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# water spouts

No. 222

JUNE 2006

## Upcoming NDSU Field Days and Other Crop-related Events

- **Streeter** June 28 (701) 424-3606  
Central Grasslands Research Extension Center
- **Minot – Canola Tour** July 6 (701) 857-7677  
North Central Research Extension Center
- **Williston – Pulse Crops Day** July 7 (701) 774-4315  
Research Extension Center
- **Minot – Pulse Crops Day** July 11 (701) 857-7677  
North Central Research Extension Center
- **Hettinger** July 12 (701) 567-4323  
Research Extension Center
- **Dickinson** July 13 (701) 483-2348  
Research Extension Center
- **Outlook, Saskatchewan** July 13 (306) 867-5400  
Canada-Saskatchewan Irrigation Diversification Centre
- **Williston** July 14 (701) 774-4315  
Research Extension Center
- **Casselton** July 17 (701) 347-4743  
Agronomy Seed Farm
- **Carrington** July 18 (701) 652-2951  
Research Extension Center
- **Minot** July 19 (701) 857-7677  
North Central Research Extension Center
- **Langdon** July 20 (701) 256-2582  
Research Extension Center
- **Sidney, Montana** July 20 (406) 482-2208  
USDA/ARS Northern Plains Ag Research Lab
- **Mandan** July 20 (701) 663-6445  
USDA/ARS Northern Great Plains Research Lab

## Missouri Slope Irrigation Development Association (MSIDA) Annual Tour

The annual MSIDA irrigation tour will be on Monday, July 10, hosted by Allen Wahl of Central Irrigation and Excavating in Bismarck. The destination will be irrigation developments along the Missouri River, west of Hazelton, to view irrigated alfalfa, innovative pumping schemes, irrigated potatoes and novel center pivot sprinkler types to reduce erosion and runoff. The tour is free of charge. It will begin at 2 p.m. Meet at the Sid Nelson farm. Look for the Nelson Farm sign about 35 miles south of Bismarck on North Dakota Highway 1804 (just north of the boat dock). For people who want to carpool, meet at Kist Livestock in Mandan at 1 p.m. A pitchfork fondue will start at 6 p.m. For more information, call Allen Wahl at (701) 258-3928 or Kenny Miller at (701) 250-4518, ext 3.

## Irrigation Day at the Canada-Saskatchewan Irrigation Diversification Centre (CSIDC)

The CSIDC, 901 McKenzie St. S., Outlook, Sask., will have its Irrigation Day on Thursday, July 13. Events will include a trade show and field tours (9 and 11:15 a.m. and 1:30 p.m.), presentations and a haying demonstration. Highlights include specialty and field crops; irrigation systems, including a solar-powered pivot; season extension of warm-season crops; and potential irrigation expansion in Saskatchewan. Admission is free. For more information, call (306) 867-5400 or visit the center's Web site at [www.agr.gc.ca/pfra/csfdc/csfdc.htm](http://www.agr.gc.ca/pfra/csfdc/csfdc.htm).

**NDSU**  
**Extension Service**  
North Dakota State University

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## Roundup Ready Alfalfa Induces Management Changes

In the last issue, I listed what I believe will be the advantages and disadvantages of Roundup Ready alfalfa. In this issue, I would like to suggest three management changes I believe Roundup Ready alfalfa will cause.

First, Roundup Ready alfalfa will increase the acreage established without a companion crop. This should be a real advantage in that stand establishment without a companion crop, when seeded correctly, is successful more often than with a companion crop. The ease of weed control also should invite producers to use clear seeding more often.

Second, Roundup Ready alfalfa will reduce the seeding rate that many producers use. The cost of Roundup Ready alfalfa seed is around \$6.50 per pound, so if seeding rates can be reduced, the cost of establishing an alfalfa stand with Roundup Ready alfalfa can be reduced.

We evaluated alfalfa seeding rate effects on forage yield at Fargo from 2000 to 2005. Pioneer variety 53Q60 was used and seed broadcast at 1, 2, 4, 6, 8, 10, 12, 16, and 32 pounds per acres (lb/A). The seed was incorporated with one pass of a double-ganged Brillion packer. Forage was harvested twice during the seeding year and weeds were controlled well with a single application of Pursuit at 3 fluid ounces per acre. Forage was harvested four times during the last four years at very early bud, late bud, 30 percent bloom and 50 percent bloom or regrowth well initiated.

Forage yield during the 2001 seeding year was 2.9 tons per acre (tons/A) at the 1 lb/A seeding rate and 3.9 tons/A at the 12 lb/A seeding rate. But, the forage yield was not significantly different from 4 to 32 lb/A. The highest forage yield during the first harvest was at 6 lb/A, and it was not significantly different from the 4 to 32 lb/A seeding rates.

Total forage yield for the seeding and four harvest years as affected by seeding rate is presented in Figure 1. Forage yields were 30.9 tons/A at the 6 lb/A seeding rate and 31.1 tons/A at the 32 lb/A seeding rate and those within these seeding rates were not significantly different. A second seeding year in 2002 and the first through third harvest years' data had the same relationship among seeding rates. I do not like the graphing of the data this computer program did. I believe the trend line should flatten more between the 6 and 32 lb/A seeding rates, rather than decreasing at the end. Even then, these data suggest seeding rates above 6 lb/A had no yield advantage during the five years.

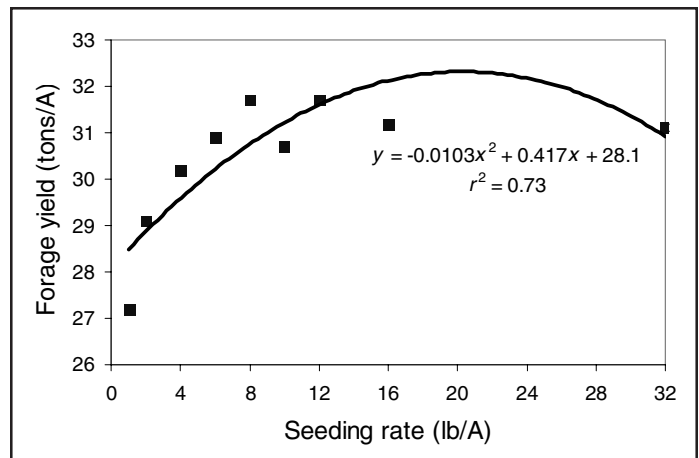


Figure 1. Seeding rate effects on forage yield of alfalfa at Fargo in 2001-2005.

Forage quality was not taken on these experiments, but forage quality was taken on another experiment that had been established at 1, 2, 3, 4, 5, and 9 plants per foot<sup>2</sup> (plants/ft) and at 8 and 20 lb/A seeding rates, which established 33 and 43 plants/ft<sup>2</sup>. Crude protein, acid detergent fiber and in vitro digestible dry matter were unaffected by seeding rate in the first and third harvest years. A 1 lb/A seeding rate will establish about 4 plants/ft<sup>2</sup>, so producers have no reason to use high seeding rates to "get finer stems," which is a common pitch from seed salesmen.

If producers establish about 20 seedlings per foot<sup>2</sup>, they have adequate plants for yield and quality. Besides, a single plant given a year to establish well can have 50-plus stems/plant, which approaches the stem density for maximum yield per acre. These data suggest seeding rate has little to do with forage quality. Primarily, height and maturity of the plant (and other factors such as leaf loss, rain damage, grass infestation, etc.) affect forage quality, not seeding rate.

I would recommend seeding Roundup Ready alfalfa at 8 lb/A to allow a small cushion on the seeding rate for poor germination conditions and less than ideal soil preparation. Some have argued that seeding rates should be increased for broadcast compared with drilled stands. Our data does not support this! Put your time and effort into preparing good seedbeds, ones that are very firm, and do a good job of seeding. Don't throw good money down the drain by increasing the seeding rate, especially with the high seed cost of Roundup Ready alfalfa. You may have a greater weed problem because of the lower seeding rate, but this should be a minor problem with the excellent weed control available with Roundup Ready alfalfa.

Third, Roundup Ready alfalfa probably will increase the length of time producers keep their stands in production. Roundup will be used to control invading species, such as dandelions, perennial grasses such as quack grass and brome grass, and annual grass species such as green and yellow foxtail. This will make the fields look much better from the road and may conserve a little additional soil water for alfalfa production, but I believe increased stand life will be a negative on forage production. When dandelions infest, the alfalfa stand is weakening and less competitive. In the past, dandelion infestation was a good indicator of when to consider discontinuing the stand. With Roundup application, we no longer will have this instructive tool.

Forage yield of high-producing alfalfa stands decreases with stand age (Table 1). This experiment, started in 1977 and seeded for seven consecutive years, shows the value of keeping stands young in dry years such as 1980. Forage yield was 1.8 tons/A less on a three-year-old stand than on a one-year-old stand. With average rainfall in 1981 and 1983, forage yields decreased 1 ton/A from a one- to four-year-old stand, about 25 percent.

Forage yield decreases with stand age, even when above-normal rainfall occurs (Table 2), but at a lesser rate. Average forage yield has been about 0.7 ton/A less on a three-year-old stand vs. a one-year-old stand at Fargo during a five-year period when rainfall averaged nearly 7 inches above normal.

Forage yields of irrigated alfalfa stands seem to decrease even faster than dryland stands as the stand ages (Table 3). Forage yields were 1.4 tons/A less on a three- vs. one-year-old stand as a 12-experiment average. However, note how variable the data are! The variety trial in 1996 to 1998 increased in forage yield, as the stand aged. This was the same with stand age in 2000 to 2002, and but yield dropped 2.9 tons/A with stand age during 1999 to 2001. Since irrigation supplies the water the alfalfa crop needs when rainfall is inadequate, other factors

**Table 1. Stand age effects on forage yield of alfalfa at Fargo, N.D. (1977-1985).**

Production Year <sup>†</sup>	Forage Yield		
		tons/A	
First	7.17		
Second	6.31	<i>(0.86 yield difference)</i>	
Third	6.44	<i>(0.13 yield difference)</i>	

<sup>†</sup> Production year is within a year so annual rainfall is similar. Average rainfall was 27.1 inches for a 5-year period.

**Table 2. Stand age effects on alfalfa yield at Fargo, N.D.**

Stand Age <sup>†</sup>	1980 <sup>‡</sup>	1981	1983	%		
					tons/acre	
1	3.4a*	4.9a	4.3a	100		
2	2.6b	4.6b	3.9ab	92		
3	1.6c	4.5b	3.4bc	87		
4		3.9c	3.3bc	75		
5			3.1bc			
			2.5c			

<sup>†</sup> Stand age within a year to remove annual rainfall differences.

<sup>‡</sup> 1980 (dry year); 1981 and 1983 (avg. rainfall).

\* Values in each column are statistically different if followed by different letter. If letter is the same, there is no statistical difference.

**Table 3. Stand age effects on forage yield of irrigated alfalfa at Carrington, N.D.**

Experiment	Harvest Year		
	1st	2nd	3rd
tons/A			
12 exp. avg. <sup>†</sup>	5.9	5.1	4.5
99-01 SH	7.5	5.7	4.6
96-98 V	4.7	5.2	6.5
94-96 V	5.4	5.5	0.0*
87-89 V	5.0	5.4	0.0*
00-02 V	6.9	6.9	6.6

<sup>†</sup> Twelve experiment average or selected individual experiments.

\* Not included in average.

cause most of the yield reduction. Light winter injury may explain some of the losses, with complete stand loss from winter kill occurring in the 1987-89 and 1994-96 experiments. Some of the loss yield is due to buildup of disease, such as fusarium root and crown rot, and a general decline in the vigor of the plants.

These data suggest that to maintain maximum productivity of alfalfa, the stands must be kept young and new stands should be established after the third to fourth productivity year. Remember, the 1 ton/A greater yield of a new stand will nearly pay for the establishment of the new stand, even with high-priced Roundup Ready seed.

In conclusion, I believe Roundup Ready alfalfa will cause an increase in clear-seeded alfalfa and a lowering of the seeding rate, both of which should be an advantage for producers. Roundup Ready alfalfa also will increase the number of years producers keep the stand in production, which will be a disadvantage.

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## New Small Grains Field Guide Available

Growing wheat, barley or oats profitably is like piecing together a challenging puzzle. Variety selection, proper fertilization, good weed control and the ability to identify and eliminate yield-robbing diseases and pests are all pieces of this puzzle. Each piece requires attention to solve the whole puzzle profitably.

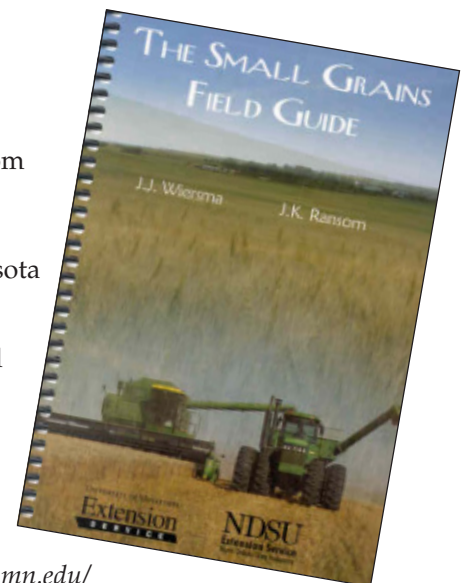
The "Small Grains Field Guide" is intended as a quick reference and field guide for the production of wheat, barley and oats. The information is organized around disciplines, rather than

around crop species, to eliminate redundancy because of the many similarities among wheat, barley and oats. If and when differences are pertinent, specific data is presented for the crop in question.

The book contains 10 sections: Agronomic Management, Crop Growth and Development, Fertility Management, Pesticide Management, Weed Management, Disease and Pest Management, Harvest and Storage Management, Marketing, Photographs and Useful Internet Resources.

This 160-page field guide is available from North Dakota State University and the University of Minnesota Extension Services.

In North Dakota, call (701) 231-7882 and ask for publication A-290. In Minnesota, call (800) 876-8636 or order online at <http://shop.extension.umn.edu/> and ask for publication 07448-S. The price is \$12.



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