Insect Management Reports

2009 Season

University of Delaware
Cooperative Extension -- IPM Program

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Control of Aphids in Fall Spinach, 2009: Promising new chemistry and labeled insecticides were evaluated for control of green peach aphids. The spinach variety, 'Vancouver ', was planted on September 25 at the University of Delaware Research and Education Center located near Georgetown, DE. Plots were four rows wide and 20-ft-long planted on 30-inch centers. Each treatment was replicated four times and arranged in a RCB design. The evaluated materials are listed in the tables. In furrow materials were applied soon after plant emergence on October 2 by opening a furrow and directing materials into the furrow using a CO_2 backpack sprayer with a one-nozzle boom delivering 19 gpa at 32 psi. Foliar materials were applied on October 9 using a single nozzle boom delivering 31 gpa at 32 psi. The number of aphids on each of 10 randomly selected plants per plot was recorded on a weekly basis. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

Aphid population pressure was moderate. On Oct 13, the Admire, Durivo, Clutch, Assail and the high rate of Movento treatments provided the best aphid control. On Oct 20, the Durivo, Clutch, Assail, and low rate of Movento provided the best aphid control. No phytotoxicity was observed.

Treatment [1]	Rate/acre	Treatment Dates/Method	Mean Number GPA per 10 plants [1]			
			Pre-Treatment September 29 (IF Trts)	October 8 (7 DAT – IF), (Pre-trt foliars)	Oct 13 (4 DAT – foliars) (14 DAT – IF)	Oct 20 (11 DAT – foliars) (21 DAT –IF)
Coragen 1.67 SC	5 oz	IF-Oct 2	0.25a	4.50ab	5.50bc	8.50a
Admire Pro	10.5 oz	IF-Oct2	1.75a	2.75ab	1.50c	1.50bc
Durivo 2.5SC	13 oz	IF-Oct2	0.50a	0.50b	0.50c	0.00c
Clutch	3oz	Foliar - Oct 9	1.50a	7.50ab	0.25c	0.75c
Clutch	4 oz	Foliar – Oct 9	0.75a	5.25ab	1.00c	1.25c
Movento 240 SC + LI-700	4 oz + 0.25% v/v	Foliar – Oct 9	0.25a	2.75ab	1.75bc	0.75c
Assail 30SG	4 oz	Foliar – Oct 9	1.75a	4.00ab	0.50c	1.25c
Lannate LV	32 oz	Foliar – Oct 9	2.75a	12.00a	7.00b	8.00a
Movento 240 SC + LI 700	5 oz + 0.25% v/v	Foliar – Oct 9	3.75a	6.60ab	1.00c	4.25abc
Untreated	---	---	0.75a	5.50ab	13.50a	7.25ab

[1] Means within a column followed by the same letter are not significantly different (Tukey's, P=0.05).

Control of Aphids in Fall Spinach, 2009: Promising new chemistry and labeled insecticides were evaluated for control of green peach aphids. The spinach variety, 'Vancouver ', was planted on September 16 at the University of Delaware Research and Education Center located near Georgetown, DE. Plots were one rows wide and 20-ft-long planted on 30-inch centers. Each treatment was replicated four times and arranged in a RCB design. The evaluated materials are listed in the tables. Foliar materials were applied on October 23 using a single nozzle boom delivering 31 gpa at 32 psi. The number of aphids on each of 10 randomly selected plants per plot was recorded on a weekly basis from Oct 20 through November 3. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

Aphid population pressure was moderate. At 7 days after treatment, all treatments provided significantly better control compared to the untreated check. At 11 days after treatment, only the Movento treatment provided significantly better aphid control compared to the untreated check. No phytotoxicity was observed.

Treatment	Rate/A	Mean Number GPA per 10 plants [1]		
		Oct 20 Pre-treatment	Oct 30 7 DAT	November 3 11 DAT
DPX-HGW86 10SE +MSO	10.1 oz/a + 0.5 v/v MSO	3.25a	0.25b	1.25ab
DPX-HGW86 10SE +MSO	13.5 oz/a + 0.5 v/v MSO	6.00a	0.75b	4.25ab
DPX-HGW86 10SE +MSO	20.5 oz/a + 0.5 v/v MSO	5.00a	0.00b	5.75ab
DPX-HGW86 10SE	10.1 oz/a	5.50a	0.75b	2.00ab
Movento + LI 700	5 oz + 0.25% NIS V/V	5.00a	0.00b	0.75b
Untreated	--	6.00a	3.25a	8.25a

[1] Means within a column followed by the same letter are not significantly different (Tukey's, P=0.05).

Control of Lepidopterous Larvae in Fall Cabbage - 2009: Promising new chemistry and labeled insecticides were evaluated for control of the cabbage insect complex. The cabbage variety, 'Early Thunder ', was transplanted on July 31 at Papen Farms, Inc., Dover, DE. Plots consisted of one 20-ft-long row on 3-ft centers. Each treatment was replicated four times and arranged in a RCB design. The evaluated materials are listed in the tables. In furrow materials were applied soon after transplanting on August 3 by opening a furrow and directing materials into the furrow using a CO_2 pressurized backpack sprayer with a one-nozzle boom delivering 29 gpa at 32 psi. Foliar materials were applied on Aug 12 and Sept 1. The same single nozzle boom was used on Aug 12 delivering 29 gpa at 32 psi. On Sept 1, applications were made with a CO_2 backpack sprayer with a one-row boom, having 3 hollow-cone nozzles per row (one over the top and one drop nozzle on each side) delivering 57 gpa at 40 psi. The number of Lepidopterous larvae on each of 5 randomly selected plants per plot was recorded on a weekly basis from Aug 10 through September 15. The number of marketable heads was determined by examining plants for feeding damage on the head and two wrapper leaves on September 22. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

Overall, insect pressure was light. All treatments provided a significantly higher percentage of marketable heads compared to the untreated controls except the "simulated" in-furrow treatments of Durivo and Coragen and the foliar treatments of the low rate of Vetica and DPX-HGW86 without MSO. Overall, all treatments resulted in significantly lower numbers of diamondback and fall armyworm larvae compared to the untreated control. All treatments resulted in a significantly lower number of cabbage looper larvae compared to the untreated control except the "simulated" in-furrow treatments of Durivo and Coragen and the foliar treatments of the low rate of Vetica on Sept 4. No phytotoxicity was observed.

Table 1 – Diamondback Moth (DBM) Counts and Marketable Heads

Treatment [1]	Rate/acre	Treatment Dates/Method	% Marketable Heads [1] September 22	Mean Number DBM Larvae per 5 plants [1]		
				August 17	August 21	September 4
Durivo 2.5SC	13.0 oz/a	In-Furrow Aug 3	71.52b	0.25b	0.00b	0.25b
Coragen 1.67 SC	5.13 oz/a	In- Furrow Aug 3	84.26ab	0.00b	0.00b	0.25b
Vetica + LI-700	14 oz/a + 0.25 v/v LI-700	Foliar – Aug 12, Sept 1	84.84ab	0.00b	0.00b	0.00b
Vetica + LI-700	17 oz/a + 0.25 v/v LI-700	Foliar – Aug 12, Sept 1	98.33a	0.00b	0.00b	0.50ab
DPX-HGW86 10SE +MSO	6.75 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	95.20a	0.00b	0.00b	0.00b
DPX-HGW86 10SE +MSO	10.1 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	94.00a	0.00b	0.00b	0.25b
DPX-HGW86 10SE +MSO	13.5 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	100.00a	0.00b	0.00b	0.00b
DPX-HGW86 10SE +MSO	20.5 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	96.88a	0.00b	0.00b	0.00b
DPX-HGW86 10SE	10.1 oz/a	Foliar – Aug 12, Sept 1	87.72ab	0.00b	0.00b	0.00b
Synapse 24WG + LI-700	2 oz/A + 0.25 v/v LI-700	Foliar – Aug 12, Sept 1	91.98a	0.00b	0.00b	0.00b
Radiant 1SC	6 oz	Foliar – Aug 12, Sept 1	93.37a	0.00b	0.00b	0.00b
Untreated	----	-----	71.72b	1.00a	0.75a	1.25a

[1] Means within a column followed by the same letter are not significantly different (Tukey's, P=0.05).

Table 2 – Cabbage Looper (CL) and Fall Armyworm (FAW) Counts

Treatment [1]	Rate/acre	Treatment Dates/Method	Mean Number CL Larvae per 5 plants [1]		Mean Number FAW Larvae per 5 plants [1]	
			September 4	September 8	September 4	September 8
A1542 (Durivo 2.5SC)	13.0 oz/a	In-Furrow Aug 3	0.75ab	0.00b	1.00b	1.50ab
E2Y45 sc (Coragen 1.67 SC)	5.13 oz/a	In- Furrow Aug 3	0.25ab	0.25b	1.50b	0.50b
Vetica + LI-700	14 oz/a + 0.25 v/v LI-700	Foliar – Aug 12, Sept 1	0.25ab	0.00b	0.25b	0.00b
Vetica + LI-700	17 oz/a + 0.25 v/v LI-700	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.75b	0.00b
DPX-HGW86 10SE +MSO	6.75 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.00b	0.00b
DPX-HGW86 10SE +MSO	10.1 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.00b	0.25b
DPX-HGW86 10SE +MSO	13.5 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.00b	0.00b
DPX-HGW86 10SE +MSO	20.5 oz/a + 0.5 v/v MSO	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.00b	0.00b
DPX-HGW86 10SE	10.1 oz/a	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.00b	0.00b
Synapse 24WG + LI-700	2 oz/A + 0.25 v/v LI-700	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.25b	0.00b
Radiant 1SC	6 oz	Foliar – Aug 12, Sept 1	0.00b	0.00b	0.25b	0.00b
Untreated	----	-----	1.00a	0.75a	3.50a	2.25a

[1] Means within a column followed by the same letter are not significantly different (Tukey's, P=0.05).

Dectes Stem Borer Management in Soybeans –2009: Research plots were established in two locations. At the University of Delaware's Research and Education Center near Georgetown, DE, 'SS4451N' soybeans were planted on May 19. Plots were 30 ft wide by 200 foot long planted on 15-inch centers. Foliar treatments were applied on July 14 with a high clearance spider sprayer delivering 20 gpa at 40 psi. Each treatment was replicated three times and arranged in a RCB design. At the on-farm Bridgeville location, 'Asgrow 4404' soybeans were planted on June 3. Plots were 20 ft wide by 50 foot long planted on 15 inch centers. Treatments were applied on July 14 with a CO_2 pressurized wheelbarrow sprayer delivering 26 gpa at 40 psi. Each treatment was replicated four times and arranged in a RCB design.

Dectes adult beetle population levels were evaluated on a weekly basis from June 1 through Aug 5 by taking 20 sweeps per plot at the Bridgeville location and 200 sweeps per plot at the Georgetown location. Before physiological maturity, 20 stems were collected from each plot at the Bridgeville location and 50 stems per plot at the Georgetown location to determine the percentage of stems infested with Dectes larvae. At physiological maturity, soybeans were harvested on Nov 9 at the Bridgeville location. At the Georgetown location, one half of the plot was harvested on Nov 4 at physiological maturity. The second half of the plot was harvested on Nov 30 to simulate a late harvest. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

The Hero and Tombstone Helios treatments at both locations resulted in a significant reduction in the number of adult beetles at 6 DAT compared to the untreated control. At the Bridgeville location, there was also a significant reduction in the percent infested stems for both insecticide treatments compared to the untreated control. However, there were no differences in yield or lodging loss for both locations.

Table 1. Bridgeville Location

Treatment	Rate/A	Number Dectes Adults per 20 sweeps				% Infested Stems Aug 25	# Larvae per 20 stems Aug 25	Yield (BU/A) Nov 9	Lodging Loss (BU/A)
		July 13 Pre-Count	July 20 6 DAT	July 27 13 DAT	Aug 5 22 DAT				
Hero	10.3 oz/A	4.50a	0.00b	0.25a	2.25a	41.25b	7.00b	18.31a	0.24a
Tombstone Helios	2.8 oz/A	4.50a	0.00b	0.50a	0.25a	46.25b	8.00b	19.21a	0.27a
Untreated	---	4.50a	1.75a	1.75a	1.00a	77.5a	12.25a	18.00a	0.38a

Means within a column followed by the same letter are not significantly different (Tukey's mean separation test; P=0.05).

Table 2. Georgetown Location

Treatment	Rate/A	Number Dectes Adults per 200 sweeps				% Infested Stems Aug 25	# Larvae per 30 stems Aug 25	Yield (BU/A) First Harvest Nov 4	Lodging Loss (BU/A) Nov 5	Yield (BU/A) Second Harvest Nov 30
		July 13 Pre-Count	July 20 6 DAT	July 27 13 DAT	Aug 4 21 DAT					
Hero	10.3 oz/A	9.00a	7.33b	8.33a	1.33a	23.33a	4.00a	56.15	0.47a	59.13a
Tombstone Helios	2.8 oz/A	11.33a	3.67b	8.67a	1.67a	23.33a	3.67a	55.45	0.39a	56.89a
Untreated	---	13.67a	13.33a	6.00a	0.67a	26.67a	6.33a	51.91	0.44a	53.54a

Means within a column followed by the same letter are not significantly different (Tukey's mean separation test; P=0.05).

Foliar Insect Management in Snap Beans, 2009*:* 'Slenderette' snap beans were planted on June 22 at the University of Delaware's Research and Education Center located near Georgetown, DE. Plots consisted of four 25 ft-long plots on 30-inch centers. Foliar treatments were applied on July 22 (bud stage), July 29 (pin stage) and Aug 5 (one week from harvest) with a CO_2 pressurized wheel-barrow sprayer delivering 26 gpa @ 40 psi. Snap beans were harvested on August 10 from a 6 ft row section and all the beans were evaluated for corn borer and corn earworm injury. Data were analyzed using Proc GLM and means were separated by Tukey's means separation test (P=0.05).

European corn borer pressure was extremely light. Corn earworm (CEW) pressure was light to moderate. All treatments provided a significantly lower percentage of CEW damaged beans compared to the untreated check except the Blackhawk, Coragen and Alverde treatments. No phytotoxicity was observed.

Treatment	Rate/Acre	Mean % Corn Earworm Damaged Beans [1]
Avaunt 30WG	3.5 oz	0.50b
Avaunt 30WG	6 oz	1.00b
BlackHawk	3.3 oz	2.00ab
Intrepid 2F	10 oz	0.75b
Synapse 24WG + LI-700	3 oz + 0.25% v/v	0.50b
Coragen 1.67 SC	5.0 oz	2.50ab
DPX HGW86 10SE	20.5 oz	0.75b
Warrior II	1.75 oz	0.50b
Alverde 2SC + LI 700	16 oz + 0.5% V/V	2.00ab
Untreated	------	4.50a

[1] Means within a column followed by the same letter are not significantly different (Tukey's; P=0.05).

Insect Management in Bell Peppers, 2009: "Paladin" bell peppers were transplanted on June 18 at the University of Delaware Research and Education center located near Georgetown, DE. Two row plots 20 ft long on 8 ft centers were replicated 4 times in a RCB design. All foliar materials were applied beginning at first flower/small fruit on July 17 and then on a weekly basis on July 24, 30; Aug 7, 12 and 19. Applications were made with a CO_2 pressurized backpack sprayer with a one-row boom, having 3 hollow-cone nozzles per row (one over the top and one drop nozzle on each side) delivering 68 gpa at 35 psi. Plots were sampled on a weekly basis from June 22 through Aug 4 for green peach aphid (GPA) aphids, European corn borer (ECB) egg masses, beet armyworm (BAW) egg masses, and corn earworm(CEW) and fall armyworm(FAW) damaged fruit. All commercial size peppers were harvested on Aug 11 and Aug 24 and evaluated for ECB, BAW, CEW and FAW damage. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

Insect pressure was light. No damaged fruit were detected at the first harvest (August 11). All treatments provided significantly better BAW control compared to the untreated check on Aug 24. No phytotoxicity was observed.

Treatment	Rate/Acre	Trt. Dates	Mean No. GPA /50 lvs August 4 [1]	Mean Percent Damaged Fruit – August 24 [1]	
				European Corn Borer	Beet Armyworm
Synapse 24 WG + LI-700 Baythroid XL	2 oz + 0.25% v/v 2.8 oz	July 17, 24 30; Aug 7 Aug 12,19	0.75a	0.00a	0.00a
Synapse 24 WG + LI-700 Baythroid XL	3 oz+ 0.25% v/v 2.8 oz	July17,24,30 Aug 7,12,19	3.00a	0.00a	0.00a
Radiant 1SC	5 oz	July 17, 24 30; Aug 7, 12,19	4.00a	0.00a	0.39a
Coragen 1.67SC Avaunt 30WDG	5.0 oz 3.5 oz	July17,24,30 Aug 7,12,19	0.75a	0.00a	0.26a
Orthene 97 Warrior II	1 lb 1.92 oz	July 17, 24 July 30, Aug 7,12,19	0.50a	0.00a	0.00a
Avaunt 30WDG Coragen 1.67SC	3.5 oz 5.0 oz	July 17, 24 30; Aug 7 Aug 12,19	3.75a	0.00a	0.00a
Warrior II	1.92 oz	July 17, 24 30; Aug 7, 12,19	2.50a	0.00a	0.54a
Vetica Warrior II	12 oz 1.92 oz	July17,24,30 Aug 7,12,19	1.25a	0.00a	0.00a
Intrepid 2F	10 oz	July 17, 24 30; Aug 7, 12,19	2.50	0.35a	0.00a
Untreated	----	-------	2.25a	0.57a	3.07b

[1] Means within a column followed by the same letter are not significantly different (Tukey's, P=0.05).

***Late Season Evaluation of Foliar Insecticides for Control of Lepidopterans on Sweet Corn, 2009*: ‘** Seneca Horizon’ sweet corn was planted on July 6 at the University of Delaware Research and Education Center located near Georgetown, Delaware. Plots were 25 ft long and one row wide, planted on 30 inch centers. Each treatment was replicated 4 times and arranged in a RCB design. Application of all treatments listed in the table began at ear shank emergence and were applied on a 3-4 day schedule (Aug 10, 13, 17, 20, and 24). All applications were made using a CO2 pressurized back pack sprayer and a two nozzle boom equipped with D2 hollow cone nozzles delivering 41 gpa at 37 psi. At harvest (Aug 27), all the ears from each plot were husked and evaluated for damage as percent clean ears (fresh market) and percent clean plus tip damaged ears (damage less than 1.0 inches from the tip- processing ears). The total number of live larvae of each species were identified and counted. Data were analyzed using Proc GLM and means were separated by Tukey’s mean separation test (P=0.05).

Corn earworm pressure was high. Fall armyworm pressure was low. All treatments provided a significantly higher percentage of clean and processing ears compared to the untreated check. All treatments provided a significantly lower percentage of CEW damaged ears compared to the untreated check. All treatments provided a significantly lower percentage of FAW damaged ears compared to the untreated check except the stand alone Warrior II application. Overall, the Belt 480SC switch to Baythroid XL treatments provided the lowest level of corn earworm control. No phytoxicity was observed.

Treatment	Rate/A	Application Date	% Clean Ears (Fresh Market)[1]	% Clean + Tip Damaged Ears (Processing)	Percent Damaged Ears[1]	
					CEW	FAW
Belt 480 SC + LI-700 Baythroid XL	3 oz + 0,25% v/v 2.8 oz	8/10,13,17,20 8/24	66.45d	69.17d	29.98b	0.89b
Belt 480 SC Baythroid XL	3 oz 2.8 oz	8/10,13,17,20 8/24	78.58c	81.36c	20.49bc	0.93b
Coragen 1.67 SC + MSO Lannate LV + Asana XL	3.5 oz + 0.5% v/v 24 oz + 9.6 oz	8/10,13,17 8/20, 24	91.93ab	94.58ab	8.07cd	0.00b
Coragen 1.67 SC + MSO Lannate LV + Asana XL	5 oz + 0.5% v/v 24 oz + 9.6 oz	8/10,13,17 8/20, 24	93.73ab	98.28ab	6.28d	0.00b
Coragen 1.67 SC + LI-700 Lannate LV + Asana XL	3.5 oz + 0.5% v/v 24 oz + 9.6 oz	8/10,13,17 8/20, 24	90.10ab	93.77ab	10.86cd	0.00b
Lannate LV + Asana XL	24 oz + 9.6 oz	8/10, 13, 17, 20, 24	96,25ab	97.22ab	3.75d	0.00b
Warrior II	1.92 oz	8/10, 13, 17, 20, 24	87.03bc	87.96bc	7.20d	5.78ab
Voliam xpress Lannate LV + Warrior II	9 oz 24 oz + 1.92 oz	8/10,13,17 8/20, 24	99,11a	99.11a	0.89d	0.00b
Voliam xpress Warrior II	7 oz 1.92 oz	8/10,13,17,20 8/24	98.11ab	98.11ab	1.89d	0.00b
Voliam xpress Warrior II	9 oz 1.92 oz	8/10, 13, 17 8/20, 24	98.28ab	100.00a	1.73d	0.00b
Voliam xpress Alternate with Warrior II	7 oz 1.92 oz	8/10, 17, 24 8/13, 20	94.99ab	96.61ab	5.00d	0.00b
Untreated	---	----	7.35e	11.55e	89.08a	11.11a

[1] Means in the same columns followed by the same letter are not significantly different (Tukey's; P=0.05).

***Mid-Season Evaluation of Foliar Insecticides for Control of Lepidopterans on Sweet Corn, 2009*:** 'Xtra Tender 372A' sweet corn was planted on June 11 at the University of Delaware Research and Education Center located near Georgetown, Delaware. Plots were 25 ft long and one row wide, planted on 30 inch centers. Each treatment was replicated 4 times and arranged in a RCB design. All treatments listed in the table were applied once in the whorl on July 22 by directing sprays into the whorl with a two nozzle boom delivering 35 gpa at 37 psi. Silk sprays began at ear shank emergence and were applied on a 3-4 day schedule (July 28 and 31; Aug 4,7,11,14). All applications were made using a CO2 pressurized back pack sprayer and a two nozzle boom equipped with D2 hollow cone nozzles delivering 41 gpa at 37 psi. At harvest (Aug 17), all the ears from each plot were husked and evaluated for damage as percent clean ears (fresh market) and percent clean plus tip damaged ears (less than 1.0 inches from the tip- processing ears). The total number of live larvae of each species were identified and counted. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

Corn earworm and sap beetle pressure was high. All treatments provided a significantly higher percentage of clean and processing ears compared to the untreated check. All treatments provided a significantly lower percentage of CEW and sap beetle damaged ears compared to the untreated check. Overall, the Belt treatments provided the lowest level of sap beetle control; however, this would be expected since it is only consider a " worm" material. No phytoxicity was observed.

Treatment	Rate/A	Application Date	% Clean Ears (Fresh Market)	% Clean + Tip Damaged Ears (Processing)	Percent Damaged Ears [1]	
					CEW	Sap Beetle
Belt 480 SC + LI-700	3 oz + 0,25% v/v	July 28, 31; Aug4,7,11,14	45.73cd	57.81bc	17.28bc	36.10bc
Belt 480 SC	3 oz	July 28, 31; Aug4,7,11,14	33.28d	54.33c	18.29b	47.48b
Coragen 1.67 SC + MSO Lannate LV + Asana XL	3.5 oz + 0.5% v/v 24 oz + 9.6 oz	July 28,31; Aug4 Aug 7,11,14	61.05bc	70.63abc	8.71bc	32.20bcd
Coragen 1.67 SC + MSO Lannate LV + Asana XL	5 oz + 0.5% v/v 24 oz + 9.6 oz	July 28,31; Aug4 Aug 7,11,14	69.26abc	83.26ab	3.68bc	27.08bcde
Coragen 1.67 SC + LI-700 Lannate LV + Asana XL	3.5 oz + 0.5% v/v 24 oz + 9.6 oz	July 28,31; Aug4 Aug 7,11,14	75.27ab	82.50ab	6.30bc	18.43cde
Lannate LV + Asana XL	24 oz + 9.6 oz	July 28, 31; Aug4,7,11,14	75.03ab	81.36abc	10.57bc	14.41cde
Warrior II	1.92 oz	July 28, 31; Aug4,7,11,14	62.70bc	71.41abc	17.35bc	24.74bcde
Voliam xpress Lannate LV + Warrior II	9 oz 24 oz + 1.92 oz	July 28,31; Aug4 Aug 7,11,14	90.00a	94.00a	0.00c	4..00e
Voliam xpress Warrior II	7 oz 1.92 oz	July 28,31; Aug4 Aug 7,11,14	89.23a	96.17a	1.63bc	7.53e
Voliam xpress Warrior II	9 oz 1.92 oz	July 28,31; Aug4 Aug 7,11,14	93.38a	95.30a	0.00c	11.62de
Voliam xpress Alternate with Warrior II	7 oz 1.92 oz	July 28; Aug 4, 11 July 31;Aug 7,14	79.73ab	85.66a	5.12bc	14.15cde
Untreated	---	----	2.08e	5.21d	83.39a	83.39a

[1] Means in the same columns followed by the same letter are not significantly different (Tukey's; P=0.05).

Two Spotted Spider Mite Management in Soybeans - 2009: ' SSRT4451N ' soybeans were planted on June 3 at the University of Delaware Research and Education Center located near Georgetown, DE. Plots consisted of four 25 ft-long rows on 30-inch centers. Each treatment was replicated four times and arranged in a RCB design. Foliar treatments were applied as a broadcast spray on July 29. All foliar treatments applied with a CO_2 pressurized wheel barrow sprayer delivering 26 gpa at 40 psi. Mite populations were evaluated on a weekly basis from June 26 through Aug 12 by examining 20 leaflets per plot for the presence of motile spider mites. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

Spider population pressure was low. All treatments provided significantly better spider mite control 6 days after treatment compared to the untreated check except the dimethoate and Lorsban. No phytotoxicity was observed.

Table 1. Two-Spotted Spider Mite Counts

Treatment	Rate/A	Mean Number Mites per 20 leaflets [1]			Yield [1] BU/A
		July 27 Pre-Treatment	Aug 4 6 DAT	Aug 12 14 DAT	
Dimethoate 4 EC	16 oz	96.50a	5.00ab	2.00a	34.14a
Dimethoate 4 EC + CHEM-STIK LpH	16 oz + 1 qt/100 gal	97.50a	6.75ab	0.00a	34.29a
Lorsban 4EC	16 oz	189.50a	6.75ab	0.50a	31.60a
Zeal WSP	1 oz	95.75a	0.00b	0.00a	33.12a
Zeal WSP	2 oz	88.25a	1.25b	0.00a	33.68a
Oberon 2SC	8 oz	60.50a	0.25b	0.50a	35.76a
Oberon 2SC	12 oz	109.50a	0.50b	0.00a	36.03a
Hero 1.24EC	10.3 oz	66.25a	0.75b	0.50a	35.98a
Brigade 2 E	6 oz	88.75	0.00b	0.00a	36.56a
Untreated Check	---	147.00a	19.75a	1.50a	35.28a

[1] Means within a column followed by the same letter are not significantly different (Tukey's mean separation test; P=0.05).

Melon Aphid, Cucumber Beetle and Squash Bug Management in Watermelons, 2009: 'Jamboree' watermelon plants were transplanted on May 20 at the University of Delaware's Research and Education Center located near Georgetown, DE. Plots consisted of two 20 ft-long rows on 8ft centers. Each treatment was replicated four times and arranged in a RCB design. Foliar treatments were applied with a CO_2 pressurized back pack sprayer for : (a) cucumber beetle control on June 2 (single nozzle broadcast application delivering 26 gpa at 40 psi) and June 12 (three nozzle broadcast application delivering 26 gpa at 32 psi); (b) melon aphid control on May 28 (single nozzle broadcast application delivering 26 gpa at 40 psi) and August 3 (four nozzle broadcast application delivering 29.5 gpa at 32 psi) ; and (c) squash bug control on June 30 and July 7 (four nozzle broadcast application delivering 29.5 gpa at 32 psi). Cucumber beetle and squash bug population levels were evaluated by counting the number of live and dead insects per 10 plants. Aphid population levels were assessed on 10 plants per plot to determine the percent infested plants and the number of aphids per 10 plants early season and the number of aphids per 50 leaves late season. Data were analyzed using Proc GLM and means were separated by Tukey's mean separation test (P=0.05).

The Assail, Clutch and Warrior treatments provided the best control of cucumber beetles 3 days after the second application. All treatments provided significantly better melon aphid control early season compared to the untreated check. Later in the season, all treatments provided significantly better melon aphid control at 4 DAT. The Movento provided a lower level of melon aphid control at 9 DAT. Overall, the Voliam xpress, Baythroid XL, Warrior and high rate of Clutch provided the best squash bug control.

Table 1. Cucumber Beetle Data

Treatment	Rate/ Acre	Trt Dates	Mean Number Live Cucumber Beetles per 10 Plants [1]				
			Pretrt June1	6 DAT June 8	3 DAT June 15	10 DAT June 22	17 DAT June 29
Untreated Check	---	---	6.5a	19.00ab	15.5a	10.67ab	15.00a
Assail 30 SG	4 oz	6/2, 6/12	1.5a	12.25ab	1.5b	13.33ab	17.33a
Voliam Flexi 40 WG	7 oz	6/2, 6/12	20.0a	25.75a	5.25ab	21.00a	17.67a
Voliam xpress	9 oz	6/2, 6/12	16.75a	7.00ab	4.25ab	7.67ab	9.67a
Baythroid Xl	2.8 oz	6/2, 6/12	14.25a	13.00ab	4.0ab	7.33ab	9.00a
Baythroid Xl	2.8 oz	6/2, 6/12	7.5a	7.75ab	3.75ab	10.00ab	14.33a
Warrior II	1.92 oz	6/2, 6/12	3.25a	5.75b	2.75ab	11.00ab	18.00a
Clutch	3 oz	6/2, 6/12	5.0a	16.50ab	1.75b	11.00ab	16.67a
Clutch	4 oz	6/2, 6/12	3.75a	16.75ab	2.0b	7.67ab	15.67a
Warrior II	1.92 oz	6/2, 6/12	7.75a	6.75ab	2.0b	4.33b	27.67a

[1] Means in a column followed by the same letter are not significantly different (P= 0.05; Tukey's Test).

Table 2. . Percent Melon Aphid Infested Plants – Early Season Spray – May 28

Treatment	Rate/A	Mean Percent Aphid Infested Plants [1]			
		Pretrt 5/27	4 DAT 6/1	11 DAT 6/8	18 DAT 6/15
Untreated Check	---	27.50a	37.50a	27.50a	22.50a
Assail 30 SG	4 oz	32.50a	2.50b	0.00b	0.00b
Voliam Flexi 40 WG	7 oz	25.00a	0.00b	0.00b	0.00b
Voliam Flexi 40 WG	6 oz	12.50a	0.00b	0.00b	0.00b
Movento 240 SC + Li-700	3 oz + 0.25 % v/v	25.00a	0.00b	0.00b	0.00b
Movento 240 SC + Li-700	5 oz + 0.25% v/v	20.00a	7.50b	0.00b	0.00b
Assail 30 SG	6 oz	17.50a	2.50b	0.00b	0.00b
Clutch	3 oz	45.00a	0.00b	0.00b	0.00b
Clutch	4 oz	10.00a	0.00b	0.00b	0.00b
Lannate LV	32 oz	37.50a	0.00b	0.00b	0.00b

[1] Means in a column followed by the same letter are not significantly different (P= 0.05; Tukey's Test).

Table 3. Melon Aphid Counts – Early Season Spray – May 28

Treatment	Rate/A	Mean Number Aphids per 10 Plants [1]			
		Pretrt 5/27	4 DAT 6/1	11 DAT 6/8	18 DAT 6/15
Untreated Check	---	63.00a	72.50a	147.25a	40.75a
Assail 30 SG	4 oz	30.50a	0.500b	0.00b	0.00b
Voliam Flexi 40 WG	7 oz	28.75a	0.00b	0.00b	0.00b
Voliam Flexi 40 WG	6 oz	8.50a	0.00b	0.00b	0.00b
Movento 240 SC + Li-700	3 oz	27.25a	0.00b	0.00b	0.00b
Movento 240 SC + Li-700	5 oz	13.75a	1.25b	0.00b	0.00b
Assail 30 SG	6 oz	21.00a	0.250b	0.00b	0.00b
Clutch	3 oz	48.75a	0.00b	0.00b	0.00b
Clutch	4 oz	23.25a	0.00b	0.00b	0.00b
Lannate LV	32 oz	107.50a	0.00b	0.00b	0.00b

[1] Means in a column followed by the same letter are not significantly different (P= 0.05; Tukey's Test).

Table 4. Melon Aphid Counts – Late Season Spray – Aug 3

Treatment	Rate/A	Mean Number Aphids per 50 Leaves [1]		
		Pretrt 7/28	4 DAT 8/7	9 DAT 8/12
Untreated Check	---	11.00a	10.00a	12.25ab
Assail 30 SG	4 oz	0.00a	0.75b	1.25b
Voliam Flexi 40 WG	7 oz	0.00a	0.00b	0.25b
Movento 240 SC + Li-700	3 oz	12.33a	2.50b	22.25a
Movento 240 SC + Li-700	5 oz	1.33a	0.00b	10.25ab
Assail 30 SG	6 oz	72.67a	0.00b	0.00b
Clutch	3 oz	3.00a	0.00b	1.75b
Clutch	4 oz	13.00a	0.00b	0.50b
Lannate LV	32 oz	2.67a	0.00b	0.75b

[1]Means in a column followed by the same letter are not significantly different (P= 0.05; Tukey's Test).

Table 5. Squash Bug Counts

Treatment	Rate/A	Treatment Dates	Mean Number Live Squash Bugs per 10 Plants [1]			
			Pretrt 6/29	6 DAT 7/6	6 DAT 7/13	15 DAT 7/22
Untreated Check	---	---	32.33a	45.67a	31.67a	14.67a
Assail 30 SG	4 oz	6/30, 7/7	23.33a	24.33ab	9.33b	4.67a
Voliam Flexi 40 WG	7 oz	6/30, 7/7	50.00a	25.33ab	6.33b	3.33a
Voliam xpress	9 oz	6/30, 7/7	8.67a	0.33b	0.33b	1.67a
Baythroid Xl	2.4 oz	6/30, 7/7	12.67a	7.00b	2.33b	8.33a
Baythroid Xl	2.8 oz	6/30, 7/7	9.33a	2.33b	3.33b	9.67a
Warrior II	1.92 oz	6/30, 7/7	9.00a	0.67b	0.67b	2.33a
Clutch	3 oz	6/30, 7/7	26.67a	22.67ab	12.00ab	4.67a
Clutch	4 oz	6/30, 7/7	13.33a	12.00b	9.67b	3.67a
Warrior II	1.5 oz	6/30, 7/7	7.67a	3.67b	1.33b	2.00a

[1]Means in a column followed by the same letter are not significantly different (P= 0.05; Tukey's Test).