

SOYBEAN: *Glycine max* L., 'NK S24-K2'**Soybean Aphid Efficacy Screening Program, 2016***Erin W. Hodgson^{1,2} and Greg VanNostrand³¹Department of Entomology, Iowa State University, 103 Insectary Bldg., Ames, IA 50011-3140, Phone: (515) 294-2847, Fax: (515) 294-7406 (ewh@iastate.edu), ²Corresponding author, e-mail: ewh@iastate.edu, and³Department of Entomology, Iowa State University, 021 Insectary Bldg., Ames, IA 50011-3140, Phone: (515) 294-6124, Fax: (515) 294-7406 (gregvn@iastate.edu)

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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 2016, we established plots at two Iowa State University Research Farms (Northeast and Northwest) on 27 May and 27 May respectively. NK S24-K2 soybean variety was used for all treatments. Plots were arranged in a 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 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 Northwest location, foliar treatments were applied using a custom sprayer and TeeJet (Springfield, IL) flatfan nozzles (TJ 8002) with 14 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.

The plots at each farm were uniformly colonized in late July and there was light soybean aphid pressure at both locations until after full bloom, or early August. At the Northeast location, foliar applications were made on 18 Aug when plants were in the R5 growth stage. Soybean aphids in the untreated check plots averaged 15 per plant days days prior to the 18 Aug application and peaked on 25 Aug at 115 aphids per plant. The untreated check had 1,543 CAD and was significantly higher than many foliar insecticides. There were significant reductions in aphids with many 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. At the Northwest farm, foliar applications were made 9 Aug when plants were in the R5 growth stage. Soybean aphid populations in the untreated check plots averaged 282 per plant one day prior to the 24 Aug application and peaked on 30 Aug at 705 aphids per plant. The untreated check had the significantly higher CAD compared to treatments with foliar insecticides. There were reductions in aphids with all foliar insecticides versus the untreated check (Table 2). Yield between treatments varied from 70-92 bushels per acres, and we believe the differences were due to soybean aphid seasonal exposure.

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Table 1

Treatment/formulation ^a	Rate ^b	CAD ^c	Yield ^d
Untreated Control	–	1,542.76D	66.05A
Cruiser 5FS	79.95g	1,585.84D	65.26ABC
Cruiser 5FS +	79.95g	1,218.79CD	62.96ABCD
Warrior II 2.08CS	1.6 fl oz		
Clariva Complete 6.77FS	203.45g	797.14ABC	59.84BCD
Clariva Complete 6.77FS +	203.45g	1,231.58CD	59.32D
Warrior II 2.08CS	1.6 fl oz		
Warrior II 2.08CS	1.92 fl oz	930.97BC	64.27ABCD
Lorsban Advanced 3.76EC	16.0 fl oz	353.21AB	65.49AB
Warrior II 2.08CS +	1.92 fl oz	542.83AB	59.49CD
Lorsban Advanced 3.76EC	16.0 fl oz		
Cobalt Advanced 2.63EC	16.0 fl oz	472.22AB	65.00ABCD
Endigo ZC 2.06SC	3.5 fl oz	411.16AB	59.72BCD
Hero 1.24EC	5.0 fl oz	373.38AB	60.46ABCD
Hero 1.24EC +	5.0 fl oz	247.84A	65.31ABC
Dimethoate 4E	16.0 fl oz		
Brigadier 2SC	6.1 fl oz	382.83AB	59.76BCD
Carbine 50WG	2.8 oz	476.93AB	64.91ABCD
Transform 50WG	1.0 oz	306.91A	64.38ABCD
Seeker 2.09SE	2.1 fl oz	362.17AB	64.48ABCD
Seeker 2.09SE	2.6 fl oz	347.58AB	60.04BCD

Means within columns followed by the same letter are not significantly different, LSD. Least significant difference for mean separation of cumulative aphid days ($P = 0.0014$; $F = 2.92$; $df = 16, 3$). Least significant difference for mean separation of yield ($P < 0.0001$; $F = 3.78$; $df = 16, 3$).

^aFormulations are given in pounds of active ingredient per gallon of product for liquids and in percent active ingredient for solids.

^bFoliar product rates are given as formulated product per acre, and seed treatments are given as grams active ingredient per 100 kg seed.

^cCumulative aphid days.

^dYield in bushels per acre.

Table 2

Treatment/formulation ^a	Rate ^b	CAD ^c	Yield ^d
Untreated control	–	15,107.80C	70.28F
Cruiser 5FS	79.95g	12,692.86C	78.30E
Cruiser 5FS +	79.95g	3,866.14AB	84.54D
Warrior II 2.08CS	1.6 fl oz		
Clariva Complete 6.77FS	203.45g	16,220.64C	71.32F
Clariva Complete 6.77FS +	203.45g	4,776.24AB	87.24BCD
Warrior II 2.08CS	1.6 fl oz		
Warrior II 2.08CS	1.92 fl oz	4,264.30AB	89.11ABC
Lorsban Advanced 3.76EC	16.0 fl oz	3,838.70AB	87.32BCD
Warrior II 2.08CS +	1.92 fl oz	3,566.03AB	92.40A
Lorsban Advanced 3.76EC	16.0 fl oz		
Hero 1.24EC	5.0 fl oz	7,903.52B	85.22CD
Hero 1.24EC +	5.0 fl oz	4,756.72AB	86.26BCD
Dimethoate 4E	16.0 fl oz		
Brigadier 2SC	6.1 fl oz	4,072.56AB	89.74AB
Carbine 50WG	2.8 oz	3,512.73A	89.00ABC

Means within columns followed by the same letter are not significantly different LSD. Least significant difference for mean separation of cumulative aphid days ($P < 0.0001$; $F = 6.29$; $df = 11, 3$). Least significant difference for mean separation of yield ($P < 0.0001$; $F = 14.07$; $df = 11, 3$).

^aFormulations are given in pounds of active ingredient per gallon of product for liquids and in percent active ingredient for solids.

^bFoliar product rates are given as formulated product per acre, and seed treatments are given as grams active ingredient per 100 kg seed.

^cCumulative aphid days.

^dYield in bushels per acre.