2019

Soybean Aphid Efficacy Screening Program, 2018

Erin W. Hodgson
Iowa State University, ewh@iastate.edu

Greg VanNostrand
Iowa State University, gregvn@iastate.edu

Soybean Aphid Efficacy Screening Program, 2018

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 in Iowa, but pyrethroid resistance is an emerging issue in the North Central region. In 2018, we established plots at two Iowa State University Research Farms (Northeast and Northwest) on 22 May and 30 May, respectively. NK S24-K2 soybean variety was used for all plots. 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 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. At the Northeast location, all foliar applications were made on 10 Aug, except for Macho 2.0 FL treatments which were made on 13 Aug, when plants were in the R5 growth stage. 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 on 13 Aug. Soybean aphids were counted on randomly selected whole plants within each plot every week from 22 Jun to 6 Sep at the Northeast location and from 27 Jun to 8 Sep at the Northwest location. To estimate the total exposure of soybean 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.

Disciplines

Agriculture | Agronomy and Crop Sciences | Entomology

Comments

This article is published as Hodgson, E. W., and G VanNostrand. Soybean Aphid Efficacy Screening Program, 2018. *Arthropod Management Tests* 44 (2019): tsz013. doi: 10.1093/amt/tsz013.

Arthropod Management Tests, 44(1), 2019, 1–3
doi: 10.1093/amt/tsz013
Section F: Field & Cereal Crops

SOYBEAN: *Glycine max* L. Merr. "NK S24-K2"

Soybean Aphid Efficacy Screening Program, 2018

Erin W. Hodgson[1] and Greg VanNostrand

Department of Entomology, 2005 Advanced Teaching and Research Building, Iowa State University, Ames, IA 50011-1101, Phone: 515.294.2847 (ewh@iastate.edu; gregvn@iastate.edu) and [1]Corresponding author, e-mail: ewh@iastate.edu

Subject Editor: Donald Cook

Soybean | *Glycine max*

Soybean aphid (SBA) | *Aphis glycines* Matsumura

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 in Iowa, but pyrethroid resistance is an emerging issue in the North Central region. In 2018, we established plots at two Iowa State University Research Farms (Northeast and Northwest) on 22 May and 30 May, respectively. NK S24-K2 soybean variety was used for all plots. 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 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. At the Northeast location, all foliar applications were made on 10 Aug, except for Macho 2.0 FL treatments which were made on 13 Aug, when plants were in the R5 growth stage. 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 on 13 Aug. Soybean aphids were counted on randomly selected whole plants within each plot every week from 22 Jun to 6 Sep at the Northeast location and from 27 Jun to 8 Sep at the Northwest location. To estimate the total exposure of soybean 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 both locations were initially colonized by soybean aphid in July, but populations remained low throughout the season. Uniform aphid colonization was established in late July and continued to build throughout August. Soybean aphids in the untreated plots averaged 7 per plant 1 day prior to the 10 Aug application and peaked on 21 Aug at 44 aphids per plant at the Northeast location. The untreated check had 680 CAD and was significantly higher than plots treated with most foliar insecticides. There were significant reductions in aphid densities with foliar insecticides versus the untreated check, but there were no significant differences among treatments for yield (Table 1). Soybean aphid populations in the untreated check plots averaged 22 per plant 7 days prior to the 13 Aug application and peaked on 25 Aug at 123 aphids per plant at the Northwest location. The untreated plots had significantly higher CAD compared with plots treated with foliar insecticides. There were significant reductions in aphid densities with the foliar insecticides versus the untreated check, but there were no significant differences among treatments for yield (Table 2).

This research was supported by industry gift(s) of seed, pesticides, and financial support.

Table 1.

Treatment/formulation	Rate	CAD[a]	Yield (bu/acre)
Untreated Check	–	680.95D	61.69
Lorsban Advanced 3.755EC	16.0[b]	45.93A	61.51
Dimethoate 4E	16.0[b]	84.29A	62.55
Warrior II 2.08CS	1.92[b]	257.68AB	62.91
Mustang Maxx 0.8EC	2.8[b]	578.79CD	63.19
Tundra 2EC	3.2[b]	199.26A	56.62
Tundra 2EC	4.8[b]	133.56A	61.49
Cruiser 5FS	0.0756[c]	535.63CD	60.78
CruiserMaxx Vibrance 2.49FS	0.0945[c]	524.45CD	59.02
Macho 2.0FL	2.0[b]	448.24BC	62.22
Macho 2.0FL	3.0[b]	80.25A	62.34
Macho 2.0FL	4.0[b]	168.92A	63.02
Transform 50WG	0.542[d]	116.59A	62.95
Transform 50WG	0.8[d]	80.05A	63.55
Sefina 0.42DC	3.0[b]	122.87A	62.94
Carbine 50WG	2.8[d]	41.28A	57.19
Warrior II 2.08CS + Lorsban Advanced 3.755EC	1.92[b] + 16.0[b]	79.34A	61.96
Hero 1.24EC + Dimethoate 4E	5.0[b] + 16.0[b]	80.46A	59.09
Cobalt Advanced 2.632EC	16.0[b]	61.91A	60.33
Cruiser 5FS + Warrior 2.08II CS	0.0756[c] + 1.92[b]	147.05A	60.48
CruiserMaxx Vibrance 2.49FS + Warrior II 2.08CS	0.0945[c] + 1.92[b]	212.47A	60.36
Brigadier 2SC	6.1[b]	93.05A	65.42
Endigo ZCX 2.7CS	3.5[b]	163.49A	64.39
Endigo ZCX 2.7CS	4.5[b]	80.24A	58.93
Transform 50WG + Tundra 2EC	0.8[d] + 4.8[b]	42.03A	62.53
Transform 50WG + Tundra 2EC	0.542[d] + 3.2[b]	70.34A	60.00
Transform 50WG + Tundra 2EC	0.4[d] + 2.4[b]	67.94A	61.49
$P > F$		<0.01	0.30

Means within columns not followed by the same letter are significantly different.

[a]Cumulative aphid days.

[b]Fluid oz formulated product per acre, foliar application.

[c]mg active ingredient per seed, seed treatments.

[d]oz (weight) formulated product per acre, foliar application.

Table 2.

Treatment/formulation	Rate	CAD[a]	Yield (bu/acre)
Untreated Check	–	2,148.05GH	78.04
Lorsban Advanced 3.755EC	16.0[b]	205.30AB	75.99
Dimethoate 4E	16.0[b]	185.36A	71.87
Warrior II 2.08CS	1.92[b]	579.31A-E	77.68
Mustang Maxx 0.8EC	2.8[b]	647.76A-E	75.18
Tundra 2EC	3.2[b]	870.25A-F	78.34
Tundra 2EC	4.8[b]	544.93A-D	75.56
Cruiser 5FS	0.0756[c]	1,052.31B-F	78.29
CruiserMaxx Vibrance 2.49FS	0.0945[c]	1,563.37EF	76.94
Transform 50WG	0.542[d]	261.43AB	74.91
Transform 50WG	0.8[d]	694.25A-E	78.26
Pyrifluquinazon 0.17SC	0.8[b]	2,690.45H	76.47
Pyrifluquinazon 0.17SC	1.2[b]	1,233.87DEF	77.80
Pyrifluquinazon 0.17SC	1.6[b]	1,045.74A-F	81.25
Sefina 0.42DC	3.0[b]	1,436.88EFG	77.90
Carbine 50WG	2.8[d]	627.53A-E	80.55
Warrior II 2.08CS + Lorsban Advanced 3.755EC	1.92[b] + 16.0[b]	432.07A-D	71.83
Hero 1.24EC + Dimethoate 4E	5.0[b] + 16.0[b]	331.97ABC	78.01
Cobalt Advanced 2.632EC	16.0[b]	282.58AB	75.34
Cruiser 5FS + Warrior 2.08II CS	0.0756[c] + 1.92[b]	405.44A-D	78.08
CruiserMaxx Vibrance 2.49FS + Warrior II 2.08CS	0.0945[c] + 1.92[b]	369.52ABC	80.15
Brigadier 2SC	6.1[b]	322.48ABC	76.05
Endigo ZCX 2.7CS	3.5[b]	1,421.68EFG	74.73
Endigo ZCX 2.7CS	4.5[b]	219.389AB	75.41
Argyle OD 2.52	4.0[b]	871.61A-F	77.52
Argyle OD 2.52	6.0[b]	464.514A-D	78.14
Leverage 360 3SC	2.8[b]	1,149.34C-F	77.65
Transform 50WG +Tundra 2EC	0.8[d] + 4.8[b]	807.58A-F	75.19
Transform 50WG +Tundra 2EC	0.542[d] + 3.2[b]	276.67AB	78.43
Transform 50WG +Tundra EC	0.4[d] + 2.4[b]	202.38AB	77.95
$P > F$		<0.01	0.53

Means within columns not followed by the same letter are significantly different.
[a]Cumulative aphid days.
[b]fluid oz formulated product per acre, foliar application.
[c]mg active ingredient per seed, seed treatment.
[d]oz (weight) formulated product per acre, foliar application.