Northwestern Agricultural Research Center Field Day

July 11, 2013

2:30 pm Registration and Introductions

3:00 pm Field Tours

Stop #1: Canola Market Update and Clearfield Demonstration…….. page 3
Steve Starr, Pacific Coast Canola, LLC, Warden WA

Stop #2: Orange Wheat Blossom Midge Wheat Preference Demonstration…….page 4
Jordan Penney - Northwestern Agricultural Research Center, Tryg Koch – Producer, Miles Passmore – Producer, David Tutvedt – Producer

Stop #3: Wireworm Worries in Wheat……..page 5
Dr. Gadi Reddy - Western Triangle Research Center, Conrad, MT, and Brian Tutvedt - Producer

Stop #4: Canola Seeding Pattern Demonstration……..page 6
John Josephsen – Northwestern Agricultural Research Center, Andy Lybeck – CHS Kalispell

Stop #5: Canola Planting Date, Density and Varieties…….. page 7
Brooke Bohannon and Dr. Bob Stougaard – Northwestern Agricultural Research Center, and David Tutvedt – Producer

Stop #6: Pea Production Problems – The Pea Leaf Weevil……page 8
Dr. Hector Carcamo - Agriculture and Agri-Food Canada, Lethbridge, AB, Dr. Gadi Reddy- Western Triangle Research Center, Conrad, MT, and Doug Manning – Producer

Stop #7: Wild Oat Herbicide Update……page 9
Dr. Bob Stougaard – Northwestern Agricultural Research Center

Stop #8: Falling Numbers Demonstration……..page 10
Brooke Bohannon and Dr. Bob Stougaard – Northwestern Agricultural Research Center

5:30 pm Dinner Sponsored by CHS Kalispell

Guest speaker: Ron de Yong, Director, Montana Department of Agriculture

Northwestern Agriculture Research Center Staff

Bob Stougaard – Superintendent – PhD Professor of Weed Science

Brooke Bohannon – Research Associate

Dove Carlin – Administrative Associate

John Josephsen – Farm Manager

Jordan Penny – Assistant Farm Manager

Seasonal Employees

Kelsey Ovik, Carmen Tikka, Danielle Ruonavaara, Austin Jones, Janie Tikka

Advisory Committee

Flathead County

Markus Braaten, Toby Goodroad, Tryg Koch, Pat McGlynn, Miles Passmore, Dale Sonstelie, David Tutvedt

Lake County

Dan Barz, Scott Buxbaum, Dan Lake, Steve Siegelin, Jack Stivers, Steve Tobol

Lincoln County

Ed Braaten, Al Cameron, Valene Goff

Sanders County

Shawn Christensen, John Halpop, Dale Neiman, Craig Weirather

Canola Market Update and Clearfield Demonstration

While canola markets continue to expand, niche markets also have developed. In particular, there is a demand, and a corresponding premium paid, for non-GMO canola. Clearfield canola varieties qualify as being non-GMO. A 10 acre field was planted to a Clearfield variety to evaluate weed control and yield potential using non-GMO canola.

4-9-13 Fertilized with 110-40-20-20 Incorporated twice

4-24-13 Seeded Nexera 2012CL at 6.7 lbs/ac = target 7 plants/ft2 with a 70% survival.
92% germ, TKW 7.16g, 63,352 seeds/lb with Helix Vibrance seed treat

5-29-13 Applied Beyond Herbicide at 4 oz/ac

6-27-13 50% bloom applied Endura fungicide at 6 oz/ac

Orange Wheat Blossom Midge Preference

In past years, the OWBM have been found in much lower numbers in Reeder than in most other spring wheat varieties. While this occurs in small research plots, it's uncertain if the same outcome would happen on a field scale. This demonstration was established to find out if the midge preferred Solano over Reeder in a large scale trial. The trial was put out in 4 locations across Flathead Valley. The seeding date was to be after May 1st to ensure adequate midge pressure. The target plant population was to be at 35 plants/sq. ft, which meant that Solano was seeded at 135 lbs/acre and that Reeder was seeded at 100 lbs/acre. Reeder was to be sprayed with Palisade at the two node stage. Both varieties were to be sprayed at 50% heading with Warrior II if economic thresholds were present.

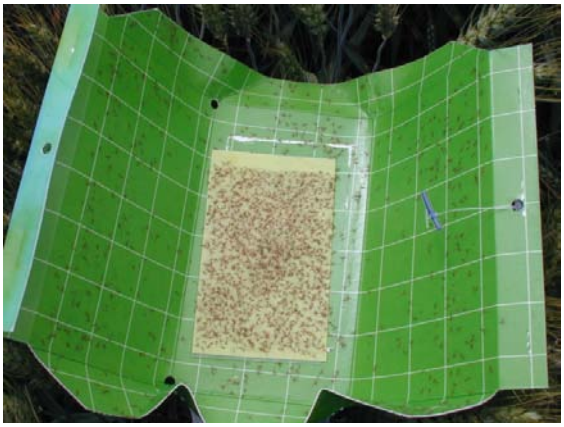
OWBM (Number per spike)				Yield (Bu/ac)			
Year	Variety			Year	Variety		
	Reeder	Hank	Conan		Reeder	Hank	Conan
2008	28	69	113	2008	64	46	23
2009	7	13	26	2009	101	93	62
2010-1	2	25	18	2010-1	103	90	74
2010-2	5	50	47*	2010-2	82	70	53*
2011-1	10	58	46	2011-1	44	19	13
2011-2	81	321	341*	2011-2	37	9	13*
2012	46	102	-	2012	34	15	-

*Solano was used in place of Conan

Location	HCF		NWARC		Passmore		Tutvedt	
Variety	Reeder	Solano	Reeder	Solano	Reeder	Solano	Reeder	Solano
Plants/ft2	22	24	25	26	26	28	19	34
Total Stems/ plant	5	4	3	4	4	4	5	3
Plant Dry wt (g)	32.7	32.5	51.4	30.2	70.0	73.0	54.0	40.0

Variety	TKW	Rate
Solano	38.8	135 lb/ac
Reeder	28.8	100 lb/ac

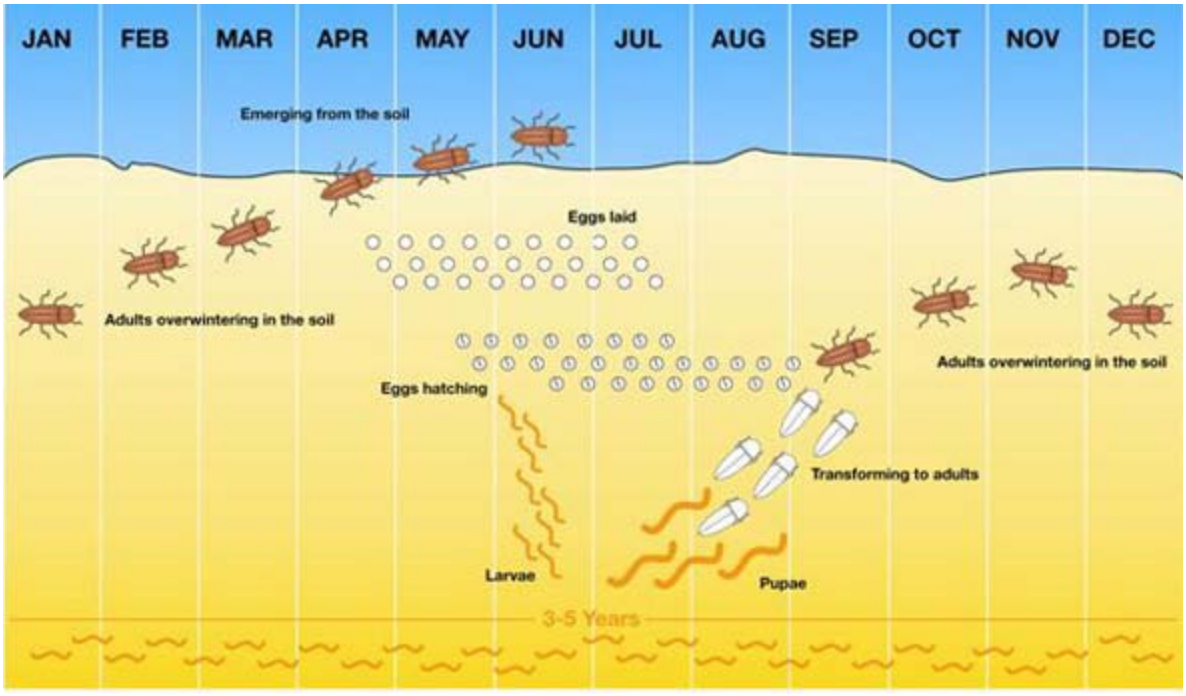
*Target plant population = 35 /sqft



The Life Cycle of the Wireworm

Wireworms, which are the larvae of click beetles, have become an increasingly common pest of wheat and barley in recent past. Wireworms overwinter as larvae or as recently developed adults which do not emerge from the soil until the following spring, usually from early May to June. Adult wireworms, which are commonly called click beetles, migrate by flying within fields or to new fields. The adult beetles are slender, tan to nearly black, and range from 1/2 to 3/4 inch long.

The females mate and burrow into the soil to deposit eggs. Both sexes are capable of flying to reach mates and egg-laying sites. Females burrow back into the soil to lay eggs. Eggs are laid singly 2 to 6 inches deep in the soil and hatch in 3 to 4 weeks. The larvae move easily through the soil in search of food. They can feed in the soil for 2 to 5 years before pupating in July or August. In the Northwest, most wireworms take about 3 years to complete their life cycles.



Canola Seeding Pattern

Here at the station we have been interested in the difference we have been seeing in the use of our Great Plains disk drill verses our Valmar fertilizer spreader in small seeded crops.

Our initial large scale trial was with alfalfa in 2012 which resulted in good stand establishment and a slightly better first year crop.

This year we decided to try side by side demonstrations of the two seeding patterns with canola here in the Flathead valley. The table below shows our methods and inputs, but there are still questions to be answered.

> Will higher seeding rate for broadcast verses drilled be more productive or not?
> What will the result of sclerotinia and insect pressure be?

The Canadian Canola Council has found that in 18 site-years of research on the prairies, broadcast canola seeding was inferior to 25 mm (1") drilled seeding nine times, and superior only twice. Overall, broadcast seeding yielded 5% less than drilled seed, but in several cases the yield loss was 20%. This indicates that broadcast seeding is a higher risk practice than drilled methods.

We hope to see results here at the station that show significant differences. We'll see…

Canola Seeding Pattern		
	Disk Drilled	Broadcast
4/26/2013	Planted Pioneer TKW 5.5g	45H29 12 lb/ac
Fertilizer	0-40-40-20	0-40-40-20
Soil test results showed 202 lbs of availible N in the field.		
Plants/ft2	17	22
Dry wt (g)	53.6	58.1
Herbicide/Fungicides used		
5/31/2013	Cornerstone	Plus 16.5 oz/ac
6/27/2013	Endura	6 oz/ac
lb/ac= 9.6*plants/ftsq * TKW / 60 % survival		
.25 acres per pattern type		

Canola Date, Variety and Density

In 2012 the valley experienced a late frost which caused severe damage to canola stands. Many producers were faced with the decision of whether or not to reseed their fields. Based on this experience and with the input of our Advisory Committee, we decided to conduct a study to look at the effect of seeding dates on canola production. In addition we are evaluating how seeding rate and variety might impact the effect of seeding date. We separated seeding dates by the number of growing degree days it takes for canola to be fully emerged and the first true leaf visible (300 GDD32).

When calculating seeding rates we used a 75% survival rate. The Canola Council suggests anywhere from 60-80% survival rate depending on seed bed prep and soil moisture. We achieved our target density with the first seeding date. The second seeding date appears to have a higher percent emergence. The third seeding date has very erratic emergence and is generally lower than our target populations.

This information strongly suggests that there is a relationship between seeding dates and percent emergence. If we can understand the relations hip between seeding dates and canola emergence we could better target seeding rates.

Seeding Date:	4/17/13	5/9/13	5/21/13
Soil temp 2"	52.5 F	59.4 F	59.5 F
Soil temp 4"	44.4 F	58.2 F	57.7 F
GDD32	0	303	299
Fertilizer 4/9/13 0-40-40-20			
Soil test results showed 202 lbs of available N in field			
Insecticide 6/6/13 Warrior II 1.5 oz/ac			

Seeding Rates

(lb/ac = 9.6 * plants/ftsq*TKW / 75% Survival)

Variety	TKW	Plant/ftsq	Rate (lb/ac)
DKL 30-42	6.8	4	3.5
DKL 30-42	6.8	8	7.0
DKL 30-42	6.8	16	13.9
InVigor L130	6.1	4	3.1
InVigor L130	6.1	8	6.2
InVigor L130	6.1	16	12.5
HyClass 955	5.3	4	2.7
HyClass 955	5.3	8	5.4
HyClass 955	5.3	16	10.9

	17-Apr-13			9-May-13			May 21, 2013		
	Density plants/ft2			Density plants/ft2			Density plants/ft2		
Variety	4	8	16	4	8	16	4	8	16
DKL 30-42	3.8	8.0	16.0	3.8	9.7	21.6	1.5	2.0	4.7
InVigor L130	4.3	11.0	17.0	7.3	15.0	24.0	2.3	6.0	5.7
HyClass 955	4.1	10.7	17.0	7.0	12.6	25.0	3.7	6.8	9.6
mean	4.08	9.84	16.64	6.08	12.44	23.40	2.50	5.00	6.70

Pea Leaf Weevil

- The adult is about 5 mm long and has three light-colored stripes extending length-wise down the thorax and sometimes the abdomen. The larvae are “C” shaped, light milky white in color with a dark brown head, legless, soft and fleshy and about 3.5 to 5.5 mm in length.
- In early May, the adult is found on legume crops such as peas, alfalfa, and lentils. Symptoms of adult feeding are notching of leaf margins. The female lays 1000 to 1500 eggs in the soil near or on developing plants in May through June. Once the eggs hatch, the larvae proceed downward to the roots of the plant and feed on root nodules. Most economical losses may result from the larvae feeding on the root nodules when nitrogen in the soil is low.
- The threshold is 30% of seedlings with clam leaf damage before the 5th node stage. Its life cycle is completed in the late summer, when the larvae pupate and the adult emerges in August and September. The adults feed on any plants of the bean family before they over-winter in alfalfa or other perennial legumes. In the spring they move primarily by flying (above 17°C) or they may walk short distances.

Wild Oat Herbicide Update

This study was initiated to evaluate crop tolerance and efficacy of some newer cereal herbicides. Treatments were applied when wild oats had one tiller or a week later when two tillers were present.

Treatment		Rate		Applied	Wild Oat
Check					0
Rimfire Max	+	3	OZ WT/A	1T	86
Huskie	+	11	FL OZ/A		
MSO		1.5	PT/A		
Rimfire Max	+	3	OZ WT/A	1T	82
Huskie	+	11	FL OZ/A		
Quad 7		0.8	PT/A		
Wolverine		27.4	FL OZ/A	1T	50
Huskie Complete	+	13.69	FL OZ/A	1T	83
Ammonium Sulfate		0.5	LB/A		
Varro	+	6.85	FL OZ/A	1T	78
Carnivore		1	PT/A		
Huskie Complete	+	13.69	FL OZ/A	2T	72
Ammonium Sulfate		0.5	LB/A		
Wolverine		27.4	FL OZ/A	2T	58

5/31/2013: wild oat 1T, 7 inches. Crop 2T, 10 inches. LSD: 13.4
6/6/2013: wild oat 2T, 12 inches. Crop 3T, 12 inches.

Late applications may be effective in controlling weeds, but the extended duration of competition often results in lower yields.

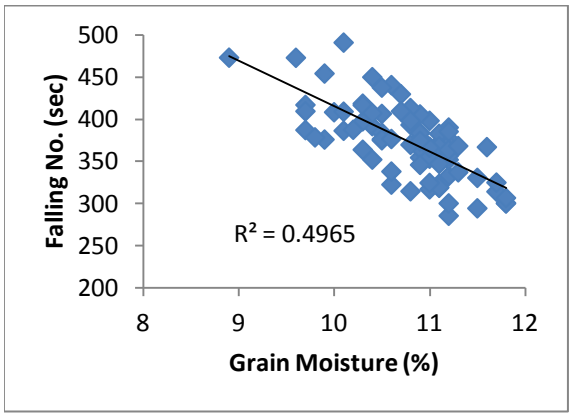
	% Control		Yield	
Year	1 WAE	3 WAE	1 WAE	3 WAE
1992	92	82	82	65
1993	89	93	78	57
1994	97	97	112	92
1995	94	98	96	90
Mean	**93**	**92**	**92**	**76**

Falling Numbers

Falling number is similar to percent sprout damage; both measurements provide an indication as to whether or not the grain has started to germinate in the head. This typically becomes a problem when wet conditions occur shortly before harvest and is referred to as **preharvest sprout (PHS)**. While rainfall is the major culprit, there are other situations where wheat can be graded with a low falling number even though conditions are dry and no sprout is evident.

Late maturity alpha amylase (LMA) is associated with high altitudes and cold temperature shocks midway through grain filling. This produces low FN in the absence of PHS. There's a third amylase enzyme which gets expressed with insect feeding, specifically by the OWBM. In addition, our data indicates that grain moisture at harvest impacts falling numbers.

	Yield	owbm	FN
Variety	bu/A	no/spike	sec.
Faller	90.9	7	447
Amidon	74.1	18	442
Choteau	72.2	8	418
Hank	70.7	51	331
Vida	59.8	24	253
Volt	57.7	37	309
Solano	52.8	48	267



It's this conversion from starch to sugar that is central to the falling number test. Alpha amylase acts like a pair of scissors and breaks starch down into smaller pieces, eventually producing sugar. This in turn reduces baking quality. The falling number test begins with the mixing of flour and water in test tubes to form a slurry. The tubes are placed in a boiling water bath and automatically stirred for 60 seconds, causing the slurry to thicken. After mixing, the stirrers are released at the top of the slurry and begin to fall. The falling number apparatus records the time for the stirrer to fall through the slurry. The rate at which the stirrer falls is directly related to the amount of starch degradation, which in turn is related to alpha amylase activity. As alpha amylase activity increases, more starch is converted to sugar and the slurry thins. As the slurry thins, the stirrer falls faster, resulting in lower falling numbers.