# LTB01-1

# 2000 Colorado Field Crop Insect Management Research and Demonstration Trials

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**CONTROL OF RUSSIAN WHEAT APHID IN WINTER WHEAT WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000**

Shawn Walter, Jeff Rudolph, Terri Randolph, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF RUSSIAN WHEAT APHID IN WINTER WHEAT WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000:** Treatments were applied on 12 April 2000 with a 'rickshaw-type' $CO_2$ powered sprayer calibrated to apply 20 gal/acre at 3 mph and 30 psi through four 8004 (LF4) nozzles mounted on a 5.0 ft boom. Conditions were cloudy with winds from the northeast at 0-5 mph and 42EF temperature at the time of treatment. Plots were 4 rows (5.0 ft) by 28.0 ft and were arranged in six replicates of a randomized, complete block design. Crop stage at application was late tillering (Zadoks 26-27). The crop had been infested with greenhouse-reared aphids on 14 March 2000.

Treatments were evaluated by collecting 20 symptomatic tillers along the middle rows of each plot one day prior and one, two and three weeks after treatment. Tiller samples were placed in Berlese funnels for 24 hours to extract aphids into alcohol for counting. Precounts averaged 209 ± 24 Russian wheat aphids per 20 symptomatic tillers. Aphid counts transformed by the square root + ½ method were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05). Original means are presented in the tables. Total insect days for each treatment were calculated according the method of Ruppel (Journal of Economic Entomology 76: 375-7, 1983). Reductions in insect days were calculated by Abbott's (1925) formula: (percent reduction = ((untreated-treated)/untreated) X 100). Insect days were also compared by analysis of variance and the Student-Neuman-Keul test (á=0.05) with original means presented in the tables.

Aphid pressure was as severe as in past artificially-infested winter wheat experiments, about 20 aphids/tiller in the untreated control. Di-Syston 8E, Lorsban 4E-SG, 0.5 and Lorsban 4E-SG, 0.25 treatments had fewer aphids than the untreated control at 1, 2 and 3 weeks after treatment. All treatments except Capture 2E, Warrior + Supercharge, Penncap M 2FM and Fulfil 50 WP had fewer aphid days than the untreated control over the course of the experiment. There were no differences among treatments in terms of reduced aphid days. Di-Syston 8E and Lorsban 4E-SG, 0.5 treatments reduced total aphid days over three weeks by more than 90%, the level of performance observed by the more effective treatments in past experiments. No phytotoxicity was observed with any treatment.

**Field History**

| | |
|---|---|
| Pest: | Russian wheat aphid, *Diuraphis noxia* (Mordvilko) |
| Cultivar: | 'TAM 107' |
| Planting Date: | 13 September 1999 |
| Irrigation: | Once post planting, furrow irrigated |
| Crop History: | Pinto beans in 1999 |
| Herbicide: | None |
| Insecticide: | None prior to experiment |
| Fertilization: | None |
| Soil Type: | Clay, OM 2.0%, pH 7.9 |
| Location: | ARDEC, 4616 North Frontage Road, Fort Collins, CO 80524 (southeast side of Block 800) |

Table 1. Control of Russian wheat aphid in winter wheat, ARDEC, Fort Collins, CO, 2000.

| PRODUCT, LB (AI)/ACRE | APHIDS PER 20 TILLERS ± SEM[1] 1 WEEK | 2 WEEKS | 3 WEEKS | TOTAL APHID DAYS ± SEM[1] | % REDUCTION[2] |
|---|---|---|---|---|---|
| DI-SYSTON 8E, 0.75 | 8.0 ± 3.2 D | 24.7 ± 6.1 E | 60.8 ± 32.1 D | 413.6 ± 92.4 D | 93 |
| LORSBAN 4E-SG, 0.50 | 10.2 ± 6.6 D | 44.8 ± 23.2 DE | 63.8 ± 22.3 CD | 572.8 ± 174.2 CD | 90 |
| LORSBAN 4E-SG, 0.38 | 10.8 ± 3.6 D | 46.3 ± 21.4 DE | 87.7 ± 15.5 BCD | 669.1 ± 190.5 CD | 88 |
| LORSBAN 4E-SG, 0.25 | 14.0 ± 4.2 D | 62.5 ± 20.1 CDE | 55.2 ± 23.0 D | 679.6 ± 160.3 CD | 88 |
| DIMETHOATE 4E, 0.38 | 47.7 ± 14.8 CD | 102.0 ± 24.4 BCDE | 146.8 ± 48.9 ABCD | 1394.8 ± 321.4 BCD | 75 |
| CGA293343 25 QP, 0.044 | 74.0 ± 19.2 BC | 172.0 ± 27.7 BCD | 292.2 ± 35.5 AB | 2485.6 ± 231.9 BCD | 56 |
| WARRIOR T, 0.03 | 87.5 ± 18.6 BC | 101.7 ± 18.8 BCDE | 221.5 ± 40.9 ABCD | 1793.2 ± 238.7 BCD | 68 |
| CAPTURE 2E, 0.03 | 147.8 ± 88.8 BC | 281.0 ± 156.3 BC | 441.5 ± 169.3 A | 4029.7 ± 1978.5 AB | 28 |
| WARRIOR T, 0.03 + SUPERCHARGE (0.5% v/v) | 116.2 ± 15.6 ABC | 233.8 ± 65.9 BC | 188.0 ± 60.9 ABCD | 2701.4 ± 659.5 ABCD | 52 |
| PENNCAP M 2FM, 0.75 | 132.0 ± 25.0 AB | 318.8 ± 74.7 AB | 307.5 ± 94.8 ABC | 3770.1 ± 651.5 ABC | 33 |
| UNTREATED CONTROL | 219.0 ± 39.3 A | 501.2 ± 106.1 A | 377.5 ± 121.6 AB | 5595.9 ± 1124.2 A | --- |
| FULFILL 50 WP, 0.086 | 221.2 ± 30.6 A | 261.0 ± 59.5 B | 429.0 ± 173.1 A | 4102.6 ± 1030.9 AB | 27 |
| F Value | 16.32 | 8.87 | 5.14 | 5.56 | |
| p > F | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05).
[2]Percent reduction in total aphid days, calculated by the Ruppel method.

## CONTROL OF RUSSIAN WHEAT APHID IN SPRING BARLEY WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000

Shawn Walter, Jeff Rudolph, Terri Randolph, Hayley Miller, Aaron Spriggs, Hilary Freeman Spriggs, Mary Donohue, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF RUSSIAN WHEAT APHID IN SPRING BARLEY WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000**: The early treatment was applied on 27 April 2000 with a 'rickshaw-type' $CO_2$ powered sprayer calibrated to apply 20 gal/acre at 3 mph and 30 psi through four 8004 (LF4) nozzles mounted on a 5.0 ft boom. All other treatments were applied on 4 May 2000. Conditions were calm and overcast and temperature was 48EF at the time of the early treatment. Conditions were partly cloudy with winds from the southwest at 0-3 mph and temperature was 65EF at the time of late treatments. Plots were 2 beds (5.0 ft) by 25.0 ft and were arranged in eight replicates of a randomized, complete block design. Crop stage at the early application date was tillering (Zadoks 26-27). Crop stage at the late application date was stem elongation (Zadoks 32-33). The crop had been infested at the 2 leaf stage (Zadoks 12) with greenhouse-reared aphids on 13 and 14 April 2000.

Treatments were evaluated by collecting 20 symptomatic tillers per plot one day prior and one, two and three weeks after treatment. Tiller samples were placed in Berlese funnels for 24 hours to extract aphids into alcohol for counting. Precounts averaged 153 ± 8 Russian wheat aphids per 20 symptomatic tillers. Aphid counts transformed by the square root + ½ method were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05). Original means are presented in the tables. Total insect days for each treatment were calculated according the method of Ruppel (Journal of Economic Entomology 76: 375-7, 1983). Reductions in insect days were calculated by Abbott's (1925) formula: (percent reduction = ((untreated-treated)/untreated) X 100). Insect days were also compared by analysis of variance and the Student-Neuman-Keul test (á=0.05) with original means presented in the tables. Yields were taken on 26 July 2000 with a Wintersteiger plot combine. Yields were converted to bushels per acre adjusted by subsample moisture. Plot yields were compared by analysis of variance and the Student-Neuman-Keul test (á=0.05).

Aphid pressure was as severe as observed in past artificially-infested spring barley experiments. All treatments had fewer aphids than the untreated control at each sampling date. All treatments had fewer aphid days than the untreated control. No treatment reduced total aphid days by more than 90% after 3 weeks, the level of performance observed by the more effective treatments in past winter wheat experiments. All treatments yielded more than the untreated control. No phytotoxicity was observed with any treatment.

**Field History**

| | |
|---|---|
| Pest: | Russian wheat aphid, *Diuraphis noxia* (Mordvilko) |
| Cultivar: | Moravian 37 |
| Planting Date: | 24 March 2000 |
| Irrigation: | Furrow |
| Crop History: | Pinto beans in 1999 |
| Herbicide: | Harmony Extra, 0.3 oz/acre on 27 April 2000 |
| Insecticide: | None prior to experiment |
| Fertilization: | None |
| Location: | ARDEC, 4616 North Frontage Road, Fort Collins, CO 80524 (center of Block 200B) |

Table 1. Control of Russian wheat aphid in spring barley, ARDEC, Fort Collins, CO, 2000.

| PRODUCT, LB(AI)/ACRE | APHIDS PER 20 TILLERS ± SEM[1] | | | TOTAL APHID DAYS ± SEM[1] | % REDUCTION[2] | YIELD[3] |
|---|---|---|---|---|---|---|
| | 1 WEEK | 2 WEEKS | 3 WEEKS | | | |
| LORSBAN 4E-SG, 0.50 | 24.3 ± 9.1 C | 40.6 ± 9.6 B | 93.9 ± 16.8 C | 697.8 ± 105.3 B | 88 | 63 AB |
| WARRIOR T, 0.03 + HARMONY EXTRA (0.3oz.ac)+ STARANE SALVO (2/3 pt/acre) + SUPERCHARGE (0.5% v/v) | 94.8 ± 13.1 B | 97.6 ± 17.6 B | 121.8 ± 14.1 BC | 1441.13 ± 134.8 B | 76 | 58 AB |
| WARRIOR T, 0.03 | 107.4 ± 23.0 B | 100.4 ± 27.0 B | 174.0 ± 11.1 BC | 1687.4 ± 163.0 B | 72 | 67 A |
| WARRIOR T, 0.02 | 114.4 ± 26.1 B | 107.3 ± 23.5 B | 238.6 ± 32.8 B | 1986.3 ± 343.4 B | 67 | 55 AB |
| WARRIOR T, 0.03 + SUPERCHARGE (0.5% v/v) | 136.0 ± 20.5 B | 110.3 ± 25.7 B | 216.9 ± 48.4 B | 2006.81 ± 398.3 B | 66 | 51 B |
| UNTREATED CONTROL | 314.1 ± 21.1 A | 333.4 ± 49.6 A | 724.3 ± 129.5 A | 5967.9 ± 812.7 A | --- | 21 C |
| F Value | 18.40 | 12.42 | 25.51 | 23.40 | | 22.41 |
| p > F | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | | < 0.0001 |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not significantly different, SNK (á=0.05).
[2]Percent reduction in total aphid days, calculated by the Ruppel method.
[3]Yield presented in bushels/acre adjusted to 12% moisture.

**EFFECT OF TREATMENT TIMING OF DIMETHOATE 4E ON BROWN WHEAT MITE IN WINTER WHEAT, ARDEC, FORT COLLINS, CO, 2000**

Terri Randolph, Shawn Walter, Jeff Rudolph, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**EFFECT OF TREATMENT TIMING OF DIMETHOATE 4E ON BROWN WHEAT MITE IN WINTER WHEAT, ARDEC, FORT COLLINS, CO, 2000**: Dimethoate 4E, 0.38 was applied with a 'rickshaw-type' $CO_2$ sprayer calibrated to deliver 20 gal/acre at 30 psi through six 8004 (LF4) nozzles mounted on a 10 ft boom. Plots were 10 ft by 50 ft and arranged in six replicates of a randomized complete block design. Crop stage for each application was tillering (Zadoks 26), jointing (Zadoks 32) and boot (Zadoks 47) respectively.

Treatments were evaluated by extracting mites in two 8 inch diameter areas per plot with a Vortis Suction Sampler. Samples were collected before the first application (tillering, Zadoks 26), before the second application (jointing, Zadoks 32), before the third application (boot, Zadoks 47) and two weeks after the third application (anthesis, Zadoks 69). Samples were placed on paper plates in Berlese funnels for 72 hours to extract the mites into alcohol for counting. Precounts averaged 1075 ± 187 mites per two-8 inch diameter suction samples. Mite counts transformed by the square root + ½ method were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05). Original means are presented in the table. Yields were taken on 13 July 2000 with a Wintersteiger plot combine. Yields were converted to bushels per acre adjusted by subsample moisture. Mean bushels per acre were compared by analysis of variance and means separated by Student-Neuman-Keul test (á=0.05).

Mite pressure was high. The first treatment had fewer mites than the untreated control. Treatment yields were higher than the untreated yields. The differences in yield may have been due to a high infestation of Russian wheat aphid rather than brown wheat mite since differences also occurred after the mite populations had declined. Phytotoxicity was not observed with any treatment.

**Field History**

Pest: Brown wheat mite, *Petrobia latens* (Müller)
Cultivar: 'TAM 107'
Planting Date: 13 September 1999
Irrigation: None
Crop History: Fallow 1999
Herbicide: None
Insecticide: None prior to experiment
Fertilization: None
Location: ARDEC, 4616 North Frontage Road, Fort Collins, CO 80524 (west side of blocks 1010 and 1050)

Table 1. Effect of treatment timing of dimethoate 4E on brown wheat mite, ARDEC, Fort Collins, CO, 2000.

| | MITES PER SAMPLE ± SEM[1] | | | |
|---|---|---|---|---|
| TREATMENT | AFTER FIRST TREATMENT | AFTER SECOND TREATMENT | AFTER THIRD TREATMENT | YIELD[2] |
| DIMETHOATE 4E, TILLERING | 47 ± 18 B | 3 ± 1 B | 2 ± 1 A | 13.0 B |
| DIMETHOATE 4E, JOINTING | 641 ± 173 A | 4 ± 1 AB | 2 ± 1 A | 11.7 B |
| DIMETHOATE 4E, BOOT | --- | 17 ± 7 A | 1 ± 0 A | 11.6 B |
| UNTREATED | 443 ± 110 A | 12 ± 4 A | 2 ± 1 A | 7.5 A |
| F value | 16.19 | 4.95 | 0.71 | 11.89 |
| p > F | 0.0007 | 0.0138 | 0.5635 | 0.0003 |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05).
[2]Yield in bushels/acre adjusted to 12% moisture.

## CONTROL OF ALFALFA INSECTS IN ALFALFA WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000

Hayley Miller, Shawn Walter, Jeff Rudolph, Terri Randolph, Aaron Spriggs, Hilary Freeman Spriggs, Mary Donohue, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF ALFALFA INSECTS IN ALFALFA WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000:** Early treatments were applied on 6 April 2000 with a 'rickshaw-type' $CO_2$ powered sprayer calibrated to apply 20 gal/acre at 3 mph and 30 psi through six 8004 (LF4) nozzles mounted on a 10.0 ft boom. All other treatments were applied on 24 April 2000. Conditions were overcast with winds from the north at 0-2 mph and temperature was 42EF at the time of early treatments. Conditions were partly cloudy with winds from the southwest at 4-6 mph and temperature was 70EF at the time of late treatments. Plots were 10.0 ft by 30.0 ft and arranged in four replicates of a randomized, complete block design. Untreated control and Furadan 4F plots were replicated eight times for a more accurate comparison of treatment effects on yield. Crop was breaking dormancy at the time of early treatments. Crop height at the time of late treatments was 1.5 ft.

Treatments were evaluated by taking 10, 180$^{N}$ sweeps per plot with a standard 15 inch diameter insect net one, two and three weeks after late treatments. Precounts were taken one day prior to late treatments by taking 100, 180$^{N}$ sweeps per replication. Alfalfa weevil larvae, alfalfa weevil adults and pea aphids were counted. Precounts averaged 205 ± 56 alfalfa weevil larvae, 3 ± 1alfalfa weevil adults and 3 ± 1 pea aphids per 10 sweeps. Insect counts transformed by the square root + ½ method were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05). Original means are presented in the tables. Yields 4 ft wide by 30 ft long, were taken in the Furadan 4F, 0.50 lb(AI)/acre and untreated control plots on 21 June 2000 with a Carter forage harvester, which cuts and weighs a 4 ft wide swath of alfalfa. Yields were converted to tons per acre adjusted by subsample moisture. Treated plots were compared to the untreated control using a two-tailed t-test with assumed equal variance (á=0.05).

Alfalfa weevil pressure was high and pea aphid pressure was low. Due to problems with the irrigation system, crop condition was poor. All treatments had fewer alfalfa weevil larvae than the untreated control at one week after treatment. No treatments had fewer alfalfa weevil adults than the untreated control at one, two or three weeks after treatment. No treatment had fewer pea aphids than the untreated control at three weeks after treatment. No phytotoxicity was observed with any treatment. The plots treated with Furadan 4F, 0.50 lb(AI)/acre yielded 15.7% more than the untreated plots. The difference was significant (two-tailed t-test, t=3.2469, df=14, $p(t>t_{0.05})$=0.0058 ). Yield reduction measured since 1995 has averaged 8.3%, with a range of 2.3% to 15.7%.

### Field History

| | |
|---|---|
| Pests: | Alfalfa weevil, *Hypera postica* (Gyllenhal) |
| | Pea aphid, *Acyrthosiphon pisum* (Harris) |
| Cultivar: | Unknown |
| Plant Stand: | Thin but uniform, drought stressed, few weeds |
| Irrigation: | Linear move sprinkler with drop nozzles |
| Crop History: | Alfalfa since 1994 |
| Herbicide: | None |
| Insecticide: | None prior to experiment |
| Fertilization: | None |
| Soil Type: | Sandy Clay, OM 2.2%, pH 7.8 |
| Location: | ARDEC, 4616 North Frontage Road, Fort Collins, CO, 80524 (Block 1030) |

Table 1. Control of alfalfa weevil larvae, ARDEC, Fort Collins, CO, 2000.

| | ALFALFA WEEVIL LARVAE PER 10 SWEEPS ± SEM[1] | | |
|---|---|---|---|
| **PRODUCT, LB (AI)/ACRE** | **1 WEEK** | **2 WEEKS** | **3 WEEKS** |
| WARRIOR 1E, 0.025 | 1.0 ± 0.7 F | 3.3 ± 1.0 D | 1.3 ± 1.3 E |
| LORSBAN 4E, 0.75 | 1.0 ± 0.4 F | 10.0 ± 2.7 D | 12.3 ± 4.0 AB |
| WARRIOR 1E, 0.03 | 3.0 ± 2.1 F | 4.0 ± 0.9 D | 0.5 ± 0.5 E |
| FURADAN 4F + DIMETHOATE, 0.50 + 0.25 | 2.8 ± 0.9 EF | 18.0 ± 4.3 CD | 9.5 ± 5.3 ABCD |
| STEWARD, 0.110 | 3.0 ± 1.1 EF | 5.3 ± 1.7 D | 6.8 ± 3.0 ABCDE |
| STEWARD, 0.065 | 3.5 ± 1.2 EF | 16.3 ± 7.3 CD | 7.3 ± 3.0 ABCDE |
| FURADAN 4F, 0.50[2] | 4.9 ± 1.5 EF | 7.9 ± 2.4 D | 8.8 ± 1.7 ABCD |
| WARRIOR 1E, 0.02 | 5.8 ± 1.1 DEF | 5.8 ± 2.3 D | 1.8 ± 0.9 DE |
| MUSTANG 1.5E, 0.0375 | 7.5 ± 1.6 DEF | 9.0 ± 1.9 D | 1.8 ± 0.5 CDE |
| FURADAN 4F, 0.25 | 8.0 ± 2.6 DEF | 12.3 ± 1.6 CD | 12.3 ± 4.6 AB |
| MUSTANG 1.5E, 0.044 | 8.3 ± 1.2 DEF | 12.5 ± 5.5 D | 3.3 ± 0.9 BCDE |
| BAYTHROID 2E, 0.025 | 9.3 ± 4.0 DEF | 5.3 ± 2.6 D | 1.5 ± 0.7 DE |
| LANNATE LV, 0.90 | 10.5 ± 2.3 DEF | 23.5 ± 7.8 BCD | 15.8 ± 4.1 A |
| MUSTANG 1.5E, 0.05 | 28.3 ± 20.1 CDEF | 9.3 ± 2.6 D | 6.5 ± 4.2 ABCDE |
| PENNCAP M 2FM, 0.75 | 22.5 ± 6.6 BCDEF | 15.8 ± 4.9 CD | 12.8 ± 4.0 AB |
| WARRIOR 1E, 0.025 EARLY | 28.5 ± 10.1 BCDE | 37.3 ± 7.0 ABC | 9.0 ± 2.0 ABCD |
| WARRIOR 1E, 0.03 EARLY | 31.5 ± 6.5 BCD | 34.8 ± 3.3 ABC | 11.8 ± 3.2 AB |
| WARRIOR 1E, 0.02 EARLY | 39.8 ± 5.2 BC | 53.5 ± 9.2 A | 18.5 ± 4.7 A |
| MUSTANG 1.5E, 0.05 EARLY | 54.3 ± 7.7 BC | 37.0 ± 10.5 ABC | 11.8 ± 1.5 AB |
| MUSTANG 1.5E, 0.044 EARLY | 58.8 ± 14.1 BC | 55.5 ± 16.3 A | 9.3 ± 2.3 ABCD |
| MUSTANG 1.5E, 0.0375 EARLY | 62.0 ± 19.0 B | 51.0 ± 18.4 AB | 15.8 ± 3.1 A |
| UNTREATED CONTROL[2] | 116.5 ± 20.9 A | 53.0 ± 12.9 AB | 11.0 ± 2.0 ABC |
| F Value | 16.47 | 10.95 | 6.33 |
| p > F | < 0.0001 | < 0.0001 | < 0.0001 |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05)
[2]Treatment repeated (8 replicates rather than 4) for purposes of measuring yield.

Table 2. Control of alfalfa weevil adults, ARDEC, Fort Collins, CO, 2000.

| PRODUCT, LB(AI)/ACRE | ALFALFA WEEVIL ADULTS PER 10 SWEEPS ± SEM[1] 1 WEEK | 2 WEEKS | 3 WEEKS |
|---|---|---|---|
| LANNATE LV, 0.90 | 1.5 ± 1.0 BCDE | 3.0 ± 1.5 D | 1.0 ± 0.7 ABC |
| STEWARD, 0.110 | 0.5 ± 0.3 DE | 3.0 ± 0.4 CD | 0.3 ± 0.3 C |
| WARRIOR 1E, 0.025 EARLY | 3.3 ± 2.9 BCDE | 3.8 ± 1.4 CD | 3.3 ± 0.5 ABC |
| PENNCAP M 2FM, 0.75 | 1.0 ± 0.4 CDE | 4.0 ± 1.8 CD | 0.8 ± 0.5 BC |
| FURADAN 4F, 0.50[2] | 1.5 ± 0.5 BCDE | 4.3 ± 1.5 CD | 2.3 ± 0.4 ABC |
| STEWARD, 0.065 | 0.3 ± 0.3 E | 3.5 ± 0.9 CD | 2.0 ± 1.1 ABC |
| WARRIOR 1E, 0.03 EARLY | 0.8 ± 0.8 DE | 4.0 ± 0.4 CD | 2.8 ± 1.5 ABC |
| LORSBAN 4E, 0.75 | 0.8 ± 0.3 DE | 4.3 ± 0.6 CD | 1.8 ± 1.0 ABC |
| FURADAN 4F, 0.25 | 3.3 ± 0.5 ABCDE | 4.5 ± 0.9 CD | 1.5 ± 0.9 ABC |
| MUSTANG 1.5E, 0.044 EARLY | 2.0 ± 0.7 BCDE | 4.8 ± 1.5 CD | 1.3 ± 0.8 ABC |
| WARRIOR 1E, 0.02 EARLY | 4.0 ± 1.1 ABCDE | 6.5 ± 1.7 BCD | 1.5 ± 0.5 ABC |
| MUSTANG 1.5E, 0.05 EARLY | 4.0 ± 1.5 ABCDE | 8.0 ± 3.3 BCD | 1.8 ± 0.8 ABC |
| FURADAN 4F + DIMETHOATE, 0.50 + 0.25 | 2.8 ± 0.6 ABCDE | 7.5 ± 1.8 BCD | 2.0 ± 0.7 ABC |
| MUSTANG 1.5E, 0.0375 EARLY | 4.5 ± 2.1 ABCDE | 8.0 ± 3.1 BCD | 2.5 ± 1.0 ABC |
| UNTREATED CONTROL[2] | 2.0 ± 0.5 BCDE | 8.0 ± 1.4 BCD | 3.1 ± 0.8 ABC |
| MUSTANG 1.5E, 0.05 | 7.3 ± 2.5 AB | 10.0 ± 3.7 ABCD | 2.0 ± 0.4 ABC |
| MUSTANG 1.5E, 0.0375 | 6.5 ± 1.3 ABC | 11.3 ± 3.2 ABC | 4.3 ± 2.0 ABC |
| BAYTHROID 2E, 0.025 | 3.3 ± 1.0 ABCDE | 11.8 ± 3.2 ABC | 3.5 ± 1.0 ABC |
| WARRIOR 1E, 0.025 | 5.5 ± 2.3 ABCD | 14.0 ± 3.7 AB | 4.3 ± 0.8 ABC |
| WARRIOR 1E, 0.02 | 5.5 ± 1.4 ABCD | 14.8 ± 5.6 AB | 3.5 ± 2.2 ABC |
| MUSTANG 1.5E, 0.044 | 10.0 ± 5.1 A | 21.3 ± 9.5 A | 5.8 ± 0.8 A |
| WARRIOR 1E, 0.03 | 6.5 ± 1.2 ABC | 18.5 ± 5.0 A | 4.8 ± 1.0 AB |
| F Value | 4.68 | 6.47 | 2.34 |
| p > F | < 0.0001 | < 0.0001 | 0.0042 |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05)
[2]Treatment repeated (8 replicates rather than 4) for purposes of measuring yield.

Table 3. Control of pea aphids, ARDEC, Fort Collins, CO, 2000.

| | PEA APHIDS PER 10 SWEEPS ± SEM[1] | | |
|---|---|---|---|
| **PRODUCT, LB(AI)/ACRE** | **1 WEEK** | **2 WEEKS** | **3 WEEKS** |
| WARRIOR 1E, 0.025 | 0.0 ± 0.0 C | 0.0 ± 0.0 D | 0.8 ± 0.5 |
| LORSBAN 4E, 0.75 | 0.0 ± 0.0 C | 0.3 ± 0.3 CD | 1.8 ± 0.6 |
| WARRIOR 1E, 0.02 | 0.0 ± 0.0 C | 0.0 ± 0.0 D | 1.5 ± 1.5 |
| WARRIOR 1E, 0.03 | 0.3 ± 0.3 C | 0.5 ± 0.3 CD | 0.0 ± 0.0 |
| FURADAN 4F + DIMETHOATE, 0.50 + 0.25 | 0.3 ± 0.3 C | 1.3 ± 1.0 BCD | 2.3 ± 0.6 |
| MUSTANG 1.5E, 0.05 | 1.5 ± 1.5 C | 0.8 ± 0.5 BCD | 1.5 ± 1.0 |
| BAYTHROID 2E, 0.025 | 1.0 ± 0.4 C | 1.0 ± 0.4 BCD | 1.5 ± 0.7 |
| LANNATE LV, 0.90 | 1.8 ± 1.8 C | 0.8 ± 0.5 BCD | 1.8 ± 1.2 |
| MUSTANG 1.5E, 0.0375 | 1.3 ± 0.5 C | 1.0 ± 0.7 BCD | 1.3 ± 0.6 |
| MUSTANG 1.5E, 0.044 | 2.0 ± 1.4 C | 1.0 ± 0.6 BCD | 1.8 ± 1.4 |
| FURADAN 4F, 0.50[2] | 2.0 ± 0.7 C | 1.4 ± 0.5 BCD | 2.5 ± 1.4 |
| FURADAN 4F, 0.25 | 2.0 ± 0.7 C | 1.3 ± 1.0 BCD | 1.0 ± 1.0 |
| PENNCAP M 2FM, 0.75 | 2.8 ± 0.9 C | 1.3 ± 0.5 BCD | 1.3 ± 0.5 |
| UNTREATED CONTROL[2] | 4.3 ± 0.8 C | 1.8 ± 0.5 BCD | 1.8 ± 0.4 |
| STEWARD, 0.110 | 6.5 ± 2.3 BC | 2.8 ± 2.1 BCD | 1.5 ± 1.0 |
| STEWARD, 0.065 | 7.0 ± 2.2 BC | 1.0 ± 0.4 BCD | 1.0 ± 1.0 |
| MUSTANG 1.5E, 0.0375 EARLY | 14.0 ± 0.8 AB | 6.3 ± 1.8 ABC | 2.0 ± 0.4 |
| WARRIOR 1E, 0.03 EARLY | 17.8 ± 6.4 AB | 8.0 ± 5.1 ABC | 3.8 ± 2.2 |
| MUSTANG 1.5E, 0.044 EARLY | 23.3 ± 7.7 A | 3.3 ± 1.3 ABCD | 4.0 ± 2.4 |
| MUSTANG 1.5E, 0.05 EARLY | 18.5 ± 4.7 A | 7.3 ± 1.7 AB | 2.0 ± 1.7 |
| WARRIOR 1E, 0.025 EARLY | 26.0 ± 5.3 A | 6.0 ± 1.7 ABC | 1.0 ± 0.4 |
| WARRIOR 1E, 0.02 EARLY | 28.5 ± 8.8 A | 12.0 ± 6.7 A | 5.8 ± 3.5 |
| F Value | 13.81 | 4.01 | 0.79 |
| p > F | < 0.0001 | < 0.0001 | 0.7182 |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05)
[2]Treatment repeated (8 replicates rather than 4) for purposes of measuring yield.

## CONTROL OF ALFALFA INSECTS IN ALFALFA WITH PROPANE FLAMING AT TWO LOCATIONS IN NORTHEAST COLORADO, 2000

Shawn Walter, Terri Randolph, Jeff Rudolph, Hayley Miller, Aaron Spriggs, Hilary Freeman Spriggs, Frank Peairs, Department of Bioagricultural Sciences and Pest Management; Jerry Alldredge, Weld County Extension; Thaddeus Gourd, Tom McBride, Adams County Extension

**CONTROL OF ALFALFA INSECTS IN ALFALFA WITH PROPANE FLAMING AT THREE LOCATIONS IN NORTHEAST COLORADO, 2000:** Propane flaming was performed on 14 March 2000 at three locations near Brighton, CO. Alfalfa was flamed using the Red Dragon TD-12 LPS Alfalfa Flamer using approximately 20 gallons of propane per acre. Baythroid 2 was applied aerially at a rate of 1 oz/acre with an effective spray solution of 1 gal/acre on 13 May 2000. Plots were 40 ft by 300 ft and unreplicated. The remainder of the field which was not in the study area was treated with Baythroid.

Treatments were evaluated by extracting insects for 5 seconds in five 8 inch diameter areas with a Vortis Suction Sampler. Samples were collected every 10 ft along two transects perpendicular to the plots. Plots were sampled four times between 13 March and 30 May 2000. Alfalfa weevil larvae, alfalfa weevil adults and pea aphids were counted. Each location's counts from treated plots were compared to the untreated control using a two-tailed t-test with assumed equal variance (á=0.05). Yields were taken on 2 June 2000 with a Carter forage harvester which cuts and weighs a 4 ft swath of alfalfa. Swaths 4 ft wide and 10-20 ft long were collected at 6 locations within each treatment and converted to tons per acre adjusted by subsample moisture. Treated plots were compared to the untreated control using a two-tailed t-test with assumed equal variance (á=0.05).

Yields were higher in the flamed plots than in the untreated control at all 3 locations (Table 1). Propane flaming did not reduce the total number of alfalfa weevils or pea aphids compared to the untreated control at any location (Figures 1-3).

### Field History

| | |
|---|---|
| Pests: | Alfalfa weevil, *Hypera postica* (Gyllenhal) |
| | Pea aphid, *Acyrthosiphon pisum* (Harris) |
| Cultivar: | Unknown |
| Insecticide: | None prior to experiment |
| Soil Type: | Unknown |
| Location: | 120th and Havana St, Brighton, CO |

Table 1. Effect of propane flaming on alfalfa yield at three locations in northeast Colorado, 2000.

| LOCATION | TREATMENT | YIELD[1,2] |
|---|---|---|
| FIELD 1 | UNTREATED CONTROL | 1.3 ± 0.1 |
| FIELD 1 | BAYTHROID | 1.8 ± 0.1 (0.0039) |
| FIELD 1 | PROPANE FLAMING | 1.8 ± 0.1 (0.0036) |
| FIELD 2 EAST | UNTREATED CONTROL | 1.9 ± 0.0 |
| FIELD 2 EAST | BAYTHROID | 1.9 ± 0.0 (0.3126) |
| FIELD 2 EAST | PROPANE FLAMING | 2.0 ± 0.0 (0.0477) |
| FIELD 2 WEST | UNTREATED CONTROL | 0.9 ± 0.0 |
| FIELD 2 WEST | BAYTHROID | 1.2 ± 0.0 (< 0.0001) |
| FIELD 2 WEST | PROPANE FLAMING | 1.0 ± 0.0 (0.0002) |

[1]Yield in tons per acre adjusted by subsample moisture.
[2] p-value indicates probability of treatment mean being similar to the untreated control, calculated with a two-tailed t-test with assumed equal variance (á=0.05).

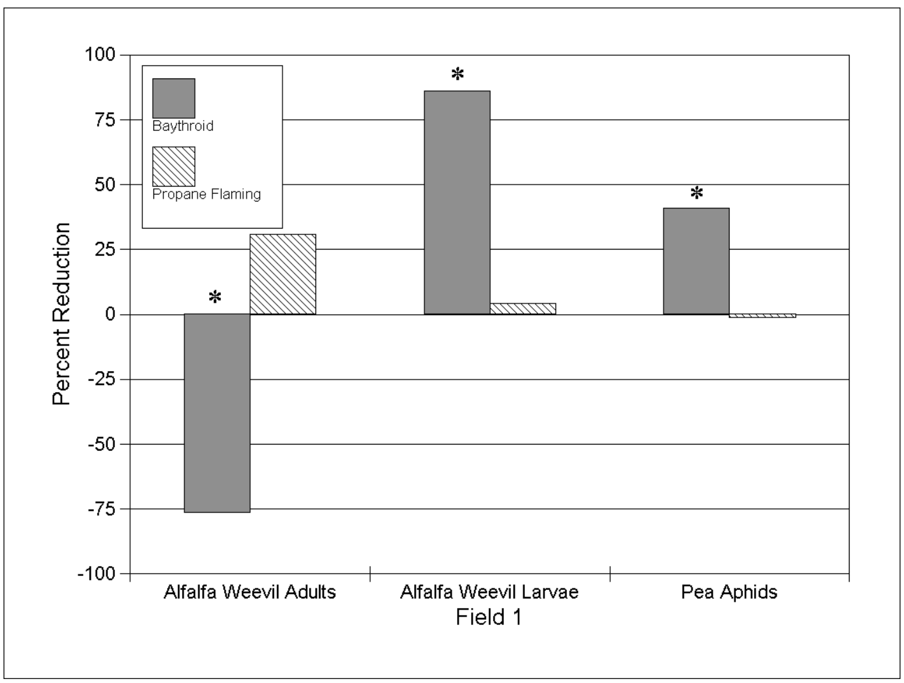


Figure 1. Percent reduction in pest abundance for each treatment as relative to the untreated control, Field 1, Brighton, CO, 2000.
*Indicates mean is different than the untreated control, calculated with a two-tailed t-test with assumed equal variance (á=0.05).

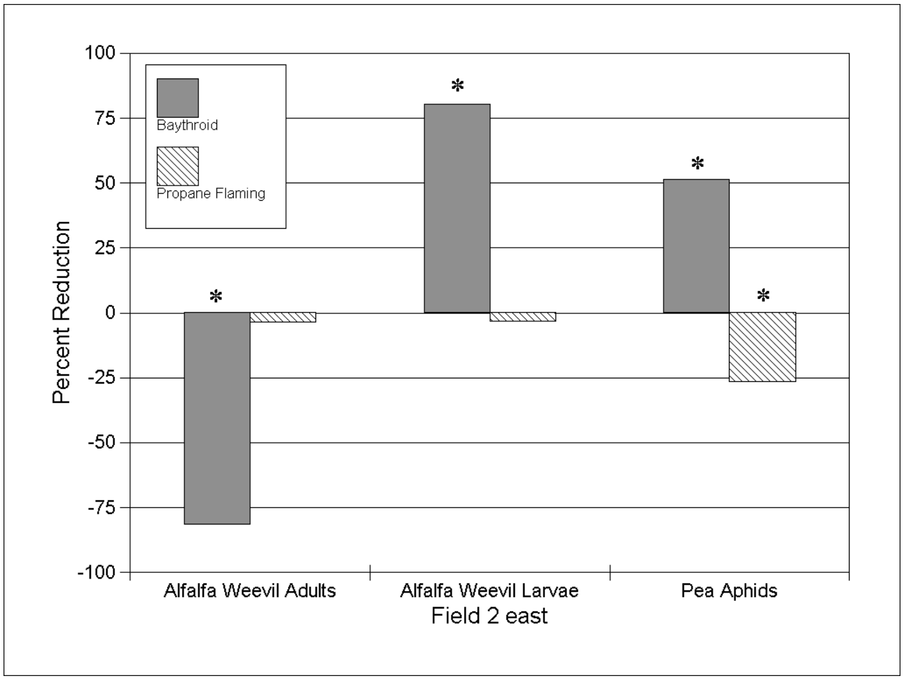


Figure 2. Percent reduction in pest abundance for each treatment as relative to the untreated control, Field 2 east, Brighton, CO, 2000.

*Indicates mean is different than the untreated control, calculated with a two-tailed t-test with assumed equal variance (á=0.05).

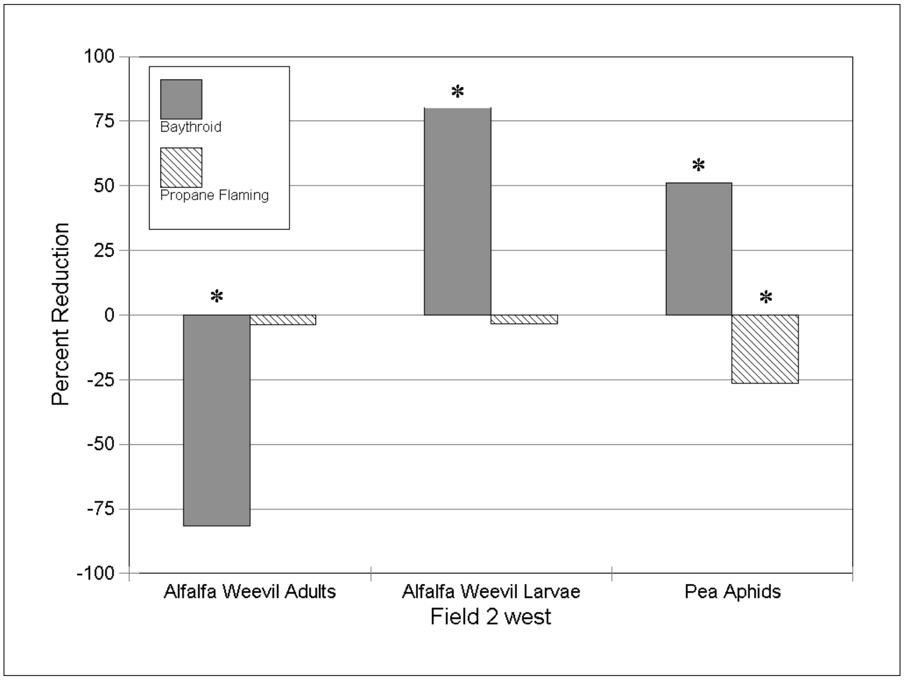


Figure 3. Percent reduction in pest abundance for each treatment as relative to the untreated control, Field 2 west, Brighton, CO, 2000.

*Indicates mean is different than the untreated control, calculated with a two-tailed t-test with assumed equal variance (á=0.05).

**CONTROL OF FLOWER THRIPS IN DRY BEANS WITH HAND-APPLIED INSECTICIDES, LENZ FARM, WRAY, CO, 2000**

Shawn Walter, Jeff Rudolph, Hilary Freeman Spriggs, Hayley Miller, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF FLOWER THRIPS IN DRY BEANS WITH HAND-APPLIED INSECTICIDES, LENZ FARM, WRAY, CO, 2000:** Treatments were applied on 30 June 2000 with a 'rickshaw-type' $CO_2$ powered sprayer calibrated to apply 20 gal/acre at 3 mph and 30 psi through six 8004 (LF4) nozzles mounted on a 10.0 ft boom. Conditions were clear and calm and temperature at 78EF at the time of treatment. Plots were 4 rows by 30.0 ft and were arranged in four replicates of a randomized, complete block design. Crop height at the time of application was 1.0 ft.

Treatments were evaluated by collecting 10 plants from each plot prior to treatment and three and seven days after treatment. Plant samples were placed in Berlese funnels for 24 hours to extract thrips into alcohol for counting. Precounts averaged 2819 ± 1169 thrips per 10 plants. Thrips counts transformed by the square root + ½ method were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05). Original means are presented in the tables.

Thrips pressure was heavy. Thrips were predominately flower thrips with few onion thrips present. Orthene 90S and Lannate LV treatments had fewer thrips than the untreated control at 3 and 7 days after treatment. No phytotoxicity was observed with any treatment.

**Field History**

Pest: Western flower thrips, *Frankliniella occidentalis* (Pergande).
Cultivar: Pinto beans
Planting Date: 26 May 2000
Irrigation: Sprinkler
Location: Yuma County, 5 miles east of Hwy 385 and County road 54

Table 1. Control of thrips in dry beans, Lenz Farm, Wray, CO, 2000.

| | THRIPS PER 10 PLANTS ± SEM [1,2] | |
|---|---|---|
| **PRODUCT, LB(AI)/ACRE** | **3 DAYS POST TRT** | **7 DAYS POST TRT** |
| ORTHENE 90S, 0.5 | 157.5 ± 65.2 BC | 355.3 ± 69.5 C |
| LANNATE LV, 0.5 | 44.0 ± 10.7 C | 419.8 ± 107.5 BC |
| DIMETHOATE, 0.25 | 676.0 ± 246.2 ABC | 634.0 ± 163.1 ABC |
| ASANA, 0.05 | 1697.8 ± 933.4 ABC | 851.5 ± 256.8 ABC |
| SEVIN XLR, 1.0 | 1071.8 ± 538.0 ABC | 883.3 ± 179.6 ABC |
| THIODAN 3EC, 0.5 | 2095.8 ± 701.1 AB | 1399.0 ± 297.4 AB |
| UNTREATED CONTROL | 2709.0 ± 1267.8 A | 1655.0 ± 609.9 A |
| F Value | 3.98 | 3.85 |
| p > F | 0.0104 | 0.0120 |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05)
[2]Insect counts transformed by the square root + ½ method were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05). Original means are presented in the table.

## CONTROL OF WESTERN CORN ROOTWORM IN CORN, BOHM FARM, ECKLEY, CO, 2000

Stan Pilcher, Dave Kennedy, Assefa Gebre-Amlak Golden Plains Area Cooperative Extension; Dave Poss, Central Great Plains Research Station; Shawn Walter, Jeff Rudolph, Terri Randolph, Aaron Spriggs, Hilary Freeman Spriggs, Mary Donohue, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF WESTERN CORN ROOTWORM IN CORN, BOHM FARM, ECKLEY, CO, 2000**: Planting time treatments were applied on 25 April 2000. Granular insecticides were applied with modified Wintersteiger meters mounted on a two-row John Deere Maxi-Merge planter. In-furrow granular applications were applied by directing a drop tube into the seed furrow. T-band granular applications were applied with a 4-inch John Deere spreader located between the disk openers and the press wheel. Liquid insecticides were applied with a $CO_2$ powered applicator mounted on the planter. In-furrow liquid applications were applied through microtubes directed into the seed furrow ½ inch above the seed. T-band liquid applications were applied with a 80E nozzle held 2 inches above the seed slot located between the disk openers and the press wheel. Plots were one 50-ft row arranged in six replicates of a randomized complete block design.

Cultivation treatments were applied on 22 May 2000. Broadcast cultivation treatments were applied with a $CO_2$ powered hand-held sprayer calibrated to deliver 23 gal/acre at 30 psi through four 80015 TJ VS nozzles. All other cultivation treatments were applied with 6 inch Gandy spreaders held 2 inches above the plant, incorporated with an Orthman cultivator. Plots were one 50-ft row arranged in six replicates of a randomized complete block design.

Seed treatments were planted on 25 April 2000 at a plant population of 32,000 per acre using a Kincaid cone planting system mounted on a two-row John Deere Maxi-Merge planter. Plots were one 50-ft row arranged in six replicates of a randomized complete block design.

Treatments were evaluated by digging three plants per plot on 11 July 2000. Plants were removed at three-plant intervals starting at 20 ft into the plot. The roots were washed and the damage rated on the Iowa 1-6 scale (Witkowski, J.F., D.L. Keith and Z.B. Mayo. 1982. Evaluating corn rootworm soil insecticide performance. University of Nebraska Cooperative Extension NebGuide G82-597, 2 pp.). Plot means were used for analysis of variance and mean separation by the Student-Neuman-Keuls test (á=0.05). Treatment efficiency was determined as the percentage of samples with a root rating of 3.0 or lower.

Western corn rootworm pressure was moderate and highly variable. Substantial regrowth had occurred by the time of evaluation which likely affected the accuracy of root ratings. No planting or cultivation time treatments had less damage than the untreated control (Table 1 and 2). No seed treatments had less damage than the untreated control (Table 3). No phytotoxicity was observed with any treatment.

Yields could not be determined in 2000 due to hail damage. Yield reduction measured between 1987-1999 have averaged 15%, with a range of 0% to 31%. Plots were hand harvested and did not take into account any losses due to lodging.

### Field History

| | |
|---|---|
| Pest: | Western corn rootworm, *Diabrotica virgifera virgifera* LeConte |
| Cultivar: | |
| Seed Treatments: | Provided by company |
| Other Treatments: | Pioneer '34K77' |
| Planting Date: | 25 April 2000 |
| Plant Population: | 32,000 |
| Irrigation: | Sprinkler |
| Crop History: | Field corn since 1996 |
| Insecticide: | None prior to experiment |
| Fertilization: | 180 N, 15 P, 8 S |
| Soil Type: | Haxtun sandy loam, OM 1.1%, pH 6.5 |
| Location: | Yuma County, NE ¼, Section 17, 4N-46W |

Table 1. Control of western corn rootworm with planting treatments, Bohm Farm, Eckley, CO, 2000

| PRODUCT | RATE | VOLUME | PLACEMENT[1] | ROOT RATING[2] | EFFICIENCY[3] |
|---|---|---|---|---|---|
| CAPTURE 2E | 0.35 fl oz | — | IF | 2.6 | 89 |
| LORSBAN 15G | 8 oz | — | TB | 2.7 | 89 |
| CAPTURE 2E | 0.30 fl oz | — | IF | 2.7 | 83 |
| FORCE 3G | 4 oz | — | IF | 2.9 | 78 |
| REGENT 4SC | 0.13 lb (ai)/ac | 3-5 GPA | IF | 2.9 | 67 |
| CAPTURE 2E | 0.30 fl oz | — | TB | 3.0 | 61 |
| COUNTER 20CR | 6 oz | — | TB | 3.0 | 69 |
| CAPTURE 2E | 0.35 fl oz | — | TB | 3.0 | 67 |
| FORCE 3G | 4 oz | — | TB | 3.2 | 72 |
| UNTREATED | — | — | — | 3.2 | 63 |
| AZTEC 2.1G | 6.7 oz | — | TB | 3.2 | 61 |
| REGENT 4SC[4] | 0.13 lb (ai)/ac | 3-5 GPA | IF | 3.4 | 50 |
| F Value | | | | 0.67 | — |
| p > F | | | | 0.7644 | — |

[1]IF, in furrow; TB, t-band.
[2]Iowa 1-6 rootworm damage scale. Means followed by the same letter(s) are not statistically different, SNK (á=0.05).
[3]Percentage of 18 plants (total in 6 replicates of a treatment) with a rating of 3.0 or less.
[4]10-34-0 fertilizer used instead of water.

Table 2. Control of western corn rootworm with cultivation treatments, Bohm Farm, Eckley, CO, 2000

| PRODUCT | RATE | PLACEMENT | ROOT RATING[1] | EFFICIENCY[2] |
|---|---|---|---|---|
| COUNTER 15G | 8 oz | BANDED | 2.7 | 89 |
| FURADAN 4F | 1.0 lb | BROADCAST | 2.8 | 78 |
| LORSBAN 15G | 8 oz | BANDED | 2.8 | 89 |
| THIMET 20G | 6 oz | BANDED | 3.0 | 56 |
| UNTREATED | — | — | 3.3 | 56 |
| F Value | | | 2.28 | — |
| p > F | | | 0.0985 | — |

[1]Iowa 1-6 rootworm damage scale. Means followed by the same letter(s) are not statistically different, SNK (á=0.05).
[2]Percentage of 18 plants (total in 6 replicates of a treatment) with a rating of 3.0 or less.

Table 3. Control of western corn rootworm with seed treatments, Bohm Farm, Eckley, CO, 2000

| PRODUCT | RATE | PLACEMENT[1] | ROOT RATING[2] | EFFICIENCY[3] |
|---|---|---|---|---|
| FORCE 3G | 4 oz | TB | 3.4 | 61 |
| COUNTER 20CR | 6 oz | TB | 3.4 | 44 |
| LORSBAN 15G | 8 oz | TB | 3.7 | 39 |
| UNTREATED | — | — | 4.0 | 39 |
| FORCE SST | 4 oz | SEED | 4.2 | 17 |
| AZTEC 2.1G | 6.7 oz | TB | 4.5 | 17 |
| F Value | | | 1.71 | — |
| p > F | | | 0.1683 | — |

[1]TB, t-band.
[2]Iowa 1-6 rootworm damage scale. Means followed by the same letter(s) are not statistically different, SNK (á=0.05).
[3]Percentage of 18 plants (total in 6 replicates of a treatment) with a rating of 3.0 or less.

## CONTROL OF WESTERN CORN ROOTWORM WITH Bt CORN ROOTWORM RESISTANT HYBRIDS AND PLANTING TIME INSECTICIDES, BAUCKE FARM, YUMA, CO, 2000

Stan Pilcher, Dave Kennedy, Assefa Gebre-Amlak Golden Plains Area Cooperative Extension; Dave Poss, Central Great Plains Research Station; Shawn Walter, Jeff Rudolph, Terri Randolph, Aaron Spriggs, Hilary Freeman Spriggs, Mary Donohue, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF WESTERN CORN ROOTWORM WITH Bt CORN ROOTWORM RESISTANT HYBRIDS AND PLANTING TIME INSECTICIDES, BAUCKE FARM, YUMA, CO, 2000**: Planting time treatments were applied on 22 May 2000. Treatments were applied with modified Wintersteiger meters mounted on a two-row John Deere Maxi-Merge planter. T-band granular applications were applied with a 4-inch John Deere spreader located between the disk openers and the press wheel. Plots were four, 25-ft rows arranged in four replicates of a randomized complete block design.

Bt hybrids with and without seed treatment were planted on 22 May 2000 at a plant population of 32,000 per acre using a Kincaid cone planting system mounted on a two-row John Deere Maxi-Merge planter. Seed treatments were used to control wireworms and seed corn maggots in the event that these insects were a problem and is not known to affect western corn rootworm larvae populations. Plots were four, 25-ft rows arranged in four replicates of a randomized complete block design.

Treatments were evaluated by digging three plants per plot on 11 July 2000. Plants were removed at three-plant intervals. The roots were washed and the damage rated on the Iowa 1-6 scale (Witkowski, J.F., D.L. Keith and Z.B. Mayo. 1982. Evaluating corn rootworm soil insecticide performance. University of Nebraska Cooperative Extension NebGuide G82-597, 2 pp.). Plot means were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05).

Western corn rootworm pressure was heavy in the study area. All Bt corn rootworm resistant hybrids and insecticide treatments had less damage than the non-Bt untreated controls. No phytotoxicity was observed with any treatment.

**Field History**

| | |
|---|---|
| Pest: | Western corn rootworm, *Diabrotica virgifera virgifera* LeConte |
| Cultivars: | Proprietary hybrids |
| Planting Date: | 22 May 2000 |
| Plant Population: | 28,500 |
| Irrigation | Sprinkler |
| Crop History: | Field corn since 1995 |
| Herbicide: | Pre - plant: Roundup 32 oz/acre |
| | Post - plant: Dual II Magnum 1.5 pt/acre |
| Insecticide: | None prior to experiment |
| Fertilization: | 150 N, 15 P, 8 S |
| Soil Type: | Haxton Sandy Loam, OM 1.1%, pH 6.5 |
| Location: | Yuma County SW ¼, Section 14, 3N 48W |

Table 1. Control of western corn rootworm, Baucke Farm, Yuma, CO, 2000

| HYBRID | EVENT | INSECTICIDE[2] | RATE | ROOT RATING[1] |
|---|---|---|---|---|
| CRW0582Z | MON 863 | — | — | 1.9 F |
| CRW0582L1 | MON 863 | SEED TREATMENT | — | 1.9 F |
| CRW0585L1 | MON 863 + YIELDGARD | SEED TREATMENT | — | 2.0 EF |
| CRW0604Z | MON 853 | — | — | 2.2 DEF |
| CRW0604L1 | MON 853 | SEED TREATMENT | — | 2.3 DEF |
| CRW0589Z | — | COUNTER 20CR | 6.0 oz | 2.9 DEF |
| CRW0589Z | — | AZTEC 2.1G | 6.7 oz | 2.8 DE |
| CRW0589Z | — | FORCE 3G | 5.0 oz | 2.9 D |
| CRW0589Z | — | LORSBAN 15G | 8.0 oz | 3.5 C |
| CRW0589Z | ISOLINE | — | — | 4.3 B |
| CTW0609Z | ISOLINE | — | — | 4.9 A |
| F Value | | | | 26.88 |
| p > F | | | | < 0.0001 |

[1]Iowa 1-6 rootworm damage scale. Means followed by the same letter(s) are not statistically different, SNK (á=0.05).
[2]Seed Treatment intended for wireworm and seed corn maggot control.

## CONTROL OF CORN SPIDER MITES IN CORN WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000

Mary Donohue, Shawn Walter, Hayley Miller, Aaron Spriggs, Hilary Freeman Spriggs, Terri Randolph, Jeff Rudolph, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF CORN SPIDER MITES IN CORN WITH HAND-APPLIED INSECTICIDES, ARDEC, FORT COLLINS, CO, 2000**: The early treatment was applied on 1 August 2000 using a 2 row boom sprayer mounted on a backpack calibrated to deliver 17.8 gal/acre at 32 psi with two 8002VS drop nozzles per row. Conditions were overcast with calm winds and air temperature of 72EF. All other treatments were applied on 8 August 2000 with the same sprayer. Conditions were clear with calm winds and air temperature of 84EF. Plots were 25 ft by two rows (30 inch centers) and were arranged in four replicates of a randomized complete block design. Plots were separated from neighboring plots by a single buffer row. Plots were infested on 13 July 2000 by laying mite infested corn leaves, which had been collected that morning in Fruita, CO, across the corn plants on which mites were to be counted. On 15 July 2000, the experimental area was treated by aircraft with Asana, 0.2 lb(AI)/acre to control beneficial insects and to encourage buildup of spider mite densities.

Treatments were evaluated by counting all mites on three leaves (ear leaf, 2nd leaf above the ear, 2nd leaf below the ear) from each of five infested plants per plot for a total of 15 leaves per plot. Precounts made on 31 July 2000 averaged 62.3 ± 14.9 mites per leaf. Mite counts and mite days (calculated by the method of Ruppel, J. Econ. Entomol. 76: 375-377) were transformed by the square root + ½ method prior to analysis of variance and means separation by the Student-Neuman-Keul method (á=0.05). Reductions in mite days were calculated by Abbott's (1925) formula: (percent reduction = ((untreated-treated)/untreated) X 100). Original mite counts at one, two and three weeks after the precounts and mite days accumulated are presented in the table.

Mite densities were high. Capture 2E + dimethoate 4E, Capture 2E + Lorsban 4E and Capture 2E treatments had fewer mites than the untreated control at 1, 2 and 3 weeks after treatment. Capture 2E + dimethoate 4E, Capture 2E + Lorsban 4E, Capture 2E, Agri-mek 0.15EC 10oz/acre and Comite II 6E + dimethoate 4E had fewer mite days than the untreated control. No phytotoxicity was observed with any treatment.

**Field History**

| | |
|---|---|
| Pest: | Banks grass mite, *Oligonychus pratensis* (Banks) |
| Cultivar: | Pioneer '38B22' |
| Planting Date: | 16 May 2000 |
| Plant Population: | 40,000 |
| Irrigation: | Linear move sprinkler with drop nozzles |
| Crop History: | Continuous corn 10 years |
| Herbicide: | Roundup Ultra, 32 oz/acre on 22 May 2000; Banvel, 1.0 pt/acre + Aatrex-Nine-O, 2.2 lb(AI)/acre + NIS, 0.25% on 6 June 2000; Accent, 1.0 oz + NIS, 0.25% on 12 June 2000; Liberty, 20 fl oz + ammonium sulfate, 3 lbs on 23 June and 18 August 2000 |
| Insecticide: | Assna at 0.2 lbs(AI)/acre on 15 July 2000 |
| Fertilization: | 150 N |
| Soil Type: | Clay, OM 1.8%, pH 7.8 |
| Location: | ARDEC, 4616 North Frontage Road, Fort Collins, CO 80524 (north side of Block 1080) |

Table 1. Control of corn spider mites with hand-applied insecticides, ARDEC, Fort Collins, CO, 2000.

| PRODUCT, LB (AI)/ACRE | MITES PER 3 LEAVES ± SEM[1] | | | TOTAL MITE DAYS | % REDUCTION[2] |
|---|---|---|---|---|---|
| | 1 WEEK | 2 WEEKS | 3 WEEKS | | |
| CAPTURE 2E + DIMETHOATE 4E, 0.08 + 0.50 | 56.3 ± 43.3 B | 2.5 ± 1.6 C | 93.5 ± 39.8 C | 3132.3 ± 350.7 B | 81 |
| CAPTURE 2E + LORSBAN 4E, 0.08 + 0.50 | 79.5 ± 52.0 B | 15.3 ± 11.9 BC | 30.8 ± 8.2 C | 3375.6 ± 664.2 B | 79 |
| CAPTURE 2E, 0.08 | 73.5 ± 54.8 B | 5.8 ± 5.0 BC | 192.8 ± 120.8 C | 4060.8 ± 989.2 B | 75 |
| AGRI-MEK 0.15EC, 10 OZ PRODUCT/ACRE | 266.3 ± 110.1 AB | 18.5 ± 5.5 BC | 199.3 ± 124.3 C | 5229.3 ± 1365.0 B | 68 |
| COMITE II 6E + DIMETHOATE 4E, 1.69 +0.50 | 394.0 ± 259.6 AB | 80.5 ± 63.4 ABC | 411.5 ± 240.4 BC | 6592.3 ± 3419.4 B | 60 |
| AGRI-MEK 0.15EC, 20 OZ PRODUCT/ACRE | 435.5 ± 113.1 AB | 159.8 ± 93.5 ABC | 150.5 ± 113.6 C | 7274.6 ± 1845.6 AB | 55 |
| COMITE II 6E, 2.53 | 273.5 ± 215.5 AB | 200.0 ± 198.3 ABC | 619.5 ± 587.7 BC | 7967.1 ± 4672.1 AB | 51 |
| COMITE II 6E, 1.69 EARLY | 466.8 ± 301.0 AB | 172.8 ± 78.8 ABC | 554.5 ± 291.1 BC | 7937.0 ± 4013.0 AB | 51 |
| FURADAN 4F + DIMETHOATE 4E, 1.00 + 0.50 | 245.3 ± 89.1 AB | 367.3 ± 176.3 ABC | 507.0 ± 154.4 BC | 9103.0 ± 2034.1 AB | 44 |
| DIMETHOATE 4E, 0.50 | 213.0 ± 45.4 AB | 421.3 ± 103.6 AB | 898.3 ± 128.5 AB | 9706.8 ± 314.8 AB | 40 |
| FURADAN 4F, 1.00 | 437.5 ± 161.3 AB | 436.8 ± 163.4 AB | 857.3 ± 213.5 AB | 11669.1 ± 2106.6 AB | 28 |
| UNTREATED | 591.8 ± 66.0 A | 585.0 ± 169.3 A | 1463.3 ± 282 A | 16282.0 ± 2088.3 A | — |
| F Value | 5.59 | 3.59 | 7.12 | 4.15 | |
| p > F | < 0.0001 | 0.0013 | < 0.0001 | 0.0004 | |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05).
[2]Percent reduction in total mite days, calculated by the Ruppel method.

**CONTROL OF SUNFLOWER STEM WEEVIL IN SUNFLOWERS WITH PLANTING AND CULTIVATION TREATMENTS, CENTRAL GREAT PLAINS RESEARCH STATION, AKRON, CO, 2000**

Mike Koch, Central Great Plains Research Station; Assefa Gebre-Amlak, Dave Kennedy, Barney Filla, Golden Plains Area Cooperative Extension; Shawn Walter, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF SUNFLOWER STEM WEEVIL IN SUNFLOWERS WITH PLANTING AND CULTIVATION TREATMENTS, CENTRAL GREAT PLAINS RESEARCH STATION, AKRON, CO, 2000**: The planting time treatment was applied on 23 May 2000 with a John Deere Maxi-Merge planter equipped with a $CO_2$ powered micro-tube directed into the seed furrow ½ inch above the seed. Cultivation treatments were applied on 10 July 2000 in a 12 inch band with a $CO_2$ powered sprayer at 17 psi with an over-whorl nozzle (11001 VS-TJ) positioned 6 inches above the whorl and mounted on an Orthman cultivator. Plots were 50 ft by two rows (30 inch centers) and arranged in four replicates of a randomized complete block design. Crop stage at cultivation application was V4 to V10. Stem weevil densities at cultivation averaged one adult per five plants.

Treatments were evaluated on 2 September 2000 by dissecting 5 plants per plot and counting the number of sunflower stem weevil larvae in the lowest 18 inches of stalk. Frost conditions forced stalks to be broken off ½ inch below the soil surface. Inspection of the broken roots showed more than 90 percent of the weevils were recovered and counted in the portion above this break. Drought caused the stalk diameter average to be 2.1 centimeters and height 118 centimeters. Weevil counts were subjected to analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05).

All treatments except Asana, 0.03 lb(AI)/acre had fewer sunflower stem weevil than the untreated control (Table 1). Cultivation and planting Furadan 4F, 1.0 treatments had fewer sunflower stem weevil than other treatments. No phytotoxicity was observed with any treatment.

**Field History**

| | |
|---|---|
| Pest: | Sunflower stem weevil, *Cylindrocopturus adspersus* (LeConte) |
| Cultivar: | Cargill SF187 oil seed |
| Planting Date: | 23 May 2000 |
| Plant Population: | 18,000 |
| Irrigation: | None |
| Crop History: | Corn in 1999 |
| Herbicide: | Sonalan 10G - 13.5 lb/acre |
| Insecticide: | None prior to experiment |
| Fertilization: | 20 N |
| Soil Type: | Weld Silt Loam and Platner Loam, OM 1%, pH 7.0 |
| Location: | USDA Central Great Plains Research Station, Akron, CO. |

Table 1. Control of sunflower stem weevil with planting and cultivation timed treatments, Central Great Plains Research Station, Akron, CO, 2000.

| PRODUCT, LB(AI)/ACRE | TIMING | LARVAE/PLANT ± SEM [1] | % CONTROL | % LODGING |
|---|---|---|---|---|
| FURADAN 4F, 1.0 | PLANTING | 1.3 ± 0.2 D | 91 | 7.3 |
| FURADAN 4F, 1.0 | CULTIVATION | 1.6 ± 0.4 D | 89 | 10.6 |
| MUSTANG 1.5E, 0.03 | CULTIVATION | 5.0 ± 0.5 C | 66 | 8.0 |
| WARRIOR 1E, 0.02 | CULTIVATION | 5.5 ± 0.4 C | 63 | 11.4 |
| WARRIOR 1E, 0.03 | CULTIVATION | 5.8 ± 0.5 C | 61 | 9.4 |
| FURADAN 4F, 0.75 | CULTIVATION | 5.8 ± 0.2 C | 61 | 7.7 |
| MUSTANG 1.5E, 0.045 | CULTIVATION | 6.4 ± 0.4 C | 57 | 12.4 |
| BAYTHROID 2E, 0.02 | CULTIVATION | 6.4 ± 0.8 C | 57 | 6.3 |
| BAYTHROID 2E, 0.03 | CULTIVATION | 7.1 ± 0.8 C | 52 | 14.2 |
| ASANA, 0.05 | CULTIVATION | 12.9 ± 0.7 B | 13 | 53.9 |
| ASANA, 0.03 | CULTIVATION | 14.8 ± 0.3 A | 1 | 55.6 |
| UNTREATED | --- | 14.9 ± 0.5 A | --- | 53.2 |
| F value | | 88.91 | | |
| p > F | | < 0.0001 | | |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05).

## CONTROL OF COLORADO POTATO BEETLE IN POTATO WITH HAND APPLIED INSECTICIDES, IRRIGATION RESEARCH FOUNDATION FARM, YUMA, CO, 2000

Assefa Gebre-Amlak, Stan Pilcher, Dave Kennedy, Golden Plains Area Cooperative Extension; Shawn Walter, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF COLORADO POTATO BEETLE IN POTATO WITH HAND APPLIED INSECTICIDES, IRRIGATION RESEARCH FOUNDATION FARM, YUMA, CO, 2000**: Treatments were applied on 12 September 2000 with a $CO_2$ powered backpack sprayer calibrated to apply 24 gal/acre at 30 psi through six 11002VS TeeJet nozzles mounted on an 8 ft boom held at 18 to 24 inches above canopy during application. Plots were 3 rows by 25 ft separated by a single buffer row arranged in four replicates of a randomized complete block design.

The field received a severe hailstorm on 20 July 2000 resulting in two potato sets with a second bloom period occurring in late August and early September. At the time of application Colorado potato beetle population consisted of 3$^{rd}$ through 5$^{th}$ instars, pupae and adults.

Treatments were evaluated by counting the number of Colorado potato beetle larvae, pupae and adults in one 10 ft row in each plot prior to and one week after treatment. Precounts averaged 13 ± 1 total Colorado potato beetles per plot. Insect counts were used for analysis of variance and mean separation by the Student-Neuman-Keul test (á=0.05).

No treatment had fewer Colorado potato beetles than the untreated control. No phytotoxicity was observed with any treatment.

**Field History**

| | |
|---|---|
| Pest: | Colorado potato beetle, *Leptinotarsa decimlineata* (Say) |
| Cultivar: | Norkotah (Selection 8) |
| Planting Date: | 17 April 2000 |
| Irrigation type: | Sprinkler |
| Crop history: | Continuous corn 5 years |
| Herbicide: | 1 May 2000, Dual II - 1.5 pt/acre + Prowl - 1.5 pt/acre; 22 June 2000, Matrix - 1.5 oz/acre + 20 oz COC/acre |
| Fungicide: | 9 July 2000, Bravo Zn - 1.0 pt/acre; 21July 2000, Quadris - 6.1 oz/acre |
| Insecticide: | None prior to experiment |
| Fertilization: | Starter - 35 gal/acre (15 N, 15 P, 0.5 S, 5 Zn)<br>Pre-plant - 434 lb/acre (46-0-0) |
| Soil Type: | Haxton Sandy Loam, OM 1.1%, pH 7.0 |
| Location: | Yuma County NW ¼ of SE ¼, Section 34, 3N 46W |

Table 1. Control of Colorado potato beetle with hand applied insecticides, Irrigation Research Foundation Farm, Yuma, CO, 2000.

| TREATMENT | COLORADO POTATO BEETLE/10FT ROW[1] |
|---|---|
| LEVERAGE 1.6F, 3.75 OZ/ACRE | 0.3 ± 0.3 A |
| BAYTHROID 2E, 1.40 OZ/ACRE | 0.3 ± 0.3 A |
| POUNCE 3.2E, 4.06 OZ/ACRE | 0.3 ± 0.3 A |
| PROVADO 1.6F, 3.75 OZ/ACRE | 1.0 ± 0.6 A |
| UNTREATED CONTROL | 2.8 ± 1.7 A |
| F Value | 1.81 |
| p > F | 0.1922 |

[1]SEM, standard error of the mean. Means in the same column followed by the same letter(s) are not statistically different, SNK (á=0.05).

## CONTROL OF COLORADO POTATO BEETLE IN POTATO WITH CHEMIGATED INSECTICIDES, IRRIGATION RESEARCH FOUNDATION FARM, YUMA, CO, 2000

Assefa Gebre-Amlak, Stan Pilcher, Dave Kennedy, Golden Plains Area Cooperative Extension; Shawn Walter, Frank Peairs, Department of Bioagricultural Sciences and Pest Management

**CONTROL OF COLORADO POTATO BEETLE IN POTATO WITH CHEMIGATED INSECTICIDES, IRRIGATION RESEARCH FOUNDATION FARM, YUMA, CO, 2000**: Treatments were applied on 5 September 2000 with a Milton Roy-Model B chemigation pump through a Valley sprinkler equipped with Nelson Lo-Flo nozzles operated at 10 psi on 52 inch drops equipped with on-off valves. Treatments were 100 ft by 350 ft and unreplicated.

The field received a severe hailstorm on 20 July 2000 resulting in two potato sets with a second bloom period occurring in late August and early September. At the time of application Colorado potato beetle population consisted of 3rd through 5th instars, pupae and adults.

Treatments were evaluated by counting the number of Colorado potato beetle larvae, pupae and adults in four, 10 ft rows in each plot prior to and one week after treatment. Precounts averaged 15 ± 3 total Colorado potato beetles per plot. Insect counts in treated plots were compared to the untreated control with a two-tailed t-test with assumed equal variance (á=0.05).

Actara 25WG, 3.00 oz/acre and Fulfill 50WG had fewer Colorado potato beetles than the untreated control (Table 1). No phytotoxicity was observed with any treatment.

**Field History**

| | |
|---|---|
| Pest: | Colorado potato beetle, *Leptinotarsa decimlineata* (Say) |
| Cultivar: | Norkotah (Selection 8) |
| Planting Date: | 17 April 2000 |
| Planting Rate: | 2200 lb/acre |
| Irrigation type: | Sprinkler |
| Nozzles: | Nelson Lo-Flo # D-3000 on 52 inch drops |
| Crop history: | Continuous corn 5 years |
| Herbicide: | 1 May 2000, Dual II - 1.5 pt/acre + Prowl 1.5 pt/acre; 22 June 2000, Matrix - 1.5 oz/acre + 20 oz COC/acre |
| Fungicide: | 9 July 2000, Bravo Zn - 1.0 pt/acre<br>21 July 2000, Quadris - 6.1 oz/acre |
| Insecticide: | None prior to experiment |
| Fertilization: | Starter - 35 gal/acre (15 N, 15 P, 0.5 S, 5 Zn)<br>Preplant - 434 lb/acre (46-0-0) |
| Soil Type: | Haxton Sandy Loam, OM 1.1%, pH 7.0 |
| Location: | Yuma County NW ¼ of SE ¼, Section 34, 3N 46W |

Table 1. Control of Colorado potato beetle with chemigated insecticides, Irrigation Research Foundation Farm, Yuma, CO, 2000.

| TREATMENT | COLORADO POTATO BEETLE/4-10FT ROWS[1] |
|---|---|
| FULFILL 50WG, 2.75 OZ/ACRE | 1.0 (0.0086) |
| ACTARA 25WG, 3.00 OZ/ACRE | 1.2 (0.0188) |
| ACTARA 25WG, 1.50 OZ/ACRE | 6.7 (0.4123) |
| UNTREATED CONTROL | 6.2 |

[1]Number in parenthesis indicates probability of mean being similar to the untreated control, calculated with a two-tailed t-test with assumed equal variance (á=0.05).

## THE 2000 GOLDEN PLAINS PEST SURVEY PROGRAM

The Golden Plains Pest Survey Program monitors economically significant insects in the Golden Plains Area through field scouting and the use of light and pheromone traps. It is sponsored solely through donations by area growers and other members of the agriculture industry. Scouting-based integrated pest management information is provided weekly to subscribers through newsletters, news releases to 24 area newspapers, radio broadcasts (The What's Bugging You Report) on 5 local radio stations, the Farm Dayta/DTN Network and the World Wide Web. This year's Golden Plains Pest Survey Program was coordinated by Barney Filla, Soil and Crop Sciences student attending Colorado State University.

We would like to thank the following individuals for their support and dedication to making this year's pest survey a success:

| **2000 Light Trap Operators** | | **2000 Pest Survey Committee** | |
|---|---|---|---|
| Bonny Dam | Bill Cody Jr. and Family | Allan Brax | Mike Fecht |
| Burlington | Stratton Equity COOP | Bill Brown | Merlin Van Deraa |
| Eckley | Merle and Hazel Gardner | Frank Peairs | Mike Ferrari |
| Holyoke | Scott Korte | Jack Rhodes | John Kreidler |
| Kirk | Gene Nelson | Dave Green | Ron Meyer |
| Wauneta | Clark Lenz | Gene Kleve | Randy Haarberg |
| Wray | Gleason Dryden | | |
| Yuma | Irrigated Research Farm | | |

**Contributors to the 2000 Golden Plains Pest Survey Program**

| | |
|---|---|
| **Akron:** | Birdsall Young, Jr., Lyle A. Foutz, Earl Jesse, Glenn Baker, Robert L. Schenk, Vale Blessing, John Hickert, Rob Pachner, Charles Callahan, John Wright, (Akron Flying Service Inc.), Gary and Shirley Brandt, Birdsall Young, Jr., Earl Jesse, John Hickert, Hickert Land Company, Glen Baker |
| **Anton:** | Chester Kenney (Anton Co-op Assn.), Newell A. Herron |
| **Amherst:** | Jim Tomky |
| **Arapahoe:** | Pat Hornung |
| **Arriba:** | Darrel Lehrkamp (Tri-Me Spraying Service) |
| **Atwood:** | Kevin Blome (Agrevo USA CO.) |
| **Aurora:** | Todd Frazier (American Cyanamid), Cris Wagner (American Cyanamid) |
| **Bayard, NE:** | Larry Kildow |
| **Benkelman, NE:** | Doran Jessee (D & D Jessee Farm, Inc.) |
| **Bethune:** | Ken Hildenbrandt (Warrior Aviation), Jack Lowe |
| **Brush:** | David Wagers |
| **Burlington:** | Dan Slinger (Stratton Equity Coop), Schutte Farms, Louis Nider (Nider Farms), Bill D. Hinkhouse, Dale Hansen, Larry Feldhousen, Gerald Cody, William Cody, Kane Cody, Jeff Nitsch (Servi-Tech), Berry Hinkhouse, Carlyle James (C & C James Ranch, Inc.), John Mauch (Wilcox Oil & Chemical, Inc.), Clayton Smith, Gary Mulch, Mulch Farms, Ryan Weaver, Clay Smith (High Plains Ag Service, Inc.), Allen Schulte, Schulte Farms |
| **Bushnell, NE:** | Bill Booker (Mycogen Seeds) |
| **Colby, KS:** | Chad Fabrizius (American Cyanamid), Darren Rubottom (American Cyanamid) |
| **Columbus, NE:** | Gary Schaneman (FMC Corporation) |
| **Cope:** | Ed Cecil (Cecil Ranch), Jim Cecil, Sackett's Inc |
| **Dalton, NE:** | Ted, Kyle and Kathy Watachorn |
| **Des Moines, IA:** | Asgrow Seed Co. |
| **Eckley:** | Ted Tuell (Tuellland Inc.), Max Schafer, Merle & Hazel Gardner (Spittoon Ranch), Kathy Wenger |
| **Elsie, NE:** | Don Langmacher, Dick Leonard |
| **Enders, NE:** | Terry Bilka |
| **Flagler:** | Leroy Loutzenhiser, Dallas Saffer (Flagler Aerial Spraying Inc), E. Leroy Loutzenhiser (LKF Partnership), Rex Loutzenhiser, Randy & Linda Loutzenhiser (RLF Partnerships), Wes Pollart, Flaglers Farmers Co-op |
| **Fleming:** | Jim Atkin (Atkin Seed) |
| **Fort Collins:** | Jim Ed Beach, CCA (Rhone Poulenc), Larry Schild (American Cyanamid), Kelly Darland |

**Fort Morgan:** Tim Carpenter (Centennial Ag Supply), Leland Brockman (Novartis Crop Protection), James O'Bannon (Helena Chemical)

**Gering, NE:** Tim Wolf.

**Goodland, KS:** Bill Shields (Pueblo Chemical & Supply Co.)

**Grand Junction:** Grand Valley Hybrids, Inc

**Grant, NE:** Mark McGreer, Clinton Fuchs (Golden Harvest), Larry Appel. M.S., Appel Crop Consulting, Inc

**Greeley:** Calvin Nolke (Bayer, Inc.), Tom Farris (Pueblo Chemical & Supply Co.), Bob Leisy (Asgrow), James E. Anderson (Bayer, Inc), Calvin Heimbauch, Bob Zellmer (Colorado Farm Network), Bill Curran

**Haigler, NE:** Jerry Olsen (Dundy Ag Service, Inc)

**Haxtun:** Dennis Eckman, Dave Green (Servi-Tech), Garretson Inc., Larry McConnell (Pioneer Seeds), Larry Anderson (Zion Farms), Ken Kurtzer (Kurtzer Grain & Landscaping), Jared Anderson (Servi-Tech), Dick Fryrear (Triumph Seed), Steve Firme, Quentin and Brian Biesemeier, Grainland Coop, Dora Gregory, Gregory Ag Consulting, LLC, Lauren Heermann

**Hays Springs, NE:** Steve Sandberg

**Hemingford, NE:** Dave Engel

**Holyoke:** Elwin Poe (E. Poe Farms), Mike Einspahr, Lenz Farms, KBC Trading and Processing, Jack Rhodes, Shawn Dalton, Erik Vieselmeyer (American Cyanamid), Allen and Amy Einspahr, Gary and Angie Korte, Raymond Korte, Holyoke Coop Association, Dale Haynes (Haynes Cattle Co), Mike Einspahr, Gale Haynes (Haynes Cattle Co.)

**Idalia:** Larry Allen (Allen Grain), Ken Penzing

**Imperial, NE:** Rod Johnson (R-Nette Inc.), David Kempks (Southwest Scouting Service), Bob Rogers, Agrow, Inc

**Indianola, NE:** Stan Stockhaus (Mycogen Seeds)

**Joes:** Elden Hill, Randy Haarberg (Haarberg Consulting, Inc.), Kenneth Schneider, Richard Schneider (Schneider Farms Inc,)

**Julesburg:** Steve Gerk, Ken Hodges, Jr., Gary Lancaster (Sedgwick County Extension), Bruce Holcomb

**Kearney, NE:** Ted Warfield (FMC Corporation)

**Kimball, NE:** Jack Cochran

**Kirk:** Darrell Idler (Idler Brothers), James Idler (Idler Brothers), Eugene & Frank Nelson, Ervin Frank (Frank Farms), Todd Frank (Frank & Nelson), Kent Ficken, Lesley C. Lewis

**Lamar, NE:** Kent Miller, (Kee-Nan Farms)

**Limon:** Don Wardlaw (American Cyanamid)

**Lincoln, NE:** Pioneer Hi-Bred International Inc

**Lodgepole, NE:** Mike Behrends

| | |
|---|---|
| **Longmont:** | Lyle Fagala (Zeneca Ag Products), Paul Joe Ogg (American Cyanamid Co), Warren Smith (Mycogen Seeds) |
| **Loveland:** | John Person (FMC), Claude Ross (FMC), Scott Inman (Elf Atochem No. America, Inc.), Paul H. Koehler (Garst Seed Co.), Ken Schwalm (Grand Valley Hybirds) |
| **McDonald, KS:** | C.W. Antholz |
| **Melbeta, NE:** | Don Dillman |
| **Monument:** | John T. Doyle (Rhone Poulenc) |
| **Morrill, NE:** | Gordon Strauch, Jerry Dillman |
| **North Platte, NE:** | Mike Sughroue (American Cyanamid), Corby Jensen (Monsanto Globe Seed Group), Jerry Nelson (American Cyanamid), Matt Hasenauer |
| **Ogallala, NE:** | David DeVries (Platte Valley Crop Consulting), Allan Brax, Guy Jones |
| **Otis:** | Steve Perry, Gene Perry, Perry Bros. Seed, Ken Kuntz, Ken Melendy, Richard Lewton (Lewton Farms), Harlan & Donita Schaffert, Calvin Schaffert, Schaffert Farms |
| **Ovid:** | Rick Haynes |
| **Scottsbluff, NE:** | Bill Rexus |
| **Sterling:** | Darrel W. Mertens (Aero Applicators, Inc.), Frank Molinaro (Ag. Crop Services) |
| **Stratton:** | Timothy and Gary Pautler, Mike Livingston, Stratton Equity Co-op, Bryon Foose, Cop Quest, The 1st National Bank of Stratton |
| **Torrington, WY:** | Steven Nighswonger (American Cyanamid) |
| **Vernon:** | Duaine and Wanda Dodsworth |
| **Wheatland, WY:** | Dan Melcher |
| **Woodrow:** | Arven Vondy (Vondy Ranch) |
| **Wray:** | Lance Russell (Asgrow), Dick Yearous (Simplot Soilbuilders), KRDZ, Jim Soehner, Dennis Atwell, Dwight and Nancy Rockwell, Alan Welp (Welp Farms), Marc Cartwright (Servi-Tech), Jim Bowman, Dave Wilson (Stalk, Inc), Durad and Darus Fix (D & D Farms), John Kreidler (Ag Aviation, Inc.), Robert L. Sitzman (Slash Diamond Farms, LLC), Daryl Monasmith, Larry Gardner (Covenant Farms), Kyle Domsh, Eldon and Sue Dryden, Gleason Dryden, Will Moyer (Centennial Ag Supply Co.), Phil Osmus, Greg Skoglund (Ag Aviation, Inc.), Dean Larson, Wray Feed and Bean Co, Don & Peggy Brown, David DiPippo, Great Plains Cooperative |
| **Yuma:** | Merlin S. Van Deraa (Terra Firma Ag Consulting), Jerry McPherson (Ag. Service, Inc.), Mike Ferrari (Servi-Tech), Brett Mermis (Servi-Tech), Carroll D. Josh, Stephen Monk, Jennie Brown, Kevin Koenig (Koenig Inc.), James Lengel, Craig Michael, (Aero Spray), Gary Newton (Agri-Inject, Inc), Farm Credit of Yuma, J. R. Unger, Scott Wall |

## SUMMARY OF 2000 LIGHT AND SUCTION TRAP CATCHES

The following graphs compare the 2000 European corn borer and western bean cutworm moth flights with the historical average moth flight (including 2000) by geographic location. Geographic location is defined as a 10 square mile area. The number of years contributing to the historical average ranges between 5 and 14.

**European Corn Borer Moth Flight**

First generation moth flight began at the end of May and peaked the second week of June.  Second generation flight peaked between 8 and 15 August.  There were some differences between years and locations in terms of moth population.

Light trap locations were grouped as high, intermediate and low moth activity.  High moth populations were noted in Eckley, Holyoke, Kirk and Wauneta.  Bonny Dam and Wray had intermediate moth populations.  Burlington and Yuma had low populations of corn borer moth.

**Western Bean Cutworm**

Western bean cutworm moth flight activity began the first week of July and peaked between 11 and 18 July in most locations.  Al light trap locations had high populations of western bean cutworm moths.

**Note that the y-axis scale changes from graph to graph (number of moths caught per week).**

Table 1. Russian wheat aphid suction trap results at four Colorado locations, 1987-2000.

| | AKRON | BRIGGSDALE[1] | FRUITA | WALSH |
|---|---|---|---|---|
| 1987 | — | 1832 | — | 392 |
| 1988 | 172 | 92 | 2132 | 4636 |
| 1989 | 177 | 102 | 2497 | 5003 |
| 1990 | 1234 | 1353 | 2318 | 1275 |
| 1991 | 79 | 1679 | 1054 | 883 |
| 1992 | 186 | 1685 | 1032 | 789 |
| 1993 | 7 | 2 | 336 | 374 |
| 1994 | 496 | 867 | 327 | 3216 |
| 1995 | 73 | 322 | 224 | 361 |
| 1996 | 66 | 502 | 1064 | — |
| 1997 | 301 | 216 | 648 | 2501 |
| 1998 | 36 | 550 | 1330 | 31 |
| 1999 | 1257 | 573 | 508 | 257 |
| 2000 | 121 | 430 | — | 140 |

[1]Trap moved to ARDEC (Agricultural Research, Development and Education Center, Colorado State University, Fort Collins, CO) from Briggsdale in 1990. Trap moved back to Briggsdale in 1999.

## INSECTICIDE PERFORMANCE SUMMARIES

Insecticide performance in a single experiment can be quite misleading. To aid in the interpretation of the tests included in this report, long term performance summaries for insecticides registered for use in Colorado are presented below. These summaries are complete through 2000.

Table 1. Performance of planting-time insecticides against western corn rootworm, 1987-2000, in northern Colorado

| INSECTICIDE | IOWA 1-6 ROOT RATING[1] |
|---|---|
| AZTEC 2.1G | 2.6 (21) |
| COUNTER 15G | 2.6 (25) |
| COUNTER 20CR | 2.6 (34) |
| DYFONATE 20G | 2.8 (12) |
| FORCE 1.5G (8 OZ) or 3G (4 OZ) | 2.7 (24) |
| FORTRESS 5G | 2.8 (14) |
| LORSBAN 15G | 3.1 (18) |
| REGENT 4SC, 3-5 GPA | 3.0(5) |
| THIMET 20G | 3.4 (15) |
| UNTREATED CONTROL | 4.2 (24) |

[1]Rated on a scale of 1-6, where 1 is least damaged, and 6 is most heavily damaged. Number in parenthesis is number of times tested for average. Planting time treatments averaged over application methods.

Table 2. Performance of cultivation insecticide treatments against western corn rootworm, 1987-2000, in northern Colorado.

| INSECTICIDE | IOWA 1-6 ROOT RATING[1] |
|---|---|
| COUNTER 15G | 2.7 (16) |
| DYFONATE 20G | 3.1 (9) |
| FORCE 1.5G or 3G | 3.2 (7) |
| FURADAN 4F, 2.4 OZ, BANDED OVER WHORL | 3.2 (12) |
| FURADAN 4F, 1.0, INCORPORATED | 3.3 (3) |
| LORSBAN 15G | 3.2 (12) |
| THIMET 20G | 2.9 (16) |
| UNTREATED CONTROL | 4.4 (20) |

[1]Rated on a scale of 1-6, where 1 is least damaged, and 6 is most heavily damaged. Number in () is number of times tested for average. Planting time treatments averaged over application methods.

Table 3. Insecticide performance against first generation European corn borer, 1982-2000, in northeast Colorado.

| MATERIAL | LB/ACRE | METHOD[1] | % CONTROL[2] |
|---|---|---|---|
| DIPEL 10G | 10.00 | A | 66 (4) |
| DIPEL 10G | 10.00 | C | 84 (2) |
| DIPEL ES | 1 QT + OIL | I | 91 (4) |
| LORSBAN 15G | 1.00 (AI) | A | 77 (5) |
| LORSBAN 15G | 1.00 (AI) | C | 80 (6) |
| LORSBAN 4E | 1.0 (AI) | I | 87 (9) |
| POUNCE 3.2E | 0.15 (AI) | I | 88 (11) |
| POUNCE 1.5G | 0.15 (AI) | C | 87 (4) |
| POUNCE 1.5G | 0.15 (AI) | A | 73 (7) |
| THIMET 20G | 1.00 (AI) | C | 77 (4) |
| THIMET 20G | 1.00 (AI) | A | 73 (3) |
| WARRIOR 1E | 0.03 (AI | I | 85 (4) |

[1]A = Aerial, C = Cultivator, I = Center Pivot Injection. CSU does not recommend the use of aerially-applied liquids for control of first generation European corn borer.
[2]Numbers in () indicate that percent control is the average of that many trials.

Table 4. Insecticide performance against western bean cutworm, 1982-2000, in northeast Colorado.

| MATERIAL | LB (AI)/ACRE | METHOD[1] | % CONTROL[2] |
|---|---|---|---|
| AMBUSH 2E | 0.05 | A | 99 (2) |
| AMBUSH 2E | 0.05 | I | 99 (2) |
| CAPTURE 2E | 0.08 | A | 98 (5) |
| CAPTURE 2E | 0.08 | I | 98 (5) |
| LORSBAN 4E | 0.75 | A | 88 (4) |
| LORSBAN 4E | 0.75 | I | 94 (4) |
| POUNCE 3.2E | 0.05 | A | 97 (7) |
| POUNCE 3.2E | 0.05 | I | 99 (5) |
| WARRIOR 1E (T) | 0.02 | I | 96 (2) |

[1]A = Aerial, I = Center Pivot Injection
[2]Numbers in () indicated that percent control is average of that many trials.

Table 5. Insecticide performance against second generation European corn borer, 1982-2000, in northeast Colorado.

| MATERIAL | LB (AI)/ACRE | METHOD[1] | % CONTROL[2] |
|---|---|---|---|
| DIPEL ES | 1 QT PRODUCT | I | 56 (16) |
| CAPTURE 2E | 0.08 | A | 85 (8) |
| CAPTURE 2E | 0.08 | I | 86 (14) |
| FURADAN 4F | 1.00 | A | 62 (6) |
| LORSBAN 4E | 1.00 | A | 41 (6) |
| LORSBAN 4E | 1.00 + OIL | I | 72 (14) |
| PENNCAP M | 1.00 | A | 74 (7) |
| PENNCAP M | 1.00 | I | 74 (8) |
| POUNCE 3.2E | 0.15 | I | 74 (11) |
| WARRIOR 1E | 0.03 | A | 81 (4) |
| WARRIOR 1E | 0.03 | I | 78 (4) |

[1]A = Aerial, I = Center Pivot Injection
[2]Numbers in () indicate how many trials are averaged.

Table 6. Performance of hand-applied insecticides against alfalfa weevil larvae, 1984-2000, in northern Colorado.

| PRODUCT | LB (AI)/ACRE | % CONTROL AT 2 WK[1] |
|---|---|---|
| BAYTHROID 2E | 0.025 | 96 (7) |
| FURADAN 4F | 0.25 | 86 (11) |
| FURADAN 4F | 0.50 | 91 (20) |
| LORSBAN 4E | 0.75 | 93 (14) |
| LORSBAN 4E | 1.00 | 96 (6) |
| LORSBAN 4E | 0.50 | 83 (10) |
| PENNCAP M | 0.75 | 84 (11) |
| PERMETHRIN [2] | 0.10 | 67 (7) |
| PERMETHRIN [2] | 0.20 | 80 (4) |
| WARRIOR 1E | 0.02 | 97 (11) |

[1]Number in () indicates number of years included in average.
[2]Includes both Ambush 2E and Pounce 3.2E.

Table 7. Control of Russian wheat aphid with hand-applied insecticides in winter wheat, 1986-2000[1].

| PRODUCT | LB (AI)/ACRE | TESTS WITH > 90% CONTROL | TOTAL TESTS | % TESTS |
|---|---|---|---|---|
| LORSBAN 4E | 0.50 | 20 | 37 | 54 |
| DI-SYSTON 8E | 0.75 | 14 | 39 | 36 |
| DIMETHOATE 4E | 0.375 | 6 | 31 | 19 |
| DI-SYSTON 8E | 0.50 | 2 | 10 | 20 |
| PENNCAP M | 0.75 | 3 | 19 | 16 |
| LORSBAN 4E | 0.25 | 4 | 18 | 22 |
| THIODAN 3E | 0.50 | 1 | 4 | 25 |
| WARRIOR 1E | 0.03 | 1 | 11 | 9 |

[1]Includes data from several states.

Table 8. Control of spider mites in artificially-infested corn with hand-applied insecticides, ARDEC, 1993-2000.

| PRODUCT | LB (AI)/ACRE | % REDUCTION IN TOTAL MITE DAYS[1] |
|---|---|---|
| CAPTURE 2E | 0.08 | 60 (8) |
| CAPTURE 2E + DIMETHOATE | 0.08 + 0.50 | 70 (8) |
| CAPTURE 2E + FURADAN 4F | 0.08 + 0.50 | 66 (4) |
| COMITE II | 1.64 | 27 (8) |
| COMITE II | 2.53 | 56 (3) |
| COMITE II + DIMETHOATE 4E | 1.64 + 0.50 | 61 (5) |
| DIMETHOATE 4E | 0.50 | 55 (8) |
| FURADAN 4F | 1.00 | 44 (8) |
| FURADAN 4F + DIMETHOATE | 1.00 + 0.50 | 58 (3) |

[1]Number in () indicates number of tests represented in average.

Table 9. Control of sunflower stem weevil with planting and cultivation treatments, USDA Central Great Plains Research Station, 1998-2000.

| PRODUCT | LB (AI)/ACRE | TIMING | % CONTROL[1] |
|---|---|---|---|
| BAYTHROID 2E | 0.02 | CULTIVATION | 57 (3) |
| BAYTHROID 2E | 0.03 | CULTIVATION | 52 (3) |
| FURADAN 4F | 0.75 | CULTIVATION | 61 (3) |
| FURADAN 4F | 1.0 | PLANTING | 91 (3) |
| FURADAN 4F | 1.0 | CULTIVATION | 83 (3) |
| WARRIOR 1E | 0.02 | CULTIVATION | 63 (3) |
| WARRIOR 1E | 0.03 | CULTIVATION | 61 (3) |

[1]Number in () indicates number of tests represented in average.

**ACKNOWLEDGMENTS**

2000 TEST PLOT COOPERATORS

| | | |
|---|---|---|
| ALFALFA | ARDEC | Fort Collins |
| | Glen and Lyle Murray | Brighton |
| BARLEY | Allen Matsuda | Berthoud |
| | ARDEC | Fort Collins |
| BEANS | Clark Lenz | Wray |
| CORN | ARDEC | Fort Collins |
| | Dennis Bauke | Yuma |
| | Richard Bohm | Eckley |
| | Debbie Nichols-Irrigation Research Farm | Yuma |
| SUNFLOWER | USDA Central Great Plains Research Station | Akron |
| WHEAT | ARDEC | Fort Collins |

TEST PLOT ASSISTANCE

ARDEC, Reg Koll, Chris Fryrear, Pat Buckwalter Fort Collins

EQUIPMENT MANUFACTURERS

ARDEC, Edward Reynolds Fort Collins

## PRODUCT INDEX

PENNCAP M
Manufacturer: Elf Atochem
EPA Registration Number: 4581-292
Active ingredient(s) (common name): methyl parathion . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 1, 2, 7-9, 40, 41

POUNCE 3.2EC
Manufacturer: FMC
EPA Registration Number: 279-3014
Active ingredient(s) (common name): permethrin . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 22, 39, 40

PROVADO 1.6F
Manufacturer: Bayer
EPA Registration Number: 3125-457
Active ingredient(s) (common name): imidacloprid . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 22

REGENT 4SC
Manufacturer: Rhone Poulenc
EPA Registration Number: 264-582
Active ingredient(s) (common name): fipronil . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 15, 38

SEVIN XLR
Manufacturer: Rhone Poulenoc
EPA Registration Number: 264-333
Active ingredient(s) (common name): carbaryl . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 13

STEWARD
Manufacturer: Dupont
EPA Registration Number: 352-598
Active ingredient(s) (common name): indoxacarb . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7-9

THIMET 20G
Manufacturer: American Cyanamid
EPA Registration Number: 241-257
Active ingredient(s) (common name): phorate . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 15, 38, 39

THIODAN 3EC
Manufacturer: FMC
EPA Registration Number: 279-2924
Active ingredient(s) (common name): endosulfan . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 13, 41

WARRIOR 1E
Manufacturer: Zeneca
EPA Registration Number: 10182-96
Active ingredient(s) (common name): lambda-cyhalothrin . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 7-9, 21, 39-42

WARRIOR T
Manufacturer: Zeneca
EPA Registration Number: 10182-434
Active ingredient(s) (common name): lambda-cyhalothrin . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 1, 2, 4