2011

Evaluation of insecticides for control of soybean aphid, 2009

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

Greg VanNostrand
Iowa State University, gregvn@iastate.edu

Evaluation of insecticides for control of soybean aphid, 2009

Abstract
Soybean grown in Iowa and most of the north central region of the United States has historically used low amounts of insecticide. However, the arrival of SBA in 2000 has drastically changed soybean production. The soybean aphid causes direct economic yield losses from direct plant feeding. To date, SBA can be successfully managed by foliar insecticides, and timely scouting and applications will protect yield. Plots were established at the Iowa State University Northeast Research Farm in Floyd County, Iowa. Twenty treatments were arranged in a RCB design with six replications (Table 1), and soybean (PB2636N RR) was planted in 30-inch rows using no-till production practices on 5 May. Each plot was six rows wide and 50 ft long. All of the seed had an Apron Maxx fungicide seed treatment except for the CruiserMaxx treatment which contained an insecticide and fungicide. There were two controls including a 'zero aphid' treatment in which a tank-mix of two foliar insecticides (Warrior II + Lorsban 4E) was applied every time aphids were detected. Insecticides were mixed in water and applications made using a backpack sprayer and TeeJet (Springfield, IL) twinjet nozzles (TJ 11002) delivering 20 gpa at 40 psi.

Disciplines
Entomology

Comments
This article is from *Anthropod Management Tests* 36 (2011: F87, doi:10.4182/amt.2011.F87. Posted with permission.

 doi: 10.4182/amt.2011.F87

F87

SOYBEAN: *Glycine max* L.

EVALUATION OF INSECTICIDES FOR CONTROL OF SOYBEAN APHID, 2009

Erin W. Hodgson
103 Insectary Building, Department of Entomology
Iowa State University
Ames, IA 50011-3140
Phone: 515.294.2847
Fax: 515.294.7406
Email: ewh@iastate.edu

Greg VanNostrand
gregvn@iastate.edu

Soybean aphid (SBA): *Aphis glycines* Matsumura

Soybean grown in Iowa and most of the north central region of the United States has historically used low amounts of insecticide. However, the arrival of SBA in 2000 has drastically changed soybean production. The soybean aphid causes direct economic yield losses from direct plant feeding. To date, SBA can be successfully managed by foliar insecticides, and timely scouting and applications will protect yield. Plots were established at the Iowa State University Northeast Research Farm in Floyd County, Iowa. Twenty treatments were arranged in a RCB design with six replications (Table 1), and soybean (PB2636N RR) was planted in 30-inch rows using no-till production practices on 5 May. Each plot was six rows wide and 50 ft long. All of the seed had an Apron Maxx fungicide seed treatment except for the CruiserMaxx treatment which contained an insecticide and fungicide. There were two controls including a 'zero aphid' treatment in which a tank-mix of two foliar insecticides (Warrior II + Lorsban 4E) was applied every time aphids were detected. Insecticides were mixed in water and applications made using a backpack sprayer and TeeJet (Springfield, IL) twinjet nozzles (TJ 11002) delivering 20 gpa at 40 psi.

SBA were counted on consecutive plants at randomly selected locations within each plot. The number of plants counted ranged from 5 to 20 depending on plant growth stage. All aphids (adults, nymphs and winged aphids) were counted on each plant. Summing aphid days accumulated during the growing season provides a measure of the seasonal aphid exposure that a soybean plant experiences. 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 were determined by weighing grain with a grain hopper which rested on a digital scale sensor custom designed for each of the three harvesters. Yields were corrected to 13% moisture and reported as bushels per acre. One way analysis of variance (ANOVA) was used to determine treatment effects within each experiment. The impact of treatments applied within each experiment on accumulation of aphid days was determined using log-transformed data to meet the assumptions of ANOVA. Means separation for all studies was achieved using a LSD test ($P \leq 0.05$). Treatment impacts on yield were determined using untransformed data. All statistical analysis was performed using SAS® software (SAS 2009).

In general, SBA pressure was low and did not exceed the economic threshold (250 aphids per plant). During the growing season, foliar insecticides were applied to the zero aphid plots three times (23 Jul, 6 Aug, 1 Sep) while other treatments were sprayed on 6 Aug. SBA averaged 10 per plant two days prior to the 6 Aug application, and peaked in the untreated control plots on 11 Sep at 787 aphids per plant. The untreated control has significantly more CAD than any other treatment and the CruiserMaxx treatment had significantly more CAD than any foliar treatment. Dimethoate and both Belay treatments had significantly more CAD than other foliar treatments. The yield analysis was highly variable, likely due to low aphid numbers.

doi: 10.4182/amt.2011.F87

Table 1

Treatment/formulation	Rate[1]	CAD ± SEM	CAD-LSD[2]	Yield ± SEM	Yield-LSD[3]
Untreated	-------	10,150.5 ± 1,534.7	a	57.2 ± 1.8	f
Zero, Warrior II SC	3.2 fl oz	51.1 ± 10.0	d	62.9 ± 1.4	abcd
+ Lorsban 4E	8 fl oz				
CruiserMaxx ST	3 fl oz/cwt	5,713.7 ± 538.7	b	58.5 ± 1.2	ef
Endigo ZC	3.5 fl oz	392.7 ± 90.6	d	61.1 ± 1.1	bcdef
Warrior II	1.6 fl oz	820.8 ± 252.8	d	64.1 ± 2.2	abc
Trilex 6000 ST	6 fl oz/cwt	917.6 ± 136.3	d	58.9 ± 2.4	def
+ Temprid	3 fl oz				
Trilex 6000 ST	6 fl oz/cwt	539.0 ± 129.9	d	65.3 ± 1.9	a
+ Temprid SC	3 fl oz				
+ USF07312[4]	4 fl oz				
Asana XL	9.6 fl oz	396.0 ± 48.5	d	63.5 ± 2.0	abc
Hero EW	5 fl oz	439.0 ± 64.1	d	64.5 ± 2.8	ab
Nufos 4E	24 fl oz	433.2 ± 24.0	b	62.1 ± 1.2	abcde
Dimethoate 4E	8 fl oz	3,922.9 ± 836.6	c	57.5 ± 2.7	f
Declare SC	1.02 fl oz	665.2 ± 92.3	d	62.8 ± 2.2	abcd
Declare SC	1.28 fl oz	479.4 ± 68.9	d	63.5 ± 2.0	abc
Declare SC	1.5 fl oz	410.0 ± 113.4	d	60.3 ± 2.3	cdef
Declare SC	1.28 fl oz	495.8 ± 102.7	d	62.1 ± 2.0	abcde
+ Nufos 4E	24 fl oz				
Tombstone Helios EC	2.6 fl oz	517.9 ± 49.9	d	62.5 ± 2.6	abcd
Belay	3 fl oz	4,843.5 ± 826.9	bc	58.5 ± 2.7	ef
Belay	6 fl oz	3,750.7 ± 731.3	c	58.7 ± 2.7	ef
Lorsban 4E	16 fl oz	756.7 ± 59.4	d	61.3 ± 2.1	abcdef
Lorsban Advanced	16 fl oz	1,345.8 ± 337.8	d	61.2 ± 1.2	bcdef

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

[2] $\alpha = 0.05$, LSD = 1,316; F = 24.54; df = 24, 95.

[3] $\alpha = 0.05$, LSD = 4.11; F = 6.67; df = 24, 95.

[4] Crop oil and Ammonium Sulfate were included as adjuvants and formulated at a rate of 1qt per acre and 2 lbs per acre, respectively.