 | 80 | 5 | 1.8 | 1.6 | |
| | | | | | | 04 | | | 5 | 100 | 5 | 1.6 | 2.2 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/4/1-5 | 9082610 | LASI | Siberian larch | 6-May | 98 | 98 | CONT | 5 | 5 | 100 | 4 | 0.7 | 1.3 | |
| | | | *Larix sibirica* | | | 99 | | | 5 | 100 | 4 | 1.1 | 1.8 | |
| | | | East Kazakhstan | | | 00 | | | 5 | 100 | 4 | 1.2 | 2.1 | |
| | | | USDA, ARS, Mandan, ND/NDFS Nursery, Towner, ND | | | 02 | | | 5 | 100 | 4 | 1.6 | 2.4 | |
| | | | | | | 04 | | | 5 | 100 | 4 | 1.7 | 2.9 | |
| 3/4/6-10 | 9069168 | LASI | Siberian larch | 29-May | 98 | 98 | CONT | 5 | 5 | 100 | 5 | 0.7 | 1.5 | |
| | | | *Larix sibirica* | | | 99 | | | 5 | 100 | 4 | 1.0 | 1.9 | |
| | | | Dr. Helmut Mattis, Altai | | | 00 | | | 5 | 100 | 3 | 1.7 | 2.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 4 | 2.6 | 3.0 | |
| | | | | | | 04 | | | 5 | 100 | 3 | 3.7 | 4.9 | |
| 3/5/6-10 | 9069164 | PISYM | Scots pine | 29-May | 98 | 98 | CONT | 5 | 5 | 100 | 4 | 0.8 | 1.4 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 99 | | | 5 | 100 | 2 | 1.4 | 2.0 | |
| | | | PRC, Heilongjiang Province | | | 00 | | | 5 | 100 | 3 | 2.2 | 2.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 3 | 3.6 | 4.8 | |
| | | | | | | 04 | | | 5 | 100 | 2 | 5.3 | 6.7 | poor form on 1 |
| 3/6/1-5 | 9076718 | PISYM | Scots pine | 12-May | 99 | 99 | CONT | 5 | 5 | 100 | 4 | 0.7 | 1.0 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 00 | | | 5 | 100 | 3 | 1.4 | 1.6 | |
| | | | PRC, Heilongjiang Province | | | 01 | | | 5 | 100 | 4 | 1.6 | 2.5 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 03 | | | 5 | 100 | 3 | 3.1 | 3.8 | |
| | | | | | | 05 | | | 5 | 100 | 3 | 4.3 | 5.4 | yellow-green needles on all |
| 3/6/6-10 | 9069173 | PISY | Scots pine | 12-May | 99 | 99 | CONT | 5 | 5 | 100 | 3 | 0.7 | 1.4 | |
| | | | *Pinus sylvestris* | | | 00 | | | 5 | 100 | 3 | 1.4 | 2.0 | |
| | | | Kamyshin, Russia | | | 01 | | | 4 | 80 | 4 | 1.4 | 2.1 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 03 | | | 4 | 80 | 4 | 2.8 | 3.7 | |
| | | | | | | 04 | | | 4 | 80 | 2 | 4.1 | 5.8 | needles with very little yellow coloring |
| 3/7/1-5 | 9076719 | PISYM | Scots pine | 14-May | 99 | 99 | CONT | 5 | 5 | 100 | 3 | 0.9 | 1.5 | |
| | | | *Pinus sylvestris* var. *mongolica* | | | 00 | | | 5 | 100 | 2 | 1.5 | 2.2 | |
| | | | PRC, Heilongjiang Province | | | 01 | | | 5 | 100 | 3 | 2.2 | 3.2 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 03 | | | 5 | 100 | 3 | 3.7 | 4.5 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 5.2 | 6.6 | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3/7/6-10 | 9069178 | PIRE | red pine | 14-May | 99 | 99 | CONT | 5 | 5 | 100 | 4 | 0.6 | 1.1 | |
| | | | *Pinus resinosa* | | | 00 | | | 5 | 100 | 4 | 1.0 | 1.5 | |
| | | | Walker, MN | | | 01 | | | 5 | 100 | 4 | 1.1 | 1.9 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 03 | | | 4 | 80 | 4 | 1.8 | 2.5 | |
| | | | | | | 05 | | | 3 | 60 | 4 | 2.2 | 3.4 | 4 is bent over |
| 3/8/1-5 | 9082889 | PIMU80 | Mugo pine | 6-May | 04 | 04 | | 5 | 0 | 0 | | | | |
| | | | *Pinus mugo* | | | 05 | | 5 | 3 | 60 | 4 | 0.6 | 0.6 | replanted in 2005 |
| | | | Big Sioux Nursery, Watertown SD | | | 06 | | | 3 | 60 | 5 | 0.8 | 0.8 | |
| 3/8/6-10 | 9078631 | JUSC2 | Rocky Mountain juniper | 16-May | 05 | 05 | CONT | 5 | 5 | 100 | 3 | 0.8 | 1.3 | |
| | 'Bridger Select' | | *Juniperus scopulorum* | | | 06 | | | 5 | 100 | 3 | 1.3 | 1.9 | |
| | | | USDA, NRCS, PMC, Bridger, MT | | | | | | | | | | | |
| 3/9/1-5 | 9069169 | PINUS | Siberian pine | 24-May | 01 | 01 | | | | | | | | |
| | | | *Pinus sibirica* | | | 02 | | | | | | | | replants in 2002 |
| | | | Dr. Mattis, Altai, Russia | | | 04 | CONT | | 3 | 60 | 4 | 0.5 | 0.7 | replanted in 2003 |
| | | | | | | 05 | | | 2 | 40 | 4 | 0.6 | 0.8 | |
| 3/9/6-10 | ND-500 | LASI3 | Siberian larch | 16-May | 05 | 05 | CONT | 5 | 5 | 100 | 4 | 0.8 | 1.1 | 5 was mowed off |
| | | | *Larix sibirica* | | | 06 | | | 3 | 60 | 4 | 1.0 | 1.5 | some dieback on 3 |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | | | | | | | | | |
| 4/2/6-10 | 9063152 | BEPL | Japanese birch | 6-May | 98 | 98 | CONT | 5 | 4 | 80 | 3 | 1.0 | 2.1 | 5 browsed |
| | | | *Betula platyphylla* | | | 99 | | | 4 | 80 | 2 | 3.0 | 4.0 | |
| | | | PRC, Kedong Co., Heilongjiang | | | 00 | | | 4 | 80 | 2 | 4.5 | 5.9 | |
| | | | | | | 02 | | | 4 | 80 | 4 | 5.8 | 6.1 | 3 poor form |
| | | | | | | 04 | | | 4 | 80 | 4 | 4.5 | 6.3 | 1 broken by cows; 3 broken branches |
| 4/3/1-5 | 9069177 | QUMA | bur oak | 6-May | 98 | 98 | PLBR | 5 | 4 | 80 | 6 | 0.5 | 1.0 | |
| | | | *Quercus macrocarpa* | | | 99 | | | 4 | 80 | 4 | 1.2 | 1.2 | |
| | | | E.T. Jacobson, Walker, MN | | | 00 | | | 5 | 100 | 5 | 1.2 | 1.8 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 5 | 1.9 | 2.3 | |
| | | | | | | 04 | | | 5 | 100 | 4 | 1.5 | 2.7 | 2 has broken branches |

**Project No.: 38A345K Field Evaluation of Woody Plant Materials, Apple Valley, ND**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/3/6-10 | 9076739 | QUERC | hybrid oak | 6-May | 98 | 98 | PLBR | 5 | 4 | 80 | 8 | 0.4 | 0.9 | |
| | | | *Quercus* | | | 99 | | | 4 | 80 | 6 | 0.7 | 0.8 | |
| | | | E.T. Jacobson, Walker, MN | | | 00 | | | 3 | 60 | 5 | 1.3 | 2.0 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 3 | 60 | 5 | 2.1 | 2.1 | |
| | | | | | | 04 | | | 3 | 60 | 4 | 1.0 | 2.3 | |
| 4/4/1-5 | 9069170 | QURO | English oak | 29-May | 98 | 98 | CONT | 5 | 5 | 100 | 6 | 0.6 | 0.9 | |
| | | | *Quercus robur* | | | 99 | | | 5 | 100 | 4 | 1.4 | 1.2 | |
| | | | 400 K North of Volgograd, Russia | | | 00 | | | 5 | 100 | 5 | 2.0 | 1.7 | |
| | | | USDA, NRCS, PMC, Bismarck, ND | | | 02 | | | 5 | 100 | 4 | 2.6 | 2.6 | dieback on 2 |
| | | | | | | 04 | | | 5 | 100 | 4 | 2.0 | 2.6 | |
| 4/5/6-10 | 9076737 | PRSE2 | black cherry | 6-May | 04 | 04 | PLBR | 5 | 5 | 100 | 4 | 1.0 | 1.9 | 1 bent, 3 broken branches |
| | | | *Prunus serotina* | | | 05 | | | 3 | 60 | 3 | 1.9 | 3.0 | broken branches on 3 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 2 | 40 | 4 | 2.4 | 3.8 | |
| 4/6/1-5 | 9082886 | POTR5 | aspen | 6-May | 04 | 04 | PLBR | 5 | 5 | 100 | 4 | 0.6 | 1.5 | |
| | | | *Populus tremuloides* | | | 05 | | | 5 | 100 | 4 | 1.4 | 2.3 | some top dieback on 1, |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 4 | 80 | 3 | 3.1 | 3.8 | dieback on 5 |
| 4/6/6-10 | 9082885 | POTR5 | aspen | 6-May | 04 | 04 | PLBR | 5 | 4 | 80 | 5 | 0.3 | 1.5 | |
| | | | *Populus tremuloides* | | | 05 | | | 3 | 60 | 3 | 1.3 | 2.3 | |
| | | | NDFS Nursery, Towner, ND | | | 06 | | | 3 | 60 | 3 | 2.0 | 3.4 | |
| 4/7/1-5 | 9082631 | BEPL | Japanese birch | 8-May | 00 | 00 | CONT | 5 | 5 | 100 | 3 | 1.6 | 4.4 | branches broke on 2 |
| | | | *Betula platyphylla japonica* | | | 01 | | | 5 | 100 | 6 | 1.4 | 1.7 | |
| | | | Lawyer Nursery, Plains, MT | | | 02 | | | 4 | 80 | 5 | 2.2 | 2.4 | |
| | | | | | | 04 | | | 2 | 40 | 4 | 2.0 | 2.5 | |
| | | | | | | 06 | | | 1 | 20 | 5 | 4.0 | 4.8 | multiple stemmed |
| 4/7/6-10 | 9082650 | POPUL | Soongarica poplar | 15-May | 00 | 00 | CONT | 5 | 5 | 100 | 4 | 1.7 | 3.0 | |
| | | | *Populus* | | | 01 | | | 5 | 100 | 3 | 2.9 | 4.2 | |
| | | | Valley Nursery, Helena, MT | | | 02 | | | 5 | 100 | 4 | 4.2 | 5.4 | many stems on 1 |
| | | | | | | 04 | | | 5 | 100 | 4 | 4.0 | 4.6 | dieback on 4,5 |
| | | | | | | 06 | | | 4 | 80 | 5 | 4.8 | 5.4 | severe dieback every year |

**Project No.: 38A345K Field Evaluation of Woody Plant Materials, Apple Valley, ND**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4/8/1-5 | 9082713 | PRPEP2 | Siberian peach | 23-May | 02 | 02 | PLBR | 5 | 4 | 80 | 4 | 2.6 | 2.6 | |
| | | | *Prunus persica* | | | 03 | | | 5 | 100 | 3 | 3.2 | 3.6 | some dieback |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 04 | | | 5 | 100 | 5 | 2.7 | 3.2 | dieback on all 5 |
| | | | | | | 06 | | | 4 | 80 | 4 | 3.5 | 4.2 | severe dieback every year |
| 4/8/6-10 | 9091968 | GYDI | Kentucky coffeetree | 16-May | 05 | 05 | PLBR | 5 | 5 | 100 | 4 | 0.3 | 1.4 | |
| | | | *Gymnocladus dioicus* | | | 06 | | | 5 | 100 | 4 | 0.9 | 1.6 | dieback on 5 |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| 4/9/1-5 | 9082619 | FRPE | green ash | 24-May | 01 | 01 | CONT | 5 | 5 | 100 | 4 | 0.5 | 1.4 | |
| | | | *Fraxinus pennsylvanica* | | | 02 | | | 5 | 100 | 3 | 1.2 | 2.0 | |
| | | | Jordan, MT/Valley Nursery, Helena, MT | | | 03 | | | 5 | 100 | 4 | 1.7 | 2.4 | |
| | | | | | | 05 | | | 5 | 100 | 5 | 1.6 | 2.6 | multi-stemmed poor form 1,2,3 |
| 4/9/6-10 | ND-614 | GYDI | Kentucky coffeetree | 16-Apr | 02 | 02 | CONT | 5 | 4 | 80 | 5 | 0.7 | 1.9 | |
| | 9005910 | | *Gymnocladus dioicus* | | | 03 | | | 2 | 40 | 4 | 1.0 | 2.2 | |
| | | | Union County, South Dakota | | | 04 | | | 2 | 40 | 6 | 0.9 | 1.4 | dieback on 4 |
| | | | | | | 06 | | | 1 | 20 | 2 | 2.3 | 4.0 | |

**OFF-CENTER EVALUATION PLANTING: TECHNICAL REPORT 2006**

Study NDPMC-T-0201-CP

Study Title: Eastern South Dakota Soil & Water Research Farm, Brookings, South Dakota

Purpose: The purpose of the farm is to find solutions to national and regional concerns related to soil and water conservation and the efficiency and sustainability of agricultural production. Research and technology transfer activities on the farm are conducted by a partnership including: USDA Agricultural Research Service, USDA- Natural Resources Conservation Service, South Dakota State University, South Dakota Agricultural Experiment Station, the Brookings County Conservation District, as well as 14 other County Conservation Districts from eastern South Dakota.

History: The Eastern South Dakota Soil and Water Research Farm, Inc. is a non-profit organization consisting of a Board of Directors elected from each of 15 Soil and Water Conservation Districts in eastern South Dakota. Brookings, Codington, Clark, Day, Deuel, Hamlin, Kingsbury, Lake, Lincoln, Marshall, McCook, Minnehaha, Minor, Moody, and Turner Soil and Water Conservation Districts are represented on the Board of Directors. The purpose of the corporation is to promote research of efficient farm production practices that conserve soil and water resources.

The corporation purchased 100 acres of land in Lake County, SD near the community of Madison in 1959. This land was leased to the USDA Agricultural Research Service. The work performed at the Madison farm included evaluation of the erosion of different soil types, development of tillage practices to conserve soil and water, determination of efficient crop production methods, and modeling plant-insect interactions. Research was conducted by scientists from the North Central Soil and Water Conservation Laboratory, ARS, Morris, MN; the Northern Grain Insects Research Laboratory, ARS, Brookings, SD; and the South Dakota State Agricultural Experiment Station.

In an effort to improve program efficiency and facilitate productive cooperative research programs that would more effectively solve some of the problems that are associated with agriculture in eastern South Dakota, the Board of Directors decided to relocate the research farm closer to the research laboratories. The Madison research farm was sold in 1987, and the Corporation purchased another tract of land in Brookings County.

The Brookings Research Farm consists of 80 acres located approximately one mile north of the campus of South Dakota State University. The soils on this farm are characteristic of those found in northeastern South Dakota and west central Minnesota and are similar to soils common to the northern Corn Belt. A new building was constructed in 2006. Some trees were removed during the construction.

## Methods and Materials

Assembly: The first tree planting trials were started in 2000 when 16 species were planted. An additional six species were planted in 2001. These trials were used to showcase different types of tree species and various weed control methods. Currently, 27 accessions of 26 different species are being evaluated.

In 2004, the PMC staff became involved in planting some additional tree and shrub accessions that will be evaluated on an annual basis. Refer to Table BR-2 for entries planted from 2004-2006.

For the 2006 weather summary at Brookings, see Table BR-1.

Planting Plan: The layout of the evaluation plots is shown in Figure BR-1. The tree and shrub plots are in the northeastern area of the Research Farm.

Site Preparation: Strips to be planted are chemically killed with glyphosate, and then tree fabric is laid down.

Planting Method: All trees and shrubs were planted by hand.

Weed Control/Plot Management:

Evaluations and Measurement: The plots were evaluated on September 12, 2006. Plant performance data is recorded on one or more accessions during the growing season for three years. After the third year, data is gathered according to a specific schedule. Records of planting date, survival, vigor, fruit (seed) amount, canopy width, plant height, winter injury, disease symptoms, and insect damage are recorded. Select data appears in this report. Additional information can be requested from the PMC.

**Figure BR-1.**

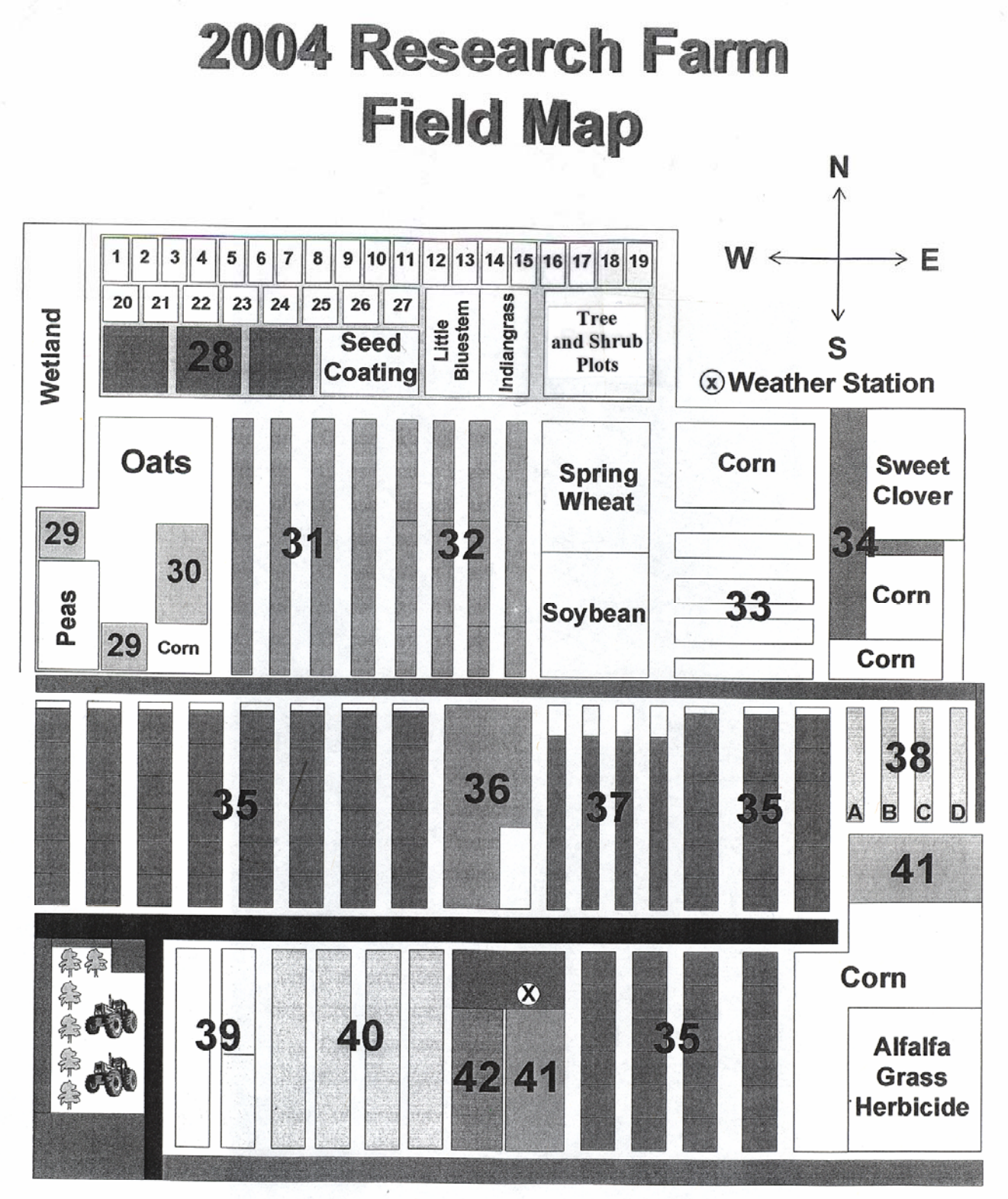
2004 Research Farm
Field Map
N
W
E
S
Weather Station
Wetland
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
20 21 22 23 24 25 26 27
28
Seed Coating
Little Bluestem
Indiangrass
Tree and Shrub Plots
Oats
29
30
31
32
Spring Wheat
Soybean
Corn
33
Sweet Clover
34
Corn
Corn
Peas
29
Corn
35
36
37
35
38
A B C D
41
Corn
39
40
42
41
35
Alfalfa
Grass
Herbicide

**Table No. 1: 2006 Weather Summary - Official Station - Brookings, South Dakota**

| | Mean Temperature (degrees Fahrenheit) | | | Precipitation (inches) | | |
|---|---|---|---|---|---|---|
| | | | | Actual | | Deviation from Normal |
| **Month** | **2006** | **Normal*** | | **2006** | **Normal*** | **2006** |
| January | 26.1 | 10.9 | | 0.15 | 0.34 | -0.19 |
| February | 18.5 | 17.9 | | 0.11 | 0.40 | -0.29 |
| March | 31.1 | 30.1 | | 1.59 | 1.29 | 0.30 |
| April | 48.4 | 44.2 | | 2.65 | 2.03 | 0.62 |
| May | 57.4 | 56.7 | | 2.02 | 2.95 | -0.93 |
| June | 66.8 | 66.1 | | 2.35 | 4.23 | -1.88 |
| July | 73.4 | 70.7 | | 0.23 | 3.11 | -2.88 |
| August | 69.1 | 68.6 | | 5.65 | 2.94 | 2.71 |
| September | 55.1 | 59.1 | | 6.36 | 2.48 | 3.88 |
| October | 43.2 | 46.3 | | 0.19 | 1.78 | -1.59 |
| November | 32.2 | 30.0 | | 0.36 | 1.00 | -0.64 |
| December | 24.9 | 16.3 | | 1.52M | 0.26 | 1.26M |
| **Annual** | **45.5** | **43.1** | | **23.18M** | **22.81** | **0.37M** |
| M=missing data | | | | | | |
| *National Climate Data Center 1971-2000 Monthly Normals | | | | | | |
| | | 2006 | | | | |
| Last Frost (28 degrees) | | 26-Apr | | | | |
| First Frost (28 degrees) | | 20-Sep | | | | |
| Frost Free Period | | 146 days | | | | |

**Key to Table BR-2. 38I347K Field Evaluation of Woody Plant Materials – Brookings, South Dakota**

PLOT LOCATION = plot location of the plant material within the evaluation
ACCESSION NUMBER = any accession number, PI number or cultivar name assigned to the plant material
PLANT SYMBOL = plant symbol of the genus and species (asterisk indicates the symbol is not official)
GENUS/SPECIES = common name and scientific name of the plant material
ORIGIN/SOURCE = origin and/or source of the plant material
TRANS DATE = month and day the plant material was transplanted at the evaluation site
YR PLT = year the plant materials were transplanted at the evaluation site
YR REC = year of record
MATL PLTD = type of material planted, PLBR = bareroot, CONT = containerized
NO PLTS = number of plants planted in the plot
NO SRV = number of plants surviving
PCT SRV = percent of plants surviving
VI = plant vigor (1=excellent, 3=good, 5=fair, 7=poor, 9=very poor)
CAN COV (ft) = canopy cover measured in feet
PLT HT (ft) = plant height measured in feet

**Table BR-2.**
**Study No.: NDPMC-T-0201-CP, Field Evaluation of Woody Plant Materials, Brookings, SD**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1-1 | 9082889 | PIMU80 | mugo pine | 18-May | 04 | 04 | PLBR | 5 | 4 | 80 | 5 | 0.9 | 1.1 | |
| | | | *Pinus mugo* | | | 05 | | | 5 | 100 | 4 | 1.0 | 0.7 | replant 3 |
| | | | Big Sioux Nursery, Watertown SD | | | 06 | | | 5 | 100 | 3 | 1.4 | 0.8 | 1 open form |
| S1-2 | 9082891 | PHOP | common ninebank | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 2 | 1.4 | 1.9 | |
| | | | *Physocarpus opulifolius* | | | 05 | | | 5 | 100 | 2 | 3.7 | 3.5 | |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 5 | 100 | 3 | 5.0 | 5.0 | 1 blight on leaves, 4 good seed |
| S1-3 | 9082642 | VILA | wayfaring bush | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 0.7 | 1.2 | |
| | | | *Viburnum lantana* | | | 05 | | | 5 | 100 | 3 | 1.3 | 1.7 | leaf burn on all |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 3 | 2.0 | 2.6 | |
| S1-4 | 9082887 | HIRH80 | seaberry | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 0.9 | 2.2 | |
| | | | *Hippophae rhamnoides* | | | 05 | | | 5 | 100 | 3 | 1.9 | 2.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 3 | 3.3 | 4.1 | |
| S1-5 | 9082888 | COAM3 | American hazelnut | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 7 | 0.3 | 0.6 | 1 browsed off |
| | | | *Corylus americana* | | | 05 | | | 5 | 100 | 5 | 0.6 | 0.7 | leaf burn on all |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | 06 | | | 5 | 100 | 3 | 1.0 | 1.4 | |
| S1-6 | 9082687 | RIAM | American currant | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 2 | 1.2 | 1.8 | |
| | | | *Ribes americana* | | | 05 | | | 5 | 100 | 3 | 4.0 | 2.6 | mildew spot on all |
| | | | Bix Sioux Nursery, Watertown, SD | | | 06 | | | 5 | 100 | 3 | 5.0 | 3.2 | 1,2 blight, leaf drop |
| S1-7 | 9082746 | RIMI | Missouri gooseberry | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 1.8 | 1.7 | |
| | | | *Ribes missouriense* | | | 05 | | | 5 | 100 | 3 | 3.1 | 2.5 | red fall color on all |
| | | | Big Sioux Nursery, Watertown, SD | | | 06 | | | 5 | 100 | 3 | 3.8 | 3.3 | 3-5 some leaf drop, blight |
| S1-8 | 9082890 | CORA6 | gray dogwood | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 4 | 0.8 | 1.3 | 3 browsed |
| | | | *Cornus racemosa* | | | 05 | | | 5 | 100 | 3 | 1.4 | 1.9 | leaf spot on 5 |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | 5 | 100 | 3 | 2.2 | 2.6 | 1,2,5 leaf spot |
| S1-9 | 9082738 | CORA6 | gray dogwood | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 2 | 1.1 | 2.4 | |
| | | | *Cornus racemosa* | | | 05 | | | 5 | 100 | 3 | 1.9 | 2.8 | leaf spot on 1 and 5 |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 2 | 3.4 | 3.8 | 1 bad leaf spot |

**Study No.: NDPMC-T-0201-CP, Field Evaluation of Woody Plant Materials, Brookings, SD**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S1-10 | 9076686 | CRCH | roundleaf hawthorn | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 4 | 0.4 | 0.5 | heavily browsed |
| | | | *Crataegus chrysocarpa* | | | 05 | | | 4 | 80 | 4 | 0.7 | 1.3 | browsed |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | 06 | | | 5 | 100 | 5 | 1.0 | 2.0 | 1 white aphid |
| S1-11 | 9091967 | PRPE2 | pin cherry | 10-May | 05 | 05 | | 5 | 5 | 100 | 3 | 2.9 | 2.9 | 5 close spacing |
| | | | *Prunus pensylvanica* | | | 06 | | | 5 | 100 | 3 | 4.2 | 4.1 | 4,5 leaf spot |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| S2-1 | 9091976 | VIDE | arrowwood viburnum | 10-May | 05 | 05 | | 5 | 5 | 100 | 3 | 0.9 | 2.2 | 1 and 4 has fruit |
| | | | *Viburnum dentatum* | | | 06 | | | 5 | 100 | 3 | 2.2 | 2.6 | clean leaves, no disease |
| | | | Lincoln-Oakes Nursery, Bismarck, ND | | | | | | | | | | | |
| S2-2 | 9082711 | EUBU6 | winterberry | 10-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.7 | 1.2 | |
| | | | *Euonymus bungeanum* | | | 06 | | | 5 | 100 | 4 | 1.1 | 1.5 | |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | | | | | | | | | |
| S2-3 | 9091975 | AMELA | serviceberry | 10-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.9 | 1.9 | leaves chewed on |
| | | | *Amelanchier lamarckii* | | | 06 | | | 5 | 100 | 3 | 3.0 | 2.9 | |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | | | | | | | | | |
| S2-4 | 9091971 | PHME13 | black chokeberry | 10-May | 05 | 05 | | 5 | 5 | 100 | 3 | 1.5 | 2.1 | fruit on all |
| | | | *Photinia melanocarpa* | | | 06 | | | 5 | 100 | 3 | 2.2 | 2.7 | |
| | | | Bailey Nurseries, Inc. | | | | | | | | | | | |
| S2-5 | 9008183 | PRVI | common chokecherry | 10-May | 05 | 05 | | 5 | 5 | 100 | 3 | 0.7 | 2.5 | |
| | | | *Prunus virginiana* | | | 06 | | | 5 | 100 | 3 | 2.0 | 4.0 | shot hole on all |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | | | | | | | | | |
| S2-6 | 9091969 | CAFR80 | Russian peashrub | 10-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.5 | 2.2 | |
| | | | *Caragana frutex* | | | 06 | | | 5 | 100 | 6 | 0.4 | 1.3 | |
| | | | Big Sioux Nursery, Watertown, SD | | | | | | | | | | | |
| S2-7 | 9019593 | JUNIP | common juniper | 2-May | 06 | 06 | CONT | 5 | 5 | 100 | 3 | 2.6 | 0.8 | |
| | | | *Juniperus* sp. | | | | | | | | | | | |
| | | | Wilton Mine, ND/McKenzie FEP, ND | | | | | | | | | | | |

**Study No.: NDPMC-T-0201-CP, Field Evaluation of Woody Plant Materials, Brookings, SD**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S2-8 | 9092054 'Silverscape' | ELAEA | Russian olive/silverberry hybrid *Elaeagnus X* 'Jefmorg' Lincoln-Oakes Nursery, Bismarck, ND | 2-May | 06 | 06 | POTD | 5 | 2 | 40 | 2 | 3.1 | 4.3 | 2,3,5 recently dead, canker? |
| S2-9 | 9092053 | RHTY | staghorn sumac *Rhus typhina* Lincoln-Oakes Nursery, Bismarck, ND | 2-May | 06 | 06 | PLBR | 5 | 5 | 100 | 3 | 3.8 | 5.0 | clean leaves, no disease |
| T1-1 | 9082853 | PRMA9 | amur chokecherry *Prunus maackii* Lincoln-Oakes Nursery, Bismarck,ND | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 1.4 | 2.6 | |
| | | | | | | 05 | | | 4 | 80 | 4 | 2.4 | 4.3 | |
| | | | | | | 06 | | | 5 | 100 | 3 | 3.3 | 5.4 | |
| T1-2 | 9076737 | PRSE2 | black cherry *Prunus serotina* Lincoln-Oakes Nursery, Bismarck,ND | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 1.4 | 2.3 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 2.4 | 4.1 | |
| | | | | | | 06 | | | 5 | 100 | 4 | 4.6 | 5.9 | |
| T1-3 | 9082885 | POTR5 | aspen *Populus tremuloides* NDFS Nursery, Towner, ND | 18-May | 04 | 04 | PLBR | 5 | 4 | 80 | 4 | 0.4 | 1.7 | |
| | | | | | | 05 | | | 5 | 100 | 5 | 1.2 | 2.1 | |
| | | | | | | 06 | | | 2 | 40 | 3 | 3.0 | 3.6 | 3-5 removed for building |
| T1-4 | 9082886 | POTR5 | aspen *Populus tremuloides* Lincoln-Oakes Nursery, Bismarck,ND | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 0.6 | 1.9 | |
| | | | | | | 05 | | | 5 | 100 | 4 | 1.5 | 2.8 | |
| | | | | | | 06 | | | 0 | 0 | | | | removed for building |
| T1-5 | 9082892 | POAL7 | white poplar *Populus alba* Big Sioux Nursery, Watertown, SD | 18-May | 04 | 04 | PLBR | 5 | 5 | 100 | 3 | 2.1 | 3.1 | |
| | | | | | | 05 | | | 5 | 100 | 2 | 4.9 | 4.7 | |
| | | | | | | 06 | | | 0 | 0 | | | | removed for building |
| T1-6 | 9091968 | GYDI | Kentucky coffeetree *Gymnocladus dioicus* Big Sioux Nursery, Watertown,SD | 10-May | 05 | 05 | | 5 | 5 | 100 | 3 | 1.1 | 1.8 | |
| | | | | | | 06 | | | 0 | 0 | | | | removed for building |
| T2-1 | 9078631 'Bridger Select' | JUSC2 | Rocky Mountain juniper *Juniperus scopulorum* USDA, NRCS, Bridger, MT | 10-May | 05 | 05 | | 5 | 5 | 100 | 2 | 0.8 | 1.5 | good color |
| | | | | | | 06 | | | 5 | 5 | 2 | 1.5 | 2.8 | |

**Study No.: NDPMC-T-0201-CP, Field Evaluation of Woody Plant Materials, Brookings, SD**
**Year of Record: 2006**

| PLOT LOCATION | ACCESSION NUMBER | PLANT SYMBOL | GENUS/SPECIES ORIGIN/SOURCE | TRANS DATE | YR PLT | YR REC | MATL PLTD | NO PLTS | NO SRV | PCT SRV | VI | CAN COV (ft) | PLT HT (ft) | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| T2-2 | 9081843 | PIPO | ponderosa pine | 10-May | 05 | 05 | | 5 | 5 | 100 | 3 | 0.6 | 1.2 | |
| | 'Hunter' | | *Pinus ponderosa* | | | 06 | | | 5 | 100 | 2 | 1.3 | 1.8 | |
| | | | USDA, NRCS, Bridger, MT | | | | | | | | | | | |
| T2-3 | 9091973 | QURU | red oak | 10-May | 05 | 05 | | 5 | 5 | 100 | 5 | 0.7 | 1.5 | |
| | | | *Quercus rubra* | | | 06 | | | 3 | 60 | 5 | 0.8 | 1.2 | 4,5 removed for building |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | | | | | | | | | |
| T2-4 | 9091974 | QURU | red oak | 10-May | 05 | 05 | | 5 | 5 | 100 | 4 | 0.6 | 2.1 | |
| | | | *Quercus rubra* | | | 06 | | | 0 | 0 | | | | removed for building |
| | | | Lincoln-Oakes Nursery, Bismarck,ND | | | | | | | | | | | |

# ASSEMBLY AND INITIAL EVALUATION

## Major Seed Source Studies and Assemblies

**MAJOR SEED SOURCE STUDIES AND ASSEMBLIES: TECHNICAL REPORT - 2006**

Study 38I013J/38A127J Apple Creek Township, Burleigh County, North Dakota

Study Title: Evaluation of Hawthorn, *Crataegus*.

Introduction: Hawthorns are thorny shrubs or small trees. This large and diverse genus is widely distributed throughout the north temperate zone. The dense, compact form and red fruit make it valuable for wildlife nesting, food, and cover. Hawthorn can be used for shrub rows in multiple row windbreaks, surface mine revegetation, critical area plantings, recreational area developments, wildlife habitat, natural areas, and barrier plantings. Three species are indigenous to North and South Dakota. They are fleshy (*C. macracantha*), round leaved (*C. chrysocarpa*), and downy hawthorn (*C. mollis*). Interspecific hybrids of fleshy and round leaved hawthorn may be found. Fireblight and cedar apple rusts are problems.

Objective: The objective is to assemble, comparatively evaluate, select, increase, and release one or more adapted cultivars of hawthorn. Criteria for selection will include growth rate, form, disease and insect resistance, survival, and fruit production. Seed orchards will be established to produce select class and certified seed.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the USDI Fish and Wildlife Service.

Location: Waterfowl Production Area, approximately 5 miles east and 1 mile south of Bismarck, North Dakota, on Old Highway 10. Legal description: N 1/2 sec. 1, T. 138 N., R. 79 W.; S 1/2 sec. 31, T. 139 N., R. 78 W. Elevation is approximately 1,700 ft.

Major Land Resource Area: The site is located in Major Land Resource Area 53B, Central Dark Brown Glaciated Plains. Most soils are derived from calcareous glacial till. The gently rolling plain includes some areas of kames and moraines that have irregular topography. Forty percent of the area is rangeland.

Soils: There are seven different soils mapping units in the planting area:

R, RB - Roseglen silt loam or loam, 0 to 3 percent slope.
P, PB - Parshall, fine sandy loams or sandy loam, 0 to 3 and 3 to 6 percent slope.
TeB - Telfer fine sandy loams or sandy loam, 3 to 6 percent slope.
Ty, Tyl - Tally fine sandy loam or sandy loam, 0 to 3 percent slope.

The Roseglen series consists of deep, moderately well-drained soils formed in loamy sediments on glacial lake plains. The surface layer is dark grayish-brown silt loam 8 inches thick. The subsoil is dark grayish-brown and grayish-brown silt loam 26 inches thick. The substratum is light yellowish-brown and light brownish-gray silt loam. Permeability is moderate. Available water capacity, the organic matter content, and fertility are high. Slopes are 0-9 percent.

These soils are in North Dakota windbreak suitability group 1. Soil moisture is favorable for the growth and survival of trees and shrubs. These soils are well suited to all types of windbreaks and other plantings. Soil blowing is a serious hazard on some soils.

The Parshall series consists of deep, well-drained soils formed in fine sandy loam alluvium on terraces and outwash plains and in upland swales. The surface layer is dark grayish-brown fine sandy loam 14 inches thick. The subsoil is dark grayish-brown, very friable fine sandy loam in the upper 17 inches and grayish-brown fine sandy loam in the lower 6 inches. The underlying material is light brownish-gray fine sandy loam in the upper 12 inches and grayish-brown sandy loam buried surface layer in the lower 13 inches.

Permeability is moderately rapid. The available water capacity is moderate. The organic matter content is high and fertility is medium. Slopes are 0-15 percent.

These soils are in North Dakota windbreak suitability group 5. These are well-drained loams and sandy soils. These soils are suited to windbreak and other plantings, but selection of species is limited. The erosion hazard is serious.

The Telfer series consists of deep, excessively and somewhat excessively drained soils formed in sandy sediments in terraces and uplands. The surface layer is dark grayish-brown loamy sand 6 inches thick. The next 8 inches is grayish-brown fine sand. The underlying material is light olive brown fine sand. Permeability is rapid. Available water capacity is low. Organic matter content is moderate and fertility is low. Slopes are 0-20 percent.

These soils are in North Dakota windbreak suitability group 7. These soils are deep, sandy, and somewhat excessively drained. These soils are suited to plantings for wildlife, recreation, and beautification but optimum survival, growth, and vigor of the plants should not be expected. Soil blowing is a serious hazard.

The Tally series consists of deep, well-drained soils that formed in material derived from eolian deposits, alluvium, or glacial outwash material. These soils are on terraces, fans, and foot slopes of hills in uplands. The upper 14 inches is a dark brown sandy loam. The next horizons, down to 38 inches, are a brown sandy loam.

These soils are in North Dakota windbreak suitability group 5. These are well-drained, loamy, and sandy soils. These soils are suited to windbreak and other plantings, but selection of species is limited. The erosion hazard is serious.

Climate: MLRA 53B. The average annual precipitation is 15 to 18 inches; highest in the growing season. Rainfall is low and somewhat erratic. The average annual temperature is 40 to 60 degrees F. Average freeze-free period is 105 to 140 days. The plant hardiness zone is 3b with an average annual minimum temperature of -40 to -30 degrees F. For the 2006 weather summary, see Table AV-1 on page 184.

**Method and Materials**

Assembly: The assembly was initiated in 1976 and completed in 1977. One hundred thirty-nine accessions were collected by NRCS field personnel from native stands in North Dakota and South Dakota. Included were Major Land Resource Areas 53, 54, 55, 58, 60, 61, and 63. In addition, 45 accessions were obtained from the Canada Agriculture Research Station, Morden, Manitoba, Canada.

Seed Processing: Collected fruit was processed upon receipt at the PMC. The processing consisted of macerating and washing fruit to separate the pulp from the seed. The cleaned seed was dried, weighed, and placed in sealed, cool, dry storage (45 to 60 degrees F, 30 percent relative humidity). Six pounds of fruit yielded one pound of seed.

Seedling Establishment: 1978: Approximately 5,000 seeds of each accession were planted 1/2-inch deep with 30-inch row spacing using a tractor mounted belt seeder on October 13. The area was covered with a heavy layer of wood fiber mulch and kept moist. A study was conducted to determine a faster, more reliable method of promoting germination (1978 Annual Technical Report). It was determined that a 90-day warm period (70 to 80 degrees F) followed by 140 days of cold (34 to 38 degrees F) in moist, sometimes dry soil, was the best method.

1979: On May 10-11, approximately 2,000 seeds of each accession were placed in small plastic trays containing a moist mixture of one part soil, one part perlite, and two parts peat moss. The trays were

placed in the PMC greenhouse at 70 to 80 degrees F and kept moist until September 25. This provided the necessary 90-day warm stratification. Next, the trays were moved to cold storage and kept at 32 to 34 degrees F until spring to fulfill the required cold stratification period.

The fall 1978 field seeded accessions of hawthorn showed no signs of germination during the year.

1980: In May, trays of cold stratified seed were removed from cold storage and placed in the PMC greenhouse. The resulting seedlings were transplanted into 'Styrobloc' containers and placed in the PMC lathhouse under sprinkler irrigation. Dead seedlings were replaced until transplant seedlings were no longer available. In October 1980, all plants were placed in the PMC tree storage cooler. Containers were later taken from the cooler in December and set in the greenhouse to provide an additional growing period for the seedlings.

1981: After the seedlings were moved to the greenhouse in December 1980, a reaction to short day length and/or insufficient cold stratification caused the plants to enter a dormant stage. Buds swelled, but no further growth was initiated in the greenhouse. Attempts to break bud dormancy during the winter (1980-1981) by increasing day length with artificial lighting proved unsuccessful. Seedlings were returned to the cooler on February 19 for an additional cold period, then moved back to the greenhouse in early May. Within one week new growth was initiated. According to publications concerning nursery practice, hawthorn may require a period of high humidity in order to break bud. Covering the plants with a layer of plastic and wet packing material for 10 days under warm temperatures (50 to 60 degrees F) will hasten the process.

At the end of May, all containers were placed in the lathhouse for the summer growing season. Seedlings ranged in height from 4 to 8 inches by October. Four inches of shingletow was spread over the plants for protection during outdoor winter storage. Rodent repellent and poison was applied to deter mice.

1982: All seedlings were sprinkler irrigated and fertilized on a regular schedule during the year. Plants averaged in height from 7 to 23 inches. All plants were prepared for winter by treating with animal repellent and covering with shingletow.

Planting plan: The test plantation is a randomized block design with some blocks incomplete; four plants per plot with five replications. Spacing is 14 feet between rows and 10 feet within row. An additional outside row was planted to offset border effects.

Plot preparation: A clean, firm planting site was prepared by disking and harrowing.

Planting method: All seedlings were planted using approved forestry methods.

Planting date: May 25, 1983. Replacements planted in May 1984.

Fertilization: No fertilizer has been applied to the planting area.

Weed control: No herbicide was applied to any plot during the year of establishment or in succeeding years. Mechanical control was by clean cultivating between rows, within row, and in fallow areas. Four to six tillage operations were performed each year in the months of May through August. Hand hoeing was done as needed to control weeds in row.

1985-1988: In addition to hand hoeing and tillage, a mechanical within row tree cultivator was used twice during the summer.

1989: Due to drought conditions, the cover crop seeded in 1988 was only mowed, not tilled. A mechanical within row tree cultivator was used within the rows.

1990-1992: In addition to tillage between rows, a mechanical within row tree cultivator was used twice during the summer.

Biological control: No insecticides have been applied. Animal repellent was applied in the fall 1983 and 1984 to discourage rodent damage. Plastic net tubes were placed over the seedlings to protect them from deer and rabbit browse. No repellent was applied in 1985. In 1987, the hawthorn was sprayed with Bonide repellent.

Irrigation: None.

Crop residue management: Each year in September a winter cover crop of oats or rye was seeded between rows. During the drought, the present cover was kept mowed to prevent soil blowing. In 1993, a permanent cover of sideoats grama, blue grama and black medic was established.

Silvicultural practices: Mechanically damaged limbs were cut and removed each year for sanitation. Weak or diseased specimens have not been treated or cleared as of 1989 in order to preserve the integrity of the evaluation process.

Evaluation and Measurement: 1983: Planting date, survival, and plant height were recorded on September 4.

1984: Plant performance was recorded in September. Notes were taken on survival, canopy width, and plant height.

1985: In addition to reporting survival, canopy width, and plant height, plants were individually scored for vigor and animal browse.

1986-1987: Plants were evaluated for survival, vigor, plant height, crown width, and disease and insect resistance.

1988: Survival, vigor, resistance to disease and insects, and extent of animal damage were rated using the HP-71B data recorder.

1989: Plants were rated for vigor and fruit production.

1990: Due to drought, no evaluations were made.

1991: Survival and vigor were rated. Plant specimens of superior accessions were collected for identification.

1992: Survival, vigor, and fruit amount were rated. Plant specimens were collected.

1993: Plant specimens were collected.

1993-1997: Grass was mowed between rows several times each year. Within-row weed control was done with a rotary tree cultivator. Wormwood and Canada thistle were spot sprayed with Roundup (Banvel).

1998-2001: Grass mowed between rows. Wormwood and thistle were sprayed.

## Results

Plant performance: 1983: A total of 1,452 plants were planted with a survival rate of 98 percent. Moisture was adequate for plant establishment, weed control was excellent, and little animal damage was noted.

1984: Available replacements were planted in May. All seedlings became established and performed well.

1985: Of the original 139 accessions, 75 of the native and 31 of the introduced are established in the plantation. Refer to Tables CRAT-1 and CRAT-2. Survival rate continued to be 98 percent. Despite growth reduction from moderate deer browse, growth rates averaged 15 cm/year with a range of 0 to 23. Maximum recorded height was 100 cm. (3.5 feet). Introduced species rate higher in vigor than native sources at this early age. No significant insect or disease problems were noted. Any geographic trends in size or growth rate are not yet obvious.

1986: Some accessions have heights in excess of 125 cm. (4.0 feet).

1987: One of the tallest, most uniform accessions is ND-1566 from Norman County, Minnesota, with heights reaching up to 155 cm. (5.2 feet). Many of the plants continue to be browsed by deer.

1988: More accessions are starting to express their vigor by putting on excellent growth. A few of the introduced hawthorn accessions produced some fruit. A total of 990 native hawthorn plants and 442 introduced hawthorn plants are alive.

1989: More plants are growing beyond the reach of the deer. Eighteen percent of the native hawthorn produced fruit while only thirteen percent of the introduced plants did. Only three accessions have lost all four trees in a plot.

1991: The native hawthorn have performed better than the introduced hawthorn. There are 972 native hawthorn plants alive, for a survival of 95 percent. There are 369 introduced hawthorn still living, which is 77 percent of the original planting. Three superior accessions from South Dakota (ND-1628, ND-1538, ND-1694) were identified by Dr. J. B. Phipps, University of Western Ontario, as *Crataegus chrysocarpa* or round leaved hawthorn. ND-1566 was identified as *Crataegus mollis*.

1992-1993: Sixteen more accessions have been identified by Dr. J. B. Phipps. Most of them are of a complex of the two common hawthorn species of the Northern Great Plains, *C. chrysocarpa* and *C. macracantha* (See Table CRAT-3).

1995: Twelve round leaved hawthorn (*C. chrysocarpa*) were moved from Apple Valley and planted randomly in a row at the PMC. These trees included the following five accessions: ND-1694 (Butte County, SD), ND-1695 (Marshall County, SD), ND-1538 (Day County, SD), ND-1628 (Hamlin County, SD), and ND-1544 (Harding County, SD). This row of trees has been assigned the accession number 9076678. This phase of the hawthorn study has been assigned the number 38A127J. Seed was then collected from these trees at the PMC. The hawthorn has a good taproot and is quite drought resistant.

1996: Ten hawthorn were moved from Apple Valley to the PMC. Three of them did not survive through the summer. Strong winds caused them to tip shortly after they were transplanted, causing several trees to die.

1997: No trees were moved in 1997.

1998-1999: In 1998, eight more trees were moved from Apple Valley to the PMC. Seed was collected from these trees. Some of this seed was provided to Lincoln-Oakes Nursery to grow seedlings for field plantings.

2000-2001: Seed continues to be harvested. No seedlings have been grown yet.

2002: Seed was collected.

2003: No seed was collected. Seedlings will be available for distribution in 2004.

2004: Seed was collected. Forty-five seedlings were sent for field evaluation plantings.

2005: A very large seed crop was harvested.

2006: Four hundred twenty-five seedlings were sent for field plantings in the three-state area.

Table CRAT-1. Native hawthorn accessions established in test plantation (Burleigh Co., North Dakota).

| Accession | County | State |
|---|---|---|
| ND-1523 | Crook | WY |
| ND-1524 | Meade | SD |
| ND-1525 | Lawrence | SD |
| ND-1526 | Crook | WY |
| ND-1533 | Crook | WY |
| ND-1534 | Meade | SD |
| ND-1535 | Oliver | ND |
| ND-1538 | Day | SD |
| ND-1539 | Burleigh | ND |
| ND-1544 | Harding | SD |
| ND-1548 | Meade | SD |
| ND-1549 | Aurora | SD |
| ND-1555 | Wells | ND |
| ND-1566 | Norman | MN |
| ND-1567 | Wells | ND |
| ND-1570 | Marshall | ND |
| ND-1571 | Stutsman | ND |
| ND-1572 | Stutsman | ND |
| ND-1574 | McLean | ND |
| ND-1576 | McLean | ND |
| ND-1577 | Morton | ND |
| ND-1579 | Ransom | ND |
| ND-1580 | Morton | ND |
| ND-1581 | Oliver | ND |
| ND-1582 | Oliver | ND |
| ND-1591 | Ziebach | SD |
| ND-1593 | Deuel | SD |
| ND-1594 | Pennington | SD |
| ND-1596 | Deuel | SD |
| ND-1609 | Campbell | SD |
| ND-1611 | Washabaugh | SD |
| ND-1614 | Dickey | ND |
| ND-1616 | Brown | SD |
| ND-1617 | Brown | SD |
| ND-1618 | Brown | SD |
| ND-1619 | Marshall | SD |
| ND-1620 | Deuel | SD |
| ND-1621 | Roberts | SD |
| ND-1623 | Day | SD |
| ND-1624 | Day | SD |
| ND-1625 | Day | SD |
| ND-1626 | Day | SD |
| ND-1627 | Day | SD |
| ND-1628 | Hamlin | SD |
| ND-1629 | Brookings | SD |
| ND-1632 | Stark | ND |
| ND-1640 | Lake | SD |
| ND-1642 | Fall River | SD |
| ND-1643 | Brookings | SD |
| ND-1644 | Wells | ND |
| ND-1645 | Ramsey | ND |
| ND-1646 | Wells | ND |
| ND-1667 | Carson | SD |
| ND-1669 | Kidder | ND |
| ND-1670 | Kidder | ND |
| ND-1671 | Dunn | ND |
| ND-1673 | Perkins | SD |
| ND-1679 | Spink | SD |
| ND-1680 | Logan | ND |
| ND-1681 | Dickey | ND |
| ND-1683 | McPherson | SD |
| ND-1685 | Kidder | ND |
| ND-1687 | Dickey | ND |
| ND-1689 | Crook | WY |
| ND-1690 | Jerauld | SD |
| ND-1691 | Hand | SD |
| ND-1693 | Beadle | SD |
| ND-1694 | Butte | SD |
| ND-1695 | Marshall | SD |
| ND-1696 | Sheridan | ND |
| ND-1704 | Grant | SD |
| ND-1709 | Gregory | SD |
| ND-1727 | Marshall | SD |
| ND-1728 | Marshall | SD |
| ND-1856 | Grand Forks | ND |

TOTAL: 75 Accessions

Table CRAT-2. Introduced hawthorn species/accessions received from the Canada Agriculture Research Station, Morden, Manitoba, and established in test plantation (Burleigh County, North Dakota).

| Accession | Species | Common Name |
|---|---|---|
| ND-20, ND-1433 | arnoldiana | Arnold |
| ND-658 | canadensis | Canada |
| ND-659 | chlorosarca | blackfruit |
| ND-661 | champlainensis | Champlain |
| ND-665 | pedicellata | Ontario |
| ND-667, ND-1512 | rivularis | river |
| ND-666 | punctata | dotted |
| ND-762 | caesia | -- |
| ND-1018 | edulis | -- |
| ND-1503 | ambigua | Russian |
| ND-1505 | coccinea | scarlet |
| ND-1506 | florentaria | -- |
| ND-1507 | floribunda | -- |
| ND-1508 | franmea | -- |
| ND-1509 | mordenensis | Morden |
| ND-1510 | nudiflora | -- |
| ND-1513 | scabrida | Brainard |
| ND-1514 | skinners dwarf | skinners dwarf |
| ND-1515 | submollis | Quebec |
| ND-1651 | dunbarii | -- |
| ND-1653 | coccinoides | Kansas |
| ND-1654 | dahurica | -- |
| ND-1656 | submollis/arnoldiana | -- |
| ND-1657 | erythropoda | Cerro |
| ND-1658 | strigosa | -- |
| ND-1659 | prunifolia | -- |
| ND-1660 | rivularis/skinners dwarf | -- |
| ND-1661 | intricata | Biltmore |
| ND-1662 | macrosperma | -- |

TOTAL: 29 Species, 31 Accessions

* 14 additional species (individual seed lots) did not germinate or survive transplanting.

Table CRAT-3. Promising native hawthorn accessions.

| Accession | Origin | Scientific Name |
|---|---|---|
| ND-1533 | Crook Co., WY | *C. chrysocarpa* |
| ND-1544 | Harding Co., SD | *C. chrysocarpa* |
| ND-1694 | Butte Co.,, SD | *C. chrysocarpa* |
| ND-1695 | Marshall Co., SD | *C. chrysocarpa* |
| ND-1619 | Marshall Co., SD | |
| ND-1727 | Marshall Co., SD | *C. chrysocarpa,* with some *C. macracantha* characters |
| ND-1728 | Marshall Co., SD | *C. chrysocarpa*, with some *C. macracantha* characters |
| ND-1538 | Day Co., SD | *C. chrysocarpa* |
| ND-1627 | Day Co., SD | intermediate between *C. chrysocarpa* and *C. macracantha* |
| ND-1624 | Day Co., SD | *C. macracantha* |
| ND-1596 | Deuel Co., SD | *C. chrysocarpa* |
| ND-1620 | Deuel Co., SD | *C. chrysocarpa* |
| ND-1628 | Hamlin Co., SD | *C. chrysocarpa* |
| ND-1679 | Spink Co., SD | *C. chrysocarpa* |
| ND-1539 | Burleigh Co., ND | *C. chrysocarpa* |
| ND-1696 | Sheridan Co., ND | intermediate between *C. chrysocarpa* and *C. macracantha* |
| ND-1856 | Grand Forks Co., ND | intermediate between *C. chrysocarpa* and *C. macracantha* |
| ND-1566 | Norman Co., MN | *C. mollis* |

Study 38I015J Apple Creek Township, Burleigh County, North Dakota

Study Title: Evaluation of chokecherry, *Prunus virginiana* L. (North Dakota).

Introduction: Common chokecherry is a winter hardy, drought resistant, native tall shrub or small tree. The shrubby, thicket-forming growth is well suited for wildlife nesting and cover. The twigs, foliage, buds, and fruit are relished by a wide variety of bird and mammal species. It is recommended for outer row plantings of multiple row windbreaks and single row field windbreaks where a dense barrier is desired. Other potential uses include recreational area developments, surface mine revegetation, and rangeland rehabilitation. However, chokecherry is susceptible to several serious diseases including Western-X disease, black knot, and leaf spots.

Objective: The objective is to assemble, comparatively evaluate, select, and release an adapted cultivar and/or cultivars of common chokecherry. Criteria for selection will include growth rate, survival, form, rate of spread, insect and disease resistance, and fruit production. Seed orchards will be established to produce select class and certified seed.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the USDI Fish and Wildlife Service.

Location: Waterfowl Production Area, approximately 5 miles east and 1 mile south of Bismarck, North Dakota, on Old Highway 10. Legal description: N 1/2 sec. 1, T. 138 N., R. 79 W.; S 1/2 sec. 31, T. 139 N., R. 78 W. Elevation is approximately 1700 feet.

Major Land Resource Area: The site is located in Major Land Resource Area 53B, Central Dark Brown Glaciated Plains. Most soils are derived from calcareous glacial till. The gently rolling plain includes some areas of kames and moraines that have irregular topography. Forty percent of the area is rangeland.

Soils: There are eight different soils mapping units in the planting area:

Ta, TaB - Tansem, loam or silt loam, 0 to 3 percent slope.
PI, PB, PBI - Parshall, fine sandy loam or sandy loam, 0 to 3 and 3 to 6 percent slope.
R, R2, RB - Roseglen, loam or silt loam, 0 to 3 percent slope.

The Tansem series consists of deep, well-drained soils formed in loamy sediments on glacial lake plains. The surface layer is dark grayish-brown silt loam 5 inches thick. The subsoil is grayish-brown and light olive brown silt loam 8 inches thick. The substratum is light yellowish-brown and pale yellow silt loam, which is varved in the lower part. Permeability is moderate. Available moisture capacity is high. Organic matter content is moderate and fertility is medium. Slopes are 1-10 percent.

These soils are in North Dakota windbreak suitability group 3. If the moisture is conserved, these soils are well suited to all types of windbreaks and other plantings. Wind and water erosion are the only hazards.

The Roseglen series consists of deep, moderately well-drained soils formed in loamy sediments on glacial lake plains. The surface layer is dark grayish-brown silt loam 8 inches thick. The subsoil is dark grayish-brown and grayish-brown silt loam 26 inches thick. The substratum is light yellowish-brown and light brownish-gray silt loam. Permeability is moderate. Available water capacity, the organic matter content, and fertility are high. Slopes are 0-9 percent.

These soils are found in North Dakota windbreak suitability group 1. In this group are nearly level to sloping soils of the Arnegard, Grail, Grassna, Havelon, Lohler, Magnus, Roseglen, and Straw series. Soil

moisture is favorable for the growth and survival of tree and shrubs. These soils are well suited to all types of windbreaks and other plantings. Soil blowing is a serious hazard on some soils.

The Parshall series consists of deep, well-drained soils formed in fine sandy loam alluvium on terraces and outwash plains and in upland swales. The surface layer is dark grayish-brown fine sandy loam 14 inches thick. The subsoil is dark grayish-brown, very friable fine sandy loam in the upper 17 inches and grayish-brown fine sandy loam in the lower 6 inches. The underlying material is light brownish-gray fine sandy loam in the upper 12 inches and grayish-brown sandy loam buried surface layer in the lower 13 inches. Permeability is moderately rapid. The available water capacity is moderate. The organic matter content is high and fertility is medium. Slopes are 0 to 15 percent.

These soils are in North Dakota windbreak suitability group 5. These are well-drained loams and sandy soils. These soils are suited to windbreak and other plantings, but selection of species is limited. The erosion hazard is serious.

Climate: MLRA 53B. The average annual precipitation is 15 to 18 inches; highest in the growing season. Rainfall is low and somewhat erratic. The average annual temperature is 40 to 60 degrees F. Average freeze-free period is 105 to 140 days. The plant hardiness zone is 3b with an average annual minimum temperature of -40 to -30 degrees F. For the 2006 weather summary, see Table AV-1 on page 184.

**Methods and Materials**

Assembly: The assembly was initiated and completed in 1979. A total of 179 accessions were collected from native stands in North Dakota, South Dakota, and Minnesota. Collection of fruit was made by NRCS field office personnel July through September 1979 and sent to the PMC.

Seed Processing: Collected fruit was processed upon receipt at the PMC. The technique consisted of macerating and washing the fruit to separate the pulp from the seed. The clean seed was dried, weighed, and placed in sealed, cool, dry storage (45 to 60 degrees F, 30 percent relative humidity). Six pounds of fruit yielded one pound of clean seed.

Seedling Establishment: 1979: A containerized method of growing the seedlings was used. A 150-day cold stratification is needed for the germination of chokecherry. In December 1979, 1,000 seeds of each accession were stratified in a moist mixture of one part soil (silty loam), one part perlite, and two parts ground peat moss. The seeds and mixture were placed in small trays at 34 degrees F for 150 days.

1980: In May 1980, the trays were removed from cold stratification and placed in the PMC greenhouse. The seedlings produced were transplanted into 'Styrobloc' containers and placed in the PMC lathhouse area under sprinkler irrigation. Dead seedlings were replaced until transplant seedlings were no longer available. In November, all seedlings were treated with animal repellent, covered with a 6 to 8 inch layer of shingletow for insulation, and stored in the lathhouse over winter. Mouse bait was added for rodent control.

1981: Because of the poor seed germination experienced for some accessions in 1980, additional seed from 31 accessions was stratified (July 17 to December 31, 1980) and planted in plastic trays. Seedlings were then transplanted into 'Styrobloc' containers in November and December 1980, and January 1981. These plants were raised in the greenhouse during the remainder of the winter to allow for a catch-up period of growth. Seedlings were moved into the lathhouse in May 1981.

Overwinter survival of one-year-old seedlings was excellent. No rodent damage was observed. Apparently, leaving the containers outdoors over winter re-stratified seed still remaining in the soil mixture, causing additional germination in May 1981. Although most new seedlings were thinned or removed, some were left to provide additional stock for those accessions which lacked sufficient numbers

in 1980. Because overall growth in containers has been relatively slow, the seedlings were kept in 'Styrobloc' containers one additional year before transplanting to the field in the spring 1983. It was anticipated that the size difference between 2-0 and 3-0 stock would be minimal, but future evaluations will be needed to consider this factor. Plants averaged in size between 6 and 8 inches.

All seedlings were sprinkler irrigated and fertilized on a regular schedule during the year. In November, all materials were treated with animal repellent and covered with shingletow in the lathhouse. Additional insulation protection was provided by several inches of snow.

1982: All seedlings were sprinkler irrigated and fertilized on a regular schedule during the year. Plants averaged in size between 6 to 16 inches in height. All plants were prepared for winter by treating with animal repellent and covering with shingletow.

Planting plan: Test plantation is a randomized block design with some blocks incomplete; four plants per plot with five replications. Spacing is 14 feet between rows and 10 feet within row. An additional outer row was planted to offset border effects. 'Schubert' chokecherry was included as the standard of comparison.

Plot preparation: A clean, firm planting site was prepared by disking and harrowing.

Planting method: All seedlings were planted using the approved forestry methods.

Planting date: May 19, 1983. Replacements were planted in May 1984.

Fertilization: No fertilizer has been applied to planting area.

Weed control: No herbicide was applied to any plot during year of establishment. Mechanical control was by clean cultivating between rows, within rows, and in fallow areas. Four to six tillage operations were performed each year in the months of May through August. Hand hoeing was done as needed to control weeds in row.

1985-1988: In addition to hand hoeing and tillage, a mechanical within row tree cultivator was used twice during the summer. In spring 1987, simazine was applied as a liquid with a pull-type sprayer for within row weed control.

1989: Due to drought conditions, the cover crop seeded in 1988 was only mowed, not tilled. A mechanical within row tree cultivator was used within the rows.

1990-1992: Annual cover crop seeded. Within row cultivation was discontinued to encourage sprouting.

1993-2001: Grass was mowed between rows several times annually. Wormwood and Canada thistle were spot sprayed with Roundup.

Biological control: Malathion has been applied at the recommended rate to control webworms (spot treatment with hand sprayer). Animal repellent was applied in the fall 1983 to discourage rodent damage. In July 1987, a truck mounted sprayer was used to apply malathion to ugly nest caterpillar damage.

Irrigation: None.

Crop residue management: Each year in September, a winter cover crop of oats or rye is seeded between the rows. During the drought years (1988-1990), the area was not worked in order to prevent soil blowing and moisture loss. Weeds were mowed to prevent seed production. In 1993, a permanent cover of sideoats grama, blue grama and black medic was established.

Silvicultural practices: Mechanically damaged limbs were cut and removed each year for sanitation. Weak or diseased trees have not been treated or cleared in order to preserve the integrity of the evaluation process.

Evaluation and Measurement: 1983: Planting date, survival, and plant height were recorded.

1984: Plant performance was recorded in September. Notes were taken on survival, canopy width, and plant height.

1985: In addition to reporting survival, canopy width, and plant height, trees were visually scored for vigor and rate of spread (multi-stem versus tree-like habit).

1986: Plants were evaluated for survival, vigor, plant height, crown width, and disease resistance.

1987: In addition to the above elements, plants were also scored for rate of spread.

1988: Plants were scored for survival, vigor, and seed (fruit) amount.

1989: Plants were rated in May for flowering period. In August, selected trees were rated for form.

1991: Plants were scored for survival and vigor.

1993: Plants were rated for survival and disease resistance in Replications 1 through 4 by Jim Walla and Y.H. Guo of NDSU, and Dallas Dockter, biological aid at the PMC.

1994: Selected plants were rated for disease resistance.

1997: Selected plants were rated for disease symptoms.

2000: All surviving plants were rated.

## Results

Plant performance: 1983: A total of 3,100 plants were planted with a survival rate of 95 percent. Moisture was adequate for plant establishment, weed control was excellent, and little animal damage was noted.

1984: Available replacements were planted in May. All plants became established and performed well. Webworm infestation was severe causing significant defoliation to a large percentage of trees.

1985: Of the original 179 accessions, 160 are established in the plantation. Refer to Table PRVI-ND-1. The cecropia moth caterpillar (*Hyalophora cecropia*) caused significant damage to seven percent of the trees in 1985. Leaf spot was prevalent throughout the plantation. A few individuals already express symptoms of black knot. The presence of webworm was minimal. Both tree-like and dense spreading forms are apparent. Early growth rates are highly variable, ranging from 33 to 71 centimeters per year. Heights up to 225 centimeters (7.5 feet) have been recorded. Survival in 1985 totaled 95 percent. Differences in size and growth rates based on north-south latitudinal origin are not apparent at this early age.

1986: Heights reached up to 290 centimeters (9.5 feet).

1987: Heights reached up to 360 centimeters (12 feet). Sixteen (16) accessions had at least one tree showing symptoms of Western-X disease. Other disease and insect problems included some black knot, webworms, and stem cankers. There was also some very minor simazine damage observed.

1988: Plants that had symptoms of Western-X disease in 1987 did not show any symptoms in 1988. A very heavy fruit crop developed. Some trees are as tall as 14 feet.

1989: Based on data collected in 1987 and 1988 on the chokecherry at Apple Valley, two populations were identified out of the assembly. The first population consisted of profusely suckering plants. These were plants that rated 1 or 2 for suckering, on a 1-9 scale, where 1 was many stems and 9 was a single stem. The second population identified consisted of plants with very few suckers. A total of 101 plants were rated 8 or 9 in 1987, from a total of 71 accessions. A few chokecherry plants died this year. This has been the second year of severe drought. Some of these trees were ones weakened by disease. Some plant specimens were collected by James Walla, Plant Pathologist, NDSU, Fargo, North Dakota. The plant specimens (three from the McKenzie FEP and one from the chokecherry assembly) have tested positive for Western-X disease. All four of these plants had shown symptoms of this disease, such as premature yellowing of the leaves, and much reduced annual growth. This results in a distinct rosetting at the tips of the branches.

1991: Due to prolonged drought plus disease, the chokecherry plants have declined in vigor, especially the trees planted in Replications 1, 2, and 3. Survival by replication is listed in Table PRVI-ND-2. Included in the mortality are many of the plants previously identified as having very little sprouting. Plants that do not sprout may not be able to respond to improved moisture conditions after being weakened.

1993: In the survey of Replications 1-4 in August, Jim Walla identified 65 trees as showing some resistance to the X-disease. This was based on the physical appearance of the plants (Table PRVI-ND-3). Further observations in following years will be needed to see if these few plants continue to show resistance. A polyclonal antibody was developed at NDSU to allow confirmation of whether plants are infected with XMLO (mycoplasma-like organism), the cause of X-disease. Using the polyclonal antibody, with backup by electron microscopy and antibodies, and a DNA probe, XMLO was confirmed to be the cause of the disease. The polyclonal antibody needs further testing to determine its usefulness in screening plants for infection.

1994: Personnel from NDSU made controlled crossings of selected chokecherry plants. These crossings were between apparently disease resistant plants and susceptible plants. The plants were injected with oxytetracycline to prevent fruit abortion and to encourage flower bud formation in 1995. Most of the fruit did not mature. Of the controlled crossings, only one plant developed mature fruit.

1997: Western-X disease is caused by a specialized type of bacterium called a phytoplasma. It is suspected that the phytoplasma is spread from infected plants to healthy plants by leafhoppers. In 1997, an inventory of leafhoppers was taken at the Apple Valley planting by personnel from PFRA at Indianhead, Saskatchewan. These insects have not yet been analyzed for the presence of Western-X disease.

2000: Survival and vigor notes were taken on August 22, 2000.

2003: For a number of years, NDSU staff has been growing clones of selected chokecherry from tissue gathered from the Apple Valley planting. In June, many of these chokecherry plants were established in a replicated crossing block at Lincoln-Oakes Nursery (Table PRVI-ND-4). There were insufficient plants to make a complete block. In future years, the block will be filled in. Each clone was planted in 3-plant plots, with one control and two plants grafted with susceptible plant tissue.

2004: Several more clones were planted in June, 2004. Lincoln-Oakes Nursery performed the maintenance on the block. The plants were evaluated in the fall for survival and vigor.

2005: Additional clones were planted in July, 2005. Also plants of some clones were replaced due to incomplete survival. Lincoln-Oakes Nursery maintained the plots. Evaluations were made in September 2005 on survival and vigor. The block (see Table PRVI-ND-4) is still incomplete.

2006: Additional clones were planted in June 2006. The block is still incomplete.

Table PRVI-ND-1. Accessions of chokecherry established in test plantation (Burleigh County, North Dakota).

| Accession | County | State |
|---|---|---|
| ND-1941 | Burleigh | ND |
| ND-1949 | Golden Valley | ND |
| ND-1958 | Sargent | ND |
| ND-1970 | Slope | ND |
| ND-1971 | McLean | ND |
| ND-1973 | Grand Forks | ND |
| ND-1980 | Grant | ND |
| ND-1982 | Emmons | ND |
| ND-1989 | Morton | ND |
| ND-1990 | Pembina | ND |
| ND-1992 | Cass | ND |
| ND-2001 | Traill | ND |
| ND-2009 | McHenry | ND |
| ND-2010 | Sheridan | ND |
| ND-2012 | Foster | ND |
| ND-2013 | Mercer | ND |
| ND-2015 | Ward | ND |
| ND-2018 | Barnes | ND |
| ND-2019 | Slope | ND |
| ND-2029 | Logan | ND |
| ND-2034 | Ramsey | ND |
| ND-2035 | Nelson | ND |
| ND-2036 | Bottineau | ND |
| ND-2039 | Stark | ND |
| ND-2040 | Billings | ND |
| ND-2041 | Griggs | ND |
| ND-2042 | Benson | ND |
| ND-2047 | Oliver | ND |
| ND-2055 | Wells | ND |
| ND-2056 | Benson | ND |
| ND-2061 | Towner | ND |
| ND-2069 | Mclntosh | ND |
| ND-2070 | Steele | ND |
| ND-2097 | Ramsey | ND |
| ND-3001 | Stutsman | ND |
| ND-3635 | Dunn | ND |
| ND-3641 | Pierce | ND |
| ND-3644 | Williams | ND |
| ND-3666 | Mountrail | ND |
| ND-3674 | Cavalier | ND |
| ND-3677 | Wells | ND |
| TOTAL (North Dakota): 41 Accessions | | |
| ND-1904 | Mellette | SD |
| ND-1905 | Minnehaha | SD |
| ND-1908 | Walworth | SD |
| ND-1910 | Potter | SD |
| ND-1917 | Sully | SD |
| ND-1918 | Stanley | SD |
| ND-1919 | Hughes | SD |
| ND-1920 | Campbell | SD |
| ND-1921 | Kingsbury | SD |
| ND-1922 | Hamlin | SD |
| ND-1927 | Buffalo | SD |
| ND-1930 | Haakon | SD |
| ND-1935 | Day | SD |
| ND-1940 | Gregory | SD |
| ND-1945 | Tripp | SD |
| ND-1957 | Lawrence | SD |
| ND-1959 | McCook | SD |
| ND-196I | Hughes | SD |
| ND-1962 | Hyde | SD |
| ND-1968 | Clay | SD |
| ND-1969 | Pennington | SD |
| ND-I985 | Sanborn | SD |
| ND-1994 | Lake (pin cherry) | SD |
| ND-1996 | Bon Homme | SD |
| ND-2002 | Ziebach | SD |
| ND-2004 | Brown | SD |
| ND-2005 | McPherson | SD |
| ND-2006 | McPherson | SD |
| ND-2007 | Tripp | SD |
| ND-2022 | Bennett | SD |
| ND-2025 | Jerauld | SD |
| ND-2028 | Spink | SD |
| ND-2032 | Codington | SD |
| ND-2063 | Marshall | SD |
| ND-2067 | Roberts | SD |
| ND-2077 | Perkins | SD |
| ND-3626 | Faulk | SD |
| ND-3633 | Dewey | SD |
| ND-3671 | Lyman | SD |
| TOTAL (South Dakota): 38 accessions | | |
| ND-1893 | Dakota | MN |
| ND-1894 | Watonwan | MN |
| ND-1895 | Freeborn | MN |
| ND-1896 | Waseca | MN |
| ND-1897 | Rock | MN |
| ND-1898 | Big Stone | MN |
| ND-1899 | Jackson | MN |
| ND-1900 | Lincoln | MN |
| ND-1901 | Brown | MN |
| ND-1902 | Pipestone | MN |
| ND-1903 | Scott | MN |
| ND-1906 | Cottonwood | MN |

| Accession | County | State |
|---|---|---|
| ND-1907 | Murray | MN |
| ND-1909 | Ramsey | MN |
| ND-1911 | Sibley | MN |
| ND-1912 | Carver | MN |
| ND-1913 | LeSueur | MN |
| ND-1914 | Lyon | MN |
| ND-1916 | Blue Earth | MN |
| ND-1925 | Martin | MN |
| ND-1929 | Mahnomen | MN |
| ND-1931 | Norman | MN |
| ND-1932 | Mower | MN |
| ND-1933 | Traverse | MN |
| ND-1934 | Pope | MN |
| ND-1936 | Swift | MN |
| ND-1938 | Fairbault (pin cherry) | MN |
| ND-1939 | Mille Lacs | MN |
| ND-1947 | Nobles | MN |
| ND-1948 | Kanabec | MN |
| ND-1951 | Meeker | MN |
| ND-1952 | Fillmore | MN |
| ND-1954 | Grant | MN |
| ND-1955 | Stearns | MN |
| ND-1956 | Houston | MN |
| ND-1964 | Douglas | MN |
| ND-1965 | Clay | MN |
| ND-1966 | Chisago | MN |
| ND-1974 | East Polk | MN |
| ND-1975 | Wadena | MN |
| ND-1976 | West Polk | MN |
| ND-1977 | Yellow Medicine | MN |
| ND-1978 | Lake of the Woods | MN |
| ND-1979 | Redwood | MN |
| ND-1981 | Ottertail | MN |
| ND-1983 | Sherburne | MN |
| ND-1984 | Becker | MN |
| ND-1987 | Red Lake | MN |
| ND-1988 | Pennington | MN |
| ND-1993 | Stearns | MN |
| ND-1998 | Todd | MN |
| ND-1999 | McLeod | MN |
| ND-2000 | Carlton | MN |
| ND-2003 | Morrison | MN |
| ND-2016 | Benton | MN |
| ND-2017 | Hubbard | MN |
| ND-2020 | Kandiyohi | MN |
| ND-2021 | Kittson | MN |
| ND-2024 | Winona | MN |
| ND-2027 | Marshall | MN |
| ND-2030 | Cass | MN |
| ND-2031 | Clearwater | MN |
| ND-2044 | Crow Wing | MN |
| ND-2045 | Stevens | MN |
| ND-2048 | Washington | MN |
| ND-2049 | Wabasha | MN |
| ND-2051 | Steele | MN |
| ND-2052 | Rice | MN |
| ND-2053 | Clay | MN |
| ND-2057 | Ottertail | MN |
| ND-2062 | Koochiching | MN |
| ND-2060 | Beltrami | MN |
| ND-2065 | Anoka (pin cherry) | MN |
| ND-2072 | Aitkin | MN |
| ND-3003 | Pine | MN |
| ND-3004 | Itasca | MN |
| ND-3636 | Cook | MN |
| ND-3637 | Ramsey | MN |
| ND-3643 | Stearns | MN |
| ND-3665 | Lake | MN |
| ND-3675 | St. Louis | MN |

TOTAL (Minnesota): 79 Accessions

| | |
|---|---|
| ND-2363 | (unknown origin) |
| ND-2400 | (unknown origin) |

TOTAL (3 States): 160 Accessions

Table PRVI-ND-2. Survival in the Chokecherry Assembly at Apple Valley, 1991, following 3 years of below normal precipitation.

| | **Trees Planted 1983** | **Trees Surviving 1991** | **Percent Survival** |
|---|---|---|---|
| Rep 1 | 672 | 466 | 69 |
| Rep 2 | 660 | 472 | 72 |
| Rep 3 | 648 | 423 | 65 |
| Rep 4 | 640 | 561 | 88 |
| Rep 5 | 616 | 527 | 86 |
| **TOTAL** | **3236** | **2449** | **76** |

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Table PRVI-ND-3. Numbers of trees showing resistance to x-disease in replications 1, 2, 3, and 4 in 1993.

| Accession | Origin | Rep. 1 | Rep. 2 | Rep. 3 | Rep. 4 |
|---|---|---|---|---|---|
| ND-2400 | unknown | 1 | 4 | | |
| ND-1982 | Emmons Co., ND | 4 | | | |
| ND-2010 | Sheridan Co., ND | 1 | 1 | 1 | |
| ND-1980 | Grant Co., ND | | 1 | | |
| ND-2013 | Mercer Co., ND | | 4 | 2 | 1 |
| ND-2055 | Wells Co., ND | | 1 | | |
| ND-2056 | Benson Co., ND | | 1 | | |
| ND-1949 | Golden Valley Co., ND | | | 1 | 2 |
| ND-2015 | Ward Co., ND | | | 1 | 1 |
| ND-2029 | Logan Co., ND | | 1 | 1 | |
| ND-3674 | Cavalier Co., ND | | | 1 | 1 |
| ND-1941 | Burleigh Co., ND | | | | 1 |
| ND-1970 | Slope Co., ND | | | | 1 |
| ND-2069 | McIntosh Co., ND | | | | 1 |
| ND-3644 | Williams Co., ND | | | | 3 |
| ND-1921 | Kingsbury Co., SD | | 1 | | |
| ND-1908 | Walworth Co., SD | | | 2 | 1 |
| ND-1918 | Stanley Co., SD | | | 1 | |
| ND-2006 | McPherson Co., SD | | | 2 | 2 |
| ND-1921 | Kingsbury Co., SD | | | | 2 |
| ND-1945 | Tripp Co., SD | | | | 1 |
| ND-1969 | Pennington Co., SD | | | | 1 |
| ND-2002 | Ziebach Co., SD | | | | 1 |
| ND-2022 | Bennett Co., SD | | | | 4 |
| ND-2025 | Jerauld Co., SD | | | | 1 |
| ND-2028 | Spink Co., SD | | | | 1 |
| ND-2032 | Codington Co., SD | | | | 2 |
| ND-2077 | Perkins Co., SD | | | | 1 |
| ND-1964 | Douglas Co., MN | | | 2 | |
| ND-1947 | Nobles Co., MN | | | | 1 |
| ND-2016 | Benton Co., MN | | | | 1 |
| ND-3675 | St. Louis Co., MN | | | | 1 |

Table PRVI-ND-4. Chokecherry planting plan at Lincoln-Oakes Nursery, Bismarck, ND.

| BLOCK 1 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Row | I | II | III | IV | V | VI | VII | VIII |
| | 7 a | D c | R b | QQ c | JJ b | 4 a | 19 b | U c |
| | 7 c | D b | R a | QQ b | JJ c | 4 b | 19 a | U b |
| | 7 b | D a | R c | QQ a | JJ a | 4 c | 19 c | U a |
| | BB c | 17 b | GG b | NN b | Q c | 3 a | E a | 21 b |
| | BB a | 17 c | GG c | NN a | Q b | 3 c | E b | 21 c |
| | BB b | 17 a | GG a | NN c | Q a | 3 b | E c | 21 a |
| | CC c | 10 b | P c | N c | I b | 8 b | 23 b | |
| | CC a | 10 c | P a | N b | I a | 8 c | 23 a | |
| | CC b | 10 a | P b | N a | I c | 8 a | 23 c | |
| | W c | S c | 2 a | H b | OO c | AA b | B b | |
| | W a | S b | 2 c | H a | OO a | AA c | B a | |
| | W b | S a | 2 b | H c | OO b | AA a | B c | |
| | | | | | | | | |
| BLOCK 2 | | | | | | | | |
| Row | I | II | III | IV | V | VI | VII | VIII |
| | OO b | P c | JJ a | GG a | AA a | 3 a | N b | QQ c |
| | OO c | P a | JJ b | GG b | AA c | 3 c | N c | QQ b |
| | OO a | P b | JJ c | GG c | AA b | 3 b | N a | QQ a |
| | 17 b | BB a | 4 a | 8 b | Q b | 23 c | S b | I b |
| | 17 a | BB b | 4 b | 8 c | Q c | 23 b | S c | I c |
| | 17 c | BB c | 4 c | 8 a | Q a | 23 a | S a | I a |
| | R c | 2 c | E a | W c | 19 b | 10 c | CC c | |
| | R a | 2 b | E c | W a | 19 c | 10 b | CC a | |
| | R b | 2 a | E b | W b | 19 a | 10 a | CC b | |
| | NN b | U b | B b | 7 a | 21 c | D b | H c | |
| | NN c | U c | B c | 7 b | 21 a | D c | H a | |
| | NN a | U a | B a | 7 c | 21 b | D a | H b | |
| | | | | | | | | |
| BLOCK 3 | | | | | | | | |
| Row | I | II | III | IV | V | VI | VII | VIII |
| | 4 c | H c | N b | D b | E a | JJ a | P b | S b |
| | 4 a | H b | N a | D c | E c | JJ b | P a | S a |
| | 4 b | H a | N c | D a | E b | JJ c | P c | S c |
| | CC a | Q b | QQ a | 7 c | 10 b | BB b | AA b | 17 c |
| | CC b | Q a | QQ b | 7 b | 10 c | BB a | AA c | 17 b |
| | CC c | Q c | QQ c | 7 a | 10 a | BB c | AA a | 17 a |
| | OO c | U c | W a | R b | GG c | 2 b | I c | |
| | OO a | U b | W b | R a | GG a | 2 a | I b | |
| | OO b | U a | W c | R c | GG b | 2 c | I a | |
| | 8 a | B b | 19 c | 23 b | 21 c | 3 b | NN c | |
| | 8 b | B a | 19 a | 23 a | 21 b | 3 a | NN b | |
| | 8 c | B c | 19 b | 23 c | 21 a | 3 c | NN a | |

| BLOCK 4 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Row | I | II | III | IV | V | VI | VII | VIII |
| | BB a | B a | QQ c | AA b | 17 c | 23 c | 21 a | 10 b |
| | BB c | B c | QQ b | AA a | 17 a | 23 a | 21 b | 10 a |
| | BB b | B b | QQ a | AA c | 17 b | 23 b | 21 c | 10 c |
| | 2 b | U c | GG c | 19 c | W c | I c | S a | 7 a |
| | 2 c | U b | GG a | 19 a | W b | I b | S c | 7 b |
| | 2 a | U a | GG b | 19 b | W a | I a | S b | 7 c |
| | E b | H c | N b | CC b | QQ c | R c | 4 c | |
| | E c | H a | N a | CC c | QQ b | R b | 4 b | |
| | E a | H b | N c | CC a | QQ a | R a | 4 a | |
| | D c | P a | 8 a | JJ a | 3 a | NN b | OO a | |
| | D a | P c | 8 c | JJ b | 3 c | NN c | OO b | |
| | D b | P b | 8 b | JJ c | 3 b | NN a | OO c | |

| BLOCK 5 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Row | I | II | III | IV | V | VI | VII | VIII |
| | 8 b | 23 b | B b | JJ b | GG a | AA b | 10 a | NN a |
| | 8 a | 23 a | B c | JJ a | GG b | AA c | 10 c | NN b |
| | 8 c | 23 c | B a | JJ c | GG c | AA a | 10 b | NN c |
| | I c | BB c | N b | R b | QQ b | 2 b | D a | P b |
| | I b | BB b | N c | R a | QQ c | 2 c | D b | P a |
| | I a | BB a | N a | R c | QQ a | 2 a | D c | P c |
| | OO a | W c | CC a | E b | 21 c | S a | 7 b | |
| | OO c | W b | CC c | E c | 21 a | S c | 7 a | |
| | OO b | W a | CC b | E a | 21 b | S b | 7 c | |
| | U b | Q b | 17 a | 19 c | 3 b | H a | 4 c | |
| | U c | Q c | 17 c | 19 b | 3 c | H c | 4 b | |
| | U a | Q a | 17 b | 19 a | 3 a | H b | 4 a | |

| BLOCK 6 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Row | I | II | III | IV | V | VI | VII | VIII |
| | N c | 7 b | JJ c | I b | 19 b | OO b | AA a | GG a |
| | N a | 7 a | JJ b | I a | 19 a | OO c | AA c | GG b |
| | N b | 7 c | JJ a | I c | 19 c | OO a | AA b | GG c |
| | 2 c | BB b | 4 b | R a | CC b | W a | NN b | S b |
| | 2 b | BB c | 4 a | R b | CC c | W c | NN c | S c |
| | 2 a | BB a | 4 c | R c | CC a | W b | NN a | S a |
| | 10 b | D c | QQ b | P b | Q b | 17 a | B a | |
| | 10 c | D b | QQ a | P a | Q a | 17 c | B b | |
| | 10 a | D a | QQ c | P c | Q c | 17 b | B c | |
| | 8 b | 23 b | 21 b | E a | 3 b | U a | H c | |
| | 8 a | 23 c | 21 c | E c | 3 c | U b | H b | |
| | 8 c | 23 a | 21 a | E b | 3 a | U c | H a | |

**MAJOR SEED SOURCE STUDIES AND ASSEMBLIES: TECHNICAL REPORT – 2006**

Study NDPMC-T-0008-WL

Study Title: Native Shrubs for Conservation, Skunkbush sumac *Rhus trilobata*

Introduction: Skunkbush sumac is a native shrub which has been used to a limited extent in wildlife plantings, as well as other conservation plantings. It does have potential for use in riparian plantings. In 1979 the variety 'Bighorn' was released by the New Mexico PMC. This accession originated from Basin, Wyoming, where the precipitation is 6.7 inches. There is some indication Bighorn skunkbush sumac is affected by rust when planted in areas of higher precipitation.

Objective: The PMC would like to find a selection from the Dakotas, east of the Badlands. This species has been reported to occur as far east as Emmons County, ND. There is a need for a selection which is adapted to more humid climates than the original Bighorn source. Seed sources from the most northern and most eastern ecotypes will be collected.

Cooperators: USDA, NRCS Plant Materials Center and Lincoln-Oakes Nursery, Bismarck, ND.

Species Description: Skunkbush sumac is a deciduous, flowering native shrub. It grows 2 to 12 feet tall, but averages about 4 feet tall. It has a taproot and a fibrous root system. Roots are deep and extensively branched with somewhat shallow, spreading woody rhizomes. It sprouts readily from the root crown, especially after a severe disturbance. It is unlikely to reproduce vegetatively in the absence of disturbance. This sumac is reported to be dioecious. It is animal-pollinated, presumably by small mammals. It reportedly has low seed production. It is estimated that only 5 to 15 percent of the flowers on the female plants actually produced seed. Acute drought may shorten twig growth and prevent fruit production. Sumac is tolerant of most soil textures, but prefers well-drained sites. It is intolerant of flooding and high-water tables.

Collection/Assembly: In September 1999, seed collections were made at 2 sites in the Cave Hills area of Harding County, SD. In September 2004, another collection was made, which was a composite of the two sites collected in 1999. In 2006, some collections were made in a number of locations, but possibly due to the drought, only small amounts were found. In South Dakota, seed was collected in Sully, Lyman, Todd, Ziebach, and Jones County. In North Dakota, seed was collected in Billings, Dunn, Slope, Golden Valley, and McKenzie County. One collection was also made in Powder River County, MT.

Seedlings were grown of the Cave Hills collections. In the spring of 2001, only a few seedlings of 9082651 (north Cave Hills) were still alive. Survival of 9082653 (south Cave Hills) was much better. In 2003 seedlings of 9082653 were planted in the Off-Center Evaluation Sites at Dickinson and Apple Valley. They are performing well.

# SELECTION AND INCREASE

## SELECTION AND INCREASE: TECHNICAL REPORT – 2006

### Promising Woody Plant Material

The following accessions show potential for further evaluation:

| Accession Number | Genus/species | Origin/source |
|---|---|---|
| ND-428<br>9005970 | black walnut<br>*Juglans nigra* | NDSU, Fargo, ND |
| ND-500<br>9005977 | Siberian larch<br>*Larix sibirica* | Res. Sta., Morden, MB, Canada |
| ND-1030<br>9005657 | Ohio buckeye<br>*Aesculus glabra* | Murray Co., MN |
| PI-323957 | black chokeberry<br>*Photinia melanocarpa* | P.I. Sta., Ames, IA |
| SD-13<br>9005888 | green ash<br>*Fraxinus pennsylvanica* | Potter Co., SD |
| SD-156<br>9005890 | green ash<br>*Fraxinus pennsylvanica* | Deuel Co., SD |
| ND-647<br>9005887 | black ash<br>*Fraxinus nigra* | Res. Sta., Morden, MB, Canada |
| ND-630<br>9006096 | bur oak<br>*Quercus macrocarpa* | Barnes Co., ND |
| Mich-768<br>9012606 | horizontal juniper<br>*Juniperus horizontalis* | USDA-NRCS, PMC, East Lansing, MI |
| ND-21<br>9034900 | nannyberry<br>*Viburnum lentago* | USDA, ARS, Mandan, ND |
| Dart's Golden<br>9019601 | dwarf ninebark<br>*Physocarpus opulifolius* | P.I. Station, Ames, IA |
| ND-170<br>9005728 | cotoneaster<br>*Cotoneaster integerrimus* | Kingsbury Co., SD |

**SELECTION AND INCREASE: TECHNICAL REPORT – 2006**

**Final Evaluation and Release Schedule**

| **Genus/Species:** | ***Aronia melanocarpa*** |
|---|---|
| **Common Name:** | **black chokeberry** |
| **Accession/PI Number:** | **PI-323957** |
| Source: | USDA, ARS, Plant Introduction Station, Ames, IA |
| Outstanding characteristics: | Winter hardiness, disease and insect resistance, excellent fruit production, fall color, and does not sucker |
| Anticipated Release Cooperators: | North Dakota, South Dakota, and Minnesota Agricultural Experiment Stations |
| Intended Use: | farmstead windbreaks, wildlife, recreational and urban plantings, and agroforestry applications such as fruit orchards |

| **Genus/Species:** | ***Ribes americanum*** |
|---|---|
| **Common Name:** | **American black currant** |
| **Accession/PI Number:** | **9082687** |
| Source: | Native collection by Big Sioux Nursery staff along the Big Sioux River near Watertown, South Dakota |
| Outstanding characteristics: | Excellent establishment, vigorous growth, disease and insect resistance, excellent fruit production, attractive fall color |
| Anticipated Release Cooperators: | North Dakota, South Dakota, and Minnesota Agricultural Experiment Stations and the South Dakota Association of Conservation Districts |
| Intended Use: | Wildlife and recreational plantings, farmstead windbreaks, and agroforestry applications such as fruit orchards |

| **Genus/Species:** | ***Crataegus chrysocarpa*** |
|---|---|
| **Common Name:** | **hawthorn, roundleaf or fireberry** |
| **Accession/PI Number:** | **9076678** |
| Source: | A composite of seed from selected native plants from 5 counties in South Dakota, including Butte, Marchall, Day, Hamlin, and Harding. The original plants were evaluated and selected from a large replicated nursery. |
| Outstanding characteristics: | Excellent survival on a variety of sites with excellent fruit production and a long life span |
| Anticipated Release Cooperators: | North Dakota, South Dakota, and Minnesota Agricultural Experiment Stations |
| Intended Use: | Wildlife and recreational plantings, farmstead windbreaks, and agroforestry applications such as fruit orchards. |

| | |
|---|---|
| **Genus/Species:** | ***Celtis occidentalis*** |
| **Common Name:** | **hackberry** |
| **Accession/PI Number:** | **9034596, ND-3878** |
| Source: | The original plants were selected from a large, replicated nursery at the ARS Northern Great Plains Research Laboratory, at Mandan, North Dakota. This accession was originally collected by James Ayen from native trees belonging to Roger Wagner. The site was along the Red Lake River near Fisher, Minnesota in Polk County. |
| Outstanding characteristics: | This selection is a northern origin source with early maturity and exceptional winter hardiness. Growth rates are equal to or greater than many other more southern sources. Seed production is excellent. |
| Anticipated Release Cooperators: | North Dakota, South Dakota, and Minnesota Agricultural Experiment Stations |
| Intended Use: | Wildlife and recreational plantings, farmstead windbreaks |

**SELECTION AND INCREASE: TECHNICAL REPORT – 2006**

Seed Orchard, Apple Creek Township, Burleigh County, North Dakota.

Introduction: An adequate source of certified and selected seed is essential for the production and promotion of seed propagated cultivars. Certified tree seed from promising selections must be available for advanced evaluations, progeny testing, and commercial nursery production in limited quantity. This can be accomplished by designating seed production areas and establishing seed orchards that are properly designed, isolated, and maintained. Sites should be selected on the basis of soils, location, accessibility, and ease of management.

Objectives: To provide an abundant local source of certified tree seed of released varieties and promising selections.

Cooperators: The USDA Natural Resources Conservation Service, Plant Materials Center, Bismarck, North Dakota, in cooperation with the USDI Fish and Wildlife Service, Burleigh County, Bismarck, North Dakota.

Location: Waterfowl Production Area, approximately 5 miles east and 1 mile south of Bismarck, North Dakota on Old Highway 10. Legal description: N 1/2 of sec. 1, T. 138 N., R. 79 W.; S 1/2 of sec.31, T. 139 N., R. 78 W. Elevation is approximately 1,700 feet.

Major Land Resource Area: The site is located in Major Land Resource Area 053B, Dark Brown Glaciated Plain. Most soils are derived from calcareous glacial till. The gently rolling plain includes some areas of kames and moraines that have irregular topography. Forty percent of the area is rangeland.

Soils: There are seven different soils mapping units in the planting area:
R - Roseglen loam or silt loam, 0 to 3 percent slope.
RB - Roseglen loam or silt loam, 3 to 6 percent slope.
Ta, Ta2 - Tansem loam or silt loam, 0 to 3 percent slope.
TaB, TaB2 - Tansem loam or silt loam, 3 to 6 percent slope.
P, Pl - Parshall, fine sandy loam or sandy loam, 0 to 3 percent slope.
TeB - Telfer fine sandy loam or sandy loam, 3 to 6 percent slope.
Tyl - Tally fine sandy loam or sandy loam, 0 to 3 percent slope.

The Tansem series consists of deep, well-drained soils formed in loamy sediments on glacial lake plains. The surface layer is dark grayish-brown Silt loam 5 inches thick. The subsoil is grayish-brown and light olive brown silt loam 8 inches thick. The substratum is light yellowish-brown and pale yellow silt loam, which is varved in lower part. Permeability is moderate. Available moisture capacity is high. Organic matter content is moderate and fertility is medium. Slopes are 1-10 percent. These soils are in North Dakota windbreak suitability group 3.

The Roseglen series consists of deep, moderately well-drained soils formed in loamy sediments on glacial lake plains. The surface layer is dark grayish-brown silt loam 8 inches thick. The subsoil is dark grayish-brown and grayish-brown silt loam 26 inches thick. The substratum is light yellowish-brown and light brownish-gray silt loam. Permeability is moderate. Available water capacity, the organic matter content, and fertility are high. Slopes are 0-9 percent. These soils are in North Dakota windbreak suitability group 1.

The Parshall series consists of deep, well-drained soils formed in fine sandy loam alluvium on terraces and outwash plains and in upland swales. The surface layer is dark grayish-brown fine sandy loam 14 inches thick. The subsoil is dark grayish-brown, very friable fine sandy loam in the upper 17 inches and grayish-brown fine sandy loam in the lower 6 inches. The underlying material is light brownish-gray fine sandy

loam in the upper 12 inches and grayish-brown sandy loam buried surface layer in the lower 13 inches. Permeability is moderately rapid. The available water capacity is moderate. The organic matter content is high and fertility is medium. Slopes are 0-15 percent. These soils are in North Dakota windbreak suitability group 5.

Climate: MLRA 053. The average annual precipitation is 15 to 18 inches; highest in the growing season. Rainfall is low and somewhat erratic. The average annual temperature is 40 to 60 degrees F. Average freeze-free period is 105 to 140 days. The plant hardiness zone is 3b with an average annual minimum temperature of -40 to -30 F. For the 2006 weather summary, see Table AV-1 on page 184. The nearest official station is at Bismarck, North Dakota.

**Methods and Materials**

Assembly: Refer to Table SDIN-AV-1 for status of woody species planted.

Planting plan: The seed increase planting site consists of blocks 1, 2, 3, and 4 (Figure AV-1). Rows are 250 feet long. Spacing is 25 feet between rows and 10 feet within row for trees; 5 feet within row for shrubs.

Plot preparation: A clean, firm planting site was prepared annually by disking, and harrowing.

Planting method: All trees and shrubs were planted using approved forestry methods.

Planting date: Refer to Table SDIN-AV-1 for year of planting from 1979 through 1988.

Fertilization: No fertilizer has been applied to planting area.

Weed control: No herbicide was applied to any plot during year of establishment or in succeeding years. Mechanical control was by clean cultivating between rows and in fallow areas. A specialized within row tree cultivator was used twice annually beginning in 1985. Two to four tillage operations were performed each year during the months of May through August. Hand hoeing was done as needed to control weeds in row. Some spot spraying of weeds is done annually. A small patch of leafy spurge is being closely monitored.

Biological control: No insecticides have been applied. Animal repellant (Arasan-50 Red) was applied in the fall of 1979-82 to discourage rodent damage. Wire cages had been placed around the 'Midwest' Manchurian crabapple to control deer browse. In 1987, wire cages were taken off the crabapple and placed on the 'Oahe' hackberry and 'Scarlet' Mongolian cherry. In 1991, the cages on the Oahe were raised up to four feet. Tubex were placed on the 'Homestead' Arnold hawthorn. In 1994, wire cages were installed on the 'Homestead' Arnold hawthorn to protect them from deer. Cages have been removed from the hackberry and the hawthorn.

Irrigation: Each year, newly planted materials were watered by hand. In 1980, water was added once a week due to extreme dry conditions.

Crop residue management: From 1980 through 1985, a winter cover crop of oats was seeded between rows in September. No cover crop was seeded in previous years. In 1986 and 1988, a rye cover crop was seeded. Due to dry conditions, the cover crop seeded in 1988 was not worked up; it was mowed. In 1993, a permanent cover of sideoats grama, blue grama, and black medic was established. Grass was mowed between rows, and some within-row weed control was done with a rotary cultivator (1993-1997). Weeds were spot sprayed and grass was mowed between rows (2000-2005).

Silvicultural practices: Dead trees and broken branches were cut and removed each year for sanitation. Any new growth below graft union was removed. In 1991, most of the Midwest crabapple and the Oahe hackberry received some minor pruning to remove multiple stems and excess lower branches.

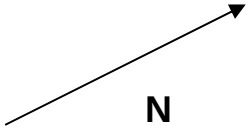
Seed harvest: Amounts of seed harvested in 1985 through 2006 are recorded in Table SDIN-AV-1.

**Figure AV-1.**

# Apple Valley Seed Orchard

**(N½ sec. 1, T. 138 N., R. 79 W.)**

| Row # | Block 1 | Block 2 |
|---|---|---|
| 1 | | |
| 2 | Bighorn | McDermand |
| 3 | Skunkbush | Ussurian |
| 4 | Sumac | Pear |
| 5 | (mostly dead) | |
| 6 | | |
| 7 | ND-313 | |
| 8 | Red Tatarian | Midwest |
| 9 | Honeysuckle | Manchurian |
| 10 | ND-629 | Crabapple |
| 11 | Amur maple | |
| 12 | SD-131 | |
| 13 | Mayday | Cardan |
| 14 | Sakakawea | Green |
| 15 | Silver buffaloberry | Ash |
| 16 | Centennial | |
| 17 | Cotoneaster | |
| 18 | Scarlet | Oahe |
| 19 | Mongolian cherry | Hackberry |
| 20 | ND-1134 | |
| 21 | Select plum | |




| Block 4 |
|---|
| Legacy |
| Late lilac |
| Regal |
| Russian almond |

| Block 3 |
|---|
| Homestead |
| Arnold |
| Hawthorn |

**Table SDIN-AV-1. Seed Orchard Harvest, 1985-2006.**

| Block/ Rows | Accession | Species | Year Planted | Year of Harvest | Clean Weight (lbs) | Remarks |
|---|---|---|---|---|---|---|
| 1/10-11 | ND-629 | amur maple | 1980 | 1985 | 3.0 | plants vary in height |
| | | | | 1988 | 10.5 | |
| | | | | 1989 | 6.0 | |
| 1/14-15 | 'Sakakawea' | buffaloberry | 1985 | 1989 | 0.26 | |
| | | | | 1993 | 7.0 | |
| | | | | 1995 | 0.18 | |
| | | | | 1998 | 6.0 | |
| 1/16-17 | 'Centennial' | European cotoneaster | 1985 | 1988 | 0.76 | |
| | | | | 1989 | 27.0 | |
| | | | | 1993 | 34.0 | |
| | | | | 1994 | 13.0 | |
| | | | | 2006 | 1.1 | |
| 1/20-21 | ND-1134 | select plum | 1985 | 1993 | 0.33 | not adapted to soils |
| | | | | 1994 | 4.1 | |
| 2/1-6 | 'McDermand' | Ussurian pear | 1979 | 1993 | 1.4 | |
| | | | | 1998 | 9.0 | |
| 2/7-11 | 'Midwest' | Manchurian crabapple | 1980 | 1989 | 4.5 | |
| | | | | 1993 | 2.5 | |
| | | | | 1995 | 0.15 | |
| | | | | 1999 | 1.0 | |
| 2/12-15 | 'Cardan' | green ash | 1980 | 1985 | 1.75 | |
| | | | | 1987 | 131.0 | |
| | | | | 1988 | 0.9 | |
| | | | | 1989 | 3.5 | |
| | | | | 1991 | 18.5 | |
| | | | | 1992 | 282.0 | |
| | | | | 1993 | 12.0 | |
| | | | | 1997 | 6.0 | |
| | | | | 1998 | 37.0 | |
| | | | | 1999 | 6.0 | |
| | | | | 2000 | 4.0 | |
| | | | | 2003 | 7.75 | |
| 2/17-21 | 'Oahe' | hackberry | 1981 | 2000 | 1.0 | caged from deer |
| 3 | 'Homestead' | hawthorn | 1988 | 1998 | 0.25 | caged from deer |
| 4 | 'Regal' | Russian almond | 1988 | 1996 | 13.0 | |
| | | | | 1997 | 21.0 | |

# RELEASES

ANNOUNCING THE RELEASE OF THE CULTIVAR

# 'PRAIRIE RED' HYBRID PLUM

by the
UNITED STATES DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

and the
SOUTH DAKOTA
AGRICULTURAL EXPERIMENT STATION

and the
NORTH DAKOTA
AGRICULTURAL EXPERIMENT STATION

and the
MINNESOTA
AGRICULTURAL EXPERIMENT STATION

and the
SOUTH DAKOTA
ASSOCIATION OF CONSERVATION DISTRICTS

The United States Department of Agriculture, Natural Resources Conservation Service; Minnesota Agricultural Experiment Station; North Dakota Agricultural Experiment Station; South Dakota Agricultural Experiment Station; and South Dakota Association of Conservation Districts announce the naming and release of a seed propagated cultivar of hybrid plum (*Prunus x* 'Prairie Red').

As a formal cultivar release, this plant will be referred to as **'Prairie Red' hybrid plum**. Identification numbers include ND-1134 and 9047203. It is suitable for conservation planting in multi-row farmstead and field windbreaks, and plantings associated with wildlife habitat and recreational development. 'Prairie Red' hybrid plum also provides a sweet, edible fruit which is larger than the native American plum. Stem density and degree of suckering is also less than native plum. The name 'Prairie Red' was chosen to reflect the colorful fruit and it's proven adaptation to a prairie environment.

**Collection Site Information:** Vegetative root suckers were collected from a specimen tree called an "apricot plum" at the Wilford Hermann farm in Hand County near Miller, South Dakota, in the early 1970s. Plants were grown at the USDA Natural Resources Conservation Service (NRCS), Plant Materials Center (PMC) located at Bismarck, North Dakota. Seeds from these plants were used for initial increase. Hand County, South Dakota is located in USDA Plant Hardiness Zone 4b and in the northern part of Major Land Resource Area 55C – Southern Black Glaciated Plains. Elevation ranges from 1,300 to 2,000 feet. Average annual precipitation is 17 to 21 inches, and the freeze-free period is 130 to 155 days.

**Description:** 'Prairie Red' was identified as a hybrid plum (*Prunus* sp.) species by Dr. Bert Swanson, Nursery Management Specialist, University of Minnesota, Department of Horticultural Science, St. Paul, Minnesota. It is a winter-hardy, medium-sized shrub or small tree which may reach 15 feet on favorable sites. The canopy width increases from root sprouts or suckers and may exceed 15 feet at maturity (10 years). The leaves are alternate, simple with sharply serrate margins and prominent veins. White flowers with five petals bloom in May. The branches are smooth when young, but become rigid and spiny as they mature. Other characteristics are similar to American plum (*Prunus americana*). The fruit color is red or red/yellow in late summer. Fruit size may be as large as 1.5 inches in diameter. Variation exists in both plant size and fruit size. The landscape position often determines whether trees are smaller or larger plants. Fruit size is likewise affected. Shrub rows that vary somewhat in elevation will generally exhibit the larger plants in the lower landscape position, especially if moisture is a limiting factor. Stem density and degree of suckering is generally less than American plum. Life span depends on the site location, but generally plants will start to die back at 10-15 years of age. Some regeneration may occur from plant suckers depending on site conditions.

**Evaluation and Plant Performance:** Seed production trees at the Bismarck PMC were established by root suckers collected from the original "apricot plum" tree. Seed was harvested from these trees and used to grow bareroot seedlings for evaluation. Thirty-three field planting evaluations were established in Minnesota, North Dakota, and South Dakota from 1990-1995 (Table 1). Eight of these failed for various reasons (see notes in Table 1), including lack of maintenance. Three plantings had missing data and were not included. The remaining twenty-two field plantings were evaluated for a 5-year period and averaged 90% survival. Plants had an average growth rate of 1.6 ft/yr in height and 1.4 ft/yr in canopy cover. Windbreak Suitability Groups (WSG) varied from WSG 1(few limitations) to WSG 6 (droughty) and WSG 10 (severe limitations). The largest trees with the highest site adaptation ratings were generally found on WSGs 1 and 3. The longer term off-center evaluation plantings (Table 2) were conducted at eight locations beginning in 1985. Data summary at each evaluation site varied from a 7 to 15 year period. Performance was not as good as the field plantings, but it was still favorable in most locations. Survival averaged 68%. Growth rates and canopy spread were reduced, although that is to be expected with older shrub plantings. The highest growth rates generally occur the first five years. Average annual growth rates were slightly less than 1 ft/yr. The average vigor rating was good (3.9). The greatest survival and best growth rates were generally on silt loam soils. American plum was not planted simultaneously with 'Prairie Red' as a standard of comparison. Most sites, however, did include American plum. Survival and growth rates were similar. The most noticeable differences were more abundant and larger fruit on the 'Prairie Red', and lower stem densities or canopy cover compared to the American plum.

**Ecological Considerations:** 'Prairie Red' hybrid plum is a good fruit producer, but the seed is too large for extensive use and movement by birds. No off-site movement of the plant by seeds was observed at any of the evaluation locations. The plant produces spreading rootstocks, and open thickets may be formed. Localized plant spread by root suckering is acceptable and not considered detrimental to the environment. The primary use is for windbreaks where landowners can have access to the edible fruit. A secondary use is wildlife habitat and recreational area plantings. The suckering habit is considered desirable for wildlife. 'Prairie Red' hybrid plum was documented as "OK to Release" when rated through the worksheet for "Environmental Evaluation of Plant Material Releases."

**Anticipated Conservation Use:** The primary conservation use of 'Prairie Red' hybrid plum is for farmstead and field windbreaks, and in wildlife habitat and recreational plantings. The showy flowers and sweet fragrance in early spring make this an excellent species for attracting pollinators. A secondary benefit is the high quality edible fruit for home use, or possibly as an alternative income crop. Fruit production, processing and associated marketing strategies represent potential business opportunities for the landowner.

**Potential Area of Adaptation:** This selection has performed well in extensive test plantings on a variety of sites in North Dakota, South Dakota, and Minnesota. Adaptation is anticipated to be on soils/sites recommended for the species (Field Office Technical Guide) across the regions of the Upper Midwest and Northern Great Plains. The best plant performance, including larger and more abundant fruit, has generally been on WSGs 1 and 3.

**Availability of Plant Materials:** Small quantities of breeder seed and seedling plants will be made available from the USDA Plant Materials Center at Bismarck, North Dakota to establish seed orchards of the 'Prairie Red' hybrid plum. Various conservation nurseries in the region will sell seed and bareroot seedlings.

**References:**

Stephens, H. A. 1973. Woody Plants of the North Central Plains. The University Press of Kansas, Lawrence, Kansas. 530 p.

Snyder, L. C. 2000. Trees and Shrubs for Northern Gardens. The Andersen Horticultural Library, Minnesota Landscape Arboretum, Chanhassen, Minnesota. 311 p.

**Prepared by:** Dwight A. Tober, Plant Materials Specialist, USDA-NRCS, P. O. Box 1458, Bismarck, North Dakota 58502; and Michael J. Knudson, Forester, USDA-NRCS Plant Materials Center, 3308 University Drive, Bismarck, North Dakota 58504.

**Approvals for the release of 'Prairie Red' hybrid plum (*Prunus* sp.):**

Robert T. Eckenwalder for

Director, Ecological Sciences Division
United States Department of Agriculture
Natural Resources Conservation Service
Washington, D.C.

8-21-06
Date

State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
Huron, South Dakota

7-26-06
Date

State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
Bismarck, North Dakota

6-30-06
Date

for Charles Montgomery-Aiken
State Conservationist
United States Department of Agriculture
Natural Resources Conservation Service
St. Paul, Minnesota

7/14/06
Date

Director
South Dakota State University
Agricultural Experiment Station
Brookings, South Dakota

8/2/06
Date

Director
North Dakota State University
Agricultural Experiment Station
Fargo, North Dakota

7/09/06
Date

Director
University of Minnesota
Agricultural Experiment Station
St. Paul, Minnesota

7/20/06
Date

John D Majeres
President
South Dakota Association
of Conservation Districts
Pierre, South Dakota

8/5/06
Date

## Table 1. 'Prairie Red' Hybrid Plum Field Planting Data Summary 1990 - 1995

| Location | Purpose | WSG | Weed Competition (1 = lowest 9 = highest) | Site Adaptation | Survival % | Height Total | Height ft/yr | Crown Total | Crown ft/yr |
|---|---|---|---|---|---|---|---|---|---|
| **North Dakota** | | | | | | | | | |
| Bottineau | Wildlife | 3 | 1 | 2 | 96 | 7.2 | 1.4 | 5.3 | 1.1 |
| Lakota | Windbreak, Farmstead | 3 | 3 | 1 | 100 | 8 | 1.6 | 6 | 1.2 |
| Minnewaukan | Windbreak, Farmstead | NA | 3 | 1 | 98 | 10.7 | 2.1 | 11.2 | 2.2 |
| Rollette | Windbreak, Farmstead | 1 | 2 | 3 | 92 | 7 | 1.4 | 4 | 0.8 |
| Forman | Windbreak, Farmstead | 1 | 2 | 2 | 95 | 7 | 1.4 | 6 | 1.2 |
| Linton | Wildlife | NA | 5 | 1 | 86 | 9.6 | 2.0 | 6 | 1.2 |
| Napoleon | Windbreak, Farmstead | 3 | 3 | 1 | 96 | 10 | 2.0 | 6 | 1.2 |
| Napoleon | Windbreak, Farmstead | 1 | 1 | 1 | 94 | 9 | 1.8 | 9 | 1.8 |
| Beach | Wildlife | 1 | 2 | 2 | 80 | 5 | 1.0 | 5 | 1 |
| Killdeer | Windbreak, Farmstead | 6 | 3 | 4 | 70 | 5.5 | 1.1 | 4 | 0.8 |
| Selfridge | Windbreak, Farmstead | 10 | 2 | 1 | 89 | 7 | 1.4 | 7 | 1.4 |
| Selfridge | Windbreak, Field | 5 | 5 | 2 | 94 | 7 | 1.4 | 4 | 0.8 |
| Watford City | Windbreak, Single Row | 5 | 4 | 4 | 91 | 6 | 1.2 | 5 | 1 |
| (5 plantings failed within the first 3 years due to weed competition, livestock damage, hail, and grasshoppers) | | | | | | | | | |
| **South Dakota** | | | | | | | | | |
| Aberdeen | Windbreak, Field | NA | 6 | 2 | 93 | 6.5 | 1.6 | 3 | 0.6 |
| DeSmet | Windbreak, Single Row | 3 | 6 | 3 | 90 | 10 | 2.0 | 5 | 1 |
| Sioux Falls | Windbreak, Farmstead | 3 | 3 | 3 | 87 | 10.7 | 2.7 | 9 | 2.3 |
| Highmore | Wildlife | 3 and 6 | 1 | 6 | 70 | 7.6 | 1.5 | 8 | 1.6 |
| Kennebec | Wildlife | NA | 5 | 2 | 99 | 7 | 1.4 | 5.6 | 1.1 |
| McIntosh | Windbreak, Farmstead | 5 | 3 | 2 | 98 | 8 | 1.6 | 6 | 1.2 |
| White River | Windbreak, Farmstead | 3 | 4 | 1 | 91 | 7 | 1.4 | 4 | 0.8 |
| **Minnesota** | | | | | | | | | |
| Windom | Wildlife | 2 | 3 | 4 | 88 | 5.5 | 1.1 | 3 | 6 |
| Mankato | Windbreak, Farmstead | 4 | 5 | 6 | 87 | 7 | 1.4 | 6 | 1 |
| (6 plantings failed because of severe deer browse, rodent damage, herbicide drift, or had missing data) | | | | | | | | | |
| **AVERAGE** | | | **3.3** | **2.5** | **90** | **7.7** | **1.6** | **5.8** | **1.4** |

## Table 2. 'Prairie Red' Hybrid Plum Off-Center Evaluations

| *Location* | *Years of Evaluation* | *MLRA* | *WSGs/Texture* | *Survival %* | *Average Vigor (1 = best 9 = poorest)* | *Height (ft/yr)* | *Canopy (ft/yr)* |
|---|---|---|---|---|---|---|---|
| **McKenzie, ND** | **1990-1999** | 53B | 4 silty clay loam | 83 | 4.5 | 5.1 (0.5) | 5.1 (0.5) |
| **Bottineau, ND** | **1985-1999** | 55A | 3 loam complex | 60 | 3.5 | 12.5 (0.8) | 15.7 (1.0) |
| **Dickinson, ND** | **1985-1999** | 54 | 5 fine sandy loam | 40 | 4.5 | 10 (0.7) | 11.5 (0.8) |
| **Highmore, SD** | **1985-1994** | 53C | 3 silt loam | 60 | 3.5 | 10.1 (1.0) | 14.2 (1.4) |
| **Lake Andes, SD** | **1985-1991** | 55C | 3 silt loam | 100 | 4 | 8.7(1.2) | 11.1 (1.6) |
| **Morris, MN** | **1985-1994** | 102A | 3 loam | 90 | 4 | 8.8 (0.9) | 10.7 (1.1) |
| **Crookston, MN** | **1985-1994** | 56 | 1K silty clay loam | 50 | 3.5 | 7.1 (0.7) | 6.8 (0.7) |
| **Rochester, MN** | **1986-1995** | 105 | 3 silt loam | 60 | 4 | 4.6 (0.5) | 4.3 (0.4) |
| **AVERAGE** | | | | **68** | **3.9** | **0.8** | **0.9** |