VALENT 2008
SPRING WHEAT SEED TREATMENT TRIALS

David Bragg
WSU Extension Entomology
P O Box 190
Pomeroy WA

Trial protocol. To study rates and efficacy of seed treatment insecticides on Cereal Leaf Beetle (CLB), Russian Wheat Aphid (RWA), and Basin Wire Worm, the wheat variety Alpowa was seeded into a RCBD design of 8 by 20 feet replications with 4 replications per treatment. Seeding date was May 15, 2008. Soil temperature at 6 inches was 52 F at seeding. Treatments included an UTC and two rates of Thiomethoxam (Cruiser 5C), two rates of Gaucho 600 ST, and four rates of Valent 10170. The first evaluation was a count of plant stand per ¼ square meter 10 DPE. Stand reduction is a standard measure of wire worm activity and damage in seedling cereals. This trial was seeded into wire worm infested recrop ground.

Table 1. One-Way AOV for: Cru10 Cru30 Gau32 Gau5 UTC V10 V20 V30 V5

Plants stand 10 DPE ¼ meter indicating early wire worm damage

Source	**DF**	**SS**	**MS**	**F**	**P**
Between	8	474.500	59.3125	36.19	0.0000
Within	27	44.250	1.6389		
Total	35	518.750			

Grand Mean 14.917 CV 8.58

Homogeneity of Variances	**F**	**P**
Levene's Test	0.89	0.5407
O'Brien's Test	0.57	0.7951
Brown and Forsythe Test	0.49	0.8558

Welch's Test for Mean Differences

Source	**DF**	**F**	**P**
Between	8.0	47.20	0.0000
Within	11.1		

Component of variance for between groups 14.4184
Standard Error of a Mean 0.6401
Std Error (Diff of 2 Means) 0.9052

Table 2. LSD All-Pair wise Comparisons Test plant stand ¼ meter sq

Treatment	Mean plants ¼ meter sq
Cru30	16.250 A
V30	15.750 AB
V20	15.250 BC
V10	14.750 C
Gau32	14.500 C
Cru10	13.250 D
V5	11.500 E
Gau5	10.500 E
UTC	8.5000 G

Alpha 0.1 Standard Error for Comparison 0.4665
Critical T Value 1.703 Critical Value for Comparison 0.7945
Based on a desired stand of 14 plants per ¼ meter sq treatments Cru 10, chlothianidin 5, Imidacloprid 5 failed to meet this standard due to wire worm damage. All treatments outperformed the UTC in stand protection.

Cereal Leaf Beetle was a serious defoliation pest in 2008 due to a long cold wet winter and spring. Wheat is a preferred host for CLB , and the number of larvae per plant did approach the wheat economic loss level in the UTC. This was due in part to summer generation adults appearing in late July reducing plant vigor through leaf destruction. The adult CLB normally emerge later and begin fall adult feeding on other grain crops including corn and Sorghum, then over winter in crop stubble

Table 3. One-Way AOV for: Cru10 Cru30 Gau32 Gau5 UTC V10 V20 V30 V5 as CLB larvae/Plant on 7/10/08

Source	**DF**	**SS**	**MS**	**F**	**P**
Between	8	55.2637	6.90797	6.86	0.0001
Within	27	27.1952	1.00723		
Total	35	82.4589			

Grand Mean 2.0853 CV 48.13

Homogeneity of Variances	**F**	**P**
Levene's Test	1.34	0.2672
O'Brien's Test	0.86	0.5631
Brown and Forsythe Test	1.39	0.2471

Welch's Test for Mean Differences

Source	**DF**	**F**	**P**
Between	8.0	M	0.0000
Within	M		

Component of variance for between groups 1.47518
Effective cell size 4.0
Observations per Mean 4
Standard Error of a Mean 0.5018
Std Error (Diff of 2 Means) 0.7097

Table 4. LSD All-Pair wise Comparisons Test Cereal Leaf beetle larvae/plant per plant 7/10/08

Treatment	Mean CLB larvae per plant	
UTC	4.0000	A
V5	3.5000	AB
Gau5	3.0000	B
Gau32	2.5000	B
Cru10	2.2500	B
V10	1.5000	C
V30	1.2525	D
V20	0.7550	D
Cru30	0.0100	E

Alpha 0.05 Standard Error for Comparison 0.7097
Critical T Value 2.052 Critical Value for Comparison 1.4561

These data show a reduction in CLB larvae compared to the UTC, with the higher rates of V10170 and Cruiser 30 grams having close to no larvae per plant. A conclusion based on this trial and previous trials in wheat is that the seed treatment products under test do affect CLB populations at higher rates. If this is true the same efficacy should show in managing populations of aphids in spring wheat.

Russian Wheat Aphid (RWA) appeared in the trial about the same time as the CLB larvae and was countable as a crop pest for the first time in several years at Central Ferry. The RWA appearance was also affected by the lack of early season predation by H. convergens and parasitoidism by *D. rapae,* an introduced Braconidae parasitoid of aphids, below 70 F.

Table 5. One-Way AOV for: Cru10 Cru30 Gau32 Gau5 UTC V10 V20 V30 V5 Russian Wheat Aphid per 100 tillers on 7/10/08

Source	**DF**	**SS**	**MS**	**F**	**P**
Between	8	43.2654	5.40818	7.63	0.0000
Within	27	19.1354	0.70872		
Total	35	62.4009			

Grand Mean 1.2539 CV 67.14

Homogeneity of Variances	**F**	**P**
Levene's Test	1.29	0.2919
O'Brien's Test	0.82	0.5896
Brown and Forsythe Test	1.11	0.3858

Welch's Test for Mean Differences

Source	**DF**	**F**	**P**
Between	8.0	M	0.0000
Within	M		

Component of variance for between groups 1.17486
Effective cell size 4.0
Observations per Mean 4
Standard Error of a Mean 0.4209
Std Error (Diff of 2 Means) 0.5953

Table 6. LSD All-Pair wise Comparisons Test percentage Russian wheat aphid/100 plants

Treatment	Mean RWA on 7/10/2008	
UTC	35.000	A
Gau5	25.000	A
Gau32	20.000	B
V5	10.025	C
V10	7.550	D
V20	7.550	D
Cru10	5.050	D
V30	2.575	D
Cru30	1.000	D

Alpha 0.05 Standard Error for Comparison 0.5953
Critical T Value 2.052 Critical Value for Comparison 1.2214

These data are the mean percentage of RWA per 100 plants. The established RWA economic injury threshold for spring grains is ca. 16%. The treatments in the group C and D all provided efficacy below this threshold in this trial. Normally the RWA would not be noticed in spring cereals.

Hippodamia convergens is the major Coccinellid predator of RWA and CLB in cereals. Ladybird Beetle larvae and adults can consume 40% of the CLB larvae and RWA in spring cereals. Since ladybird beetles have few natural enemies, counts of them indicate effects of the seed treatment insecticides that may pass through plant feeding insects.

Conclusions: very late predation by *Hippodamia convergens* due to cold weather allowed RWA and CLB populations to increase above economic thresholds. Wire worm larvae reduced stand similar to other trials in the same rotation/location. So insect factors in this trial included Basin wire worm, Cereal Leaf Beetle, and Russian Wheat Aphid. Parasitoid activity was reduced by very cold and wet weather. Treatments of Chlothianidin and Thiomethoxam at the 30 grams/Kg level doubled yield over the UTC in this trial.
The basic results are plant stand protection from wire worm larvae.