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Soybean Aphid Efficacy Screening Program, 2015

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Abstract

Soybean aphid, *Aphis glycines* Matsumura, has drastically changed soybean pest management in the North Central region. To date, SBA can be successfully managed by timely scouting and foliar insecticides. Host plant resistance is the newest soybean aphid management tool and is complementary to existing chemical control. In 2015, we established plots at two Iowa State University Research Farms (Northeast and Northwest) on 27 May and 27 May, respectively. NK S25-E5 soybean variety was used for all the soybean aphid-susceptible treatments, and 28ARC5 soybean variety was used for the *Rag2* -containing treatments. Plots were arranged in an RCB design with four replications. Each plot was six rows in width and 50 ft in length at the Northeast location and six rows in width by 44 ft in length at the Northwest location. Treatments containing a seed treatment were applied by Syngenta. For the Northeast location, foliar treatments were applied using a backpack sprayer and TeeJet (Springfield, IL) twinjet nozzles (TJ 11002) with 20 gpa at 40 lb psi. For the Northwest location, foliar treatments were applied using a custom sprayer and TeeJet (Springfield, IL) flatfan nozzles (TJ 8002) with 15.5 gpa at 40 lb psi. Soybean aphids were counted on randomly selected whole plants within each plot. To estimate the total exposure of soybean plants to soybean aphid, we calculated cumulative aphid days (CAD) based on the number of aphids per plant counted on each sampling date. Yields (bushels/acre) were determined by weighing grain with a hopper and corrected to 13% moisture. One-way ANOVA was used to determine treatment effects within each experiment. Means separation for all studies was achieved using a least significant difference test ($\alpha = 0.10$). All statistical analyses were performed using SAS software (Cary, NC).

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Comments

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SOYBEAN: *Glycine max* L.

Soybean Aphid Efficacy Screening Program, 2015*

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Soybean aphid, *Aphis glycines* Matsumura, has drastically changed soybean pest management in the North Central region. To date, SBA can be successfully managed by timely scouting and foliar insecticides. Host plant resistance is the newest soybean aphid management tool and is complementary to existing chemical control. In 2015, we established plots at two Iowa State University Research Farms (Northeast and Northwest) on 27 May and 27 May, respectively. NK S25-E5 soybean variety was used for all the soybean aphid-susceptible treatments, and 28ARC5 soybean variety was used for the *Rag2*-containing treatments. Plots were arranged in an RCB design with four replications. Each plot was six rows in width and 50 ft in length at the Northeast location and six rows in width by 44 ft in length at the Northwest location. Treatments containing a seed treatment were applied by Syngenta. For the Northeast location, foliar treatments were applied using a backpack sprayer and TeeJet (Springfield, IL) twinjet nozzles (TJ 11002) with 20 gpa at 40 lb psi. For the Northwest location, foliar treatments were applied using a custom sprayer and TeeJet (Springfield, IL) flatfan nozzles (TJ 8002) with 15.5 gpa at 40 lb psi. Soybean aphids were counted on randomly selected whole plants within each plot. To estimate the total exposure of soybean plants to soybean aphid, we calculated cumulative aphid days (CAD) based on the number of aphids per plant counted on each sampling date. Yields (bushels/acre) were determined by weighing grain with a hopper and corrected to 13% moisture. One-way ANOVA was used to determine treatment effects within each experiment. Means separation for all studies was achieved using a least significant difference test ($\alpha = 0.10$). All statistical analyses were performed using SAS software (Cary, NC).

There was light CAD at both locations in 2015. At the Northeast location, most foliar applications were made on 19 Aug when plants were in the R5 growth stage. A few foliar applications received a targeted application on 15 July when plants were in the R1 growth stage. Soybean aphids in the untreated check plots averaged five per plant 7 d prior to the 19 Aug application and peaked on 26 Aug at 32 aphids per plant. The untreated check had 723 CAD and was not significantly different than many foliar insecticides. There were significant reductions in aphids with some of the foliar insecticides versus the untreated check (Table 1). There was some variability in yield between treatments, but most products labeled for soybean aphid were not statistically different. The *Rag2*-containing treatments did suppress CAD; however, adding a foliar insecticide or seed treatments did not significantly improve yield (Table 1). At the Northwest farm, most foliar applications were made 24 Aug when plants were in the R5 growth stage. A few foliar applications received a targeted application on 21 July when plants were in the R1 growth stage. Soybean aphid populations in the untreated check plots averaged 25 per plant 4 d prior to the 24 Aug application and peaked on 5 Sept at 151 aphids per plant. The untreated check had the most CAD compared to all other treatments and was significantly different than most foliar insecticides. There were significant reductions in aphids with most foliar insecticides versus the untreated check (Table 2). Yield between treatments varied slightly, and while most foliar insecticides were statistically different, we do not believe the differences were due to soybean aphid pressure. The *Rag2*-alone treatment did have significantly more aphids than other *Rag2*-containing treatments, but the yield was not significantly reduced. This research was supported by industry gifts of seed, product, and research funding.

* This research was supported by industry gifts of seed, insecticide and funding.

Table 1

Treatment/formulation[a]	Rate[b]	CAD	Yield (bushels/acre)
Untreated Control	—	723.38CDEF	66.77ABC
CruiserMaxx Vibrance 6.77FS	62.5g	887.93EFG	66.35ABC
Warrior II 2.08CS	1.92 fl oz	714.73CDEF	63.19D
Warrior II 2.08CS	1.6 fl oz	551.16BCD	64.48CD
Warrior II 2.08CS[c]	1.6 fl oz	885.91EFG	66.79ABC
Lorsban Advanced 3.76EC	16.0 fl oz	151.27A	66.06ABC
Warrior II 2.08CS +	1.92 fl oz	170.52A	66.10ABC
Lorsban Advanced 3.76EC	16.0 fl oz		
Cobalt Advanced 2.63EC	16.0 fl oz	284.63AB	66.80ABC
Endigo ZC 2.06SC	3.5 fl oz	311.21AB	67.41AB
Endigo ZC 2.06SC	4.0 fl oz	248.46AB	65.04BCD
Quindigo 3.15ZE	14.0 fl oz	185.98A	66.91ABC
Hero 1.24EC	5.0 fl oz	634.74CDE	65.47ABCD
Brigade 2EC	3.0 fl oz	292.98AB	64.92BCD
Agri-Mek 0.7SC	2.5 fl oz	1176.14GH	65.73ABCD
Agri-Mek 0.7SC	3.5 fl oz	1301.30H	64.90BCD
Cygon 4E	8.0 fl oz	223.95A	64.94BCD
Cygon 4E	16.0 fl oz	189.70A	66.39ABC
Transform 50WG[c]	0.75 oz	861.99DEFG	67.85A
Transform 50WG[c]	1.0 oz	852.67DEF	67.65AB
Transform 50WG[c]	1.5 oz	999.23FGH	65.15ABCD
Transform 50WG	0.75 oz	409.70ABC	65.72ABCD
Rag2	—	284.71a	59.62ab
Rag2 +	—	292.13a	57.26b
CruiserMaxx Vibrance 6.77FS	62.5g		
Rag2 and	—	180.22a	59.53ab
CruiserMaxx Vibrance 6.77FS +	62.5g		
Warrior II 2.08CS	1.92 fl oz		
Rag2 +	—	268.06a	60.35a
Warrior II 2.08CS	1.92 fl oz		

Means within columns not followed by the same letter are significantly different. Least significant difference for mean separation of CAD (Susceptible seed: $P < 0.0001$; $F = 7.31$; df = 20, 3; and *Rag2* seed: $P < 0.0201$; $F = 4.64$; df = 3, 3). Least significant difference for mean separation of yield (Susceptible seed: $P < 0.0163$; $F = 2.01$; df = 20, 3; and *Rag2* seed: $P < 0.1073$; $F = 2.47$; df = 3, 3).

[a] Formulations are given in pounds of active ingredient per gallon of product for liquids and in percent active ingredient for solids.

[b] Foliar product rates are given as formulated product per acre, and seed treatments are given as grams active ingredient per 100 kg seed.

[c] Foliar product applied 15 July.

Table 2

Treatment/formulation[a]	Rate[b]	CAD	Yield (bushels/acre)
Untreated Control	—	2326.38E	66.55F
CruiserMaxx Vibrance 6.77FS	62.5 g/100 kg	1036.62ABC	67.19F
Warrior II 2.08CS	1.92 fl oz	1086.98ABC	69.15CDEF
Warrior II 2.08CS	1.6 fl oz	936.01A	70.44BCDE
Warrior II 2.08CS[c]	1.6 fl oz	218.85A	70.44BCDE
Lorsban Advanced 3.76EC	16.0 fl oz	2113.91DE	68.42EF
Warrior II 2.08CS +	1.92 fl oz	1363.81BCDE	71.62ABCD
Lorsban Advanced 3.76EC	16.0 fl oz		
Cobalt Advanced 2.63EC	16.0 fl oz	657.35AB	70.74BCDE
Endigo ZC 2.06SC	3.5 fl oz	944.64ABC	72.21AB
Endigo ZC 2.06SC	4.0 fl oz	1166.41ABC	72.58AB
Quindigo 3.15ZE	14.0 fl oz	1045.80ABC	72.58AB
Transform 50WG[c]	0.75 oz	639.40AB	70.99BCDE
Transform 50WG[c]	1.0 oz	445.58AB	69.04DEF
Transform 50WG[c]	1.5 oz	422.45AB	71.52ABCD
Transform 50WG	0.75 oz	842.63AB	71.82ABC
Pyrifluquinazon SC	2.4 fl oz	1038.89ABC	248.15BCDE
Pyrifluquinazon SC	3.2 fl oz	1865.04CDE	72.52AB
Pyrifluquinazon SC	6.4 fl oz	838.52AB	74.13A
Rag2	—	716.40a	69.02a
Rag2 +	—	321.09b	67.26a
CruiserMaxx Vibrance 6.77FS	62.5 g		
Rag2 +	—	213.96b	68.09a
CruiserMaxx Vibrance 6.77FS +	62.5 g		
Warrior II 2.08CS	1.92 fl oz		
Rag2 +	—	411.34b	69.04a
Warrior II 2.08CS	1.92 fl oz		

Means within columns not followed by the same letter are significantly different. Least significant difference for mean separation of CAD (Susceptible seed: $P < 0.0832$; $F = 1.62$; df = 17, 3; and *Rag2* seed: $P < 0.0551$; $F = 3.25$; df = 3, 3). Least significant difference for mean separation of yield (Susceptible seed: $P < 0.0017$; $F = 2.78$; df = 17, 3; and *Rag2* seed: $P < 0.5360$; $F = 0.90$; df = 3, 3).

[a] Formulations are given in pounds of active ingredient per gallon of product for liquids and in percent active ingredient for solids.

[b] Foliar product rates are given as formulated product per acre, and seed treatments are given as grams active ingredient per 100 kg seed.

[c] Foliar product applied 21 July.