AGRONOMY NEWS

Grasslands For Tomorrow

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Tops In Profit

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Winter Wheat was very competitive in both the South Dakota and North Dakota Adult Ag financial analysis records for 2000.

Andrew Swenson, NDSU Extension Service, Farm and Family Resource Management Specialist, in a recent release indicated that winter wheat was one of three crops that achieved a profit greater that $20 per acre on cash rented ground, including farm program payments. Confection sunflower and pinto bean were the other crops. Rented ground accounts for 70% of the land farmed by the 475 farmers enrolled in the ND Farm Business Management Education Program.

Winter Wheat on cash rented ground in North Dakota earned a net return with government payments of **$49.20** per acre. The following are returns for crops in the same category:

• Hard Red Winter Wheat	$49.20
• Hard Red Spring Wheat	17.48
• Durum	5.92
• Barley	5.95
• Pinto Beans	32.02
• Corn	17.58
• Soybean	23.71
• Confection Sunflower	32.23
• Oil Sunflower	20.12

The following table gives the return over listed costs or the average of all fields and the high return fields as listed in the 2000 South Dakota Adult Agriculture Financial Analysis Records for certain crops.

Winter Wheat net returns are very competitive when managed properly as noted in the high return fields column.

Crop	Average of all Fields	High Return Fields
Winter Wheat	$ 15.00	**$ 74.56**
Hard Red Sp. Wheat	19.74	43.44
Corn	6.95	67.59
Soybean	24.73	71.00

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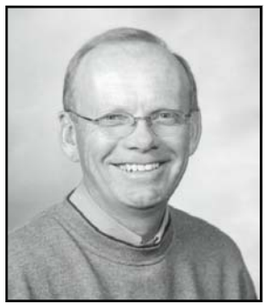

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Tour Time

There are a number of excellent tours scheduled for the next month that may be of interest to you.

The **Area IV** and **Dakota Lakes** tours are perennial favorites for no-tillers and are both scheduled for **June 28.** The NDSU Carrington tour of the **Lisbon** site will be on **July 2** and include spring wheat, barley and winter wheat varieties. There will be a new NDSU winter wheat variety released and it is included in the winter wheat variety trial. The **Carrington Station** tour will be **July 19.**

Intensive wheat management will be the feature of a tour at the Joe and Patty Breker farm on **July 16.** Nitrogen timing, rates, and application methods, protein enhancement, a growth regulator (Cerone) and fungicide treatments on spring wheat will be viewed and discussed. The tour will also include stops at a cover crop study following winter wheat and preceding corn and two new winter wheat varieties, Wesley and CDC Falcon.

The **SDSU** spring wheat and winter wheat variety trials at Prairie Ag Research and the Jim Peters farm near Britton, SD will be toured the morning of **July 24**.

Tour Dates

June 28:
Area IV SCD/ARS Research Farm Field Day, Open House: 1:00-7:00 p.m., Tour: 4:00-7:00 p.m., Mandan, ND

June 28:
Dakota Lakes Research Farm Field Day 9:30 a.m., East of Pierre, SD
Tours continue throughout the day.

July 2: **NDSU - Carrington OFF-Station Variety 7:00 p.m. Trial Tour**
7.5 miles south of Lisbon, ND

July 3: **NDSU Weeds Tour**
8:30 a.m. - NW 22 Research Farm
I-29 and County Road 20
1:00 p.m.
Agronomy Seed Farm, Casselton, ND

July 16: **Intensive Wheat Management Tour**
5:00 p.m. Breker Farm, 4 miles south, 2.5 miles east of Rutland, ND

July 19: **Carrington Res. Ext. Center Tour**
9:30 a.m., Carrington, ND

July 24: **SDSU Hard Red Spring Wheat & Hard Red Winter Wheat Variety Tour**
7:30 a.m. Prairie Ag Research
East of Britton, SD

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A Guide to Winter Cereal Production

This article was adapted from the "Winter Wheat Production Manual" and highlights the management practices that a successful winter cereal grower must adopt prior to seeding.

1. Getting Ready

It is important to start planning early if you want to include winter cereals in your cropping rotation. Ideally, planning should begin with the selection and seeding of the spring crop preceding the winter cereal. Your objective is to have suitable stubble available for fall seeding by early September. During the summer months seeding equipment should be prepared, quality seed obtained, and arrangements made for fertilizer. Winter cereal seeding may conflict with the harvest of spring seeded crops, so advance preparation is critical.

2. Field Selection

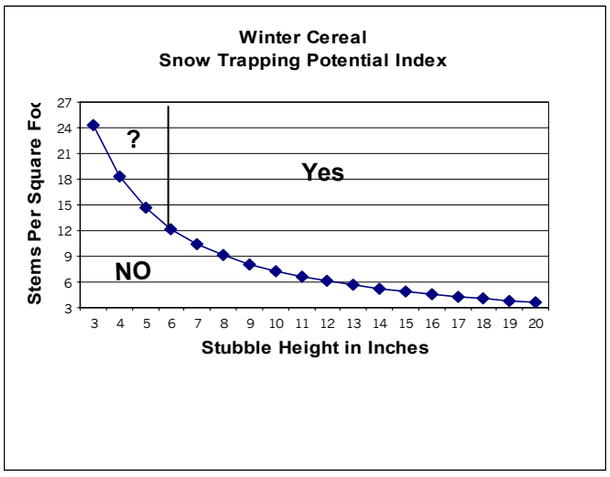
Best results have been obtained when winter cereals are direct seeded into the standing stubble of an early maturing crop such as early seeded small grains or flax. Other crops can be successfully followed with a winter cereal providing they are harvested early enough and sufficient standing stubble is left to serve as a snow trap. It is not recommended that winter wheat be seeded into spring wheat stubble unless all green growth including volunteer wheat has been completely controlled and seeding should be delayed for 10 to 14 days to ensure complete dry-down of all green growth to avoid wheat streak mosaic.

3. Crop Residue and Snow Trapping Potential (STP)

Snow is a great insulator for your winter cereal crop. The most successful way to maintain adequate snow cover is to keep the greatest possible height and density of standing stubble in the field. Harvest the preceding spring crop as high as possible and thoroughly spread the straw and chaff with the combine. Special attention must be paid to maintaining standing stubble in high traffic areas such as field approaches and headlands. Use the STP Index developed by Dr. Brian Fowler, Professor, Saskatoon, SK, Canada, to measure your snow trapping potential:

$$\text{STP} = \frac{\text{stubble height (cm)} \times \text{stubble stems/sq. meter}}{100}$$

An STP Index greater than 20 is acceptable **after the seeding operation** is completed for winter wheat and winter triticale. STPs of less than 20 indicate a high risk of winter injury. This is particularly true for winter wheat, which is not as hardy as fall rye. The graph is adapted from the formula and measures the stubble density on a square foot basis and its height in inches. This is a good "rule of thumb". Density is important, but during the winter of 2000-2001, any stubble that was less than 6" tall and had a lower stem density generally experienced significant stand loss and substantially reduced vigor. Spring cereal grain stubble such as barley and oat often have an STP index of 90 or greater, while canola stubble is often in the 25 to 30 range. A 10" to 14" small grains stubble height is a pretty good balance for snow catch and the following year's leaf disease environment. Prior broadleaf crop stubble height ideally should be at 12" to 14" or higher as they are much less dense.



4. Seeding Equipment

Making arrangements for low disturbance direct seeding is the key to successful winter cereal production. Many different types of seeding equipment can be used for winter cereals as long as they are able to seed shallow, at a consistent depth, and with minimal stubble disturbance.

5. Variety Selection and Seed Source

The variety selection process is important. The crop must have adequate winter survival characteristics to match the tillage system utilized. The snow trapping potential of the prior crop is an important factor in winter wheat variety selection.

The yield and grain quality are important for marketability.

The Ducks Unlimited, Inc. Winter Cereal Initiative is supporting variety research plots which NDSU and SDSU have located near Lisbon, ND and Britton, SD. The varieties listed have been successfully grown in the DU project area.

Winter Cereal Varieties

Winter Wheat	*Fall Rye*
Arapahoe	Ryemen
Crimson	Musketeer
CDC Falcon	Dacold
Elkhorn	
Harding	
Ransom	
Tandem	
Wesley	

Wheat Streak Mosaic

MITES

Wheat Streak Mosaic Virus (WSMV) is primarily spread by the wheat curl mite, a very tiny mite (less than 1/100 inch long) not visible to the eye. The mite has no wings but is carried by the wind from plant to plant and field to field, generally up to several miles. When large populations of the mite build up on wheat, the leaves curl so that the upper surface is rolled inward.

The life cycle of the mite, from egg to adult, is completed in seven to ten days. The mite requires green plants for feeding and reproduction. If no green food hosts are available after hatching, the mite does not survive. The mites reproduce most rapidly from 75 to 80 degrees Fahrenheit. The mites overwinter as eggs, nymphs or adults in the living winter wheat crown or crown of other perennial grass hosts.

HOSTS FOR VIRUS AND MITES

Wheat is the preferred food for the mite and an excellent host for virus reproduction. However, the mite also feeds and reproduces on various other grasses, such as corn, barley, oat, foxtail millet, cheat grass, green foxtail, barnyard grass, prairie cupgrass, and Canada wildrye.

Grass hosts other than wheat primarily are reservoirs for long term survival of mites and virus.

DISEASE CYCLE

Infection of winter wheat may occur in the fall if volunteer wheat, spring wheat, grassy weed hosts or corn plants infected with the virus and infested with mites are still green at seedling emergence of winter wheat. Volunteer plants may be in the same field or in nearby fields.

Early seeding of winter wheat favors WSMV epidemics. At early seeding, air temperatures are generally warm and the mites reproduce rapidly and have a longer time to build up on the emerged wheat seedlings prior to cold or freezing temperatures.

Infection of spring wheat depends on winter survival of the mite on winter wheat, volunteer winter wheat, or perennial grasses and on build-up of the mite population in the spring. Severe losses in spring wheat may occur if it is planted late near an infected winter wheat crop.

Volunteer wheat, if not destroyed, can be a source of infection to winter wheat in the fall as well as to spring wheat the following spring.

Factors that favor epidemics of the disease and severe losses include: 1) a wet August which favors continued germination and growth of volunteers; 2) a warm, dry fall and a warm, early spring, both of which increase mite survival, reproduction and movement.

Wheat Streak Mosaic (continued)

MANAGEMENT

Control of wheat streak mosaic depends on breaking the life cycle of the wheat curl mite. This is primarily accomplished by managing volunteers and observing recommended planting dates.

Destroy all volunteer wheat plants and grassy weed hosts at least two weeks before planting winter wheat. Since the mites have to feed on green plants to survive, they will die during this two-week period. This is called breaking the **"Green Bridge"**.

Control of volunteer winter wheat plants after harvest is also critical. Any volunteer winter wheat that escaped destruction in the fall should be destroyed at least two weeks before planting spring wheat.

Plant at the recommended seeding dates. Recommended seeding dates for winter wheat in North Dakota and northern South Dakota are September 1-15. A slightly later planting time is possible in the southern part of North Dakota and in South Dakota if winter wheat is seeded no-till.

Seeding prior to September 1 greatly increases the risks of severe losses due to wheat streak mosaic. Early seeding also favors increased chances of root rot and winter kill in winter wheat.

If it is necessary to seed next to corn fields, delay seeding until as late as possible and destroy all volunteer wheat. Some winter wheats have shown some tolerance to WSMV. They have tended to have slightly less winter hardiness.

Roger Knapp in Crimson Winter Wheat treated with Cerone at Kevin Anderson's farm, Andover, South Dakota

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SDSU Considers Foundation Seed Increases of Two Varieties

Two lines are being increased for Foundation Seed and for possible release in the fall of 2000. **SD97457** (Tomahawk/Bennett) a hard red winter wheat and **SD97W604** (SD89333) Gent/Siouxland)//Abilene) a hard white winter wheat. These two lines share a similar history in that they both performed well enough in the 1998 early yield trial nurseries to be advanced to the advanced yield trials (AYT) in 1999. SD97W604 was also chosen at this stage for tan spot resistance at Winner.

Both varieties ranked in the top three of their respective hard red and hard white 1999 AYT nurseries, next to their sibling entries (SD97W603 and SD97456) and below 2137. The yield of 2137 was 3% above SD97457 and 10% above SD97W604, indicating the relative superiority of current red lines over white lines.

Yields of these two lines in their first year of testing in the 2000 crop performance trial nursery were above average. SD97457 ranked seventh in yield of 45 entries, behind four hybrids and equivalent to the new release, Wesley, and to the popular variety, Alliance. SD97W604 ranked 16th for yield and 9th for test weight.

SD97457 was chosen for its excellent overall appearance, although it had severe tan spot symptoms. High test weight distinguished SD97457 from its sibling. Favorable tolerance to pre-harvest sprouting distinguished SD97W604 from its sibling. SD97457 ranked 7th for test weight, far exceeding the other best-yielding entries.

In each of three years of greenhouse screening conducted by Dr. Yue Jin, SDSU Plant Pathologist, the lines have been tested either for the RCR or TPMK races of stem rust. Both lines were resistant to RCR and moderately resistant to TPMK. In tests for resistance to a different bulk mixture of stem rust races each year, SD97W604 was moderately resistant and SD97457 ranged from moderately resistant to susceptible.

SD97457 has very good milling qualities. Each of three years of single kernel hardness tests indicated large heavy kernels, which contributed to very high flour yield.

SD97W604 has a short coleoptile, a trait typical of most of the experimental and released white wheats currently available. As breeding for white wheat in South Dakota progresses, lines with longer coleoptiles will be selected and advanced.

Why Grow Winter Cereals?

Roger Knapp
DU Field Agronomist

The production of winter cereals is straight forward but requires different management practices and a different thought process than spring cereals. Growers who have made the transition are successfully capitalizing on the many agronomic, economic and conservation benefits offered by these diverse crops.

Some producers have been reluctant to include a winter cereal in their rotation. The reasons commonly cited for not growing winter cereals include concerns about additional labor and equipment requirements at seeding time, the time conflict associated with seeding a winter cereal during the harvest of spring crops, and grain handling and storage concerns. All of these factors are management related and can be overcome with good planning. Producers who have learned to adapt their cropping systems to include winter cereals have noted the following benefits:

- Increased economic returns through higher crop yields and lower crop input costs
- More efficient use of spring soil moisture and precipitation
- Farm work load and labor requirements are spread more evenly throughout the year
- More efficient use of capital investments (equipment, etc.)
- Numerous potential end uses (grazing, green feed, silage, and grain) that help to diversify risk and provide greater flexibility
- Improved weed control and the opportunity for reduced pesticide use
- Soil, water and wildlife habitat conservation

Other agronomic advantages offered by these crops have also contributed to the renewed interest in winter cereal production. The earlier development and maturity of winter crops tends to reduce the risk of certain insect and disease infestations such as Orange wheat blossom midge and Fusarium head blight (scab). In the spring, the competitive advantage winter cereals have over weeds often provides an opportunity for producers to eliminate the use of grassy weed herbicides. This makes winter cereals an excellent tool for managing herbicide rotations and reducing the risk of weed resistance.