

Fact Sheet: Shrub Performance on Organic Soils – Follow-up

612-5

(Plant Materials – Forestry)

INTRODUCTION: The USDA-NRCS Rose Lake Plant Materials Center established a combination field evaluation/demonstration windbreak in 1987 on Michigan State University’s Muck Research Farm. The soil type was Houghton Muck – level, deep, organic soil with moderate permeability and neutral pH. The purpose of the planting was to evaluate plant performance on various shrub species used in windbreaks on organic soils. Initial evaluations were completed in 1991. Follow-up evaluations were conducted in 2003. Data for both years are summarized in Table 2.

PROCEDURE: Eleven Species were selected for this study. Common and scientific names of those species are in Table 1. Twenty bare-root plants of each species were planted in a single row with 180 cm (6 ft) spacing between plants. Chemical and mechanical weed control was applied during the first four years. Annual application of fertilizer, including manganese, was applied during the first four years according to soil test recommendations.

DISCUSSION:

General Comments: Spirea survival in 1991 was poor and was removed after 1991 evaluations were made.

Observations from 1991 indicated that survival and growth rate for all species except Spirea were good. This was attributed to good weed control and fertility management during the establishment period. It was also observed that those species with a fibrous root system, such as ‘Indigo’ silky dogwood, were better able to resist frost heave than those species with a non-fibrous root system such as crabapple. Root exposure was not evident in the 2003 evaluation.

Comparison of 1991 and 2003 data: Arrowwood and ‘Cheyenne’ privet demonstrated good uniformity in 1991 had comparable uniformity in 2003. ‘Indigo’ Silky dogwood had good uniformity in 1991 but uniformity was lower in 2003. The decreased uniformity was due, in part, to competition from wild grape and other weeds. That decreased uniformity caused a reduction in relative ranking among the species tested. Nannyberry, eastern ninebark, amur honeysuckle, tall hedge, and American cranberry had intermediate uniformity in 1991 and similar uniformity in 2003.

‘Roselow’ Sargent crabapple and ‘Magenta’ Crabapple had relatively poor uniformity in 1991 but demonstrated good uniformity in 2003. Crabapple and Sargent crabapple increased average height by 100 – 150% from 1991 – 2003. Average width of those species also increased by 400 – 500% over the 12-year period. Increased height, width, and uniformity increased the effectiveness rating for those species and increased the relative rank from 1991 to 2003. However, those species would require periodic pruning to keep the plants from encroaching into field borders if they are used as windbreaks near agricultural production fields.

Study Summary: The results from this study demonstrated that all the species tested, with the exception of Spirea, can be successfully used as windbreak material in organic soils. Weed control and proper fertility during establishment is critical for a successful planting. Weed control and appropriate pruning during the time span of the windbreak is required to maintain uniformity and overall effectiveness of the windbreak.

Table 1: Common and scientific names of species tested.

‘Roselow’ Sargent crabapple	<i>Malus sargentii</i> Rehder
Eastern ninebark	<i>Physocarpus opulifolius</i> (L.) Maxim
Spirea	<i>Spirea vanhouttei</i> (Broit) Zabe
Arrowwood	<i>Viburnum dentatum</i> L.
‘Indigo’ Silky dogwood	<i>Cornus amomum</i> Miller
American cranberry bush	<i>Viburnum trilobum</i> Marshall
‘Cling-Red’ Amur honeysuckle	<i>Lonicera maackii</i> Maxim
Nannyberry	<i>Viburnum lentago</i> L.
Tall hedge	<i>Rhamnus frangula</i> var. <i>columnaris</i> L.
‘Cheyenne’ Privet	<i>Ligustrum vulgare</i> L.
‘Magenta’ Hybrid crabapple	<i>Malus</i> sp.

Table 2: DATA SUMMARY 1991 & 2003

Species	% Survival 1991	Ave. Ht. (cm)	Ave. Ht. (cm)	Ave. Width (cm)	Ave. Width (cm)	Uniformity <u>1/</u>	Uniformity <u>1/</u>	Effectiveness <u>2/</u>	Effectiveness <u>2/</u>	Relative Rank	Relative Rank
		1991	2003	1991	2003	1991	2003	1991	2003	1991	2003
'Indigo' silky dogwood	100	250	250	320	550	2	4	2	3	1	4 <u>3/</u>
'Cheyenne' Privet	100	273	300	273	280	2	2	3	3	2	3
Arrowwood	100	210	260	210	360	3	4	3	3	3	5
'Cling-Red' Amur Honeysuckle	85	263	270	297	300	5	6	3	6	4	9
Eastern Ninebark	85	197	275	225	275	6	6	5	5	5	8
Tall Hedge	100	256	425	120	180	5	5	7	7	6	10
Nannyberry	100	232	360	209	550	5	4	5	5	7	7
'Magenta' Crabapple	88	212	600	141	600	7	3	7	2	8	2
American Cranberry bush	90	177	270	175	550	5	4	7	4	9	6
'Roselow' Sargent Crabapple	95	144	330	115	550	6	2	8	2	10	1
Spirea	20	88	**	106	**	8	**	9	**	11	**

1/ Uniformity of size and shape. 1= Identical - 10= Extremely variable
2/ Visual estimate of effectiveness as a windbreak based on size, density and uniformity 1= Excellent - 10= Totally ineffective
3/ 'Indigo' silky dogwood uniformity and relative rank were negatively impacted by wild grape competition
 ** Species no longer present in study

