IHARF

INDIAN HEAD AGRICULTURAL RESEARCH FOUNDATION

Winter 2007

IHARF Relies on Member Direction

P12

2006 Agronomy Research Projects

P13

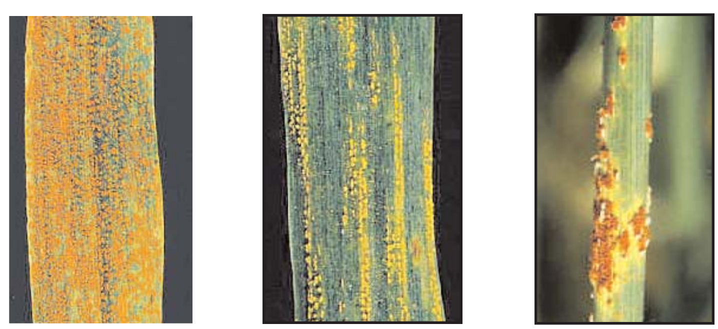
Inside This Issue:

Stripe Rust in Wheat

Wheat stripe rust, *Puccinia striiformis* f.sp. *tritici,* is the only rust that will grow on wheat heads, although stem rust occasionally forms on heads of varieties with poor stem rust resistance. On leaves, the stripe rust spores form a long line, usually the length of the leaf, hence the name stripe rust. On the head, the spores will form on the glume, palea and awns, as well as on the inside right next to the developing seed. The orange/yellow spores are called urediniospores. This is the spore stage that is

continued on page 2...

Comparison of the three rusts of wheat



Leaf Rust — *Stripe Rust (yellow rust)* — *Stem Rust*

heavy residue and a mild winter, they will likely die. Spores can be protected in the crown region of winter wheat if it is infected in the fall.

Wheat stripe rust has typically been a problem in coastal areas with high humidity and cool temperatures. Since 2000, we have had more stripe rust in Saskatchewan and an increasing amount on the heads of wheat crops. Earlier and more severe development of stripe rust was observed in the southeast and east central regions this past year than ever before. This indicates that the spores probably over-wintered, rather than being blown into the area. The 2006 prevalence of stripe rust also indicates that a new strain has likely developed that is able to withstand warmer conditions (≤18°C). It also appears that dry conditions are not as limiting once the fungus has successfully infected its host.

Fields should be scouted before heading for evidence of disease. If the disease occurs early on in a susceptible variety, yield losses can commonly be 40%. Quality may also be an issue since the disease grows on the glumes. In-field control of stripe rust is from foliar fungicides (as for other rusts and leaf diseases). Some of our wheat varieties have good resistance to this disease. A preliminary list of varieties and their resistance can be found in the 2007 Manitoba and Saskatchewan provincial seed guides.

Stripe rust continued...

spread within and between fields by wind, which causes new infections during a growing season. This is also the stage that moves up from the U.S. on wind currents.

The spores that form in the next stage of development are teliospores, which are dark in color and found on the grain. These spores are not known to have an alternate host, and they are neither considered important in the stripe rust disease cycle nor considered toxic if the wheat is used for animal feed.

Research from other areas has shown that stripe rust spore development and infection are favored by temperatures in the 5°C – 15°C range. Mycelium and spores can only survive to about -5°C, so unless there is

Wheat rust pictures shown on this page are courtesy of Brent McCallum, AAFC.

Fertilizers Restore Productivity of Established Forages

By: Stewart Brandt (AAFC, Scott), Guy Lafond (AAFC, Indian Head), Bill May (AAFC, Indian Head) and Adrian Johnston (Potash and Phosphate Institute, Saskatoon)

Forage crop fertilization is considered an optional feature for many farmers in the northern Great Plains, especially where dryland conditions limit the forage yields. However, there is a large database to support fertilization of forages as a means of maintaining yield, quality and stand purity. In fact, the cost of not fertilizing is much higher when stand productivity declines. This project was established to evaluate dry and fluid fertilizer use on old established stands of grass-legume forages.

Forage crop stands were selected at Scott and Indian Head, Saskatchewan. At Scott, the stand was a mixture of crested wheatgrass and alfalfa (25%), and at Indian Head it was bromegrass and alfalfa (30%). Both stands were old and nutrient deficient, and both were weed free. Soil tests taken at

Table 1. Average yield response to fertilizer N and P additions on established legume-grass forage stands at Scott and Indian Head, SK.

Treatment	Year 1	Year 2	Year 3	Mean
Check - no fertilizer	1193	1210	997	1130
Check - no fertilizer, coulter applied	1059	1682	2456	1736
Broadcast ammonium nitrate and MAP	1771	2723	3088	2528
Dribble UAN[1] and APP	1825	2706	2537	2359
Dribble UAN and 10% ATS + APP	1914	2581	3035	2510
Coulter UAN and APP	1566	2456	2830	2287
Coulter UAN	1406	1673	1362	1477
Coulter UAN and 3 X APP[2]	1914	2786	3008	2572
LSD P= 0.05	325	291	354	

[1]UAN - urea-ammonium nitrate; APP - ammonium poly-phosphate; ATS - ammonium thiosulfate. N rate was 53 lb N/A in 2002 and 2004, and 27 lb N/A in 2003 at Scott; 75 lb N/A in all years at Indian Head; Annual P rate is 30 lb P_2O_5/A.

[2] 3 X APP - ammonium poly-phosphate applied at 3 times the annual rate (90 lb P_2O_5/A).

the start of the project (N and S 0-24 inch, P and K 0-6 inch) showed 21 lb N/A, 6 lb P/A, >600 lb K/A and 60 lb S/A at Scott, and 25 lb N/A, 2 lb P/A, >571 lb K/A and 72 lb S/A at Indian Head.

Fertilizer treatments were applied to the study area in plots that were 6 feet by 25 feet in size. The treatments were 1)unfertilized check; 2) unfertilized check with coulter (12 inch centers) applied in year one and coulter applied urea ammonium nitrate (UAN) and ammonium polyphosphate (APP) in year two and three; 3) surface broadcast ammonium nitrate (AN) and mono-ammonium phosphate (MAP); 4) dribble banded (12 inch centers) UAN and APP; 5) dribble banded UAN and APP with ammonium thiosulfate (ATS) added at 1% of total solution; 6) coulter injected (12 inch centers) UAN and APP; 7) coulter injected UAN; and 8) coulter injected

continued on page 4...

Fertilizers continued...
UAN and APP at three times the annual rate (Table 1). Rates of N used at Scott were 53 lb N/A in 2002 and 2004, and 27 lb N/A in 2003, and 75 lb N/A each year at Indian Head. With the exception of treatment 8, all plots received 30 lb P_2O_5/A each year with the N. Treatment 8 received 90 lb P_2O_5/A in year one and then only N each year after. Treatments were applied annually to the same plot area and forage yields were harvested once each year.

Treatment responses after the first fertilizer application (year one) responded consistently over location years, but in the second and third years of application, there was a significant location by treatment interaction (Table 1). Most, if not all, of the interaction effect could be attributed to a difference in responses to P alone at the two locations. At Scott, we noted a small response to N without P after years two and three, while at Indian Head the N alone treatment yielded the same as the no fertilizer treatment (data not shown).

Dribble banding liquid UAN and APP was an effective means to apply fertilizers to old established forage stands. The yield was similar for surface broadcasting granular AN and MAP and the fluid UAN and APP. Adding ATS to liquid UAN appeared to provide a slight (not statistically significant) benefit over UAN alone. If this treatment adds little to fertilizer cost, it may be useful for providing insurance against N losses under adverse conditions.

No advantage was recorded to coulter application of the fluid fertilizer bands in this study (Table 1). Dribble band application is a lower cost method than the use of coulters, and this research would not support the investment, upkeep and operational cost of using coulters on forage lands.

Applying a three-year supply of P at the beginning of the project was as effective as applying equal increments of P annually. In fact at Indian Head, the application of the three-year P rate in year one was always the highest yielding treatment (data not shown). Only when N and P were applied together was there a yield response at Indian Head, indicating that P was the major limiting nutrient. Applying P only at Scott did increase yield, but was ineffective compared to N plus P treatment (P alone yielded 1566 lb/A compared to no fertilizer at 1344, and broadcast N and P at 2314 lb/A).

The residual effect of repeat fertilizer applications to these plots was dramatic. Check yields remained somewhat static, but fertilized yields tended to increase over time, typically increasing by about 50% in the first year of application. In the second year of application, the most effective fertilizer treatments more than doubled yields, and in the third year yields were tripled. These responses support previous research in the region which showed a progressive improvement in forage response to P additions over a series of years. Where banding without fertilizer was done the first year (Treatment 2), followed by fertilizing in each of years two and three, yields continued to be lower than where fertilizer N and P were coulter banded all three years.

Where the productivity of established forages has declined over time due to nutrient deficiencies, fertilizer additions can be an effective means of improving yields. Soil testing to evaluate the level of available nutrients is critical to ensure that all deficient nutrients are applied. Correcting deficiencies in P can be critical to achieving a profitable N response in forage crops.

Altering The Competitiveness of Tame Oats Versus Wild Oats with Phosphorous and Seeding Rate

By: William E. May (AAFC, Indian Head) and Guy P. Lafond (AAFC, Indian Head).

Introduction

Traditionally, tillage combined with delayed seeding has been used to control wild oats in tame oats. Recent oats research has shown the importance of early seeding to optimise yield and quality (May et al. 2004). However, early seeding requires that any flush of wild oats emerging as the tame oats emerge must be controlled using agronomic practices because no in-crop herbicide is currently registered to control wild oats in tame oats.

High seeding rates are important for controlling wild oats in tame oats (May 2001). Phosphorous (P) banded near the seed has promoted early season growth in cereals (Grant 2001). The yield response of oats to P has always been tested in a weed-free environment. Therefore, P fertilizer may increase early season growth, making the oat crop more competitive and producing higher yields and quality. Since higher seeding rates increase the competitiveness of oats, the effect of P needs to be measured across a range of seeding rates.

Table 1. Precipitation (mm) and soil moisture conditions in spring and monthly mean temperatures at Indian Head during the study.

Soil Moisture Reserves (spring)	2003 Very Good	2004 Fair	2005 Good
Precipitation		mm	
April	55	17	6.8
May	24	105	58
June	18	85	99
July	23	75	59
August	11	71	98
Five month total	131	354	321
% of 30 year avg.	50	134	122
Average Temperature		°C	
April	4.3	3.7	5.5
May	11.4	6.8	8.7
June	15.5	12.6	14.8
July	18.6	16.3	16.9
August	19.5	13.1	15.6
Four month avg.*	16.3	12.2	14
% of 30 year avg.	103	77	89

* Average of May, June, July and August

Objective

To determine if P side banded near the seed would increase the competitive ability, quality and yield of tame oats in the presence of wild oats in the field.

Material and Methods

- Three rates of P – 0, 15, and 30 kg P_2O_5 ha^{-1}
- Four tame oat seeding rates – 150, 250, 350 and 450 viable seeds m^{-2}
- Presence and absence of wild oats
- Conducted in 2003, 2004 and 2005 at Indian Head, Saskatchewan
- Land that had low levels of available P in the soil

continued on page 6...

Table 2. The effect of wild oat competition, tame oat seeding rate and the addition of phosphorous fertilizer on the grain yield of oats at Indian Head, SK from 2003 to 2005.

	Year		
	2003	2004	2005
		(kg ha^{-1})	
Wild oat competition			
Wild oat	2044	4569	5246
No wild oat	2640	4808	5911
Contrast			
Linear	**	**	**
Seeding rate (seeds m^{-2})			
150	2266	4816	5367
250	2357	4854	5638
350	2367	4605	5780
450	2379	4479	5528
Contrast			
Linear	NS†	**	0.057
Quadratic	NS	NS	**
Phosphorous fertilizer rate (kg ha^{-1} of P_2O_5)			
0	4119		
15	4247		
30	4244		
Contrasts			
Linear	0.02		
Quadratic	NS		

** Significant at the P = 0.01 probability level
† NS - not significant

Table 3. The effect of wild oat competition, tame oat seeding rate and the addition of phosphorous fertilizer on the wild oat panicles in oats at Indian Head, SK from 2003 to 2005.

	Wild Oat Competition					
	Wild oat			No wild oat		
	2003	2004	2005	2003	2004	2005
Wild oat density			(plants m^{-2})			
	58.9	48.8	24.7	0.6	8	0.3
Seeding rate (seeds m^{-2})			(panicles m^{-2})			
150	58.5	71.7	99.1	0.2	0.0	0.3
250	55.1	58.6	66.8	0.1	0.1	0.1
350	63.7	44.9	72.9	1.0	0.1	0.1
450	58.5	37.6	58.9	1.0	0.3	0.2
Contrasts						
Linear	NS †	**	**	NS	NS	NS
Quadratic	NS	NS	*	NS	NS	NS
Phosphorous fertilizer rate (kg ha^{-1} of P_2O_5)						
0	32.7					
15	30.8					
30	30.2					
Contrasts						
Linear	NS					
Quadratic	NS					

* Significant at the P = 0.05 probability level
** Significant at the P = 0.01 probability level
† NS - not significant

Tame oats vs. wild oats continued...

Results and Discussion

- The weather data is presented in Table 1
- In 2003, very little moisture was received during the growing season
- In 2004 and 2005, moisture was above average and temperatures were below average during the growing season
- Wild oats reduced grain yield of tame oats (Table 2)

continued on page 7...

Table 4. The effect of wild oat competition, tame oat seeding rate and the addition of phosphorous fertilizer on the wild oat biomass in oats at Indian Head, SK from 2003 to 2005.

	Wild Oat Competition					
	Wild oat			No wild oat		
	2003	2004	2005	2003	2004	2005
Seeding rate (seeds m^{-2})	(kg ha^{-1})					
150	971.3	1504.7	1385.4	7.5	0.0	8.9
250	860.0	1070.8	888.8	0.8	0.0	3.0
350	886.0	711.4	916.4	13.4	0.0	1.5
450	821.2	600.3	683.0	14.5	0.7	4.5
Contrasts						
Linear	NS	**	**	NS	NS	NS
Quadratic	NS	*	NS	NS	NS	NS
Phosphorous fertilizer rate (kg ha^{-1} of P_2O_5)						
0	509.6					
15	457.9					
30	451.9					
Contrasts						
Linear	NS					
Quadratic	NS					

Table 5. The effect of wild oat competition, tame oat seeding rate and the addition of phosphorous fertilizer on the wild oats in the harvested tame oats at Indian Head, SK from 2003 to 2005.

	Wild Oat Competition					
	Wild oat			No wild oat		
	2003	2004	2005	2003	2004	2005
Seeding rate (seeds m^{-2})	%					
150	1.4	3.3	1.4	0.2	0.1	0.1
250	1.3	1.7	0.9	0.2	0.1	0.0
350	1.4	1.5	0.6	0.4	0.2	0.0
450	1.0	0.8	0.6	0.2	0.1	0.0
Contrasts						
Linear	NS	**	**	NS	NS	NS
Quadratic	NS	*	NS	NS	NS	NS
Phosphorous fertilizer rate (kg ha^{-1} of P_2O_5)						
0	0.8					
15	0.8					
30	0.7					
Contrasts						
Linear	NS					
Quadratic	NS					

For the tables on this page:
* Significant at the P = 0.05 probability level
** Significant at the P = 0.01 probability level
† NS - not significant

Tame oats vs. wild oats continued...

- The effect of seeding rate on yield varied depending on the environment (Table 2)
    - 2003 was dry – no effect
    - 2004 with high rainfall and low temp – yield decreased as the seeding rate increased
    - 2005 with high rainfall and near normal temp – curvilinear response with 350 seeds m^2 having the highest grain yield
- Small increase in grain yield as the rate of P increased (Table 2)
- Increasing P did not reduce the losses in grain yield caused by wild oats
- Under dry growing conditions (2003), seeding rate did not change the wild oat panicle density, wild oat biomass, or percentage of wild oats in the harvested sample (Tables 3, 4 and 5)
- Under excellent growing conditions, increasing the seeding rate decreased wild oat panicle density, wild oat biomass, and the percentage of wild oats in the harvested sample (Tables 3, 4 and 5)

continued on page 8...

Tame oats vs. wild oats continued...

- Side banded P did not decrease wild oat panicle density, wild oat biomass, and the percentage of wild oats in the harvested sample (Tables 3, 4 and 5)
- Increasing either the seeding rate or fertilizer P rate increased oat biomass (data not shown)
- Test weight was not affected by seeding rate, P or the presence of wild oats
- There was a small decrease in thin seed and a small increase in plump seed as the seeding rate was increased, while adding P fertilizer did not change the plump or thin seed

Conclusions

- These results indicate that seeding rate is more important than the addition of P when using agronomic practices to control wild oats in a crop of tame oats
- The effect of seeding rate on wild oats is strongly influenced by environmental conditions during the growing season
- P can increase biomass and grain yield of oats when the level of soil available P is low

The Effect of N, P, K and Fertilizer Placement on Durum Quality

By: William E. May (AAFC, Indian Head), Guy P. Lafond (AAFC, Indian Head), Myriam R. Fernandez (AAFC, Swift Current), and Chris B. Holzapfel (AAFC, Indian Head).

Introduction

Durum quality is important in accessing price premiums in the durum market. Grain protein, hard vitreous kernels, test weight, black point, red smudge, *Fusarium* and midge-damaged kernels are major determinants in durum quality. Crop management techniques that allow farmers to maximize durum quality will improve their returns.

Objective

The objective of a study completed at Indian Head in 2002, 2003 and 2004 was to determine the response of durum to varying rates of both nitrogen (N) and phosphorus (P) on soils low in plant available P and to determine if phosphorus placement, either in the seed row or side band, has an effect on durum grain yield and/or quality. Potassium chloride (KCl) was also added in some of the treatments to see if it had an effect.

Materials and Methods

AC Avonlea was sown on Indian Head heavy clay soil with low levels of residual P. The soil residual P in 2002 was 28 kg ha^{-1}, 36 kg ha^{-1} in 2003 and 8.9 kg ha^{-1} in 2004. The residual K was greater than 500 kg ha^{-1} in all three years. The following treatments were applied:

Side band – 30N with 0P, 20P or 40P
85N with 0P, 20P or 40P
140N with 0P, 20P or 40P

Table 1. Precipitation (mm) and soil moisture conditions in the spring and the monthly mean temperatures at Indian Head during the study.

	2002	2003	2004
Soil Moisture Reserve (spring)	Poor to Fair	Very Good	Fair
Precipitation		mm	
April	20	55	17
May	18	24	105
June	115	18	85
July	49	23	75
August	98	11	71
Five month total	299	131	354
Percent of 30 year average over 5 months	114	50	134
Average Temperature		°C	
April	-0.6	4.3	3.7
May	7.1	11.4	6.8
June	15.8	15.5	12.6
July	18.6	18.6	16.3
August	15.7	19.5	13.1
Four month average†	14.3	16.3	12.2
Percent of 30 year average over 4 months	90	103	77

† Average of May, June, July and August

continued on page 9...

Effect of N, P, K continued...

140N-40P with 20K or 60K

Side band, seed placed combination –

85Nside-20Pseed

85Nside-40Pseed

140Nside-40Pseed-20Kseed

Note that the N rate is fertilizer N plus soil residual N.

Results and Discussion

Monthly accumulated precipitation and average temperature from May 1st to August 31st for each year are provided in Table 1. Precipitation from April to August was 50% of the 30-year average in 2003 and either at or above average in 2002 and 2004.

The analysis of this study showed that there was no significant interaction between the level of N and the rate of applied P for the measured variables (Table 2). The addition of K also had no effect on the variables measured. The placement of P and KCl had no effect on any variable except head density. There was a significant increase in grain yield as the rate of N increased. The addition of P had no effect on yield except in 2003, which had 50% of its normal rainfall. This may indicate that grain yield in clay soils, low in available P, may be limited by P in years with low amounts of rainfall.

The placement of either P or K in either the seed-row or side band did not affect the yield components except for heads per plant. Heads per plant were higher when 40 kg ha^{-1} of P and 20 kg ha^{-1} of K were seed placed instead of side banded. Plant density decreased as the N rate increased, but the heads per

Table 2. The effect of phosphorus and nitrogen rate, and phosphorus and potassium chloride placement on durum at Indian Head in 2002, 2003 and 2004.

	Yield	Grain Protein	Maturity	Leaf Spots	Test Weight
Nitrogen rate (fertilizer + residual)					
(kg ha^{-1})	(kg ha^{-1})	(%)	(days)	(0-11)	(kg hl^{-1})
30	2672	12.3	104	8.8	78.3
85	3058	14.4	107	8.0	78.1
140	3066	15.0	110	8.0	77.7
Contrasts					
Linear	**	**	**	**	NS
Quadratic	*	**	NS †	*	NS
Phosphorus rate (kg ha^{-1})					
0	2834	14.0	107	8.2	77.5
8.6	3004	14.0	107	8.4	78.4
17.2	2958	13.6	107	8.3	78.3
Contrasts					
Linear	NS	**	NS	NS	NS
Quadratic	NS	NS	NS	NS	NS
85N + 8.6P SP‡	3241	14.2	107	8.4	76.4
85N + 17.2P SP	3096	13.8	107	8.3	78.5
140N + 17.2P SP + 20K_2OSP	3223	14.7	109	8.0	78.7
140N + 17.2P SB~ + 20K_2OSB	3334	14.8	109	8.2	78.5
140N + 17.2P SB + 60K_2OSB	3112	15.0	110	7.7	78.2
8.6 P SP vs. 8.6 P SB	NS	NS	NS	NS	NS
0 vs. 20 K_2O SB	NS	NS	NS	NS	NS
0 vs. 60 K_2O SB	NS	NS	NS	NS	NS
20 vs. 60 K_2O SB	NS	NS	NS	NS	NS
SB vs. SP for P and K_2O	NS	NS	NS	NS	NS
SEM	337	0.23	14.4	1.93	2.1

* Significant at the P = 0.05 probability level

** Significant at the P = 0.01 probability level

† NS - not significant

‡ SP - seed placed

~ SB - side banded

continued on page 10...

Effect of N, P, K continued...

plant increased which compensated for the lower density. Kernel weight was not affected by any of the factors studied.

Protein was affected by the rate of N and P but not by fertilizer placement. There was a curvilinear increase in grain protein as N rate increased and a small decrease in protein as P rate increased (Table 2). Maturity and leaf diseases were affected by N rate, but they were neither affected by P rate nor fertilizer placement (Table 3). Maturity was delayed and leaf disease decreased as the N rate increased. HVK and midge damage increased as N increased, and red smudge decreased as the rate of P increased.

Conclusions

For the fertilizer rates used in this experiment, producers can apply P and K on a heavy clay soil to either a side band or the seed row without impacting either the yield or quality of their durum wheat. The addition of P improved the quality of durum wheat by reducing the percentage of kernels affected with red smudge and black point. In a year when precipitation was well below average and the heavy clay soil was low in available P, the addition of P fertilizer increased yield.

Acknowledgements

This research was funded by IHARF, Agriculture and Agri-Food Canada (AAFC) and the Potash and Phosphate Institute of Canada. The technical support of Roger Geremia, Orla Willoughby and Steve Kopp was appreciated.

Table 3. The effect of phosphorus and nitrogen rate and phosphorus and potassium chloride placement on the kernel quality of durum at Indian Head in 2002, 2003 and 2004.

	Hard Vitreous Kernels	Black Point	Red Smudge	*Fusarium* Damaged Kernels	Wheat Midge
Nitrogen rate (fertilizer + residual)			(%)		
(kg ha^{-1})					
30	65.0	0.20	0.61	2.0	1.08
85	77.4	0.17	0.62	1.7	1.49
140	77.8	0.20	0.62	1.8	1.61
Contrasts					
Linear	**	NS †	NS	NS	**
Quadratic	0.06	NS	NS	NS	NS
Phosphorus rate (kg ha^{-1})					
0	73.1	0.21	0.75	1.8	1.41
8.6	75.0	0.20	0.51	1.8	1.37
17.2	72.1	0.15	0.59	2.1	1.41
Contrasts					
Linear	NS	0.055	0.06	NS	NS
Quadratic	NS	NS	*	NS	NS
85N + 8.6P SP‡	77.6	0.17	0.58	1.70	1.50
85N + 17.2P SP	75.7	0.17	0.72	2.10	1.40
140N + 17.2P SP + 20 K_2O SP	73.3	0.18	0.52	2.00	1.40
140N + 17.2P SB~ + 20 K_2O SB	78.2	0.15	0.55	1.20	1.40
140N + 17.2P SB + 60 K_2O SB	76.1	0.15	0.57	1.80	1.50
8.6 P SP vs. 8.6 P SB	NS	NS	NS	NS	NS
0 vs. 20 K_2O SB	NS	NS	NS	NS	NS
0 vs. 60 K_2O SB	NS	NS	NS	NS	NS
20 vs. 60 K_2O SB	NS	NS	NS	NS	NS
SB vs. SP for P and K_2O	NS	NS	NS	NS	NS
SEM	12.2	0.08	0.3	1.2	0.99

* Significant at the P = 0.05 probability level
** Significant at the P = 0.01 probability level
† NS - not significant
‡ SP - seed placed
~ SB - side banded

IHARF Winter Seminar
January 31, 2007
9:30 am – 3:30 pm
Indian Head Memorial Hall

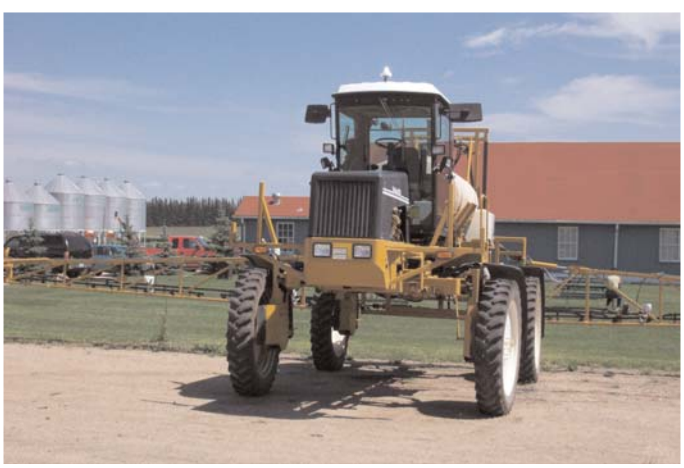
Chris Holzapfel, AAFC, Indian Head

Topics to include:

- Grain market update
- Bagged grain storage
- Greenseeker™ optical sensor – nitrogen management in wheat, canola, oats, barley
- Perennial weed management – Canada thistle, dandelion
- Nitrogen management in oilseeds – sunflower, canola quality Brassica juncea, canola, flax
- Greenhouse gas measurements
- Seed treatments, foliar fungicides

IHARF Annual Meeting to follow the seminar.

The cost is $10. To register phone (306) 695-4200.



2007 Crop Management Day

IHARF's annual Crop Management Day will take place on July 17 in Indian Head and will feature:

Guy Lafond
- Using the Greenseeker™ for N management in cereals
- Recropping flax on different stubbles
- Post-emergent N application

Bill May
- Niger: potential as a minor crop
- Sulfentrazone: developing rates for Saskatchewan

Chris Holzapfel
- Using the Greenseeker™ for N management in canola

Kelly Turkington
- Diseases in malt barley and other cereals

Jeff Schoenau
- Effects of long-term zero tillage on soil phosphorus

Rosalind Bueckert
- Effects of long-term zero tillage on lentil production

Call (306) 695-4200 for either more information or to register for the event. The cost is $25.00 per person, which includes both lunch and dinner. The pre-registration deadline is July 10, 2007.

IHARF Relies on Members for Research Direction

As I updated the mailing list for this newsletter, it was obvious that IHARF's membership has been decreasing over the past few years. I know that there are probably a number of valid reasons for this related to the ever-changing face of agriculture, but it does raise concerns.

IHARF's mission is "To promote profitable and sustainable agriculture by facilitating research and technology transfer activities for the benefit of its members and the agricultural community at large." IHARF's strength has always been in the knowledge and interest of its members. IHARF relies on its membership to provide direction and feedback for research projects, as well as input for extension events. Directors and members have participated in IHARF's own strategic planning sessions for research and served on the Crop Management Day Committee. IHARF's members have also been directly involved in strategic planning sessions for oat, canary, sunflower and harvest management to give direction and priority for research in these areas.

The need for member input continues. I will be contacting IHARF members and other Crop Management Day participants over the next couple of months to ask for your ideas and comments about the topics, format and general quality of our field day. We are looking for this input to continue to improve and ensure that the field day is useful.

We will also be looking for input about using the Greenseeker™ optical sensor, one of our major research projects. For what situations is this technology useful for farmers? Is there another area of research for this sensor that needs to be done to complete the information package? If farmers are going to use this technology, what will their needs be for training and technical support? We will be looking to our membership to supply some of these answers. It is very important to have members who are interested and willing to participate in these kinds of sessions. Input from our members on any topic is always invaluable.

Please take a moment to renew your membership if it is due, and encourage others who are interested to join as well. Membership participation can only strengthen the organization and improve the quality of information we provide. We look forward to your participation.

The cost of IHARF memberships is $25 per year, or $100 for five years. A membership application is located on the back page of this newsletter.

2006 Agronomy Research Projects

The following is a list of the agronomy research projects that were conducted by IHARF and AAFC in 2006. If you would like more information on any of these projects, please contact IHARF at (306) 695-4200.

- Response of sunflower and canola-quality *Brassica juncea* to nitrogen compared to canola and flax
- Stubble management and nitrogen management in winter wheat
- Optical sensor research on wheat, canola, oats and barley
- Comparison of long-term and short-term zero tillage
- Management of Canada thistle and dandelion
- Greenhouse gas emissions, legume based rotations and long-term wheat rotations
- Effect of oat variety on oat quality
- Malt barley management – stubble, nitrogen, fungicide, herbicide, seeding dates, seeding rates, and varieties
- Canary – cultivar trials and *Septoria* leaf mottle control
- Field pea management study
- Effects of self-seeding medics in a continuous grain system
- Weed control in flax, niger and foxtail millet
- Improving competitiveness of tame oats over wild oats using groat size and seeding rate
- Niger development
- Forages in rotation for soil improvement
- Post-seeding application of UAN
- Swath grazing comparison with Golden German millet and oats
- Long-term wheat rotations
- Oilseed radish and arugula – agronomy and nutritional components

Appreciation for a Job Well Done

Once again harvest is complete, the last greenhouse gas samples have been taken, machinery has been winterized, staff are processing samples, entering data, repairing equipment and planning for 2007, while scientists are analyzing data, writing reports and preparing presentations. Another year's agronomic research work summarized in one paragraph. Although it may seem that the past year went by in the time it took to read this paragraph, there is a lot of work that is required to provide the final research reports and scientific papers.

Between AAFC and IHARF there are 51 agronomic studies that consist of 2900 plots and cover between 30 and 40 acres. Throughout the year, the plot staff (depending on the project) measure and stake plots, take soil samples for moisture and nutrients, count weeds, measure nitrous oxide emissions, calibrate seeds, and

continued on page 14...

Job well done continued...

remove and install greenhouse gas chambers. They also seed, complete plant emergence counts, spray herbicides and fungicides, measure ammonia emissions, mow pathways, top-dress fertilizer, collect dry matter samples, prepare trailers and the pavilion for the field day, collect flag leaves and soil samples, and take flowering and maturity notes.

Their duties continue as they fix machinery, download weather data, take NDVI readings, get ratings on crop injury and weed control, complete head counts,count flax bolls and the number of flax seeds in the bolls, gather disease and lodging ratings, harvest, seed winter crops, and clean and weigh grain samples. Did I forget to mention that they also calculate dockage, determine the percentage of thins, grind soil samples for analysis, enter data, prepare grain samples for nitrogen and phosphorus analysis, apply fall herbicides and fertilizer trials, calculate 1,000 kernel weights, take canola green counts, and haul grain?

Of course, the plot staff's work does not stop there. They now have to get ready for next year's studies by staking for the studies, entering data, completing field plans, ordering supplies, cleaning sheds, and taking snow measurements in the stubble.

The Precision Farm and AAFC Research Farm fields also keep staff busy as these two farms consist of 750 acres that are used for field scale research projects. Annual duties include calibrating and setting up machinery, planning and managing field scale research projects, seeding, spraying herbicides and fungicides, Greenseeking, topdressing nitrogen, and checking for insects. Staff are also responsible for fixing machinery, preparing for the field day, harvesting, hauling grain, managing data, soil sampling, winterizing equipment, checking grain, planning for 2007, ordering shop supplies, and remodeling equipment.

We have several AAFC and IHARF people to thank for all the work that is done every year. Much appreciation to Roger Geremia, Hilary Hunter, Steve Kopp, Randy Shiplack, Orla Willoughby and Alan Davies (summer student) for their dedication to and competence with the plot work. Thanks also to Chris Omoth, who looks after the Precision and Research Farms' field scale acres, and Chris Holzapfel, who manages and completes the bulk of the work related to his own Greenseeker™ plots and field scale trials, as well as helping Chris O. as necessary. Guy Lafond and Bill May spend much of their time in the plots during the growing season. Guy, Bill and Chris H. also put all of the numbers together in the end. We want to thank you all for a job well done.

IHARF Partners

Precision Farm

Platinum
- Markusson New Holland
- New Holland North America
- Bayer CropScience
- Agriculture and Agri-Food Canada's Matching Investment Initiative

Gold
- Koch Fertilizer Canada Ltd. (formerly Simplot Canada Limited)

Silver
- BASF Canada
- Enviro-Test Labs
- Mosaic
- Midwest Technologies Inc.
- Pattison Liquid Systems
- Westeel

Bronze
- Liphatech Inc.
- Nite Hawk Trucking
- OmniSTAR Inc.
- Pedde Farms
- Raven Industries
- Syngenta
- Town of Indian Head

Zero Till Field Day

Bronze
- Accutrak Systems Ltd.
- Conserva Pak Seeding Systems
- Ag Canada - Indian Head Research Farm
- Pattison Liquid Systems Inc.
- Plainsview Credit Union
- Saskatchewan Canola Development Commission

Effect of Pulses on Soil and Air Quality

Platinum
- Agriculture and Agri-Food Canada
- Saskatchewan Agriculture & Food
- Saskatchewan Pulse Growers

Agri-Arm

Gold
- Saskatchewan Agriculture & Food

Silver
- Agriculture & Agri-Food Canada

Best Management Practices for GHG Mitigation

Platinum
- Agriculture & Agri-Food Canada

Silver
- Fluid Fertilizer Foundation
- Potash & Phosphate Institute of Canada
- Simplot Canada Ltd.
- Vale Farms

Bronze
- Paterson Grain

Greenseeker Evaluation

Platinum
- Agriculture & Agri-Food Canada - ETAA Program

Gold
- Pattison Liquid Systems
- Saskatchewan Canola Development Commission

Silver
- Oklahoma State University

Minor Use Program

Silver
- Agri-Food Innovation Fund
- Agriculture & Agri-Food Canada
- Saskatchewan Agriculture & Food

IHARF BOARD OF DIRECTORS 2007

Terry Rein, President
Box 115
INDIAN HEAD SK SOG 2K0
695-0366 (cell)
tgrein@sasktel.net

Marcel van Staveren, Vice President
Box 89
GRIFFIN SK S0C 1G0
861-3764 (cell)
marcelvanstaveren@yahoo.ca

Chad Skinner, Secretary
Box
INDIAN HEAD SK S0G 2K0
695-3420/695-7783 (cell)
theskinnerfamily@sasktel.net

Lyle Drew
3518 Edinburgh Drive
REGINA SK S4V 2G7
789-2459 / 537-3936 (cell)
fax: 789-3215
lyle.drew@basf.com

Maurice Delage
69 Academy Park Road
REGINA SK S4S 4T8
586-8640 / 535-0553
Fax: 586-8640
maurice@delagefarms.ca

Ron Lyke
Box 427
WOLSELEY SK S0G 5H0
698-2724
Fax 698-2923
r.lyke@sasktel.net

Andrew Schaefer
Box 51
RICETON SK S0G 4E0
738-4806 / 596-0900 (cell)
Fax: 738-2151
asfarm@imagewireless.ca

Deb Sluser
Box 336
GLENAVON SK S0G 1Y0
224-4683
Fax: 224-4319
rdsluser@sasktel.net

Vaughn Johnson
Box
MONTMARTRE SK
424-2725
vaughn@xplornet.com

EX OFFICIO

Dave Gehl, Officer in Charge
gehl@agr.gc.ca
695-2274

Guy Lafond, Research Scientist
lafond@agr.gc.ca
695-5220

Bill May, Research Agronomist
695-5225
mayb@agr.gc.ca

Chris Omoth – Precision Farm Technician
AAFC Union Representative
omothc@agr.gc.ca
695-7516

c/o Indian Head Experimental Farm
Box 760
INDIAN HEAD SK S0G 2K0
Fax 695-3445

STAFF

Chris Holzapfel, Research Associate
holzapfelcb@agr.gc.ca

Hilary Hunter, Greenhouse Gas Technician
hunterh@agr.gc.ca

Judy McKell, Manager
judymckell@sasktel.net

c/o IHARF
Box 156
Indian Head Sk S0G 2K0
695-4200

Pat Rediger, Communications Co-ordinator
Benchmark Public Relations
3rd Floor, 2368 Rae Street
REGINA SK S4T 2G2
522-9326
Fax: 586-5177
prediger@benchmarkpr.ca

IHARF MEMBERSHIP APPLICATION

Participate in determining research projects! Get the latest information on them!
Please fill out this form and mail it to: IHARF, Box 156, Indian Head, SK S0G 2K0

Name.. ___$25/1 year
Address... ___$100/5 years
City/Town..Prov. .... Postal Code ....