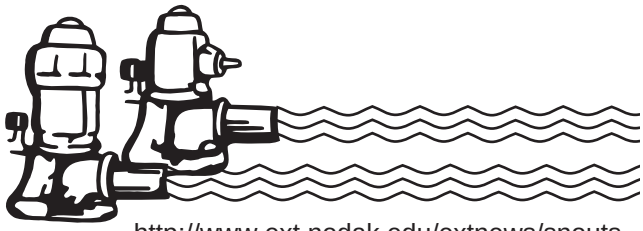
NDSU EXTENSION SERVICE



water spouts

No. 202 MAY 2003

http://www.ext.nodak.edu/extnews/snouts

How to Obtain Crop Water Use Tables for Previous Growing Seasons

As the growing season progresses, many farmers like to compare the progress of this year's crops with what happened in preceding years. It's a way of reinforcing the good decisions and making sure they don't repeat bad decisions. Many farmers keep extensive field records and one piece of information that can help irrigators are crop water use values from the previous years.

Since 1995, we have been providing crop water use estimates during the growing season for the 10 most common irrigated crops in North Dakota. The estimates are calculated for each of the weather stations on the North Dakota Agricultural Weather Network (NDAWN). The crop water use estimates have been provided as crop water use maps and in tabular form. The crop water use tables for this year are currently available at this address:

http://ndawn.ndsu.nodak.edu/applications.html

Select the *Crop Water Use Table* link and you will be asked to select a weather station. The tables of crop water use are available by month and are updated every day.

If you want to view the crop water use tables for previous years, go to this address:

www.ext.nodak.edu/weather/ndawn/listings.html

Select the radio button next to the weather station you desire. Then go to the bottom of the page and select the start and stop date. Then select the crops in which you are interested and the tables will be provided.

The NDAWN system was started in 1989 with the eight weather stations located on North Dakota State University agricultural experiment stations. Since then, many have been added every year, so the weather data for the station you select will only go back to the year the station was installed. The period of record for weather statistics for each station is available on the NDAWN Web site.

Tom Scherer (701) 231-7239
NDSU Extension Agricultural Engineer
tscherer@ndsuext.nodak.edu

Alfalfa Harvesting in 2003

Alfalfa harvest on fields with no winter injury should be earlier than normal this year due to the very early spring. Warm temperatures and dry conditions initiated alfalfa growth at least three weeks earlier than last year. Harvest will not necessarily be three weeks earlier than last year because the photoperiod and cool temperatures of the last week or so will keep the plants growing vegetatively for a longer time. This means the alfalfa will grow taller prior to flowering than it did last year. Thus, harvest will have to occur at an earlier maturity stage in 2003 in order to harvest the same quality as last year.

Many alfalfa fields harvested four times or three times, with the third cut in September, experienced some winter injury. If winter injury was severe, forage quality should be sacrificed for stand maintenance. Let alfalfa in the uninjured area reach about 25 percent bloom so injured areas can regain some plant vigor prior to harvest. If winter injury was not a factor, then harvest for quality.

Maturity stage and plant height influence forage quality of alfalfa, with plant height frequently affecting forage quality more than maturity stage in the first harvest. If your objective is to get prime hay in the bale, harvest must occur around 25 inches of growth in early years like this. The plant maturity stage will vary, but it could be as early as late vegetative to very early bud. Last year, Vernal alfalfa harvested at 22 to 23 inches in the late bud growth stage and had 27 percent ADF and 38 percent NDF in grab samples. Allowing for harvesting losses, this was the correct stage to harvest in 2002 (a cool, late spring), but the correct maturity stage for harvest will be much earlier this year.

I expect harvest of irrigated alfalfa to occur the last days of May this year if you're attempting to get prime hay in the bale. Base your decision to harvest on the height of the plant (not calendar date or maturity stage). If the alfalfa is approaching 25 inches, harvest if the weather allows.

Dwain W. Meyer (701) 231-8154
Extension Specialist, Forages
dmeyer@ndsuext.nodak.edu

Irrigated Sunflower

Sunflower is commonly grown as a dryland crop. There has been some inquiry on irrigated sunflower. Research and farmer testimony has demonstrated that sunflower responds to irrigation with yield increases of 100 to 200 percent over dryland yields common on droughty soils and in extremely dry years. Sunflower adapts to a wide range of soils and climatic conditions. Low yields may be caused by any of the following: incorrect plant population, poor soil fertility, lack of weed control, diseases, insect damage, bird depredation, lodging, late planting and harvesting losses. Management of all factors listed plus sound water use and management is a must.

Average yields of 26 sunflower hybrids and varieties at the North Dakota State University Carrington Irrigation Research Station in the late 1970s were 3,222 lb/ac for irrigated sunflower vs. 1,126 lb/ac for dryland sunflower (Table 1). These average yields represent a 186 percent yield increase of irrigated over dryland sunflower. During another year, white mold caused yields of irrigated sunflower to be similar to dryland yields (Table 2). Rainfall also was above normal for the second growing season. Plant populations were 22,000 plants per acre, 28 inches of water was applied by furrow irrigation. Fertilizer applied included 94 lb/ac of 46-0-0 plus some P and K. **Note:** This irrigation was via furrow and not overhead sprinkler. With overhead sprinkler, less water would be applied over the growing season at key times.

Under the irrigation management, some lodging was reported, especially in the taller varieties. A large portion of the lodging was attributed to root lodging with the plants leaning primarily because of heavy top weight and lack of support by wet soil in the root zone. Some neck breakage occurred in the irrigated trials, however, only a few broken heads were reported to be completely lost. Plant populations of 24,000 to 28,000 plants per acre are recommended for irrigated sunflower production planted in 30-inch row spacing.

Table 1. Sunflower oilseed yields, lbs/ac, Carrington (first year). (*dry growing season)

	Low	High	Avg.*
Carrington – Dryland	786	1312	1126
– Irrigated	2161	4612	3222

* Average yield of 26 entries.

Table 2. Sunflower oilseed yields, lb/ac, Carrington (second year). (*above average rainfall)

	Dryland	Irrigated
High Yield	2568	2656
Low Yield	1963	1786
Average Yield	2356	2216
Ratio (dryland to irrigated) – 1 to 0.94		

* Average of 31 hybrid entries.

Water utilization by sunflower depends on a number of factors including variety, date of planting, timing of irrigation, soil types, fertility and plant populations. Optimum utilization of water occurs if N, P and K levels are sufficiently available for high yields. All nutrient requirements of sunflower must be met for most effective use of water. Robinson, University of Minnesota reported that sunflowers responded well under irrigation with adequate nitrogen applied. Sunflower yields were only 872 pounds per acre with N fertilized dryland trials and increased to 2,397 pounds per acre with irrigation plus nitrogen. That was an increase of 175 percent averaged over two years of research under irrigation compared to dryland. The irrigated sunflowers with no nitrogen added yielded only 683 pounds per acre. Nitrogen is the key nutrient along with water to obtain high yields.

Water deficiency between flowering and maturity adversely influences yield more than at other times. Irrigation management becomes much more critical from early flowering until maturity. Irrigation should maintain soil moisture at 80 percent of field capacity at flowering stages and at 70 percent of field capacity at other times was optimum. Seed yields increased 30 percent and oil yields 48 percent from irrigation 22 days after mid-flower was reported by sunflower workers in Australia.

The exact timing and number of irrigations depend on rainfall distribution and stored soil moisture. Typical of all high-value irrigated crops, monitoring of the crop and top-level management practices are vital to obtain high economic returns.

In three years of field tests in Texas, it was reported that sunflower would yield fairly well with adequate moisture at

planting time and then one additional watering at flowering time. Top yields of dryland versus irrigation reported were 1,580 lbs. to 3,330 lb/ac in year one, from 820 to 2,330 lb/ac in year two and 1,740 to 2,970 lb/ac in year three. Sunflowers should have either rainfall or some irrigation every 14 days for maximum yield output. However, with adequate moisture at planting time, then perhaps one good watering at bloom or just prior to bloom may pay off more than where sunflower is watered several times. High costs of energy involved in irrigation may prove this type of scheduling to be economically sound. More research must be conducted to thoroughly address this problem of water use and scheduling.

Duane R. Berglund (701) 231-8135
NDSU Extension Agronomist
dberglun@ndsuext.nodak.edu

Micro-Irrigation for You

Growing your own herbs, fruits, vegetables and flowers, and xeriscaping or landscaping is an enjoyable pastime for many North Dakotans. For most homeowners, now is the time to prepare the ground for gardening, greening the lawn and landscaping. For a few, it is time to tend seedlings, plant trees, shrubs, flowers and ground covers, shop for exotic plants, select mulches and look at hoop houses. Then there is the neighborly competition to turn your lawn greener. Some lawns are truly golf-course green, some are prairie-like (natural) and many are unkempt. The after-dinner chore (lawn mowing) will be a constant reminder that the competition is in earnest. One thing to remember though is that the green or the "off-color" turf is a natural evolution of urban landscaping.

Enthusiasm for gardening and/or farming will also depend, to a large extent, on ways to diminish habitual chores. One of the chores is watering. The indomitable garden hose spray is the choice of many. It is readily available in stores, with many spray patterns, and quite handy. Yet you have to uncoil, stretch, move and spend time doing the chore. The watering chore could be once every day or more frequently under dry, hot conditions and it could take hours. The hose spray effectively gives the plants a good, cold shower. The water application could be better and a little more sophisticated. Consider water conservation (reduce water running onto the street, runoff and evaporation) if you are in an urban setting.

All these gardening activities will come to fruition if spring warmth and rains could be predictable. If rain events and precipitation amounts during the current spring, summer and the fall are uncertain it will have a profound effect on your gardening and farming activities. A little preparation will go a long way to diminish the adverse effects of erratic weather.

There is a specific micro-irrigation system that could be tailored to suit your need/s. Most micro-irrigation systems can be designed, constructed and managed by any individual. The water source could be surface water (pond, lake, stream river) or groundwater (well). The quantity required depends on how extensively or how intensively you plan to irrigate. Determining quality of water (usually through tests) also indicates whether it is compatible with the soils. Both the quantity and the quality aspects of water will have a bearing on the choice of a micro-irrigation method over another.

It is essential that you draw a plan to scale on a piece of paper. On the plan, locate the water source, the water conveyance system to the field/s and the power source. The type of plants you want to grow will influence the quantity of water needed. The duration and frequency of watering for optimal plant growth are also important considerations. Technical assistance to help you make informed decisions will be provided by the North Dakota State University Extension Service.

Publications

The NDSU Extension Service publication, AE-1243 "Introduction to Micro-irrigation," explains the various types of micro-irrigation, their suitability and many uses. Micro-irrigation offers the advantage of a one-in-three-irrigation system. It combines the good attributes of gravity, sprinkler and drip systems. The publication is available at the office of NDSU Extension Service county agents. Many irrigators may also consider using evapotranspiration indicators for scheduling water use for turf, plants and groundcovers and crops. Information on a very simple bucket drip irrigation system suitable for some homeowners can be seen at:

www.chapinlivingwaters.org.

Demonstration

NDSU Extension will organize demonstration of micro-irrigation systems this summer at research and extension centers, at community colleges, at Absaraka, Oakes experimental stations and at small fruit farms. Look for dates in the near future.

Aung K. Hla (701) 652-3194
NDSU Extension Area Irrigation Specialist
ahla@ndsuext.nodak.edu

A Short History of the Missouri Slope Irrigation Development Association

Irrigation has always been an important part of the social and economic development of North Dakota. In fact, irrigation was a major topic of discussion by two U.S. Senators at the North Dakota Constitutional Convention in July 1889 when North Dakota became a state. At that meeting, the delegates enacted section 210 of the North Dakota Constitution, which states, "All flowing streams and water courses shall forever remain the property of the state for mining, irrigation and manufacturing purposes." Since that time,

NDSU Extension Service
Agricultural and Biosystems Engineering
P.O. Box 5626
Fargo, ND 58105-5626

Non-Profit Org.
U.S. Postage
Paid
Permit No. 818
Fargo, N.D.

several associations, formed to promote the use of irrigation, have come and gone. However, one that has been active for the past 39 years is the Missouri Slope Irrigation Development Association (MSIDA).

After the completion of the Garrison Dam, the impetus to develop irrigation along the Missouri River began in earnest. In 1964, Guy Larson, a member of the Water Resource Committee of the Bismarck Chamber of Commerce, felt a new, high-value crop was needed to promote irrigation development. Larson worked with Holly Sugar of Sidney, Mont., to secure 100 acres in allotments for growing sugarbeets. Five farmers — Ervin Bourgois of Bismarck, Tom Price of Hensler, Marvin Landgren of Wilton, Carl Kuehn of Washburn and Dennis Solberg — were each given a 20-acre allotment. Even though they had never grown sugarbeets, their average for the 100 acres was more than 14 tons with the high yield near 20 tons. Northern Pacific Railway provided special rates for delivery of the sugarbeets to Sidney. The allotment was extended to 1965 and after that a thriving irrigated sugarbeet industry developed.

In 1964, these five growers and Larson formed the Missouri Slope Irrigation Development Association with help from local county extension agents and Dan McLellan, North Dakota State University extension agricultural engineer. A board of directors was formed. Each county along the Missouri River, from the Garrison Dam to the South Dakota border, was represented by one person on the board. The board drew up the constitution and bylaws of the association. The primary objective of the association was to share information on irrigation. As stated in a newspaper article from 1964, the two purposes for the association were: "1) expansion of irrigated acres in the Missouri Slope area and 2) involve more people such as farmers, ranchers, businessmen, politicians and industrialists."

Every year since 1964, MSIDA has held an annual meeting, sponsored an irrigation tour and together with the NDSU Extension Service, has held an annual irrigation workshop. The objective of the association hasn't changed over the years, as it is a strong supporter of the North Dakota Irrigation Caucus. Members of the association are currently working with the Irrigation Caucus to develop Horsehead Irrigation District (on the east side of Lake Oahe, south of Linton) and the Big Bend Irrigation District west of Washburn. As in past years, MSIDA will have its annual irrigation tour around the second week in July. An article about the tour will be in the June issue of this newsletter. If you have additional information about the formation of the MSIDA, please contact me.

Tom Scherer (701) 231-7239
NDSU Extension Agricultural Engineer
tscherer@ndsuext.nodak.edu