Influence of No-tillage Practices on Tobacco Thrips Infestations in Cotton.

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ABSTRACT

Infestations by the tobacco thrips *(Frankliniella fusca* Hinds), were reduced in no-tillage as compared with surface tillage for up to 21 days in areas planted with cotton *(Gossypium barbadense* L.), following fallow (1990) and wheat (1991). Thrips populations were also influenced by different cultivars; fewer adults and nymphs were collected on 'Chembred 1135' in either tillage system as compared with 'Coker 320' or 'Delta Pine 90.' Infestations were significantly reduced in all treatments when aldicarb (0.6 kg ai/ha) was applied in the seed furrow at planting time.

INTRODUCTION

Use of no-tillage (NT) practices for the production of cotton is being pursued increasingly in several southern states, and there is concern for potential of increased insect problems associated with reduced tillage. All and Musick (1986) and Stinner and House (1990) reviewed the status of knowledge on insect pest hazard in no-tillage systems, and both indicate that there is a paucity of information on cotton insects. Promotion of "earliness" in cotton with practices that ensure good germination and establishment of vigorous stands has substantial yield benefits Rhone-Poulenc 1989). Reduction in damage by the tobacco thrips in young cotton aids rapid establishment of vigorous stands. Certain cotton cultivars, such as Delta Pine 90, have resistance to tobacco thrips (DuRant, 1989). The current research was conducted during 1991-92 to determine if infestations of tobacco thrips were influenced by NT practice during the initial weeks of cotton growth and to evaluate whether cultivar selection or aldicarb were effective IPM practices.

METHODS

In 1990, the test was conducted in a two ha field near Athens that had been left fallow following harvest of corn the previous year. In 1991 the cotton was planted shortly after harvest of wheat in a two ha field. The fields were arranged in a randomized complete block split-split plot design. Main plots were NT or surface tillage (ST), split plots were cultivars Delta Pine 90 (DP90), Coker 320 (C320), or Chembred 1135 (CB1135) (used in 1990 only) and split-split plots were aldicarb (0.6 kg ai/ha) applied at planting in the seed furrow as compared with no insecticide treatment. Tillage blocks were 20 m long x 48 (1990) or 64 (1991) rows with 3.5 m alleys; cultivar plots were 16 or 32 rows; insecticide and control plots were alternating paired rows within each block. Each treatment was replicated four times.

Thrips populations were sampled 21 days after planting by immersing leaves of 20 plants collected at random from each plot in containers with 80% alcohol. Adults and nymphs were counted and identified using a dissecting microscope. Data were analyzed using computer based ANOVA procedures (SAS, 1985).

RESULTS AND DISCUSSION

In both 1990 and 1991, tobacco thrips were the only species identified from the samples taken 21 days post planting on plants in the first true leaf stage of development. Substantially greater infestations occurred in

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1990 in the corn/fallow area as compared with the wheat area of 1991, but thrips infestations were generally higher statewide in 1990 than 1991. Significantly higher numbers of adults and immatures were sampled from plants in the surface tillage (ST) areas as compared with no-tillage in the 21 day sample both years. Means were 1.47 ± 0.4 (std. deviation) and 0.6 ± 0.4 in NT, and 1.75 ± 0.6 and 1.0 ± 0.4 in ST in 1990 and 1991, respectively.

There were significant differences in tobacco thrips infestations among the three cultivars in 1990, with CB1135 having significantly fewer insects (x = 1.42 +0.4) as compared with C320 and DP90 (x = 1.64 + 0.5 and 1.76 + 0.5, respectively). In 1991, CB1135 was not used in the test, but C320 had significantly fewer numbers of tobacco thrips (x = 0.65 + 0.4) as compared with DP90 (x = 0.93 + 0.2). There was no cultivar x tillage interaction in either year.

Aldicarb at 0.6 kg ai/ha significantly reduced thrips populations in comparison with the untreated cotton at 21 days in all treatments. The percent control was 42.1 in NT and 32.9 in ST in 1990; whereas, in 1991; 51.7% control of thrips in the NT plots was significantly greater than ST, which had 39.4%. No interaction of cultivar or cultivar x tillage with aldicarb treatment occurred in either year.

In conclusion, the research indicates that infestations of tobacco thrips on seedling cotton (first true leaf stage) are reduced for up to 21 days in NT as compared with ST systems. Damage to the seedling cotton at this stage can result in 10 to 20% or higher reductions in yield with susceptible cultivars. CB1135, a hybrid cotton cultivar, had less infestation by tobacco thrips than C320 or DP90, and damage was significantly reduced to all three cultivars by treatment with aldicarb (0.6 kg ai/ha). Thus, IPM for control of tobacco thrips infestations on seedling cotton may be enhanced using a combination of no-tillage, cultivar selection and aldicarb.

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