EFFECTS OF TEMIK® (ALDICARB BRAND PESTICIDE)APPLIED SIDEDRESS TO COTTON COMPARED TO AT-PLANTING TREATMENTS OF TEMIK®

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Abstract

TEMIK® Brand Pesticide is widely used across the cotton belt as an at-planting treatment for early season insect and nematode control. However, sidedress applications have not been widely used in the Mid-South. Owing to varietal changes, the discovery of tarnished plant bug, Lygus lineolaris, resistance (13, 14, 15, 16) and increased nematode yield losses (2), we theorized that sidedress applications of TEMIK® could protect plants during a period of vulnerability between square initiation and bloom. Therefore, the effects of TEMIK® as sidedress applications at varying rates in nematode- and non-nematode- infested soils were compared to standard at-planting treatments of TEMIK® at two locations. One trial was conducted at Minter City, MS. on SureGrow 125 in soil infested by root-knot, Meloidogyne incognita, and reniform, Rotylenchus reniformis, nematodes. The other trial was conducted at Memphis, TN. on Nu-Cotn 33B in non-nematode- infested soils. Results from box mapping data showed the greatest response to sidedress applications in nematode- infested soils but both locations indicated increased first position boll retention and yield between nodes 9-14.

Introduction

TEMIK® has been shown to have significant effects on the growth and development of cotton, impacting quality and yield when applied at- planting and sidedress (3, 4, 5, 7, 8, 9, 10, 12). Reddy et. al. (10) showed that TEMIK® increased biomass during the vegetative period, under extreme temperatures. They also indicated increased root development, numbers of bolls and squares, boll weight and earliness. There have been several reports of TEMIK® applied as a sidedress treatment increasing fiber quality (3, 4). McCarty et. al. (9) indicated that sidedress applications of TEMIK® increased earliness.

Losses from nematode populations have been increasing in MS. over the last five years. Losses have risen from 51,516 bales in 1991 to 82,929 bales in 1995 (1, 2). Shaw (11) indicated a high number of fields in MS. showing threshold levels of root-knot and reniform nematodes. Cook and Namken (6) indicated that reniform nematodes reduced plant growth, growth rate, micronaire and seed index. Several studies have indicated yield responses of cotton to TEMIK® applied as a sidedress treatment in nematode-infested soils (3, 9, 12). McCarty et. al. (9) indicated a greater yield response to sidedress applications when reniform populations were present. There have also been indications of aphid suppression by sidedress applications of TEMIK® (4, 5) with improved yield, foliage retention and fruit retention.

With resistance and cross resistance to specific foliar cotton insecticides building in plan-bug populations, additional attention and data generation are being demanded in this area (14, 15, 16). Snodgrass (13) showed that plant bug adult and nymph populations increase in proportion to square development. He further indicated that nymphs demonstrate a stronger preference for the squares than do adults which preferred leaves during early fruit development.

With changes in cotton varieties, increased nematode awareness and earlier development of aphid populations, it has made it necessary to further evaluate the collective effects of TEMIK® as a sidedress application on the morphology of cotton grown under field conditions.

Materials and Methods

Two experimental locations were established and evaluated in MS. and TN. to compare the effects of TEMIK® applied as a sidedress application at varying rates to standard at-planting treatments. The MS. location was naturally infested with reniform & root- knot nematodes and had irrigation available. There was no known nematode population or irrigation in the TN. site. The study in MS. consisted of non-randomized strips that were replicated four times. The TN. location was conducted as single strips with three sub-sample replications within each strip. Plant mapping data were collected using a box-mapping system. Plants used for mapping were consecutively collected from ten row -feet/treatment/replication and were cut between nodes 3 & 4. Fruiting nodes were divided into three main axis zones (nodes 4-8, 9-14 & >14). Vegetative bolls & bolls from plants with aborted terminals were reported separately.

Treatments in MS. consisted of an untreated check, two at-planting treatments (TEMIK® at 5.0 and 7.0 lbs./Ac) and three sidedress treatments (TEMIK® at 3.5 lbs./Ac at-planting followed by 5.0 lbs./Ac, TEMIK ® 6.0 lbs./Ac at-planting followed by 5.0 lbs./Ac and TEMIK® 6.0 lbs./Ac followed by 9.0 lbs./Ac). There were four treatments in TN., consisting of TEMIK® at 3.5 lbs./Ac at-planting, TEMIK ® 3.5 lbs./Ac at-planting followed by 5.0 lbs./Ac, TEMIK® 3.5 lbs./Ac at-planting followed by 7.5 lbs./Ac,

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TEMIK ® 3.5 lbs./Ac at-planting followed by 10.0 lbs./Ac. Rates are expressed in lbs. of product/Acre.

The MS. location was planted with SureGrow 125 on May 3, 1996 and the sidedress application was made on June 6, 1996 at 7-8 node cotton. Nu-Cotn 33 B was planted May 12, 1996 in TN. and the sidedress application was made on July 1, 1996 at 12-13 node cotton. All sidedress applications were applied prior to first bloom **.**

Discussion

Mississippi.
The sidedress treatments in MS. increased overall yields in root-knot and reniform nematode-infested soils (Figure 1) over the at-planting treatments. Total first position boll numbers, lbs. of lint cotton between nodes 9 and 14 and total dollar ($) value were increased in all sidedress treatments over the at-planting treatments and the untreated check (Figure 2, 3 and 4). Only TEMIK® at 6.0 lbs./Ac applied at-planting followed by 9.0 lbs./Ac increased yield of first position bolls at nodes > 14 (Figure 3). There were no differences between at-planting and sidedress treatments for first position bolls between nodes 4-8 (Figure 3).

The response of sidedress treatments did not differ from each other at this location in total first position boll numbers, lbs. lint cotton of position 1, 2 or >2 and total dollar value (Figure 2, 3 and 4) At-planting treatments of TEMIK® at 6.0 and 7.0 lbs./Ac did not differ from each other in yield (Figure 1). TEMIK® at 7.0 and TEMIK® 6.0 lbs./Ac followed by 9.0 lbs./Ac had a greater number of bolls from plants possessing aborted terminals (Figure 5).

Tennessee.
In TN. there were little differences between the at-planting treatments and sidedress treatments. However, TEMIK® at 3.5 lbs./Ac at-planting followed by 7.5 lbs./Ac produced a slightly higher number of first position bolls at nodes 9-14 (Figure 6). TEMIK® at 3.5 lbs./Ac followed by 10.0 lbs./Ac produced a greater number of second and > 2 position bolls at nodes 3-8 and > 14 (Figure 6). TEMIK® at 3.5 lbs./Ac followed by 5.0 lbs./Ac produced more lint cotton at the first positions between nodes 9-14 while TEMIK® at 3.5 lbs./Ac at-planting followed by 10.0 lbs./Ac produced more lint cotton between nodes 4-8 and nodes > 14 (Figure 7). TEMIK® at 3.5 lbs./Ac at- planting and 3.5 lbs./Ac at-planting followed by 10.0 lbs./Ac increased the number of bolls from plants possessing aborted terminals (Figure 8). TEMIK® at 3.5 lbs./Ac at-planting followed by 5.0 or 7.5 lbs./Ac yielded more lbs. of lint cotton/Ac from the main axis (Figure 9). Soil variations in replication 3 affected the over-all yield of the sidedress treatments**.**

Summary

It was apparent from the two studies, that the greatest yield response resulted from application of TEMIK® applied sidedress in the nematode -infested soils. At this location, the three sidedress treatments resulted in productions of greater numbers of first position bolls, higher yields, more lint cotton between nodes 9-14 and increased total dollar values. However, the TN. location did show slight numerical advantages from the sidedress treatments of TEMIK ® 3.5 lbs./Ac at-planting followed by 5.0 lbs./Ac and TEMIK® 3.5 lbs./Ac followed by 7.5 lbs./Ac when compared to the at-planting treatment in main axis yield, first position boll retention and yield between nodes 9-14.

Acknowledgments

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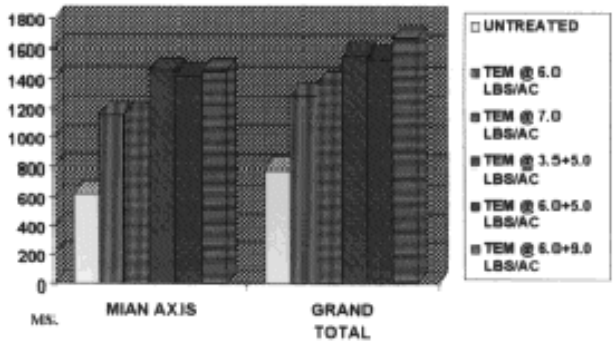

Figure 1. MS. lbs. of lint cotton/Ac from main axis and grand total including weight from plants with aborted terminals and vegetative bolls.

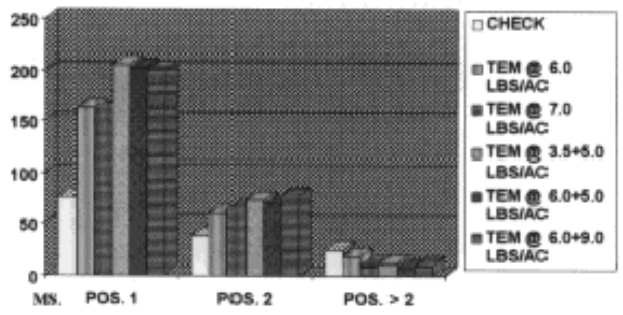

Figure 2. The total bolls at positions 1, 2 and >2 for MS.

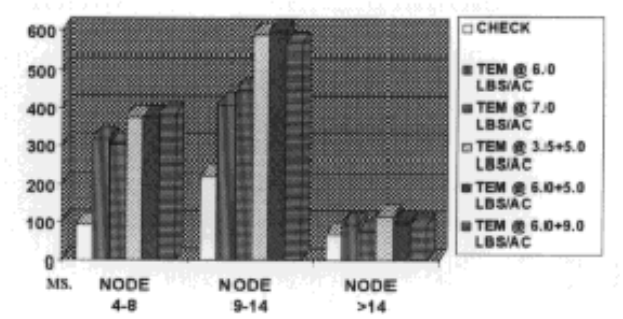

Figure 3. Total lbs. of lint cotton/Ac at position 1 by zones for MS.

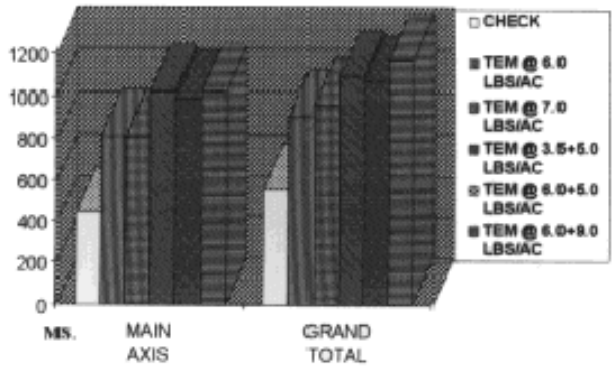

Figure 4. Total dollar value/Ac @ .70/lb. of lint cotton for MS.

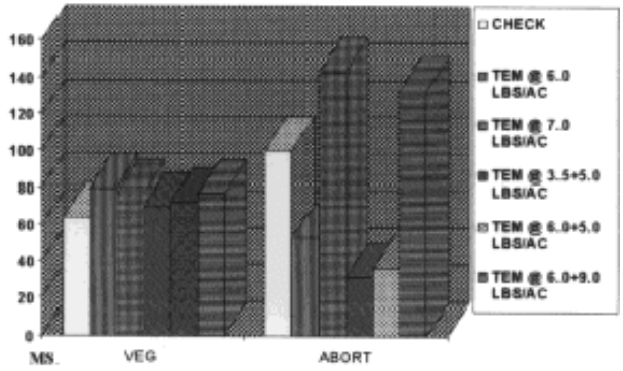

Figure 5. Total lbs. of lint cotton/Ac contribution from vegetative bolls and bolls from plants with aborted terminals.

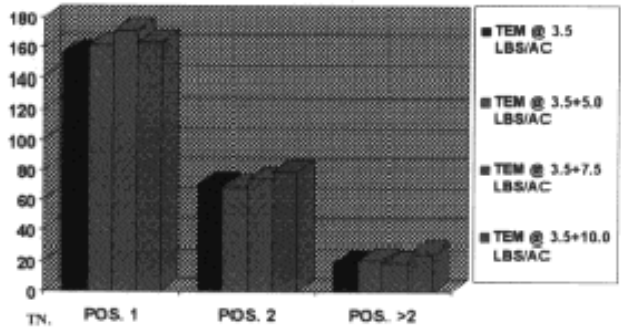

Figure 6. Total bolls from position 1, 2 and >2 for TN.

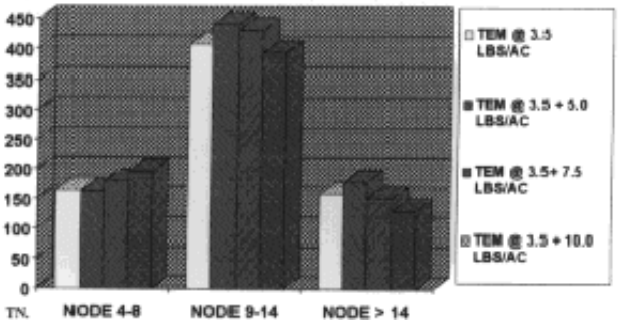

Figure 7. Total lbs. of lint cotton/Ac @ position 1 by zone for TN.

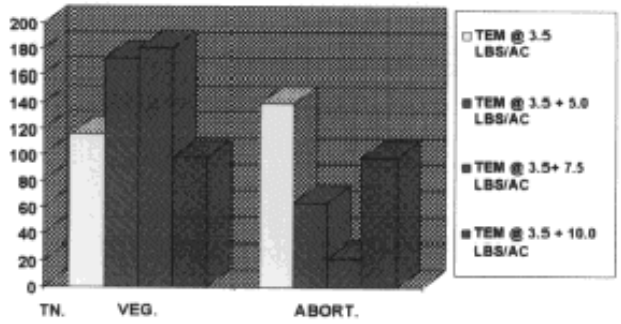

Figure 8. Total lbs. of lint cotton/Ac generated from vegetative bolls and bolls from plants with aborted terminals

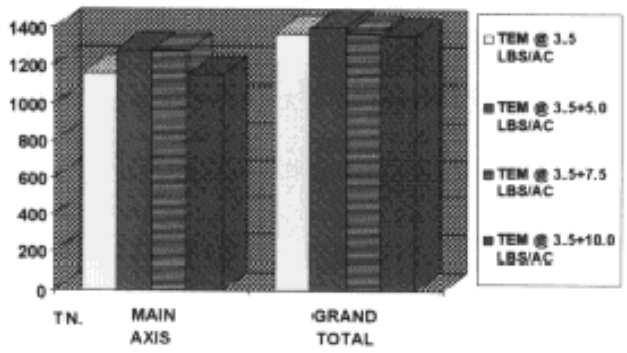

Figure 9. TN. lbs. of lint cotton/Ac from main axis and grand total yield including weight from plants with aborted terminals and vegetative bolls.

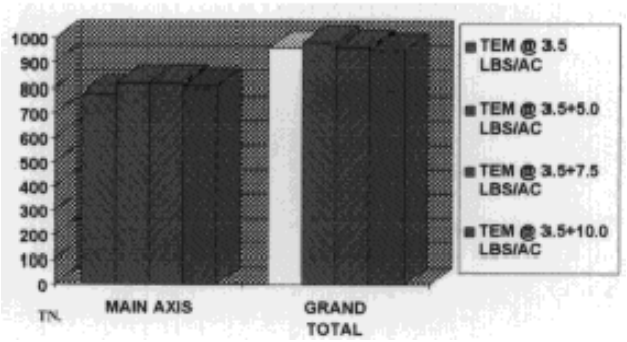

Figure 10. Total $ Value/ Ac at $.70/Lb. of lint cotton for TN