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2007 North-Central Idaho Crop Management Trials

Northern Idaho Small Grain and Grain Legume Research and Extension Program

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University of Idaho
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Introduction

Increase in cereal grain yields results from a synergistic combination of advances in genetic improvement of cereal grain varieties and improved agronomic practices. Some studies have shown that genetic improvement has contributed about 50 percent of the total improvement in yields over the past 30 to 40 years. Varietal development programs strive not only for greater yield potential, but also for improved end-use quality, better disease and insect resistance. However, genetic potential cannot be expressed without good agronomic management practices.

Variety evaluation for crop performance is conducted and summarized annually and results for 2007 were published in the University of Idaho Research bulletin 170 (January 2008). This publication is available on-line at the UI College of Agriculture publication website: http://www.ag.uidaho.edu/cereals/nidaho. The information summarized in this bulletin pertains to crop management and can fit into the overall management and genetic improvement used for successful crop production in Idaho.

This report summarizes field agronomic performance evaluations by northern Idaho Extension educators. Included are studies of 1) a demonstration trial of safflower yield; 2) a herbicide response study with Clearfield wheat; 3) agronomic and cultivar evaluation for camelina, a potential northern Idaho oilseed crop; 4) the effects of seed treatments on grain-legume performance; 5) winter and spring wheat seed treatments; 6) winter wheat variety performance evaluation in strip-trials; 7) rapeseed meal pre-application and seed treatment of pea crops; and 8) an evaluation of nitrogen application methods to winter wheat to reduce nitrogen runoff potential and improve nitrogen use efficiency.

Overall, additional testing may produce information that changes results presented here. Final decisions regarding management options should also be based on the grower's experience, economics, interactions with other management practices, and more than one year of test information.

2007 Beyond® and Affinity® Tank Mix
Sequential Herbicide Efficacy & Crop Response on herbicide resistant Clearfield Wheat

Larry J. Smith, UI/Nez Perce County Extension

Cooperators: Allen & Millie Lansing, Lansing Farm, Cavendish, Idaho
DeWayne Ward, Primeland Cooperatives
Brian Sifers, BASF
Don Kambitsch, DuPont Crop Protection
Bob Brown, UI/Nez Perce County Extension

Application dates: May 19 and May 30, 2007
Field planted to ORCF-102 (a soft white Clearfield winter wheat)
Plot design: Large, on-farm replicated strips
Sprayer type: All treatments applied by a ground sprayer—Case I.H. Patriot

- Nozzles: Tee Jet Nozzle, size 008 – 110 degrees
- Boom height of 30 to 40 inches

Spray applications made by Primeland Cooperatives

Treatments: Product and rate applied:

Treatment	Herbicide product	Rate/Acre	Date
1	Affinity (imazamox) Tank Mix	1 oz/ac	May 19
2	Beyond (tribenuron) Affinity Tank Mix & Headline	5 oz/ac 1 oz/ac 6 oz/ac	May 19 May 30 May 30
3	Beyond	5 oz/ac	May 19
4	Affinity Tank Mix Beyond & Headline	1 oz/ac 5 oz/ac 6 oz/ac	May 19 May 30 May 30

Beyond and Affinity Tank Mix
Sequential Herbicide Efficacy & Crop Response Reading: July 9, 2007

			Rep I		Rep II		Rep III		Average	
	Treatment	Rate /Acre	Weed Control	Crop Damage	Weed Control	Crop Damage	Weed Control	Crop Damage	Weed Control	Crop Damage
1	Affinity Tank Mix—May 19	1 oz/ac	95%	0	90%	0	95%	0	93%	0
2	Beyond—May 19 Affinity Tank Mix—May 30 & Headline—May 30	5 oz/ac 1 oz/ac 6 oz/ac	95%	0	97%	0	95%	0	96%	0
3	Beyond—May 19	5 oz/ac	97%	0	95%	0	98%	0	97%	0
4	Affinity Tank Mix—May 19 Beyond—May 30 & Headline—May 30	1 oz/ac 5 oz/ac 6 oz/ac	95%	0	90%	0	97%	0	94%	0
	LSD 0.05=4.2 CV									
	Relative weed pressure rating		15%		45%		30%		30%	

Observations and comments:

- No statistical difference in weed control was observed among any treatment.
- The untreated check had more bedstraw, broadleaf weeds, and grasses than other treatments.
- Some isolated patches of bedstraw were found within all treatments.
- No crop damage was observed in any of the treatments under a sequential treatment interval of 11 days.
- Treatments provided acceptable levels of weed control.
- Weed pressure on the untreated check was 15%, 45%, and 30%, respectively, in replicates I, II, and III.
- For more information on sequential herbicide treatments in crop rotations, consult 2007 PNW 437, "Herbicide-Resistant Weeds and Their Management," by Donn Thill, et. al., Professor Weed Science, University of Idaho.

2007 Spring Safflower Seed Yield Demonstration Trial

Larry J. Smith, UI/Nez Perce County Extension
with
Davern Riggers, Riggers Farm, Reubens, Idaho

Cooperators: Richard Cooley, Earthkeep, Inc., Carson, Washington
Dr. Jerald Bergman, Montana State University & North Dakota State University
Tom Hickman, Cal/West Seeds, Woodland, California
Roeland Kapsenberg, Cal/West Seeds, Woodland, California
Art Weisker, Cal Oils, Woodland, California
Scotty Brammer, Brammer Farms, Lenore
George Brocke & Sons, Kendrick
Bob Brown, Tech Support, UI/Nez Perce County Extension

Field location: Reubens, Idaho

Planting date: May 18, 2007

Plot size: One acre per variety, non-replicated

Seeding rate: Hybrids 15 lbs per acre
Non-hybrids 20 lbs per acre

Seed treatment: Vitavax (carboxin)/Thiram
All varieties seed treated

Fertilizer: 100-N 20-P 0-K 14-S lbs per acre

Herbicides: Sonolan G-10 10 pounds per acre, pre-plant (labeled for use on safflower)

Notes:

June 6, 2007: Somewhat irregular stands of one-inch tall plants established. Rain was needed, conditions were not weedy.

July 1, 2007: Irregular stands filled-in satisfactorily. Sonolan and safflower competition managed weeds satisfactorily. Dry conditions became a concern although varieties continued to show resilience.

August 1, 2007: Varieties continued to show resilience and vigor at full bloom in spite of area heading to D-3 drought status.

September 14, 2007: Safflower varieties windrowed and allowed to dry for harvest due to preparations for winter wheat planting

September 20, 2007: Harvest

Seasonal pest problems: Weeds kept in check by Sonolan herbicide and crop competition. No insect or disease pressure recorded.

Maturity ranking notes

Table 1. 2007 Spring Safflower Trial, Riggers Farm, Reubens/Gifford

Variety	Relative Maturity 17-Aug	Relative Maturity 20-Sep	Yield at harvest	Moisture at Harvest	Seed yield after moisture adjustment	Seed oil content
			lbs/acre	percent	lbs/acre	%
MSU—NDSU Oleic 5	M	E	1177	11.7%	1133	38.2
CW 8807 – T05 – 1016	M	E	1089	11.4%	1052	35.5
CW 9907 – T06 – 1017	E	M	1034	12.8%	984	37.3
Seedtek 1133	E	L	1045	16.2%	959	38.0
Seedtek S-344	M	E	1012	11.7%	975	36.4
MSU—NDSU Hybrid 49	M	E	957	9.5%	943	35.1
Seedtek S-345	M	L	990	16.6%	905	38.5
MSU—NDSU Nutra Safflower	M	L	792	16.5%	725	43.3

Ranking scale: E = early M = medium L = late
*Growth stage on August 17 by visual observation: Full bloom—some flower drying in early maturing entries.
**Maturity ranking on September 20 based on % moisture at harvest.
Safflower maturity is difficult to rate. Trends are present for maturity and follow-up ratings will provide final analysis.

Summary and comments:

- The safflower varieties were windrowed to allow timely harvest in preparation for planting the following crop of winter wheat. Windrowing had a negative effect on yield and quality because harvest was undertaken early in order to ready the field for timely planting of the following crop of winter wheat.

- Percent oil readings were in the normal average range of 38%. Oilseed reading by Dr. Jerald Bergman, MSU-NDSU safflower breeder, Sydney, Montana.

- The MSU-NDSU variety Oleic 5 trended higher than other seed yields, while MSU-NDSU Nutra Safflower trended higher than other varieties oil percentages.

- Weeds were satisfactorily controlled by Sonolan herbicide and crop competition.

- Planting the following crop of winter wheat went smoothly since there was no problem with safflower crop residue. The soil was in good (mellow) condition following the safflower crop.

- Overall, the safflower varieties emerged satisfactorily, weed control was satisfactory, no disease or insect problems were observed, and the safflowers thrived well until harvest even though the county was designated a D-3 drought status.

- More years of evaluation are required to fully evaluate the agronomic, economic, and marketing potential of safflower for north central Idaho.

Evaluation of Foliar Fungicide for Control of *Ascochyta rabiei* -- Chickpea Blight 2007

Larry J. Smith, University of Idaho Extension, Nez Perce County
with
Kevin Hasenoehrl, Hasenoehrl Farm, Cameron area, Kendrick, Idaho

Cooperators: Brian Sifers, BASF Company
Don Kambitsch, DuPont Crop Protection
Tom Chamberlin, Primeland Cooperatives
DeWayne Ward, Primeland Cooperatives

Objective: To evaluate and compare the efficacy of various fungicide treatments for control of Ascochyta blight (*Ascochyta rabiei*) on chickpea (*Cicer arietinum*).

Field location: Hasenoehrl Farm, Cameron area, Kendrick, Idaho

Planting date: May 1, 2007

Harvest date: August 31, 2007

Variety: Dwelley chickpea

Seeding rate: 150 pounds/acre

Soil type: Silt loam

Rotation: Spring barley 2005—soft white winter wheat 2006—chickpeas 2007

Precipitation: Total 6 inches rainfall March through August 2007

Weed control: Assure II 10 ounces/acre
Pursuit 2 ounces/acre
Sencor 8 ounces/acre

Seed treatments: Apron XL-LS(metalaxyl), Maxim(fludioxomil), & Mertect LSP(thiabendazole)

Blight level at time of application: 3.3% to 4.0% spotted throughout the trial area

Fungicide application: June 13, 2007
Non-replicated strips run from north to south. Treatment entry plot length is 1,000 feet. All treatments applied in tank mix with Assure II herbicide at 10 ounces per acre with prime oil (crop oil) at 1 gallon per 100 gallons water.

Fungicide treatments applied:

1. Proline (Bayer) 5.7 ounces per acre
2. Bravo Weather Stik (Syngenta) 1.3 pints per acre
3. Untreated check by applying Assure II and crop oil only
4. Manex (Dupont) 1.5 quarts per acre
5. Headline (BASF) 6.0 ounces per acre

6. Quadris (Syngenta) 6.2 ounces per acre
7. Quadris Opti (Syngenta) 1.66 pints per acre

Methods:

- Six fungicide treatments and an untreated check were evaluated.
- Plot size per treatment replicate:
  - First two strips = 50’ X 1,000’ (Quadris)
  - Remaining five strips = 60’ X 1,000’

Sprayer type:

- All treatments applied by a ground spray rig—Case I.H. Patriot
  - Nozzles: Tee Jet, size 008 – 110 degrees
  - Boom height of 35 inches
  - Application at 20 gallons per acre

Seed Yield

Treatment	Rate	% Plants with Blight June 13, 2007	Yield pounds per acre
Quadris (Syngenta)	6.2 ounces per acre	3.3%	1,305
Quadris Opti (Syngenta)	1.66 pints per acre	3.6%	1,290
Untreated check drive through	applying Assure II and crop oil only	3.6%	1,290
Manex (Dupont)	1.5 quarts per acre	4.0%	1,275
Headline (BASF)	6.0 ounces per acre	3.0%	1,245
Proline (Bayer)	5.7 ounces per acre	3.6%	1,230
Bravo Weather Stik (Syngenta)	1.3 pints per acre	4.0%	1,215
Average		3.6%	1,264

Blight symptoms were vague, and inter-dispersed within the yellowing lower leaves.
No blight lesions observed on stems within the canopy
All blight occurrences were mostly evenly distributed within the test area

Summary and comments:

A low incidence of Asocochyta rabiei, chickpea blight, was evident early in the growing season and remained low as a result of summer drought. For this reason, any yield variances among the treatments of the non-replicated demonstration strips are more likely due to soil type and drought stress rather than differences among fungicide treatments. Moreover, during the next crop season, a replicated trial of this type would more amply define any significant differences among the fungicide products if normal rainfall patterns resume in tandem with significant disease pressure.

2006-2007 On-Farm
Hard White and Hard Red Winter Wheat Variety Demonstration Trial
Four Located at Leland, Genesee, Lewiston & Lapwai, Idaho

Larry J. Smith, UI/Cooperative Extension System
Idaho Wheat Commission
Doug Finkelnburg, University of Idaho Extension Support Scientist, Moscow, Idaho

Cooperators: Robert Blair, Blair Farm, Leland, Idaho
James Evans, Evans Farm, Genesee, Idaho
Art & Doug McIntosh, TriMax Associates--McIntosh Farm, Lewiston, Idaho
Bob, Dick, Mark, & Todd Wittman, Wittman Farm, Lapwai, Idaho
Bob Brown, UI/Nez Perce County Extension Tech Support

Seed Processor Cooperators: Genesee Union Warehouse, Genesee, Idaho
Primeland Cooperatives, Lewiston, Idaho
UI Foundation Seed Program, Kimberly, Idaho
WSU Foundation Seed Program, Pullman, Washington

Location: **Blair Farm, Leland**:
Planting date: October 22, 2006
Harvest date: August 10, 2007
Seeding rate: 84 lbs/acre
Fertilizer: Nitrogen 120 lbs /acre
100 lbs NH_3 (anhydrous ammonia)
20 lbs liquid nitrogen
Phosphorous 25 lbs /acre
Sulfur 20 lbs /acre

Location: **Evans Farm, Genesee**:
Planting date: October 24, 2006
Harvest date: July 24, 2007
Seeding rate: 95 lbs/acre
Fertilizer: Nitrogen 150 lbs/acre
Phosphorous 25 lbs/acre
Sulfur 25 lbs/acre
Potassium 10 lbs/acre

Location: **TriMax Associates—McIntosh Farm, Tammany area, Lewiston**:
Planting date: October 4, 2006
Harvest date: July 7, 2007
Seeding rate: 90 lbs/acre
Fertilizer: Urea 80 lbs/acre
Ammonium phosphate (11-52-0) 40 lbs/acre

Location: **Wittman Farm, Lapwai**:
Planting date: October 13, 2006
Harvest date: July 26, 2007
Seeding rate: 90 lbs/acre
Fertilizer: Liquid NH_3 150 lbs/acre
Phosphorous 13.25 lbs/acre
Sulfur (Thiosol) 13 lbs/acre
Liquid nitrogen 10 lbs/acre
16-20-0 50 lbs/acre

Situation: Following Nez Perce County Crop Advisory Committee recommendations, nine varieties of hard red winter wheat and three varieties of hard white winter wheat were evaluated for seed yield, test weight, and seed protein in large, on-farm strips at four locations in north central Idaho.

Accomplishment: At four on-farm locations in north central Idaho, hard red and hard white winter wheat varieties were planted in long, replicated strips and were maintained and harvested under participating grower's cropping practices. Varieties evaluated included the hard red winter varieties Bauermeister, Finley, DW, Declo, Boundary, Eddy, Paladin, Falcon, and Juniper and the hard white winter varieties UI Darwin, Gary, and MDM. Seed was provided by Primeland Cooperatives, Genesee Union Warehouse, and the University of Idaho and Washington State University Foundation Seed programs.

Trials were harvested using grower equipment and seed weights were taken in the field using portable electronic truck pad scales or combine-mounted yield monitors. Lewiston Grain Inspection provided grain protein percentage and test weight readings.

NOTE: The variety Moreland was not planted at the Leland location. However, it was used to compute the average overall seed yield, test weight, and protein percentage for hard red and hard white winter wheat evaluated for all sites except Leland in the previous tables. However, in separate statistical evaluations for seed yield, test weight, and percent protein on the following pages, Moreland was omitted from the hard red wheat class comparison to negate any data shift accuracy since it was not planted in Leland, thus presenting a null data set for that location.

A. Seed yield for all varieties tested (hard red and hard white) (Figure 1): The average seed yield across the four locations was 60 bushels per acre. The highest seed yield was recorded at Lapwai followed by Leland, Genesee, and Lewiston, respectively. The hard red winter variety Eddy, at 89 bushels per acre in Lapwai, produced the highest yield of any variety tested.

1. **Seed yield for hard red winter wheat:** The varieties of DW and Paladin yielded significantly better at the 5% significance level than Juniper and Finley (Table 1).

Figure 1. Average Seed Yield--Hard Red and White Winter Wheat--4 Locations

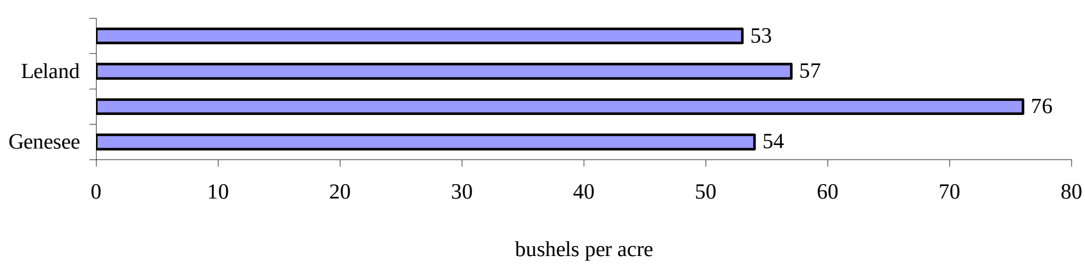


Table 1. Seed Yield—Hard Red Winter Wheat

Variety by Class	Leland	Genesee	Lewiston	Lapwai	Average*	
Hard Red	--------------------bushels per acre--------------------					
Finley	43	55	41	63	51	A
Juniper	41	55	48	65	52	AB
Falcon	41	51	50	77	55	ABC
Declo	66	51	46	77	60	ABC
Boundary	71	41	58	79	62	ABC
Bauermeister	56	67	59	68	63	BC
Eddy	64	45	52	89	63	BC
Paladin	56	57	64	83	65	C
DW (IDO 513)	64	57	63	79	66	C
Average hard red	56	53	53	76	60	

LSD 5% = 12 bushels C.V. = 14%

* Average values followed by the same letter are not significantly different at the 5% Level.

2. **Seed yield for hard white winter wheat:** No differences in yield were observed at the 5% significance level among MDM, Gary, and UI Darwin (Table 2).

Table 2. Seed Yield—Hard White Winter Wheat

Variety by Class	Leland	Genesee	Lewiston	Lapwai	Average*	
	--------------------bushels per acre--------------------					
Hard White						
MDM (WA 7936)	65	66	55	76	66	A
Gary	64	61	46	74	61	A
UI Darwin	58	49	53	76	59	A
Average	62	59	51	76	62	NS

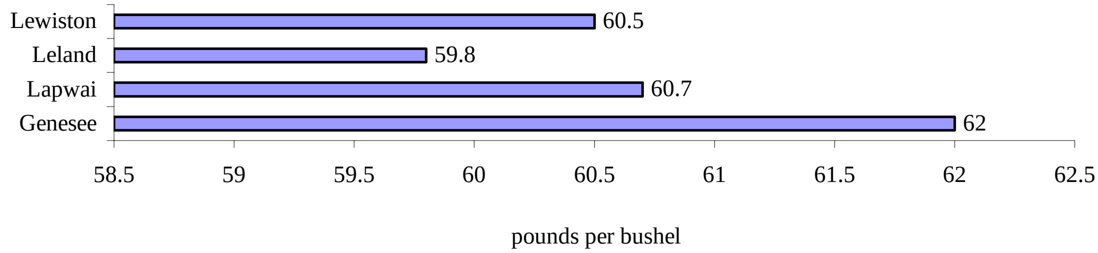
C.V. = 8%

*Average values followed by the same letter are not significantly different at the 5% Level.

3. **Comments:**
    i. Average seed yield across the four locations ranged from a low of 53 bushels per acre at the Genesee and Lewiston locations to a high of 76 bushels per acre at the Lapwai location. (Chart 1)
    ii. Falcon, Juniper, Boundary, and Finley (deer damage) were varieties providing the lowest yields of 41 bushels per acre each at Leland, Genesee, and Lewiston, respectively.
    iii. The Leland location was impacted by deer damage and herbicide timing.
    iv. The Lewiston location was impacted by early-season cattle feeding under wet conditions and partial summer fallow and moisture deficient slick spots (alkali soil spots).

B. Test weight for all varieties tested (hard red and hard white)(Figure 2): The average test weight across four locations was 60.7 pounds per bushel. The highest test weights were found at Genesee followed by Lapwai, Lewiston, and Leland, respectively.

Figure 2. Average Test Weight--Hard Red & White Winter Wheat--4 Locations



1. **Test weight for hard red winter wheat:** The varieties Paladin and Eddy provided significantly better at the 5% significance level than Falcon, Declo, Boundary, and Bauermeister, respectively(Table 3).

Table 3. Test Weight—Hard Red Winter Wheat

Variety by Class	Leland	Genesee	Lewiston	Lapwai	Average*	
	--------------------pounds per bushel--------------------					
Hard Red						
Bauermeister	57.3	60.7	60.0	58.7	59.2	A
Boundary	59.3	60.9	60.5	60.5	60.3	AB
Declo	60.2	62.6	58.6	61.2	60.7	B
Falcon	59.5	62.7	60.2	61.1	60.9	BC
Juniper	61.2	62.2	61.8	59.3	61.1	BCD
Finley	60.3	63.1	61.2	61.2	61.5	BCD
DW (IDO 513)	60.8	63.0	62.2	62.2	62.1	CD
Eddy	62.4	62.4	61.3	62.7	62.2	D
Paladin	61.3	63.3	61.7	62.7	62.3	D
Average	60.3	62.4	60.8	61.1	61.1	

LSD 5% = 1.3 pounds per bushel C.V. = 1.4%

* Average values followed by the same letter are not significantly different at the 5% Level.

2. **Test weight for hard white winter wheat:** The variety UI Darwin provided significantly better test weight than Gary and MDM at the 5% significance level (Table 4).

Table 4. Test Weight—Hard White Winter Wheat

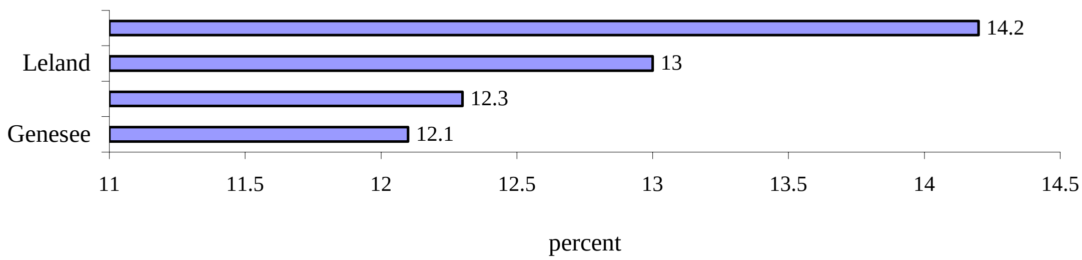
Variety by Class	Leland	Genesee	Lewiston	Lapwai	Average*	
	--------------------pounds per bushel--------------------					
Hard White						
MDM (WA 7936)	56.3	60.0	59.3	57.8	58.4	A
Gary	56.5	61.0	59.6	58.8	59.0	A
UI Darwin	62.5	62.6	61.5	62.1	62.2	B
Average	58.4	61.2	60.1	59.6	59.8	

LSD 5% = 1.9 pounds per bushel C.V. = 1.9%

*Average values followed by the same letter are not significantly different at the 5% Level.

C. **Percent seed protein for all varieties tested (hard red and hard white)(Figure 3):** The average percent protein across the four locations was 12.9%. The highest percent seed protein was found at the Lewiston location followed by Leland, Lapwai, and Genesee, respectively.

Figure 3. Percent Protien--Hard Red & White Winter Wheat--4 Locations



1. **Percent protein for hard red winter wheat:** The variety Declo provided significantly better seed protein at the 5% significance level than Bauermeister, Falcon, Boundary, and DW, respectively (Table 5).

Table 5. Seed Protein Percentage - Hard Red Winter Wheat

Variety by Class	Leland	Genesee	Lewiston	Lapwai	Average*	
	--------------------% protein--------------------					
Hard Red						
DW (IDO 513)	12.8	11.5	13.3	11.8	12.4	A
Boundary	12.4	12.0	14.2	11.6	12.6	AB
Falcon	11.9	11.8	14.2	12.4	12.6	AB
Bauermeister	13.0	11.9	13.5	12.0	12.6	AB
Eddy	12.4	12.0	14.5	11.9	12.7	ABC
Finley	13.3	11.8	14.3	12.6	13.0	ABC
Paladin	13.5	12.6	13.8	12.5	13.1	BC
Juniper	12.6	12.1	14.7	13.3	13.2	BC
Declo	13.6	12.3	15.1	12.1	13.3	C
Average	12.8	12.0	14.2	12.2	12.8	
LSD 5% = 0.7			C.V. = 3.5%			

* Average values followed by the same letter are not significantly different at the 5% level

2. **Percent protein for hard white winter wheat:** There were no significant differences for seed protein among the varieties tested at the 5% significance level (Table 6).

Table 6. Seed Protein Percentage—Hard White Winter Wheat

Variety by Class	Leland	Genesee	Lewiston	Lapwai	Average*
	--------------------% protein--------------------				

Hard White						
Gary	13.2	11.7	14.3	12.1	12.8	A
UI Darwin	12.8	12.3	14.5	13.0	13.2	A
MDM (WA 7936)	14.2	12.6	13.6	12.2	13.2	A
Average	13.4	12.2	14.1	12.4	13.1	NS

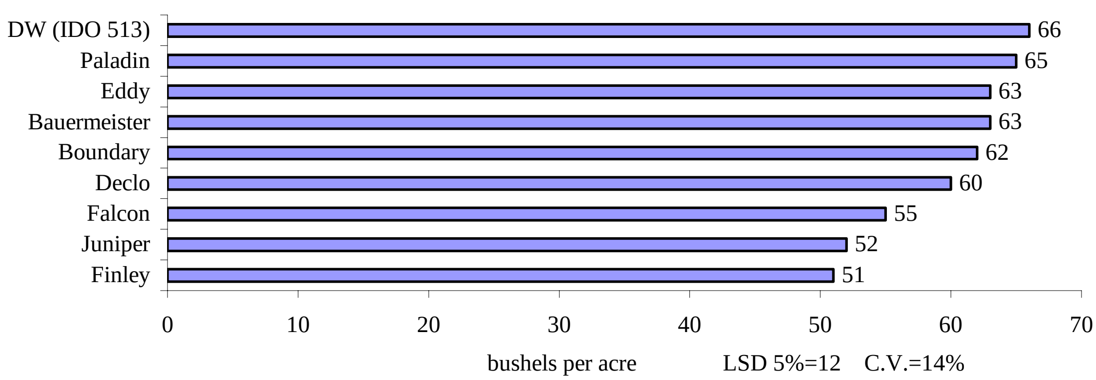
C.V. = 4.6%

*Average values followed by the same letter are not significantly different at the 5% level.

D. Condensed summary for hard red wheat varieties (5% significance level) (Figures 4, 5, and 6): DW and Paladin provided the best seed yield while Paladin and Eddy provided the best test weights. The variety Declo provided the best percent seed protein.

E. Condensed summary for hard white wheat varieties (5% significance level)(Figures 7, 8, and 9): MDM provided the best seed yield. The variety UI Darwin provided the best test weight while no differences in percent seed protein were found among the varieties tested.

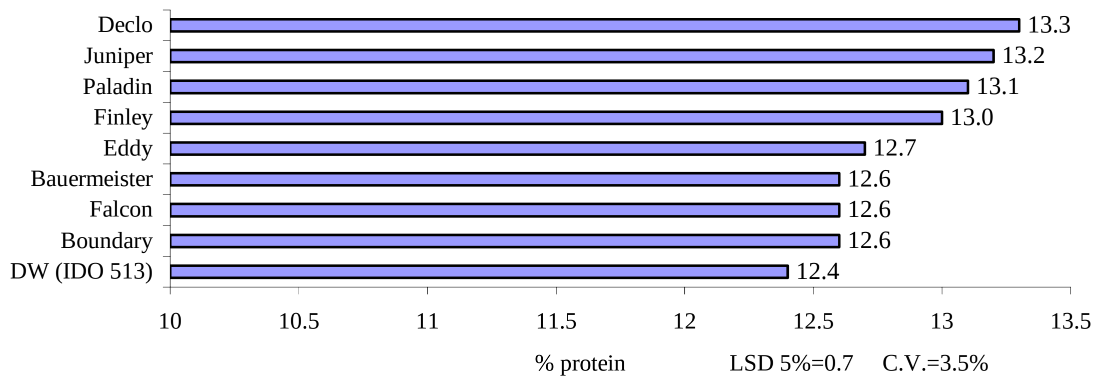
Figure 4. Hard Red Winter Wheat Seed Yield Average--4 Locations



Comments:

- Declo, Juniper, and Paladin provided significantly higher protein percentage than DW (IDO 513) at the 5% significance level.
- All four locations provided average seed protein percentages levels at or above 12.0%.

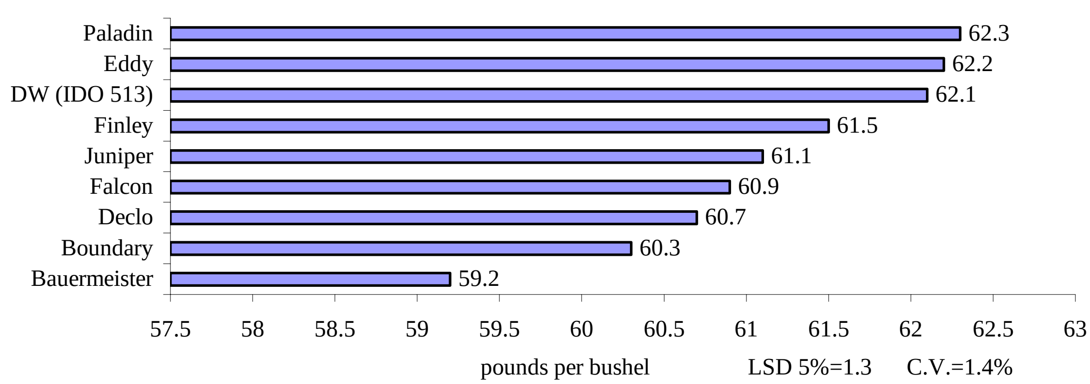
Figure 5. Hard Red Winter Wheat Percent Protein Average--4 Locations



Comments:

- DW (IDO 513), Finley, Juniper, Falcon, and Declo provided significantly higher test weight than Bauermeister at the 5% significance level.
- Average test weight across the four locations was 61.1 pounds per bushel.
- All locations provided average test weight readings at or above 60.3 pounds per bushel.

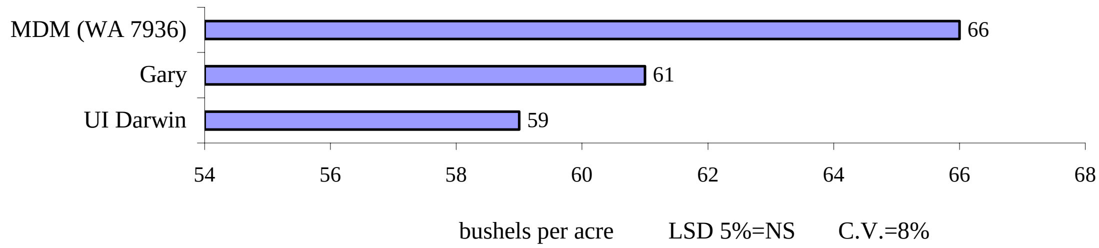
Figure 6. Hard Red Winter Wheat Test Weight Average--4 Locations



Comments:

- Average seed yield across the four locations was 62 bushels per acre.
- Seed yield across the four locations was impacted during a drought year by cropping sequences, cultural practices, scattered showers, and other factors.

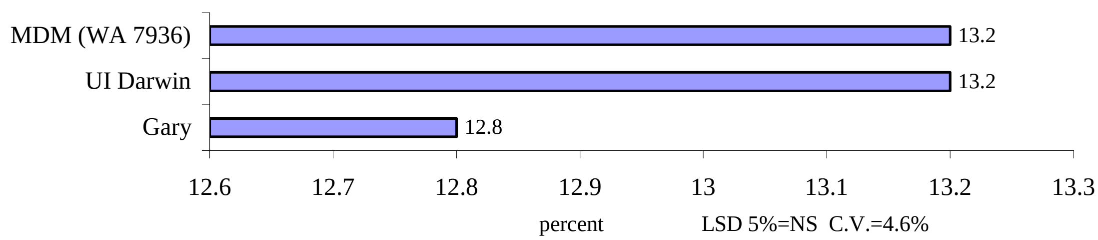
Figure 7. Hard White Winter Wheat Seed Yield Average--4 Locations



Comments:

- Average seed protein across four locations was 13.1%
- Percent seed protein across the four locations ranged from 12.2% to 14.1%.
- All four locations provided seed protein percentages at or above 11.7%

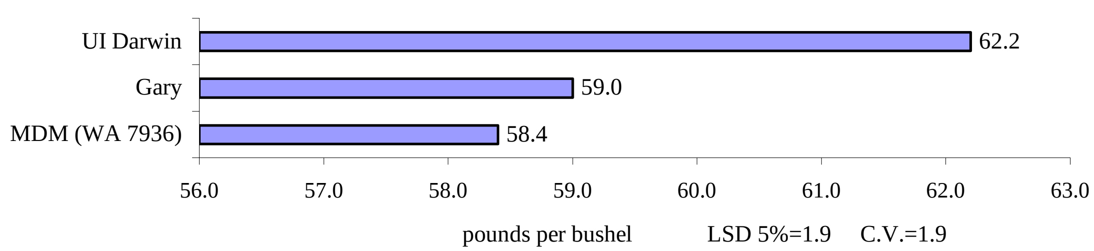
Figure 8. Hard White Winter Wheat Percent Protein Average--4 Locations



Comments:

- Average test weight of hard white winter wheat across four locations was 59.8 pounds per bushel.

Figure 9. Hard White Winter Wheat Test Weight Average--4 Locations



Overall Summary of Results and Observations for Both Hard Red and Hard White Winter Wheat Including: Seed Yield, Protein Percentage, and Test Weight Comparison

Across Four Locations in North Central Idaho

Seed yield: Average for seed yield across the four locations was 60 bushels per acre for the hard red winter wheat and 62 bushels per acre for the hard white winter wheat. The combined seed yield average for the hard red and hard white winter wheat classes was 60 bushels per acre.

Seed protein percentage: The average seed protein percentage across the four locations for hard red winter wheat was 12.8% while the average for hard white winter wheat was 13.1%. Average percent seed protein across the four locations for hard red and hard white winter wheat was 12.9%.

Test weight: Hard red wheat had the best average test weight at 61.1 pounds per bushel while the hard white wheat varieties had the lowest average test weight at 59.8 pounds per bushel. The average test weight across the four locations for both the hard red and hard white winter wheat varieties was 60.7 pounds per bushel.

Threshability: The variety Juniper (hard red winter wheat) threshed poorly while the variety Finley (hard red winter wheat) threshed at a medium level. All other varieties threshed easily and cleanly.

Cereal leaf beetle: Damage on all varieties ranged from a trace to 5% at both the Lewiston and Lapwai locations, respectively. No damage was observed at Genesee and Leland locations.

Straw strength, height, and lodging: Falcon and Juniper (hard red varieties) and UI Darwin and Gary (hard white varieties) were ranked tall, while all other varieties tested were ranked as medium in height. Both Finley and Falcon (hard red varieties) expressed lodging at most of the test locations. The variety Declo (hard red variety) provided the best straw strength while Falcon (hard red variety) provided the weakest straw strength.

Maturity: MDM and Gary (hard white varieties) and Bauermeister (hard red variety) were rated as late maturing, while Finley (hard red variety), DW (hard red variety), Eddy (hard red variety), Paladin (hard red variety), and UI Darwin (hard white variety) were rated as early maturing. All remaining varieties were rated as intermediate in maturity.

Stripe rust: A trace to 5% level was recorded on the hard red varieties Finley, Falcon, and Juniper, while other varieties evaluated were not impacted by the disease.

Summary comments: The production area was classified as a D3 drought category (severe drought). However, on the average, all four test locations produced acceptable seed yield, test weight, and percent seed protein levels. On the other hand, the drought classification, in tandem with crop husbandry and historical cropping sequences, impacted all aspects of observations and comparative results of this work.

Varieties Tested by Class:

Hard White Winter Wheat

Gary (IDO 550) Hard white winter wheat released by Idaho and USDA-ARS. A semi-dwarf adapted for rain-fed production. Good dual purpose quality, bread baking, and noodles. Lower ash content than other varieties available. High yielding in regional dryland trials, but limited testing in the Treasure Valley. Highly resistant to dwarf bunt, moderate adult plant resistance to stripe rust, moderately resistant to leaf rust and moderately tolerant of snow mold. Gary is similar in yield to Golden Spike, lower in test weight, earlier to head, and taller. Inadequate straw strength will limit acreage under irrigated conditions.

MDM (WA 7936) A Washington State University release in 2005 for low to intermediate rainfall regions. It yielded higher than Golden Spike and Gary in Washington dryland testing. Milling yield and bread making quality are poorer than Finley, a quality hard red winter variety. MDM has not been tested in western Idaho dryland regions.

UI Darwin (IDO 604) A hard white winter wheat intended as a replacement for the hard red winter cultivar Bonneville. UI Darwin is similar to Bonneville in appearance and agronomic characteristics and does best in dryland production areas. UI Darwin has average height, maturity, yield, and test weight. UI Darwin has some adult plant resistance to stripe rust, is resistant to dwarf bunt and has moderate resistance to snow mold. UI Darwin is similar to Bonneville in quality.

Hard Red Winter Wheat

AgriPro Paladin (W96-355) A hard red winter wheat released by AgriPro in 2005. Paladin had higher than average yields and test weight and is shorter than average. Paladin yielded well in the District III trials and had average grain and flour protein. Loaf volume was low.

Bauermeister (WA 7939) A Washington State University release in 2005 adapted to dryland conditions. It is higher yielding than Weston and Buchanan in Washington testing. A semi-dwarf, it is shorter than Finley and Weston. Milling yield, protein, and bread making quality are lower than Finley and Weston. Bauermeister has not been tested in western Idaho dryland trials as seed has never been provided. Bauermeister yielded well under irrigated and dryland conditions, but had lower than average test weight. Quality tested in the Pacific Northwest Regional Quality Testing was poor.

Boundary (IDO 467) Released by Idaho AES, USDA-ARS in 1997. Boundary is intended for production in the high yield production zones. Yield under irrigation has been less than Promontory. Test weight and grain protein tend to be lower than average. Straw strength is very good and better than Promontory. Mixing tolerance is much better than average and loaf volume is slightly less than average.

Declo (SMD 215-2) Released by Sunderman Breeding in 1999. Delco is a high yielding variety for irrigated conditions. It has high test weight and is shorter than Boundary and Promontory and taller than Garland. Heading date is later than Promontory and earlier than Boundary. Protein content is higher than Boundary and similar to Promontory. Declo is listed as a variety with limited markets due to concerns with its milling and baking quality.

Eddy A new hard red winter wheat from WestBred, LLC. Eddy is showing excellent quality in 2-year data equal to Finley, the hard red wheat check. Eddy was assigned the “Q+” quality score.

DW (IDO 513) A hard red winter variety released by the University of Idaho and the USDA-ARS. DW is best adapted to dryland environments. DW tends to be slightly lower in yield compared to Boundary and Bonneville. Replacement for Bonneville. Intermediate protein but good bread making quality, loaf volume, and mix time. Named for D.W. Sundermann, former USDA-ARS wheat breeder at Aberdeen.

CDC Falcon 1999, Crop Development Center, Saskatchewan, Canada.
Short height, medium maturity, medium strong straw strength, good winter hardiness (according to a North Dakota Wheat Growers publication).

Finley 2001 release date, Washington State University and USDA-ARS. Released for dryland (semi-arid) wheat production regions of Washington. Release based on seed yield, superior end use quality and stripe rust resistance.

Juniper (IDO 575) An Idaho 2006 release intended primarily for low rainfall production. There has been limited testing of this variety in western Idaho. It has dwarf bunt resistance. It lodges less than Weston. Protein is lower than Bonneville and comparable to Weston. Milling yield and loaf volume is similar to Weston but mixing tolerance is better for Juniper.

Moreland (IDO 517) A University of Idaho 2002 release from the university extension agency in Aberdeen. Early maturing, adapted to irrigated production. TCK (Dwarf bunt) resistant and susceptible to stripe rust. More winter hardy than Stephens but less snow mold tolerant than Boundary. Good yield potential in the absence of stripe rust. Baking quality is exceptional (good mixing time and high bake volume), much better than Garland and other commonly grown irrigated hard red winters. Moreland is similar in yield to Boundary. Height is similar to Declo, shorter than Boundary, and straw strength is very good.

Camelina: a Potential New Oilseed for Idaho - Agronomic Studies and Cultivar Evaluation.

Stephen O. Guy

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ACCOMPLISHMENTS: Camelina, an old Brassica oilseed crop from Europe, might find new opportunities for production in Idaho just as production grows in Montana. Our 2007 agronomic trials to evaluate camelina were grown at Moscow, ID, Greencreek, ID, and Dusty, WA. All trials were seeded and harvested and results were analyzed. Oil amount and profiles are pending. In an additional observation trial, camelina was broadcast seeded at Lewiston, ID, and returned 1760 lb/a of seed yield. Three cultivar evaluations were conducted at the three sites described above. Entries were selections from Montana and older European varieties. Three of the Montana cultivars are now named varieties with seed available soon. For the third year, yields at Moscow have been over 2000 lb/a with the best varieties this year at almost 2200 lb/a (Table 1). The Greencreek site was less productive, however fertilizer rates, at 40 lb/a applied N, were probably too low as shown in the fertilizer trial. The Dusty site is in a low rainfall area and was seeded March 6 and averaged almost 1500 lb/a as expected in a 14” PPT area. Test weights were over 50 lb/a and plant heights ranged from 24 to 36 inches average height at Greencreek and Moscow, respectively. Seed test-weights were typical for camelina, but were highest at Greencreek, indicating the best grain filling. No insect problems were noted in any trials.

Table 1. Camelina Cultivar evaluation: 3-location summary 2007

	----- Yield -----				----- 3-site average -----		
Cultivar	Moscow	Greencreek	Dusty	3-site avg.	test wt.	plant ht.	500 seed wt
	----- lb/acre -----				lb/bu	inches	g
Blain Creek (MT-1)	2010	970	1435	1470	50.6	29	0.63
MT-3	2175	1290	1460	1640	51.5	29	0.55
Suneson (MT-5)	2170	1115	1500	1595	51.5	29	0.56
MT-12	2075	1090	1225	1465	50.8	29	0.49
MT-15	2090	1125	1560	1590	50.1	30	0.60
MT-32	2050	1150	1440	1545	50.7	28	0.46
MT-38	2075	1130	1480	1560	51.4	27	0.48
Calena	2085	1105	1780	1655	50.9	28	0.57
Ligena	2045	1175	1540	1585	49.7	29	0.69
Average	2085	1130	1490	1570	50.8	29	0.56
LSD 0.05	125	175	480	150	0.7	2	0.05
C.V. (%)	4	11	22				

Fertilizer was applied at the time of seeding as a broadcast application of urea to evaluate camelina response to N fertilizer rates. At Moscow, there were no significant responses to N fertilization for yield, test weight or plant height (Table 2). At Greencreek, yield increased and test weight decreased as N rate increased. Information from Montana shows that there is little N fertilizer response above 50 lb/a, and there is no explanation for the high fertilizer response, especially with the low yield at Greencreek. There was nearly 100 lb/a of soil available N at the Moscow site and that contributed to the lack of response at that location. Further work is needed to adequately define N fertilizer respone by camelina.

Table 2. N Fertilizer on Camelina Studies, 2007

	--------- Moscow, Idaho ----------			--------- Greencreek, Idaho ---------		
N Fert.	yield	test wt.	plant ht.	yield	test wt.	plant ht.
lb/a	lb/a	lb/bu	inches	lb/a	lb/bu	Inches
0	2020	50.0	33	760	51.7	22
20	2015	50.0	34	920	51.4	23
40	2080	50.1	34	940	51.0	23
60	2150	50.3	34	1090	51.1	23
80	2150	50.2	33	1210	51.1	23
100	2025	50.1	33	1350	51.1	24
Average	2070	50.1	33	1045	51.2	23
LSD 0.05	n.s.	n.s.	n.s.	200	0.5	n.s.
C.V. (%)	6	1.0	4	13	0.6	7

Camelina seeding methods and timing were evaluated at Moscow in two experiments. When three seeding dates were compared with drilled and broadcast seeding, the earliest date had the highest yields and test weights, followed by the second date. Yields dropped 25% in the drilled treatment on the third date, one month after the first date on March 19 (Study 1). Drill and broadcast seeding was not different except at the third date when broadcast seeding had poor stand establishment due to drier soil conditions. When camelina was seeded by drilling, broadcast, dribbling on the surface in a drill row, and packing after dribbling, there were no significant differences in yield, test weight or plant height at the first date (that was date two in the seeding date experiment)(Study 1). However, at the last planting date, April 19, drilling was superior for camelina performance, followed by dribbling and packing (to help incorporate the seed and facilitate germination), then broadcast and dribbled (without packing). When seeding camelina, even at Moscow with a high precipitation level, it is important to seed early and rely on camelina's frost tolerance. Early seeding and frost tolerance gives camelina an advantage over canola. The variety trial at Dusty survived 22ºF with no ill effects, and reports from Montana showed tolerance to 16ºF. The seeding method is not as important early when soil moisture on the surface is adequate, but when seeding is delayed to dates similar to other spring crops we seed, shallow incorporation of camelina seed in the soil is helpful.

Table 3. Seeding Studies, Moscow, Idaho, 2007

Study 1

------ Seeding ------ Date	Method	yield	test weight	plant height
		lb/a	lb/bu	inches
3/19	Drill	2175	51.7	35
3/19	Broadcast	2130	51.6	33
4/5	Drill	2070	50.8	37
4/5	Broadcast	1990	50.9	36
4/19	Drill	1655	50.8	34
4/19	Broadcast	1235	51.0	32
Average		1875	51.1	34
LSD 5%		260	0.5	2
C.V.		10.8	0.6	6.4

Study 2

------ Seeding ------ Date	Method	yield	test weight	plant height
		lb/a	lb/bu	inches
4/5	Drilled	2235	48.9	35
4/5	Dribbled	2065	49.5	34
4/5	Drib.+pack	2320	49.1	35
4/5	Broadcast	2255	49.6	34
4/19	Drilled	2070	48.4	35
4/19	Dribbled	1185	50.2	29
4/19	Drib.+pack	1730	49.5	34
4/19	Broadcast	1285	49.8	29
Average		1895	49.4	33
LSD 5%		270	n.s.	3
C.V.		9.6	2.0	5.9

IMPACTS/PROJECTIONS: Because this is new information about a new crop, there is little impact from the work yet, but these results were conveyed to growers at regional oilseed/energy meetings in Washington, Utah, and Oregon and at meetings in Idaho. These results will give growers important camelina management information that could help establish this new crop for the region. During 2007, camelina was discussed as a topic and information was presented at seven extension education events.

PUBLICATIONS:

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2007 Grain and Legume Seed Treatment Experiments

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2007 Field evaluation of seed treatments for fungicidal efficacy of Vincit products on spring wheat

In 2007, a field trial was conducted at the Kambitsch Farm near Genesee, Idaho evaluating the fungicidal efficacy of Vincit products when applied as seed treatments to spring wheat. Seed treatments were provided by Cheminova, Inc. Spring wheat was planted on April 25. The trial was conducted using standard extension fertility and pest best management practices.

Summary of Results:
Stands established significantly better from untreated seed than seed treated with Vincit Minima + Thiram 42S at the higher rate. Seed treated with Vincit F and Vincit FS did not grow as tall as other treatments or the untreated check. Yields from untreated seed were significantly higher than all other seed treatments except Vincit FS. Test weights were not statistically different for all treated and untreated seed.

2007 Cheminova Spring Wheat Seed Treatment Study - Kambitsch Farm, Genesee, ID

Treatment	Stand Count		Plant Height	Yield	Test Weight
(amount per 100 lb seed)	plants/sq. ft.		inches	bu/A	lb/bu
	5 May	29 May			
Untreated check	41	41	31	60	56.6
Vincit Minima (3.07oz.) + Thiram 42S (1.92oz.)	38	38	31	58	57.0
Vincit Minima (3.07oz.) + Thiram 42S (3.3oz.)	34	35	31	58	57.1
Vincit F (3.07oz.)	38	39	30	58	56.6
Vincit FS (3.07oz.)	37	38	30	59	56.6
Dividend Extreme	37	38	31	58	57.0
average	38	38	30	59	56.8
LSD 0.05	7	6	1	2	NS
CV%	15	14	2	3	1.0

NS - no significant difference at 5% level

2007 Field evaluation of Nitragin, Inc. seed treatments on spring wheat

A field trial of spring wheat treated with Nitragin, Inc. products was grown at the Parker Farm, in Moscow, Idaho. Seed was planted on April 25. The trial was conducted using standard extension fertility and pest best management practices.

Summary of Results:
Seed treatments had no effect on plant stand establishment or plant height. Nitragin, Inc. seed treatments yielded no differently than the standard seed treatment of Dividend Extreme. Dividend Extreme treated seed also produced test weights as good as or better as Nitragin, Inc. treated seed.

2007 Nitragin Spring Wheat Seed Treatment Study - Parker Farm, Moscow, Idaho

Treatment	Stand Count		Plant Height	Yield	Test Weight
(amount per 100 lb seed)	plants/sq. ft.		inches	bu/A	lb/bu
	15 May	29 May			
Standard treatment - Dividend Extreme 2 oz./cwt	35	36	31	68	59.1
Wave - 15 fl. oz./cwt	38	39	31	69	58.7
Wave - 10 fl. oz./cwt	38	40	31	68	58.3
Wave - 7.5 fl. oz./cwt	39	39	31	67	58.7
NI - 65SC-1 - 0.184 fl. oz./cwt	39	40	31	70	58.7
NI - 65SC-3 - 0.184 fl. oz./cwt	38	39	31	68	58.4
NI - 65SC-5 - 0.22 fl.oz./cwt	34	35	31	67	58.2
Wave/NI-50-C-8 - 9.0 fl.oz/cwt	39	39	31	70	59.0
NI-65SC-1/NI-50C-8 - 9.0 fl. oz./cwt	33	34	31	66	58.2
NI-65SC-5/NI-50C-8 - 9.0 fl. oz./cwt	38	41	31	70	58.9
LCF 1:5000 dilution	36	37	31	69	58.9
LCF 1:10,000 dilution	36	36	31	68	58.7
LCF 1:20,000 dilution	34	35	31	67	58.9
LCF 1:10,000 dilution + Wave 10 fl. oz./cwt	38	38	31	70	59.0
Average	37	38	31	69	58.7
LSD (0.05)	NS	NS	NS	4	0.8
C.V. (%)	17	17	2	5	1.2

NS - no significant difference at 5% level

2007 Field evaluation of Nitragin, Inc. seed treatments on peas

A seed treatment trial of Nitragin, Inc. products on peas was evaluated at the Parker Farm in Moscow, Idaho. Seed was planted on May 1. The trial was conducted using standard extension fertility and pest best management practices.

Summary of Results:
Pea seed treated with NI-CT-1 established better than the standard treated seed-check and several other treatments judging by the early stand count. By the second (four week) stand count NI-CT-1 and LCF with a 1:10,000 dilution had significantly better establishment than the standard treated check and three other treatments. No treatment grew statistically taller or had greater vine length than the standard treated check. Yields were not statistically different among treatments. Seed treated with NI-CT-1 produced a greater seed weight than the standard treated seed-check.

2007 Nitragin Spring Peas Seed Treatment Study - Parker Farm, Moscow, Idaho

Treatment	Stand Count		Canopy Height	Vine Length	Yield	Seed Weight
(amount per 100 lb seed)	plants/sq. ft.		inches	inches	bu/A	g/100
	15 May	29 May				
Standard treated seed -	10	10	20	25	2879	18.3
NitraStik-C - 6.7 oz./cwt	10	10	23	23	3043	18.0
Optimize Pulse with liquid additive - 5.0 fl. oz./cwt	10	11	21	24	3007	18.7
Optimize Pulse IF - 1.4 oz./1000 ft.	9	9	24	25	2976	17.8
NI-65SC-5 - 0.22 fl. oz./cwt	11	11	23	23	3053	19.0
OptimizePulse + additive + NI-65SC-5 - 5.22 fl. oz./cwt	10	10	22	23	2910	18.6
NI-CT-1 - 1.36 ml/lb.	12	12	21	24	3060	18.4
LCF 1:5000 dilution	10	10	21	24	3051	18.8
LCF 1:10,000 dilution	11	12	19	24	2893	18.5
LCF 1:20,000 dilution	11	11	21	22	2878	18.5
LCF 1:10,000 dilution + OptimizePulse + additive 5.0 fl. oz./cwt	10	11	21	25	2940	18.4
Average	10	11	21	24	2972	18
LSD (0.05)	2	2	NS	2	NS	0.6
C.V. (%)	13	13	22	7	7	2.6

NS - no significant difference at 5% level

2007 Field evaluation of Nitragin, Inc. seed treatments on chickpeas

A seed treatment trial of Nitragin, Inc. products on chickpeas was evaluated at the Parker Farm in Moscow, Idaho. Seed was planted on May 1. The trial was conducted using standard extension fertility and pest best management practices.

Summary of Results:
No treatment established better, grew taller, produced more yield, or produced higher seed weights than the standard treated seed-check.

2007 Nitragin Chickpeas Seed Treatment Study - Parker Farm, Moscow, Idaho

Treatment	Stand Count		Height	Yield	Seed Weight
(amount per 100 lb seed)	plants/sq. ft.		inches	bu/A	g/100
	1st count	2nd count			
Standard treated seed -	9	9	19	1603	46.8
NitraStik-GC - 7 oz./cwt	8	8	19	1678	47.4
NI-50C-2GC - 4.25 fl. oz/cwt + NitraStik-GC - 7.0 oz./cw	8	9	19	1522	45.7
Soil Implant-GC - 5 lb/A	8	8	19	1484	47.5
NI-50C-2GC - 4.25 fl. oz/cwt + Soil Implant-GC - 5 lb/A	8	8	18	1721	47.5
LCF 1:5000 dilution	8	8	18	1532	46.4
LCF 1:10,000 dilution	8	8	18	1651	47.5
LCF 1:20,000 dilution	8	8	19	1665	47.0
LCF 1:10,000 dilution + Soil Implant-GC - 5 lb/A	9	8	19	1496	47.3
Average	8	8	19	1595	47.0
LSD (0.05)	NS	NS	NS	NS	NS
C.V. (%)	15	15	3	13	3.8

NS - no significant difference at 5% level

* Stand counts taken ~two weeks after planting.

Seed Treatment and Rate of Seeding Study for Spring Hulless Barley Cultivars, Genesee, ID 2006-2007.

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Introduction

The effectiveness of two seed treatments and rates of seeding were evaluated on stand and yield of ten cultivars of spring hulless barley for two years at the University of Idaho Kambitsch research farm near Genesee, Idaho. Raxil-Thiram (product of Bayer Cropscience) and Apron (product of Syngenta) were applied at labeled rates on barley.

Methods

Seed was treated with Raxil-Thiram (4oz./100 lb seed) and Raxil-Thiram (4oz./100 lb seed) + Apron (0.32oz./100 lb seed). An untreated check was also planted. Seed was planted at either a low or high seeding rate. In 2006, the "low" planting rate was 12 sd/ft^2 and the "high" rate was 24 sd/ft^2. In 2007, we increased both low and high planting rates to 20 and 30 sd/ft^2 respectively. The experimental design was a randomized complete block with 4 replicates. Data was analyzed using ANOVA. All trials were conducted using standard extension fertility and pest best management practices.

Results

2006 summary (Table 1)

- Seeding rate affected yield, test weight, lodging, and stand counts.
- Higher seeding rate produced higher yield, lower test weight, and more lodging than the lower rate.
- Seed treatments did not produce any significant results.
- Camas and Tradition out-yielded other varieties.
- Cultivars Meresse and 01AH2812 had highest test weights.
- Tradition grew tallest and had highest incidence of lodging.
- Cultivars Camas, WB Salute, Tradition and Yu 599-006 established best.

2007 summary (Table 2)

- Seeding rate only affected lodging. Lodging was higher among the higher seed rate.
- Seeding rate did not affect yield, test weight, or plant height.
- Seed treatments didn't affect yield, test weight, or plant height.
- Camas and Tradition out-yielded other varieties.
- Variety 01AH2812 had the highest test weight.
- Tradition grew tallest and had the highest percent lodging.
- Cultivars Camas, WB Salute, Tradition, and Yu-599-006 had the highest stand counts.

Conclusions

The results of this study indicate that these seed treatments did not affect yields, test weight, plant height, stand establishment, or percent lodging when compared to untreated seed. However, relative disease pressure was not measured. There were no significant differences between test weights in 2007 with a 20-30 sd/ft^2 seeding rate difference but did with the 12-24 sd/ft^2 seeding rate in 2006. This may be due to the lower stand densities producing larger seeds due to lack of competition. The higher incidence of lodging observed among high seeding rates (24 and 30 sd/ft^2) may also be a result of increased plant density at those seeding rates. We saw a significant yield response to seeding rates in 2006 but not in 2007, which may indicate that 20-24 sd/ft^2 is a threshold beyond which yield and test weights do not increase but lodging does. Hulless barley did not establish as well in 2006 compared to 2007, but this is likely do to unseasonably hot late spring weather in 2006 that was observed to stunt or kill outright some young barley plants.

Table 1. Agronomic data for spring hulless barley seed treatment X seeding rate study in Genesee, ID 2006.

Seeding Rate	Seed Yield	Test Weight	Plant Height	Lodging	Stand Counts
	bu/acre	lb/bu	inches	%	plnt./ft^2
12 sd/ft^2	89	57.8	34	1	10
24 sd/ft^2	98	57.3	34	2	17
Average	93	57.5	34	1	14
LSD (0.10)	2	0.2	NS	1	2
Seed Treatment					
A*-no treatment	94	57.6	34	1	14
B*-Raxil-Thiram	92	57.5	33	2	13
C*-Raxil-Thiram+Apron	94	57.5	34	1	13
Average	93	57.5	34	1	14
LSD (0.10)	NS	NS	NS	NS	2
Variety or Selection					
Camas	116	56.0	35	0	18
Bear	95	59.4	36	0	12
Meresse	85	61.0	31	0	11
CDC Alamo	77	59.7	35	0	10
01AH2812	78	60.5	35	0	12
99Ab38-5	76	60.0	35	3	7
Yu 501-039	93	60.4	33	0	12
WB Salute	104	54.0	33	2	18
Tradition	113	53.5	39	7	18
Yu 599-006	94	51.0	25	1	17
Average	93	57.5	34	1	14
LSD (0.10)	4	0.4	1	2	2
CV$^+$ (%)	7	1.3	5	319	22

*A - non-treated seed
*B - seed treated with Raxil-Thirom (4 oz./100 lbs.)
*C - seed treated with 4 oz/100 lbs. Raxil-Thirom + 0.32 oz../100 lbs. Apron
$^+$ CV applies to rate, treatment, and variety within collumn
NS - no significant difference at the 5% level

Table 2. Agronomic data for spring hulless barley seed treatment X seeding rate study at Genesee, 2007.

Seeding Rate	Seed Yield	Test Weight	Plant Height	Lodging	Stand Counts
	bu/acre	lb/bu	inches	%	plnt./ft^2
20 Sd/ft^2	98	53.5	31	63	24
30 sd/ft^2	97	52.5	31	116	36
average	97	53.0	31	89	30
LSD (0.10)	NS	NS	NS	2	7
Seed Treatment					
A*-no treatment	98	53.3	31	1	30
B*-Raxil-Thiram	98	53.0	31	1	30
C*-Raxil-Thiram+Apron	97	52.7	31	1	30
average	97	53.0	31	1	30
LSD (0.10)	NS	NS	NS	NS	NS
Variety or Selection					
Camas	112	52.5	31	0	33
Bear	97	52.9	33	0	30
Meresse	97	57.0	30	0	27
CDC Alamo	95	56.8	31	0	25
01AH2812	89	58.7	32	0	29
99Ab38-5	88	53.4	33	0	27
Yu 501-039	92	54.0	31	1	28
WB Salute	99	50.2	31	1	34
Tradition	108	50.1	36	3	34
Yu 599-006	96	44.4	24	1	32
Average	97	53	31	1	30
LSD (0.10)	4	0.7	1	>1	3
CV$^+$ (%)	7	2.8	6	133	15

*A - non-treated seed
*B - seed treated with Raxil-Thirom (4 oz./100 lbs.)
*C - seed treated with 4 oz/100 lbs. Raxil-Thirom + 0.32 oz../100 lbs. Apron
$^+$ CV applies to rate, treatment, and variety within column
NS - no significant difference at the 5% level

Rapeseed meal pre-planting timing, rate, and seed treatment study in peas, Kendrick and Moscow, ID 2007.

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Introduction
Rapeseed meal is emerging as a source of nutrients and pest management on agricultural crops. The purpose of this study was to test the effects of rapeseed meal application to agricultural soils prior to planting on pea production. Rapeseed meal was applied at 10- and 20-days prior to planting and application rates were 0, 1000, and 2000 lb/A. At planting, eight seed treatments were applied to investigate how seed treatments were affected by the timing and rate of rapeseed meal pre-application as it applied to stand establishment and crop performance.

Summary of Results
Results indicate pre-application of rapeseed meal to crop soils decreases plant stand density at both early and late growing season assessment. Yields in non-amended plots were also higher in most cases. Regardless of meal application rate or seed treatment, plots amended 10-days prior to planting produced higher yields than 20-day pre-planting amended plots.

Combined Results - Table 1.

Stand Counts (6/11)
Plots amended 10- and 20-days prior to planting had plant stand densities significantly lower than non-amended plots. Plots amended with meal 10-days previous to planting had more plants per square foot than those amended 20 days previously regardless of application rate. Among pea seed treatments, LCF1+Apron was observed to have a significantly higher stand count in 10-day pre-planting amended plots.

Stand Counts (6/27)
Non-amended plots had significantly higher stand counts than both 10- and 20-day pre-planting amended plots. Meal application rate was not observed to have an effect on stand counts. Among pea seed treatments, LCF1 and LCF1+Arpron had significantly higher stand counts in 10-day pre-planting amended plots. Among seed treatments in 20-day pre-planting amended plots, seeds treated with Apron only had significantly higher stand counts than LCF1+Apron and LCF3.

Yield
Non meal-amended treatments produced pea yields significantly higher than 20-day pre-planting amended yields at both meal-application rates and higher than 10-day -1,000 lb/acre pre-planting yields. Pea yields from 10-day pre-planting amended treatments were significantly higher than 20-day treatments. Among pea seed treatments every treatment produced higher yields when grown in 10-day pre-planting amended plots. LCF1+Apron yields from 10-day pre-planting amended plots were significantly higher than yields from Apron-only treated seeds-plots.

Table 1. Results for pre-planting application and timing of rapeseed meal on peas from Moscow and Kendrick, ID locations.

	Stand Count (6/11)		Stand Count (6/27)		Yield	
Meal Application Timing	10-days Pre.	20-days Pre.	10-days Pre.	20-days Pre.	10-days Pre.	20-days Pre.
	plant/sq.ft.		plant/sq.ft.		lb/A	
Meal Application Rate						
0 lb/A	8.4	8.6	8.8	8.9	341	286
1,000 lb/A	6.7 *	5.1 *+	7.4 *	5.4 *+	290 *	172 *+
2,000 lb/A	6.4 *	4.4 *+	7.1 *	4.9 *+	328	153 *+
LSD (*P* =0.05) (among rate within timing)	0.6	0.6	0.6	0.6	36	36
Pea Treatment						
LCF1	7.1	6.0	7.8	6.3 +	342	199 +
LCF2	6.8	5.7	7.3	6.2	306	217 +
LCF3	6.7	5.6	7.4	6.0	315	210 +
LCF1+Apron	7.2	5.3 +	8.0	5.7 +	361	214 +
LCF2+Apron	6.7	5.9	7.4	6.2	317	229 +
LCF3+Apron	6.4	5.7	6.8	6.1	337	205 +
Apron	8.3	7.2	8.8	7.6	283	181 +
No Treatment	8.1	6.8	8.6	7.2	294	175 +
Average	7.2	6.0	7.8	6.4	320	204 +
LSD (*P* =0.05)*	1.6	1.6	1.6	1.6	77	77
C.V.(%)	32	32	30	30	24	24

* Rapeseed meal amended pea values different from non-ameneded pea values at *P=0.05* .
+ 10-day pre-planting meal application values different than 20-day values at *P=0.05* .

Kendrick – Table 2.

Stand Counts (6/11)
Plots amended 10- and 20-days prior to planting had plant stand densities significantly lower than non-amended plots. Plots amended with rapeseed meal 10-days previous to planting had more plants per square foot than those amended 20 days previously regardless of application rate. Insects caused seed/seedling damage in amended treatments. This insect was not observed to be a problem at the Moscow site. Among pea seed treatments, stand counts of 20-day pre-planting amended plots were significantly lower than 10-day plots for all but one treatment (LCF2+Aron).

Stand Counts (6/27)
10-day pre-planting amended plots were not significantly different from non-amended plots but denser than 20-day plots. Meal application rate did not affect stand counts. Among pea seed treatments, stand counts of 20-day pre-planting amended plots were significantly less dense than the 10-day pre-planting amended plots for all seed treatments.

Yield

Non-amended and 10-day pre-planting amended plot yields were not significantly different. However, non-amended treatment yields were significantly higher than 20-day pre-planting amended treatments regardless of meal application rate. All pea treatments produced significantly higher yields when grown in plots amended 10-day previous to planting when compared with yields from plots amended 20 days previous to planting. No significant difference was observed in pea yields among seed treatments in either 10- or 20-day pre-planting meal-amended plots.

Table 2. Pea harvest results for pre-planting application and timing of rapeseed meal, Kenderick, ID 2007.

	Stand Count (6/11)		Stand Count (6/27)		Yield	
Meal Application Timing	10-days Pre.	20-days Pre.	10-days Pre.	20-days Pre.	10-days Pre.	20-days Pre.
	plant/sq.ft.		plant/sq.ft.		lb/A	
Meal Application Rate						
0 lb/A	8.7	8.4	9.0	8.8	401	374
1,000 lb/A	6.7	2.5 *+	7.7	2.8 *+	383	135 *+
2,000 lb/A	6.7	2.1 *+	7.6	2.6 *+	418	103 *+
LSD (*P* =0.05) (among rate within timing)	0.8	0.8	0.9	0.9	69	69
Seed Treatment						
LCF1	7.3	4.7 +	8.4	4.9 +	405	202 +
LCF2	7.2	3.9 +	7.7	4.4 +	391	248 +
LCF3	7.2	4.3 +	8.1	4.7 +	417	216 +
LCF1+Apron	7.5	3.7 +	8.4	4.1 +	451	226 +
LCF2+Apron	6.7	4.4	7.6	4.6 +	391	218 +
LCF3+Apron	6.6	3.4 +	7.0	3.9 +	401	180 +
Apron	8.2	5.7 +	9.0	6.1 +	347	151 +
No Treatment	8.0	4.6 +	8.7	5.1 +	401	189 +
Average	7.3	4.3	8.1	4.7	400	204
LSD (*P* =0.05)*	2.6	2.6	2.7	2.7	102	102
C.V.(%)	31.6	31.6	30	30	24	24

* Rapeseed meal amended pea values different from non-amended pea values at *P=0.05* .
\+ 10-day pre-planting meal application values different than 20-day values at *P=0.05* .

Moscow – Table 3.

Stand Counts (6/11)

Plant stands were significantly denser in non-amdend plots than in amended plots. Plots amended with 1,000 lb/A of meal 20-days prior to planting were denser than 10-day pre-planting amended plots. Among pea seed treatments the only significant observation was that LCF2 treated peas grew better in 20-day pre-planting amended plots.

Stand Counts (6/27)
Plant stands were significantly denser in non-amended plots than in rapeseed meal-amended plots. Peas in plots amended with 1,000 lb/A of rapeseed meal 20-days prior to planting were denser than in 10-day pre-planting amended plots. No-significant differences were observed among pea seed treatments.

Yield
Non meal-amended pea yields were significantly higher than the 10-day pre-planting amended yields, but not when compared with the 20-day pre-planting amended yields. Pea yields from amended treatments at 2,000 lbs/acre were significantly higher for 10-day pre-planting amended treatments than 20-day. No significant yield differences were observed among seed treatments or among meal treatment rates.

Table 3. Pea harvest results for pre-planting application and timing of rapeseed meal, Moscow, ID.

	Stand Count (6/11)		Stand Count (6/27)		Yield	
Meal Application Timing	10-days Pre.	20-days Pre.	10-days Pre.	20-days Pre.	10-days Pre.	20-days Pre.
	plant/sq.ft.		plant/sq.ft.		lb/A	
Meal Application Rate						
0 lb/A	8.1	8.8	8.6	9.0	281	198
1,000 lb/A	6.7 *	7.7 *+	7.1 *	8.1 *+	197 *	210
2,000 lb/A	6.2 *	6.7 *	6.5 *	7.1 *	238 *	203 +
LSD (*P* =0.05) (among rate within timing)	0.8	0.8	0.8	0.8	31	31
Pea Treatment						
LCF1	6.8	7.4	7.3	7.7	279	196
LCF2	6.5	7.5 +	6.9	7.9	222	186
LCF3	6.2	7.0	6.8	7.3	213	203
LCF1+Apron	7.0	6.9	7.6	7.3	272	202
LCF2+Apron	6.7	7.3	7.2	7.7	244	240
LCF3+Apron	6.3	7.9	6.6	8.3	273	230
Apron	8.4	8.7	8.6	9.1	220	211
No Treatment	8.1	9.0	8.5	9.3	186	161
Average	7.0	7.7	7.4	8.1	239	204
LSD (*P* =0.05)*	2.0	2.0	1.9	1.9	116	116
C.V.(%)	18.9	18.9	17.1	17.1	38	38

* Rapeseed meal amended pea values different from non-amended pea values at $P=0.05$.
\+ 10-day pre-planting meal application values different than 20-day values at $P=0.05$.

Evaluation of Slow-Release Nitrogen in Dryland Winter Wheat of North-Central Idaho

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INTRODUCTION: Nitrogen fertilizer management is a critical economical and environmental decision for winter wheat growers in the high rainfall region of north-central Idaho. Nitrate-nitrogen pollution of groundwater is a major problem facing agriculture when fertilizer rates or stability in the soil allows nitrate movement into groundwater. The Idaho Departments of Environmental Quality, Water Resources, and Agriculture have identified 25 areas with elevated concentrations of nitrate in aquifers across the state, referred to as Idaho Nitrate Priority Areas. Nearly 95% of Idaho residents rely on groundwater as their sole source of drinking water. Over the past 50 years, human activities, including agricultural practices, have contributed to the elevated nitrate concentrations in groundwater in these 25 rural, agricultural areas. The Camas Prairie, located in north central Idaho, is ranked No. 5 on Idaho's Nitrate Priority Area list. Nitrate levels of 5 milligrams per liter or greater in the Camas Prairie areas are reported in at least 25% of tested wells. Values greater than 2.0 milligrams per liter indicate increased nitrate levels caused by human activities.

The Camas Prairie agricultural areas are primarily comprised of grain farms averaging about 2,000 acres in size. Annual precipitation ranges from 20 to 27 inches across the region. Elevations vary with an average elevation of 5,000 feet. The majority of the precipitation comes between November and June. Agricultural producers do not irrigate their crops. A typical crop rotation includes a three-year rotation of winter wheat, spring wheat or barley, and a spring legume. Other common crop rotations include a two-year rotation of either winter wheat followed by spring grains, or winter wheat followed by spring legume or canola. Kentucky bluegrass for seed and grass or alfalfa pastures are also important, but usually are in smaller areas. Soils in the Camas Prairie are somewhat shallow, silt loam. Many of soils in this region are classified as highly erodible. With high intensity winter/spring rain and highly erodible soils, a Best Management Practice called "direct seeding" has been widely promoted and is adapted to the area. Direct seeding minimizes soil disturbance in seeding fall or spring crops; this maximizes crop residues, minimizes the potential for erosion and enhances the soil's ability for moisture infiltration.

Under these high precipitation conditions, a split fall/spring nitrogen fertilizer application has been developed using deep placement of fall anhydrous or aqua ammonia (liquid) in combination with surface applied forms of nitrogen in the spring. A well-timed spring top-dress of nitrogen provides readily available nitrogen to the developing crop. The split fertilizer application gives better fertilizer use efficiency and helps reduce excess fertilizer leaching from the traditional practice of over-application of nitrogen in the fall. When a single fertilizer application is used, nitrogen is traditionally applied at higher levels in the fall to compensate for nitrogen loss through the winter by downward leaching of nitrate. Fertilizers are usually more expensive to apply in the spring, due to wet fields, and farmers are busier then preparing for spring crop planting.

Recently the fertilizer industry stopped production of granular ammonium nitrate, a primary spring top-dress nitrogen source. This will likely impede the split application practice. The loss of ammonium nitrate as a spring applied fertilizer together with increases in fuel and nitrogen costs will likely precipitate a return to traditional higher N fertilization levels in single fall applications, which will reduce fertilizer utilization effectiveness and could increase movement of nitrate into groundwater. There is a need for economical practices that will allow spring N fertilizer application and/or keep fall applications from leaching.

STATEMENT OF PROBLEM: New strategies and technology for nitrogen fertilizer management are needed. A non-mobile slow-release source of nitrogen fertilizer in combination with fall deep-banded nitrogen application, in place of the spring applied top-dress, could prove to be an effective alternative for application of fall applied nitrogen fertilizer. Slow-release nitrogen fertilizers, such as Poly-Coated Urea (PCU), are thought to be essential in maintaining overall efficient use of nitrogen fertilizer, while protecting critical groundwater resources from pollution.

The fall/spring split fertilizer application program requires the cost of additional applications. Spring applications are often done either by ground, which requires specialized equipment, or by aerial applications, an expensive alternative. Additional costs, to the grower and the environment, are incurred by the lost nitrogen due to leaching beyond the crop's root zone. The economic and environmental advantages of applying a slow-release fertilizer in the fall should help promote utilization of this method.

A good fertilizer management program requires the tools, resources and knowledge to measure the varying amounts of nitrogen and soil moisture in the soil profile, as well as understanding the feasibility of using a slow-release nitrogen fertilizer in the Camas Prairie agricultural areas. This understanding will come from experimental evidence.

Poly-coated urea has primarily been used in the turfgrass industry. Agriculturally priced PCU has only been available for the past three years and was identified as a promising new N source by Raymond Ward in 2004 (R.C. Ward, Ward Laboratories, NE, 2004, "Nitrogen as a Plant Nutrient, The Leading Edge Journal of No-Till Agriculture"). Poly-coated urea is currently being studied as an N source for a number of field crops, including wheat (S.A. Ebelhar, *et al*., "Polycoated urea effects on wheat yields and nitrogen use efficiency", University of Illinois, 2006). Fall application on wheat has been studied in Kentucky (G.J. Schwab and L.W. Murdock, "Nitrogen Transformation Inhibitors and Controlled Release Urea", AGR-185, University of Kentucky, 2005).

Additionally, recent STEEP projects have focused explicitly on plant nutrition issues, including "The Strategic Use of Broadcast and Controlled Release Fertilizer to Facilitate N Applications and Improve Nitrogen Use Efficiency in Direct Seed Systems" (Richard Koenig and David Huggins, WSU/USDA-ARS, 2004).

PROJECT OBJECTIVES: The primary goal of this project was to compare the effectiveness of a conventional fall application of nitrogen with a banded application of slow-release nitrogen, specifically Poly-Coated Urea (PCU), in a direct seed winter wheat production system. Field experiments served as a basis for characterizing nitrate-leaching potential and the subsequent potential of fall seeded crops to effectively utilize fall applied and residual fertilizer nitrogen. Slow-release nitrogen was be evaluated as an effective practice to extend the availability of nitrogen in the root zone into the critical tillering period of winter wheat. This has helped determine whether slow-release nitrogen is an effective replacement for spring applied nitrogen commonly used as a top-dress in the study region and across other neighboring non-irrigated cropland areas. This study has helped enable farmers in the Camas Prairie agricultural areas to better manage nitrogen fertilizer applications to maximize production and minimize groundwater pollution.

MATERIALS AND METHODS: Work reported here is the first year of a three-year long investigation funded by a Hatch grant. The first year was a small plot study investigating the relationships between several fertilizer strategies and yield of winter wheat. Plot size was 5' X 20'. Soil was sampled prior to fertilizing and seeding to determine needed fertility applications based on University of Idaho Northern Idaho Fertilizer Guide for Winter Wheat. This procedure indicated a total nitrogen need of 116 lbs./acre. One hundred pounds per acre of 16-20-0-0 fertilizer was applied over the plot prior to seeding. One hundred lbs. of nitrogen/acre was applied at seeding through a direct-seed plot drill in a spring-wheat stubble field that had been heavy harrowed prior to seeding. The following treatments were applied to fall-seeded winter wheat near Craigmont, ID.

TREATMENTS (100 lbs nitrogen/acre)

1 = 100% urea
2 = 100% PCU
3 = 60% urea + 40% PCU
4 = 60% PCU + 40% urea

The four treatments were applied to the plots in a randomized complete block design with four replications of each treatment. Plots were harvested individually and the grain weighed for total yield and test weight. Analysis of yield differences between treatments was conducted using ANOVA and Fisher's least significant difference (LSD) procedure.

RESULTS: The data (Table 1) demonstrate that for this study there are no statistical differenes in yield between treatments at the 95%. However, treatments #2 and #3 are significantly different, and that at the 90% CI for the LSD test.

CONCLUSION: This initial study confirms that there is a relationship between yields and the fertilizer treatments. The second year of the study is broadened to three sites across the geographical area of the study. On-farm strip tests replace the small plots. It is hoped that this will reduce the residual variation so that differences between treatments can be more clearly identified.

Table 1. Results of slow-release nitrogen treatments on winter wheat, 2006-2007

Yield (bu/ac) by Treatment	n	Mean
1-100% urea	4	74.03
2-100% PCU	4	70.55
3-60% urea + 40% PCU	4	77.73
4-60% PCU + 40% urea	4	75.83
Yield LSD		NS

Contrast	Difference	90% CI		
1 v 2	3.48	-3.47	to 10.42	
1 v 3	-3.70	-10.65	to 3.25	
1 v 4	-1.80	-8.75	to 5.15	
2 v 3	-7.18	-14.12	to -0.23	(significant)
2 v 4	-5.27	-12.22	to 1.67	
3 v 4	1.90	-5.05	to 8.85	
n	16			

Test Wt. (lb/bu) by Treatment	n	Mean
1-100% urea	4	53.28
2-100% PCU	4	53.90
3-60% urea + 40% PCU	4	54.45
4-60% PCU + 40% urea	4	54.33
LSD		NS

FUTURE WORK:

The second year of the study will examine these treatments:

1- 50% shanked N, 50% Urea (control)

2- 50% shanked N, 70% Urea

3- 50% shanked N, 30% Poly-Coated Urea (PCU)

4- 50% shanked N, 50% PCU

5- 50% shanked N, 70% PCU

6- 50% shanked N, 50 % spring broadcast urea (ground applied)

Additionally, the objectives for the second year are also broadened to include these specific objectives:

Objective 1. Compare the efficacy of slow-release nitrogen in combination with traditional nitrogen applications to current standard fertilization practices on yields of winter wheat.

Objective 2. Investigate the timing and placement of slow-release nitrogen as banded applications to evaluate the effectiveness of maintaining nitrogen in the seed zone on growth and yield. Nitrogen use efficiency (NUE) will be evaluated for each treatment.

Objective 3. Evaluate the profitability of fall applied slow-release nitrogen as compared to traditional fall single application and fall/spring split applications of nitrogen.

Objective 4. Evaluate the effectiveness of slow-release nitrogen as a means of preventing fall applied nitrogen from leaching.

Objective 5. Disseminate information about N fertilizer management and conservation practices that affect nutrient management through extension programming.

Extensive soil and tissue testing, soil moisture monitoring, and economic analysis will be conducted during the second phase of the project to accomplish these objectives. Changes in nitrogen fertilizer materials available to farmers have impacted nitrogen application rates, methods, and timing. This study of slow-release nitrogen fertilizers, integrated into current practice, can show farmers a cost-effective way to increase profitability at the same time reducing groundwater pollution. It will also introduce measuring devices that have not been in standard use, that can help farmers monitor nitrogen and soil moisture, enabling them to better manage their fertilizer application according to what is optimal for given soil and plant conditions. Results are of interest to non-irrigated wheat cropping operations in high precipitation areas of the Western region. Most importantly, professionals, producers and the public at large will be made aware of new practices that enable growers to be more profitable without polluting groundwater.