www.ag.ndsu.edu/extension-aben/irrigation/water-spouts

water spouts

No. 269 July 2013

In this issue:

Upcoming 2013 NDSU Field Day

Potato Field Day Aug. 22 (218) 773-3633
Larimore, Inkster, Hoople
Sponsored by
Northern Plains Potato Growers Association

Northern Plains Potato Grower Association Field Day

The Northern Plains Potato Grower Association field day will start at 7 a.m. on Thursday, Aug. 22, at Hoverson Farms, with breakfast followed by research presentations. The farm is on the south side of the intersection of U.S. Highway 2 and North Dakota Highway 18 (about 25 miles west of Grand Forks).

The tour then will proceed to the Forest River Colony near Inkster, N.D., where lunch will be served at noon. Following lunch will be a field tour of the irrigated research trials.

The last stop will be at Oberg Farms in Hoople and will include research presentations and a barbecue. As in previous years, the potato research and Extension activities are occurring throughout North Dakota and Minnesota. The work addresses potato breeding; nutrient management; and disease, insect and weed pests.

The efforts are focused on improving potato production for the North Dakota and Minnesota growers, but they also affect production practices throughout the U.S. and the world. The Northern Plain Potato Growers Association, Minnesota Area II Research and Promotion Council, industry partners and other organizations fund many of the projects. For more information on these activities, visit my website at *www.ag.ndsu.edu/potatoextension.*

Andy Robinson, (701) 231-8732
NDSU Extension Potato Agronomist
Andrew.P.Robinson@ndsu.edu

Dry Bean Production Guide Updated

Dry bean is a food crop that requires producers to provide special cultural management and attention. Proper management is essential from cultivar selection, field selection and planting through harvest, plus marketing for maximum profitability.

The "Dry Bean Production Guide" (A1133) was completely reviewed and parts were rewritten, and it has just been published by the North Dakota Extension Service. Some of the main chapters include: Introduction; Dry Bean Types and Development Stages; Dry Bean Fertility; Weed Control; Relative Herbicide Effectiveness on Weeds; Disease Identification and Management; Insect Management in Dry Edible Bean; and Weed, Insect and Disease photos.

A Web version of the guide can be found at *http://tinyurl.com/drybeanguide* or purchased from the NDSU Distribution Center for $6 per copy, which includes shipping and handling. Call (701) 231-7882 or email NDSU.DistributionCenter@ndsu.edu for information or order online at www.ag.ndsu.edu/pubs.

The Northarvest Bean Growers Association *(www.northarvestbean.org/)* will mail a complimentary copy to all registered dry bean producers in the near future.

Hans Kandel, (701) 231-8135
NDSU Extension Agronomist
Hans.Kandel@ndsu.edu

NDSU | EXTENSION SERVICE

County Commissions, NDSU and U.S. Department of Agriculture Cooperating. This publication will be made available in alternative formats for people with disabilities upon request, (701) 231-7881.

Irrigation in Motion: A N.D. Water Education Foundation Tour – July 23

The five southeastern counties in North Dakota have about 85,000 acres being irrigated for a variety of crops, many of which are high-value. This area of the state has the potential to develop more irrigation. The tour will focus on irrigation in the Oakes area and will start with a visit to the Oakes Irrigation Research site. Irrigation research at this site has been ongoing since 1970 and, through the years, has provided valuable information for irrigation development and water management.

The next stop on the tour will allow participants to view and discuss a new innovation in irrigation water supply for the area: horizontal wells. Several horizontal wells have been installed in the area, and this technology has the potential to increase irrigation development. Facilities of the Oakes Test Area, a 5,000-acre irrigation development, will be visited, along with stops to view and discuss irrigated high-value crops. The tour begins and ends in Jamestown.

Registration is $20 per person and includes tour transportation, a meal, refreshments, informational materials and a one-year subscription to North Dakota Water magazine. To register, go to *www.ndwater.com* and click on "2013 North Dakota Water Tour Registration Form" or send a check to NDWEF, P.O. Box 2254, Bismarck, ND 58502. Please include the number of people who will be attending. For more information, give us a call or send an email.

North Dakota Water Education Foundation,
(701) 223-8332
Fax, (701) 223-4645
ndwaterusers@btinet.net

Maintaining Air/Vacuum Release Valves

Through the years, I have noticed that the valves on many irrigation systems, installed to protect the pipeline and pump, are often in poor shape.

When the irrigation system was new, the irrigation dealer installed the combination air and vacuum release valve(s) to protect the pump and pipeline from water hammer and air restrictions. Their purpose was to let air into or out of the pipeline at key locations.

They often are located at the pump, in front of the check valve, and on the high points of the pipeline between the pump and irrigation system. If the pipeline goes over a hill, they are installed at the highest point of the pipeline.

They can be mounted on standpipes that extend from the pipeline to about 3 to 4 feet above the field surface,

Photo and figure by Tom Scherer, NDSU

but some are buried in a vault. A common design of irrigation air/vacuum release valves has a plastic ball enclosed in an aluminum head with a rectangular outlet on the top, as shown in the figure above.

At pump startup, the air in the pipeline will be pushed out through the valve until water pushes the ball up to the top and seals the opening. When the pump shuts off, water flows back into the pipeline and the ball drops, letting in air.

On older irrigation pipelines, I often have noticed broken or missing standpipes or valves where the ball is stuck. Why is making sure these valves are working so important? Air always is in a pressurized pipeline. Air gets in a pressurized irrigation pipeline three ways: when the pump is started; through valves and pump packing glands and under vacuum conditions; and through the water (water naturally contains about 2 percent air by volume). Because water always contains some air, it continually will replenish the air that is trapped at high points in the pipeline.

No matter how air gets into the pressurized pipeline, it will collect in the high points where it can restrict the flow by effectively forming an air bubble that reduces the available flow diameter of the pipe. People often are surprised to learn that an air bubble will stay in a pipeline with flowing water and under pressure. Problems often occur when parts of that air bubble "slough" off to be carried down the pipe, where it can cause explosive water hammer. Water hammer can cause all types of problems, such as collapsed pipes, damaged water fittings and broken pump volutes.

If the air/vacuum release valves are broken or not working at the high points of the pipeline, a different type of

problem occurs. When the pump shuts off, a vacuum condition occurs in the pipeline at these points that could damage the pipeline fittings and cause leaks.

On center pivots, you often can hear air periodically being expelled by the first few sprinkler heads. The pump could be sucking air due to too much drawdown in the well, or the air could be collecting at a high point of the pipeline. Either way, it is not a good situation. The next time you're working with the irrigation system, check the condition of the air/vacuum release valves. Make sure they are working properly.

Tom Scherer, (701) 231-7239
NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu

Calibrating a Center Pivot for Chemigation

With all the wet weather, some of the nitrogen fertilizer that was applied may have been leached below the root zone. Often chemigation is used to add additional nitrogen to the field.

Chemigation is the injection of any chemical into the water used for irrigation. In the past, this practice has been called fertigation for adding fertilizer, herbigation when herbicides were added, fungigation for fungicides, etc. Now it is just called chemigation.

Chemigation is a very efficient and effective irrigation management tool when used properly. It is recognized as a best management practice (BMP) for irrigated agriculture.

When chemigating, the irrigation water delivery system and the chemical injection equipment must conform to state laws regarding backflow prevention. In addition, the pesticide label must state that the pesticide can be used for chemigation and can be applied through a center-pivot irrigation system.

Center-pivot systems are used on more than 80 percent of the irrigated land in North Dakota. With the cost of pesticides and liquid fertilizer increasing every year, properly calibrating a center-pivot irrigation system for chemigation is important. Below are five easy steps to follow to ensure that a center-pivot chemigation system is calibrated properly:

1. Calibrate the injector pump.

Determine the injection rate of the chemical injection pump for a particular setting of the injection rate control knob. This must be done with the irrigation system running so the injection pump is working against the water pipeline pressure. Do this by letting the injection pump draw from a calibrated container on the suction side of the injector pump. Determine the time in minutes to inject 1 gallon of liquid, then use this equation to determine the injection pump rate in gallons per hour:

$$\text{Injector Pump Rate (gallons/hour)} = \frac{60}{\text{Minutes to Pump 1 Gallon}}$$

2. Determine the total hours to cover the field at the speed the center pivot will be operated and the number of acres covered:

Time to cover the field = _____ hours

Acres covered = _____

3. Determine the total gallons of chemical to be injected. Multiply the injection pump rate (step 1) by the total hours to cover the field (step 2). Use the following equation:

Total gallons to be injected = injector pump rate x hours to cover field

4. Determine the amount of chemical required to cover the field.

Multiply the field acreage by the chemical rate as specified. For nitrogen, it would be the gallons of UAN-28 per acre, and for a pesticide, it would be the rate that is recommended on the label for the particular crop. Use the following equation:

Total chemical volume = field acres (step 2) x chemical volume/acre

5. Add the total chemical (step 4) to the injection supply tank and then fill the supply tank to the total volume to be injected (step 3).

When working with many pesticides and dry chemicals, make sure you have a method to agitate the injector supply tank to keep the chemicals in solution. Many chemicals will settle out if not agitated.

Tom Scherer, (701) 231-7239
NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu

Get Your Irrigation System Ready: Rainy Weather Sometimes Can Fool You

Throughout this spring and early summer, practically all of North Dakota has been receiving a steady supply of rain, which generally has negated the use of irrigation.

Some areas have too much water on the ground, which has caused delayed planting or no planting at all. However, variable rainfall events can fool you into thinking that enough water is in the root zone and you delay starting the irrigation system until it's too late.

With average weather conditions, most irrigated crops will use 0.25 to 0.30 inch of water each day during July

North Dakota State University
Agriculture Communication
NDSU Dept 7070
PO Box 6050
Fargo ND 58108-6050

Non-Profit Org
US Postage
PAID
Permit No 818
Fargo ND

For more information on this and other topics, see www.ag.ndsu.edu

and August. To determine when to turn on the irrigation system and schedule irrigation, knowing how much rain is received at each field and having some estimate of the daily water use of your irrigated crop is important.

To measure rainfall, I recommend having two accurate rain gauges with at least 2-inch diameter openings. They should be in opposite corners of the field and situated based on the prevailing weather conditions in your area. For instance, during the summer, many storms come from the west and southwest in the eastern part of the state, so the rain gauges should in the southwest and northeast corners. However, these conditions may not apply in other parts of the state.

You have two easy ways to obtain daily estimates of crop water use. The first is to visit your local county Extension Service office and get a copy of publication AE792, "Irrigation Scheduling by the Checkbook Method," or download a copy at *www.ag.ndsu.edu/pubs/ageng/irrigate/ae792.pdf*. This publication has tables that allow you to estimate the daily water use for corn, wheat, barley, soybeans, pinto beans, potatoes, sunflowers, sugar beets and alfalfa. To estimate the daily crop water use, you need to know the maximum air temperature and the number of weeks since crop emergence.

The second method is to access estimates on the North Dakota Agricultural Weather Network (NDAWN) website: *http://ndawn.ndsu.nodak.edu/*. Select "Applications" on the left-side menu and then select "Crop Water Use" maps or tables.

The map display will show the crop water use estimates for the 72 weather stations in NDAWN for any crop and period of time you select. In addition, you can view a "deficit" map for each crop. The deficit is displayed as the crop water use amount minus the rain amount received at each weather station. Numerical tables with the crop water use estimates also can be obtained for each weather station.

But even with accurate measurement of rainfall and crop water use, you still need to check the soil moisture in the field periodically during the season. Checking the soil moisture at several sites in a field about every two weeks during the growing season is a highly recommended practice.

Tom Scherer, (701) 231-7239
NDSU Extension Agricultural Engineer
Thomas.Scherer@ndsu.edu