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water spouts

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Oakes Irrigation Research Site Field Day

A field day will be held at the NDSU Oakes Irrigation Research Site – Robert Titus Research Farm on Thursday, Aug. 15, with refreshments at 8:30 a.m. and a tour from 9 a.m. to noon.

> **The main topics of research will be the control of white mold, an update on Palmer amaranth and 60-inch corn.**

The approximately 40-acre site, located 4.5 miles south of Oakes on North Dakota Highway 1, is a substation of the NDSU Carrington Research Extension Center.

Michael Wunsch, plant pathologist at the Carrington Research Extension Center, has been doing extensive research in ways to more effectively control white mold in soybeans, dry beans and sunflowers. Much of his work has been done at the Oakes research site.

He will discuss his studies and provide producers, consultants and the agricultural industry with insights into how to effectively manage and prevent white mold from robbing yields and profits.

Palmer amaranth is on the move and has invaded North Dakota. NDSU Extension cropping systems specialist Greg Endres will talk about the known locations where it has been found and what we need to know to deal with this very aggressive weed.

Members of NDSU Team Potato will talk about their potato trials, including the variety trials at the Oakes site and other locations in North Dakota.

Short corn, specifically the varieties that reach a height of 60 inches, is a new concept on the soil conservation radar. It allows for the development of an inter-seeded cover crop. Recent on-farm trials have shown that it does not reduce yields and adds many soil health and grazing benefits. Kelly Cooper and Seth Nelson, two researchers at the Oakes site, will talk about the potential applications and show the preliminary work that is being done at Oakes.

Topics and presenters are:

9 a.m.	**Welcome and discussion of the mission of the NDSU Research Extension Center system** *Blaine Schatz*, Carrington Research Extension Center director
9:15 a.m.	**Overview of research and demo projects at Oakes** *Kelly Cooper*, research scientist at the Oakes site
9:30 a.m.	**White mold studies in soybeans** *Michael Wunsch*
10 a.m.	**Potato variety trials** *NDSU Team Potato representatives*
10:30 a.m.	**Rye as a suppressor of white mold in dry beans** *Wunsch*
11 a.m.	**60-inch corn** *Cooper* and *Seth Nelson*, research specialist, Oakes site
11:30 a.m.	**Palmer amaranth** *Greg Endres*

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Tour participants also will have the opportunity to review the site's irrigated corn hybrid and soybean performance tests.

For more information, contact the Carrington Research Extension Center at 701-652-2951 or visit its website at *www.ag.ndsu.edu/CarringtonREC*.

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Potato Field Day Set for Aug. 22

North Dakota State University and University of Minnesota potato research will be highlighted during the Northern Plains Potato Grower Association (NPPGA) field day on Thursday, Aug. 22.

The field day tour will travel to three locations. The day will begin at 7 a.m. with breakfast at Hoverson Farms near Larimore. Research presentations will begin at 8:15.

Lunch and research presentations will be at the Forest River Colony near Inkster at noon. Also scheduled is a field tour of the irrigated research trials.

The last stop will be at Oberg Farms near Hoople starting at 5 p.m. The final stop will include research poster presentations and an evening meal.

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An Inch of Irrigation Water Can Increase Yields

Have you ever wondered what impact an inch of applied irrigation water in August has on final yield? At this time of the year, the weather is hot, the crop is fully developed and total seasonal crop water use exceeds rain plus stored soil moisture.

From many years, this question has been answered by the experiments that determined the water productivity for many crops. Water productivity is the crop response to water at critical growth stages. It is the slope of crop water use versus yield graph, and indicates the additional amount of yield for each additional inch of water.

In the following table are yield estimates obtained from many research reports (mainly from North Dakota, Minnesota and South Dakota) for each crop. The range of yield responses probably is due to soil types, growing conditions, crop varieties and geographic locations where the research was performed.

Crop	Yield Increase Per Inch Applied Water Per Acre		Water Use for the Growing Season
			(inches)
Corn	8 to 14	bushels	18 to 20
Corn silage	1.25 to 1.75	tons	18 to 20
Alfalfa	0.2 to 0.25	ton	22 to 24
Pinto beans	250 to 300	pounds	15 to 17
Potatoes	2,200 to 2,900	pounds	17 to 19
Soybeans	4 to 5.5	bushels	17 to 18
Sunflowers	170 to 190	pounds	15 to 16
Sugarbeets	1.5 to 1.7	tons	21 to 23

These numbers assume that stored soil moisture and rainfall are less than the required seasonal crop water use during the growing season and that the difference is provided by irrigation.

You can look at seasonal crop water use estimates using the North Dakota Agricultural Weather Network (NDAWN) website at *http://ndawn.ndsu.nodak.edu*. Go to "Applications" on the left-hand menu and select "Crop Water Use."

Here is something to remember about these yield increase estimates: They are accurate only for irrigation water applied to bring the growing season crop water use total to its maximum. Applying more water than the seasonal crop water use plus the water lost due to the application efficiency of the irrigation system will have a very small yield return per inch applied. It is the law of diminishing returns.

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Crop Water Use in August

August is typically our hottest and driest month of the growing season, but it also is the month when crops are developing their ears, pods, tubers, etc., and water availability is most important for good yields. Irrigation water management during August is very important for long-season crops such as corn, dry beans, potatoes, sugarbeets and soybeans.

In normal years, crops use more water in July than August, and the average rainfall amounts

are correspondingly greater in July. However, this year is quite different in that our planting dates were generally two weeks behind normal.

The average rainfall in July is 2.75 inches at Carrington and 2.35 inches at Oakes, whereas the average rainfall in August for both locations is about 2 inches. This indicates that the irrigation water demand is generally greater in August than in July. Couple this with declining water levels in wells and streams during August, and irrigation water management becomes very important.

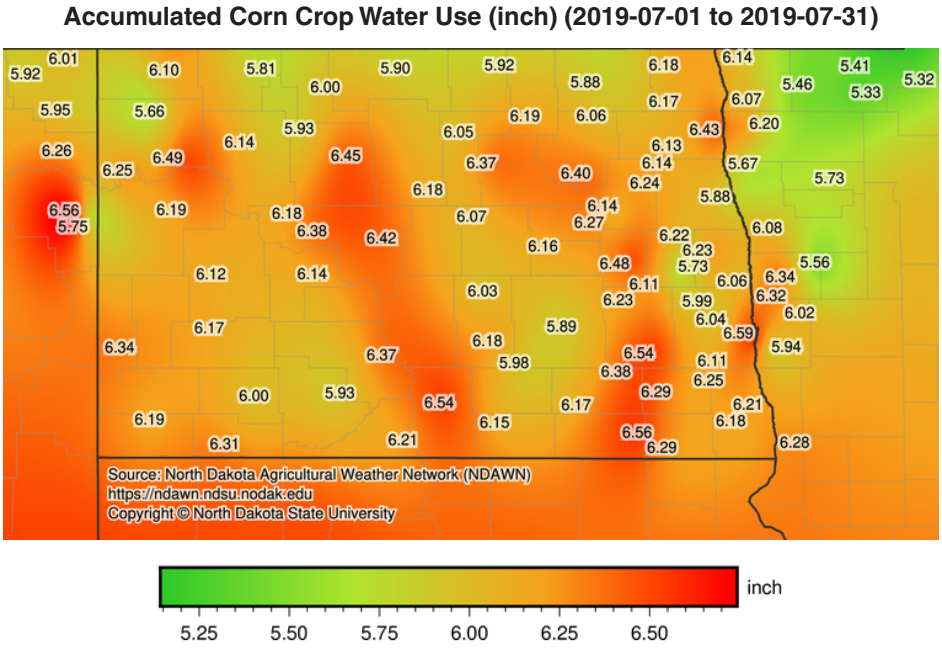

Figure 1. Estimated corn water use for July 1 to July 31, assuming no water stress.

Normal water use for July and August of commonly irrigated crops is shown in the following table.

	Average Water Use	
	July	August
	inches	
Corn	6.6	6.3
Alfalfa	6.6	6.3
Pinto beans	7.0	5.8
Potatoes	7.0	5.5
Soybeans	6.5	5.9

Even though our growing season is about two weeks behind "normal," according to the crop water use estimates on the North Dakota Agricultural Weather Network *(NDAWN: https://ndawn.ndsu.nodak.edu)* website, corn water use in July, assuming a May 30 emergence date, was about equal to the average, as shown in **Figure 1**.

As crops mature, cutting back on irrigation during the latter part of August is common. This can be an expensive mistake. Research has shown that corn, moderately water stressed toward the end of the growing season, had an average yield reduction of 13%, compared with corn that was fully irrigated to maturity.

Crop water use tables published in AE792, "Irrigation Scheduling by the Checkbook Method" *(www.ag.ndsu.edu/publications/crops/irrigation-scheduling-by-the-checkbook-method-1)* show that water use is similar for most full-season crops during August.

The following table shows the estimated daily water use based on maximum air temperature.

Maximum Air Temperature	Estimated Daily Water Use for Long-season Crops in August
50-59 F	0.08 inch
60-69 F	0.13 inch
70-79 F	0.19 inch
80-89 F	0.24 inch
90-99 F	0.29 inch

Site-specific crop water use estimates (for each weather station) can be obtained from the NDAWN website. Click on Applications in the left-hand menu. Remember, the table above and the values from the website give the estimated water use by the crop.

Applied irrigation water must be greater to compensate for evaporation and drift losses. For center pivot irrigation, research has shown that 85% application efficiency is reasonable for North Dakota. This means that almost 0.26 inch per acre must be pumped to get a net 0.22 inch into the soil for the crop to use. Likewise, if you pump 1.18 inches of water per acre, only 1 inch will infiltrate into the soil for crop use.

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North Dakota Water Education Foundation – Summer Water Tours

Access to substantial quantities of clean water is important for the development of North Dakota, and the best way to learn about water projects is to see them in person via a tour.

These tours provide a firsthand look at North Dakota's critical water issues. Registration is $20 per person and includes tour transportation, meals, refreshments, informational materials and a one-year subscription to *North Dakota Water* magazine.

Tours offered are:

- **Aug. 7 – Water and Oil** (tour begins and ends in Williston)
- **Aug. 15 – Missouri River and Industry** (tour begins and ends in Bismarck)

For more information about each tour online, go to *https://ndwater.org/events/summer-water-tours* or send a check made out to NDWEF and mail to PO Box 2254, Bismarck, ND 58502. Please indicate which tour or tours you want to attend and include the number of people who will attend. For more information, give us a call or send an email.

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