Treatment Tresholds for Stink Bugs

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RESEARCH PROBLEM

Because of continued difficulties in detecting stink bugs in cotton, we continued testing the effectiveness of using symptoms of boll injury as a monitoring tool for treatment decisions. Predominant phytophagous (plant-feeding) stink bugs in the Southeast and much of the mid-South are similar and include the green stink bug, *Acrosternum hilare* (Say); the southern green stink bug, *Nezara viridula* (L.); and the brown stink bug, *Euschistus servus* (Say). Several other species are part of the plant-feeding stink bug complex but are of less importance. Research with treatment thresholds for stink bugs, based on monitoring internal feeding injury to bolls, supported treatment at 20% injury to mid-sized (ca. 14-d-old) bolls.

BACKGROUND INFORMATION

In recent years, most involved with cotton production have become increasingly aware of potential losses due to plant-feeding stink bugs (Pentatomidae). Many have realized that pentatomids have benefited from some of the major technologies and advancements available today and that they will continue to thrive under technological conditions that will be accessible in the very near future. The eradication of the boll weevil, *Anthonomus grandis* Boheman; availability of alternative chemistries for selective control of worm (Lepidoptera) pests; established use of transgenic *Bt* cotton; and the registration of second-generation *Bt* varieties enhanced in controlling worm pests, all offer significant reductions in broad-spectrum foliar insecticide usage. Stink bugs greatly benefit from the reduction of insecticides applied for major pest groups. In the absence of these materials providing "coincidental" control of stink bugs, producers have had to shift to using "intentional" control for their management. Entomologists have been addressing this problem for several years now and have generated some useful information concerning management of stink bugs in cotton (Greene et al., 1999;

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Greene et al., 2001a,b; Willrich et al., 2002; Greene and Capps, 2002). In 2002, we continued investigations into the development of boll injury-based thresholds for stink bugs.

RESEARCH DESCRIPTION

Plots (16 rows by 66 ft) of DP451B/R at the Rohwer Branch of the Southeast Research and Extension Center in Desha County, AR and ST4892B/R (24 rows by 200 ft) at a producer's farm in Ashley County, AR were arranged in a randomized complete block design with 6 to 7 treatments and 4 replications. Twenty-five bolls (50 to 75% full size, ca. 14 d from white bloom) were collected from each plot weekly and examined for internal symptoms of feeding by stink bugs. A boll was considered damaged if at least one internal growth (cell proliferation) or obvious staining of lint with associated feeding injury to seeds was observed. Dicrotophos (Bidrin 8, Amvac, Los Angeles, CA at 0.50 lb ai/acre) was applied to all plots in a treatment at or exceeding the following levels of damaged bolls: 10, 20, and 30% and at a density of 1 bug per 6 ft of row. Additional treatments included a 15% level in Ashley County and an untreated control at both sites. Two rows from the center of each plot were harvested by machine.

RESULTS AND DISCUSSION

In 2002, three test fields in southeast Arkansas were established for research addressing boll-injury thresholds for stink bugs. One field was lost due to the absence of satisfactory numbers of bugs and other circumstances. A second field in Ashley County was sampled all season, but a problem with harvesting resulted in the loss of yield data from the test. Yield data, along with boll injury and insect sampling data, were obtained from a third test site at the Rohwer Experiment Station in Desha County, AR. At that site, 4 applications of dicrophos (Bidrin 8) at 0.5 lb ai/acre at thresholds of 10, 20, and 30% internal boll injury resulted in 217, 227, and 151 lb/acre, respectively, increases in lint yield when compared with untreated plots. Three applications at the 50% level resulted in a 119 lb/acre increase. In-field populations were not detected at the threshold of 1 bug per 6 row feet using a shake sheet. These data support data summarized from 1999-2001 in Georgia cotton fields where 10, 20, and 30% thresholds had identical trends in yield (Fig. 1). When yield increases and insecticide costs were calculated, the 20% level of treatment (followed closely by 30%) yielded the best net return. Recommendations in Arkansas, Georgia, South Carolina, and many other states include some variation of a boll-injury threshold for stink bugs. As a result of these continuing studies, alternative monitoring and management recommendations are available for stink bugs in cotton.

PRACTICAL APPLICATION

Because stink bugs are challenging to detect in cotton with traditional sampling tools, we continued investigations of other methods of monitoring the pest complex for management decisions. Research with treatment thresholds for stink bugs, based on monitoring internal feeding injury to bolls, supported treatment at 20% injury to mid-sized (ca. 14-d-old) bolls.

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DISCLAIMER

The mention of trade names in this report is for informational purposes only and does not imply an endorsement by the University of Arkansas Cooperative Extension Service.

LITERATURE CITED

Greene, J.K., S.G. Turnipseed, M.J. Sullivan, and G.A. Herzog. 1999. Boll damage by southern green stink bug (Hemiptera: Pentatomidae) and tarnished plant bug (Hemiptera: Miridae) caged on transgenic *Bacillus thuringiensis* cotton. J. Econ. Entomol. 92(4):941-944.

Greene, J.K., G.A. Herzog, and P.M. Roberts. 2001a. Management decisions for stink bugs. Proc. 2001 Beltwide Cotton Conf., National Cotton Council, Memphis, TN. Vol. 2:913-917.

Greene, J.K., S.G. Turnipseed, M.J. Sullivan, and O.L. May. 2001b. Treatment thresholds for stink bugs (Hemiptera: Pentatomidae) in cotton. J. Econ. Entomol. 94(2):403-409.

Greene, J.K. and C.D. Capps. 2002. Efficacy of insecticides for control of stink bugs. Proc. 2002 Beltwide Cotton Conf., National Cotton Council, Memphis, TN. CD-ROM.

Willrich, M.M., K. Emfinger, B.R. Leonard, D.R. Cook, and J. Gore. 2002. Modified AVT: susceptibility of stink bugs to selected insecticides. Proc. 2002 Beltwide Cotton Conf., National Cotton Council, Memphis, TN. CD-ROM.

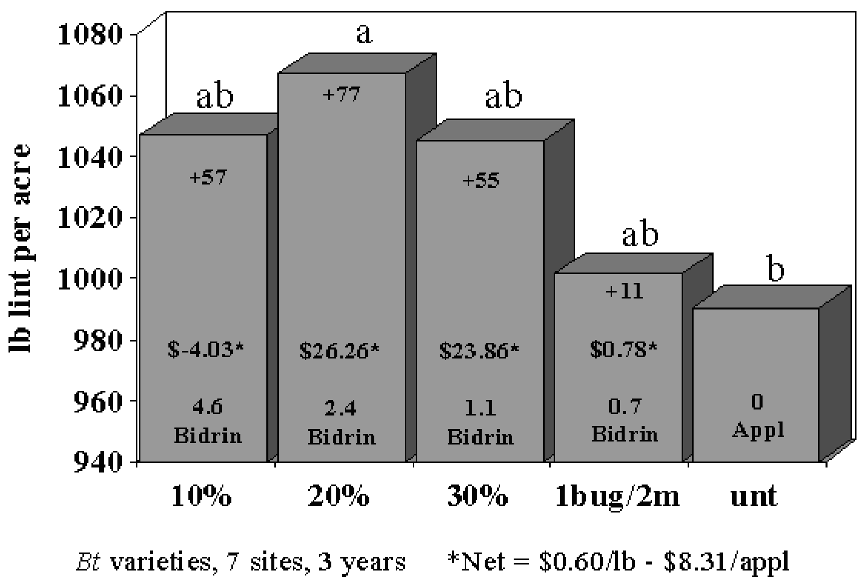

Fig. 1. Seven-site average (1999-2001) lint yield following treatment with dicrotophos (Bidrin 8, avg. no. of treatments per season) at various thresholds (percentage of internal boll injury or density) for stink bugs. *Net $ gain, calculated with yield gain at $0.60 per lb minus $8.31 per application ($5.31, insecticide plus $3.00, application costs). Treatment bars with a letter in common are not significantly different, P≤0.05, LSD = 74.