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THRIPS AND LYGUS CONTROL FROM SEED APPLIED INSECTICIDES

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Abstract

Early season insect pests may develop into a serious problem under less than ideal cotton growing weather conditions. Seed applied insecticides can be effective in controlling these early season pests. Temik (aldicarb), Gaucho (imidacloprid) and Adage (thiamethoxam) were applied with the seed to evaluate their control of thrips (*Frankliniella occidentalis*) and lygus (*Lygus hesperus*) at two locations. Early season insect pressure was very light. Lower thrips counts and less leaf damage were observed for all three treatments versus the untreated check. The insecticide treatments were all equally effective. The negligible early season insect damage did not have any long-term effect as cotton lint yields were not significantly different.

Introduction

Thrips (*Frankliniella occidentalis*) and lygus (*Lygus hesperus*) are annual pests in the San Joaquin Valley. The amount of loss from these insects varies year to year. They cause damage to terminal buds and leaves as populations increase. Adult thrips feed on cotton by piercing the leaf or bud with sucking mouthparts and ingest the sap from the plant. This can affect plant growth as well as crop yield. Thrips cause mutilated leaves, terminal bud damage, and in some cases plant death. Damage usually occurs in the early cool seasons. Plants generally out grow the damage as the weather warms (Borror et al, 1976). Thrips larvae can be beneficial as they feed on spider mite eggs (Rude, 1984). In most cases, mite control by thrips in the early season out weighs the plant damage (Johnson-Hake et al., 1996).

Lygus bugs nymphs usually don't cause any damage until they become adults (Borror et al., 1976). Lygus adults feed on the squares and terminal buds of cotton. Damaged squares shrivel up and eventually drop off the plant thus causing an alteration plant development and a reduction in yield. Lygus populations do not usually appear until later in the season, at a time when cotton starts producing squares. Infestations start as adults from neighboring crops fly in and reproduce on the new host's leaves (Johnson-Hake et al., 1996). Lygus prefer different crops, such as alfalfa, but when nothing better is present or the preferred host plant dries out they tolerate cotton (Rude, 1984).

Thrips and lygus are controllable with contact or systemic insecticides (Fairbanks et al., 1999). Three systemic insecticides were applied with the seed to evaluate early season insect control and the effect on plant growth and yield.

Materials and Methods

Field plots were established as a completely randomized block design at the University of California Research and Extension Centers in Shafter (SREC) and Westside (WSREC) in the San Joaquin Valley. Soil was Wasco sandy loam and Panoche clay loam at SREC and WSREC, respectively. Plots consisted of two 40" rows by 300' long replicated three times. Plots were planted April 23, 2001 at SREC and April 29, 2001 at WSREC. Normal cultural practices were used as each location. The four treatments were Temik 15G (aldicarb) applied with the seed at planting at 3.5 lbs/acre, Gaucho 480F (imidacloprid) applied to the seed at 8 fl. oz./cwt. of seed, Adage 5FS (thiamethoxam) applied to the seed at 7.65 fl. oz./cwt. of seed, and an untreated check (UTC). Delta Pine DP-6211 seed was used with a standard fungicide seed treatment.

Plants were evaluated and insects collected at regular intervals during the growing season. The sampling was conducted on 30 feet of row in two locations in each replication. A leaf was rated as having thrips damage if more the 25% of the leaf edge was crinkled. Insect counts were made from 25 leaves or 50 net sweeps. Plots were mechanically harvested following final plant mapping.

Results

Germination and stand establishment were not affected by any of the insecticide treatments. At SREC thrips counts were not significantly different at the cotyledon stage but were significantly lower for the insecticide treatments than the untreated check at the first and second leaf stage (Table 1). There was no difference between the insecticide treatments. Leaf damage was significantly higher for the untreated check than the insecticide treatments at the cotyledon stage but was not significantly different on the first or second leaves. No significant differences were observed in leaf damage at WSREC (Table 2). No early season lygus populations were measured in the plots.

A statistically significant but meaningless difference in plant height at WSREC was observed. No other plant mapping differences were observed (Table 3). Lint yields were very good at both locations averaging 2.9 and 3.9 bales per acre at SREC and WSREC, respectively (Table 4). There were no significant differences between any of the treatments.

Conclusions

Insect pressure at SREC and WSREC in the San Joaquin Valley of California was very light in 2001. Seed applied insecticide treatments were effective in reducing early season insects. The limited insect damage on the untreated check plants did not adversely affect plant growth and yield. Insecticide control of thrips did not adversely affect mite populations, which remained in check throughout the early growing season. A population of beneficial insects was active during the test across all treatments. The value of seed applied insecticides needs additional investigation.

References

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Table 1. Effect of seed insecticide treatments on early season insect count and leaf damage on cotton.

	Cotyledon Stage			1st Leaf		2nd Leaf	
SREC	Plant Count #/foot	Thrips Count #/plant	Cotyledon Damage %	Thrips Count #/plant	Leaf Damage %	Thrips Count #/plant	Leaf Damage %
Temik	4.0	1.3	2.5	0.25	1.5	0	1.0
Gaucho	3.0	1.3	3.25	0.0	1.3	0	1.0
Adage	3.7	0.7	2.75	0.25	1.0	0	1.0
UTC	4.0	2.7	5.0	2.5	1.7	2.75	1.3
$LSD_{0.05}$	NS	NS	1.6	2.2	NS	2.3	NS

Table 2. Effect of seed insecticide treatments on cotton leaf damage.

WSREC	May 17	May 23	June 9	June 19
	---------- % ----------			
Temik	9.0	8.3	9.3	0.0
Gaucho	7.3	10.7	8.7	1.7
Adage	5.3	12.7	11.0	2.0
UTC	9.0	10.0	6.7	4.3
$LSD_{0.05}$	NS	NS	NS	NS

Table 3. Effect of seed insecticide treatments on final plant mapping.

	Plant Height	Vegetative Nodes	Fruiting Nodes	1st Position Retention	2nd Position Retention
WSREC	Inches	--------- # ---------		---------- % ----------	
Temik	36.9	5.7	18.0	71.2	12.3
Gaucho	38.6	5.8	18.8	59.7	20.5
Adage	35.9	5.5	17.8	73.6	11.5
UTC	38.6	5.6	18.9	64.0	17.5
$LSD_{0.05}$	2.2	NS	NS	NS	NS

Table 4. Effect of seed insecticide treatments on cotton lint yield.

	SREC	WSREC
	---------- lbs/acre ----------	
Temik	1351	1877
Gaucho	1400	1859
Adage	1420	1856
UTC	1372	1900
$LSD_{0.05}$	NS	NS
CV %	3.8	3.9