EVALUATION OF FURY FOR CONTROLLING FOLIAR INSECT PESTS ON LEAFY GREENS, OKLAHOMA, 2001:

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Collard seeds were planted 11 May at the Wes Watkins AREC, Lane, OK. The experimental design was a randomized complete block with five treatments and five replicate blocks with plots on 6-ft row spacing and two rows of plants 10 inches apart in each plot, 15 ft long and with 15-ft alleys between plots. Plots were treated on 5, 13 and 18 Jul using a tractor-mounted sprayer with three hollow-cone nozzles per row, one directed over the row and one on each side of the row on drops directed at an angle to direct the spray up and into the plant canopy. The sprayer was operated at 40 psi and delivered 20 gpa. Three plants per plot were examined approximately four days after each treatment and number of green peach aphid (GPA) and cabbage looper (CL) larvae recorded. Plant damage was determined on 17 Jul by examining the terminal five leaves on three plants per plot for evidence of feeding by caterpillars and grasshoppers as evidenced by chewing type holes in leaves. The total number of leaves with chewing type feeding damage was recorded. Data were summarized and analyzed using ANOVA and treatment effects were compared using a LSD test for data for each variable with data summed across survey dates.

GPA and CL larvae were moderately abundant. Each insecticide or insecticide combination provided significant reductions in CL densities in comparison to densities in the untreated plots. Applications of Capture significantly reduced GPA densities in comparison to the untreated plots. Each treatment with the exception of Lepinox alone resulted in significant reductions in numbers of leaves with feeding damage. Lepinox has specific activity for lepidoptera species and was not expected to control grasshoppers that caused a portion of the leaf feeding damage. However, Fury and Capture are both broad spectrum activity pyrethroid insecticides with activity against lepidoptera and grasshoppers and therefore were expected to provide control of both types of leaf feeding pests. Applications of Fury and Capture did result in significant reductions in leaf damage due to leaf chewing insects.

Treatment	Rate	GPA[1]	CL[1]	Damaged leaves[2]
Fury	0.5 lb ai / acre	42 bc	0.5 b	0.4 b
Fury + Lepinox	0.5 lb ai/acre + 1.0 lb / acre	26 bc	0.5 b	0.6 b
Capture	0.01 lb ai/acre	3 c	0.3 b	0.2 b
Lepinox	1.0 lb / acre	269 a	0.9 b	2.7 a
untreated	-	131 b	2.4 a	2.3 a

1 Mean number per 3 plants per survey date.
2 Mean number of damaged leaves / 5 leaves per plant.
Numbers in a column followed by different lower case letters are significantly different (LSD, P=0.1).

EVALUATION OF NOVALURON FOR CONTROLLING INSECT PESTS ON LEAFY GREENS, OKLAHOMA, 2001

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Cabbage lopper (CL): *Trichoplusia ni* (Hubner).
Grasshoppers: unknown species

Collard seeds were planted 11 May at the Wes Watkins AREC, Lane, OK. The experimental design was a randomized complete block with 10 treatments and five replicate blocks with plots 6-ft wide and two rows of plants 3-ft apart in each plot. Plots were 15 ft long with 15-ft alleys between plots. Plots were treated on 5, 13 and 18 Jul using a tractor-mounted sprayer with three hollow-cone nozzles per row, one directed over the row and one on each side of the row on drops directed at an angle to direct the spray up and into the plant canopy. The sprayer was operated at 40 psi and delivered 20 gpa. Three plants per plot were examined approximately 4-5 days after each treatment and number of CL larvae recorded. Plant damage was determined on 17 Jul by examining the terminal 5 leaves on three plants per plot for evidence of feeding by caterpillars and grasshoppers as evidenced by chewing type holes in leaves. The total number of leaves with chewing type feeding damage was recorded. Data were summarized and analysed using ANOVA and treatment effects compared using a LSD test for data for each variable on individual survey dates with data summed across survey dates.

CL pressure was moderate throughout the evaluation period. Novaluron at the two higher rates, Intrepid, Avaunt, Proclaim and Warrior applications resulted in significantly reduced abundance of CL after a single application as indicated by surveys on 10 Jul. Each insecticide application resulted in reduced densities of CL after the second application as indicated by surveys on 17 Jul. Population densities of CL were in decline in the untreated plots on 24 Jul and applications of Novaluron and Intrepid resulted in significantly reduced abundance of CL. When data for density of CL was summed across dates results indicated that each of the insecticides provided significant reductions in CL abundance through the season. Counts of damaged leaves indicated that each insecticide resulted in reductions in number of damaged leaves in comparison to the untreated plots. The two high rates of Novaluron and Proclaim resulted in significantly reduced numbers of damaged leaves in comparison to the low rates of Novaluron, Intrepid and Avaunt. Leaf damage resulted from feeding by CL and grasshoppers and thus indications are that the higher rates of Novaluron and Proclaim in contrast to Intrepid and Avaunt resulted in reductions in grasshopper feeding in addition to controlling CL.

Cabbage looper larvae / 3 plants

Treatment	Rate (lb ai/acre	10 July	17 July	24 July	Ave. across dates	Damaged leaves
Novaluron	0.023	4.0 a	0.8 c	0.4 b	1.7 b	2.3 b
Novaluron	0.045	2.6 abc	2.4 b	0.8 ab	1.9 b	2.3 b
Novaluron	0.068	1.0 cd	1.2 bc	0.6 b	0.9 bc	0.3 f
Novaluron	0.081	1.6 bcd	1.2 bc	0.8 ab	1.2 bc	1.2 de
Intrepid	0.15	0.6 cd	0.6 c	0.0 b	0.4 c	1.8 bcd
Confirm	0.12	1.8 abcd	1.2 bc	1.4 ab	1.5 bc	1.3 cde
Avaunt	0.065	1.0 cd	0.8 c	1.0 ab	0.9 bc	2.1 bc
Proclaim	0.1	0.0 d	1.0 bc	0.8 ab	0.6 c	0.9 ef
Warrior	0.03	0.8 cd	2.4 b	1.0 ab	1.4 bc	1.4 cde
Untreated	--	3.8 a	5.4 a	2.2 a	3.8 a	3.1 a

Means in a column followed by the same lower case letter are not significantly different, LSD, P=0.1.
Results expressed as mean number of CL / 3 plants and number of damaged leaves / 5 terminal leaves per plant.

INSECTIDE EFFICACY FOR CONTROLLING INSECTS ON LEAFY GREENS, OKLAHOMA, 2001

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Green peach aphid (GPA); *Myzus persicae* (Sulzer)
Cabbage lopper (CL); *Trichoplusia ni* (Hubner).
Grasshoppers: unknown species

Collard seeds were planted 11 May at the Wes Watkins AREC, Lane, OK. The experimental design was a randomized complete block with six treatments and five replicate blocks with plots on 6-ft row spacing and two rows of plants 10 inches apart in each plot, 15 ft long and with 15-ft alleys between plots. Plots were treated on 5, 13 and 18 Jul using a tractor-mounted sprayer with three hollow-cone nozzles per row, one directed over the row and one on each side of the row on drops directed at an angle to direct the spray up and into the plant canopy. The sprayer was operated at 40 psi and delivered 20 gpa. Three plants per plot were examined approximately four days after each treatment and number of GPA and CL larvae recorded. Plant damage was determined on 17 Jul by examining the terminal five leaves on three plants per plot for evidence of feeding by caterpillars and grasshoppers as evidenced by chewing type holes in leaves. The total number of leaves with chewing type feeding damage was recorded. Data were summarized and analyzed using ANOVA and treatment effects compared using a LSD test for data for each variable with data summed across survey dates.

GPA were moderately abundant throughout the evaluation period. Each of the insecticide applications with the exception of Baythroid provided significant reductions in GPA density in comparison to the untreated plots. Leverage is a mixture of Baythroid and imidacloprid and provided similar reductions of GPA as imidacloprid alone. Thiamethoxam, acetameprid and imidacloprid belong to the neonicotinoid insectidide group and when applied as foliar sprays provided similar control of GPA as measured by reductions in density in comparison to the untreated plots. Baythroid and Leverage applications resulted in reduced damage to leaves in comparison to each of the other insecticide application treatments and the untreated plots. This reduction was probably due to the activity of the pyrethroid insecticide, Baythroid, in controlling CL and grasshoppers that caused the chewing feeding type damage to leaves.

Treatment	Rate	GPA[1]	Damaged leaves [2]
Untreated	--	126 a	3.0 b
Thiamethoxam	0.05 lb ai / acre	23 bc	3.7 ab
Acetameprid	0.1 lb ai / acre	1 c	3.1 b
Imidacloprid	0.06 lb ai / acre	3 bc	4.1 a
Baythroid	0.044 lb ai / acre	101 ab	1.0 d
Leverage	3.75 fl oz / acre	11 bc	1.9 c

Means in a column followed by different lower case letters are significantly different, LSD, P=0.1.
1 Mean number of GPA per three plants averaged across survey dates.
2 Mean number of damaged leaves from terminal five leaves per plant on 17 Jul.

CONTROLLING CORN EARWORM WITH B.t. TRANSGENIC SWEET CORN, OKLAHOMA, 2001

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Corn Earworm (CEW); *Helicoverpa zea* (Boddie)

Two isogenic lines of sweet corn, one containing a B.t. event and the other without, were planted to a field at the Wes Watkins AREC, Lane, OK on 2 May. Rows were set at 36 inch intervals and seed planted at six inch intervals with a Monosem precision planter. The experimental design was a randomized complete block with 2 treatments and 5 replicate blocks. Plots were two rows wide by 200 ft long. Plots were separated by 12 ft alleys. Twenty-five ears of corn were removed from each plot at the kernel 'milk' stage and evaluated for CEW presence and damage. Number of CEW per ear, presence of tip feeding on the ear and rating of the extent of damage on each ear were recorded. Data were summarized and analyzed using ANOVA and a LSD test to make comparisons between treatments.

The Rogers CSS 0966 with the CryIA(b) delta endotoxin event had significantly fewer damaged ears of corn with signficantly fewer CEW present in the ears. The isogenic Rogers line without the B.t. event had an average of 0.9 CEW per ear and thus would have been non-marketable without the use of insecticide applications to control the CEW. Planting CSS 0966 resulted in significant control of CEW in comparison to production of the Rogers Prime Plus without the B.t. gene and resulted in a marketable crop without application of insecticides.

Cultivar	CEW / ear	% Ears with damaged tips	% of ear damaged
Rogers Prime plus	0.93 a	99 a	30 a
Rogers CSS 0966	0.17 b	22 b	2 b

Means in a column followed by different lower case letters are significantly different (LSD, P=0.1).

CONTROLLING SQUASH BUGS ON PUMPKIN WITH FOLIAR APPLICATIONS, OKLAHOMA, 2001:

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Squash bug (SB): *Anasa tristis* (De Geer)

Pumpkin was direct seeded to a field at the Wes Watkins AREC, Lane, on 10 Jul. The experimental design was a randomized complete block with 8 treatments and 5 replicate blocks with plots on 9 ft row spacing, 20 ft long with 20 ft alleys cut between plots in rows. Plants were thinned to a 36 inch spacing in plots. Plots were treated on 15, 21, 29 Aug and 13 Sep using a tractor –mounted sprayer with 3 hollow-cone nozzles per row, 1 directed over the row and 1 on each side of the row on drops directed at an angle into the crop canopy. The sprayer was operated at 40 psi and delivered 20 gal/acre. Plots treated with Actara were treated on only one date, 15 Aug. Surveys to determine insect abundance were conducted at approximately 7 day intervals by examining three 1.5 ft^2 randomly selected areas of plant foliage within each plot.

Squash bugs were not abundant and did not begin to increase in numbers until Aug. Surveys of plots 5 days after the first application of treatments indicated that application of Capture resulted in significant reductions of squash bugs in comparison to the untreated plots. All treatments except SpinTor and Actara resulted in significantly fewer squash bugs per plant as compared to the untreated plots as determined by surveys on 9/21 as conducted after a total of 4 applications. Actara was applied to plots on only one date, 15 Aug. No squash bugs were found on plants in plots treated with Capture, Warrior and MetasystoxR on 9/21.

		No. squast bugs	
Treatment	Rate (lb ai/acre)	20 August	21 September
SpinTor 2SC	0.125	1.6 bc	4.6 ab
MetasystoxR	0.5	1.2 bc	0.0 c
diazinon	0.75	2.6 abc	1.4 bc
Capture 2EC	0.1	0.2 c	0.0 c
Warrior SC	0.02	1.4 bc	0.0 c
endosulfan	2.0	2.2 bc	1.2 bc
Actara	0.02	5.0 a	3.0 abc
untreated	-	3.4 ab	5.8 a

Mean values in columns followed by the same lower case letter are not significantly different, LSD, P=0.1.

COMPARISON OF NICOTINOID INSECTICIDES FOR CONTROLLIING APHIDS ON LEAFY GREENS, OKLAHOMA, 2001

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Green peach aphid: *Myzus persicae* (Sulzer)

Spinach was seeded in a commercial production field near Webber Falls, OK in Feb 2001. One section of the field was designated for use in experiments to evaluate efficacy of insecticide applications and plots were delineated as areas one bed wide (six ft) by 20 ft long. Each bed had four rows of plants approximately 10 inches apart. The experimental design was a randomized complete block with three treatments and five replicate blocks. Soil applications of insecticides were made on 11 Mar, immediately after planting and prior to seedling emergence by spraying a one inch band directly over each seed row at a rate of 10 gpa and at 40 psi. On 30 Apr, just prior to harvest of plants we removed two plants from each plot and returned them to the lab. We removed the terminal-most fully expanded leaf and cut a 2.5 cm diameter disk from the middle of the leaf. The leaf disk was placed on a moist filter paper and within a closed petri dish. Ten to 20 late instar apterous GPA individuals were place on the leaf disk. The petri dish was placed in a room at 72 degrees F. for 24 hours after which we examined each dish and determined number of dead aphids. Data were summarized and analysed using ANOVA and a LSD mean separation for comparisons among treatments.

GPA populations were not present in the commercial production field. Results from bioassays conducted in the lab indicated that applications of Admire and thiamethoxam to the soil resulted in leaf tissue with residual insecticidal activity as indicated by significantly greater mortality of GPA in comparison to leaf disks from untreated plots. The residual activity of the insecticides was apparent approximately 50 days after application and just prior to harvest.

Treatment	Rate	Mortality [1]
untreated	--	11% b
Admire 2.4	2.4 oz / 1000 row ft	55% a
thiamethoxam	0.12 oz ai/1000 row ft	65% a

Means in a column followed by different lower case letters are significantly different, LSD, P=0.1.

1 Mean of number of dead aphids / initial number of aphids at inoculation.

COMPARISON OF APPLYING IMIDACLOPRID TO THE SOIL AND FOLIAGE TO CONTROL APHIDS, OKLAHOMA, 2001

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Green peach aphid (GPA): *Myzus persicae* (Sulzer)

Spinach was seeded in a commercial production field near Hydro, OK in Oct. 2000. One section of the field was designated for use in experiments to evaluate efficacy of insecticide applications and plots were delineated as areas one bed wide (six ft) by 20 ft long. Each bed had four rows of plants approximately 10 inches apart. The experimental design was a randomized complete block with five treatments and five replicate blocks. Foliar insecticide applications were made on 6 Mar and 3 Apr by overspraying plants using a sprayer delivering 10 gpa at 40 psi with one hollow-cone nozzle over each row of plants. Soil applications of insecticides were made on 6 Mar with plants at the 5 true leaf stage, by spraying a one inch band along one side of each row of plants at a rate of 10 gpa and at 40 psi. Surveys of insect pests were conducted on three dates during the production season and approximately 7-10 days after foliar applications of insecticides. On 13 Apr, two weeks prior to harvest of plants we removed two plants from plots treated with Admire, Provado and untreated plots and returned them to the lab. We removed the terminal-most fully expanded leaf and cut a 2.5 cm diameter disk from the middle of the leaf. The leaf disk was placed on a moist filter paper and within a closed petri dish. Ten to 20 late instar apterous GPA individuals were placed on the leaf disk. The petri dish was placed in a room at 72 degrees F. for 24 hours after which we examined each dish and determined number of dead aphids. Data were summarized and analyzed using ANOVA and a LSD mean separation for comparisons among treatments.

GPA populations were not present in the commercial production field. Results from bioassays conducted in the lab indicated that Admire applied to the soil early in the season provided low but significant residual insecticidal activity after approximately 60 days as evidenced by aphid mortality in bioassays conducted in the laboratory. Provado foliar applications did not result in residual activity as evidenced by lack of mortality of aphids in bioassays conducted in the lab.

Insecticide / Application	Rate	Mortality	
Admire / soil	2.4 oz / 1000 row ft	19%	a
Provado / foliar	3.75 oz / acre	8%	b
untreated	--	7%	b

Means in a column followed by the same lower case letter are not significantly different, LSD, P=0.1.
Mortality = number of dead aphids / number of aphids placed alive on leaf disk.