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TARNISHED PLANT BUG SUPPRESSION AND WATER QUALITY IMPACT FROM HERBICIDE APPLICATIONS IN FIELD

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Abstract

Experiments were conducted in 2000, 2001 and 2002 in Tensas parish near Newellton LA, to evaluate the potential of reducing tarnished plant bugs (TPB), *Lygus lineolaris* Palisot de Beauvois, by managing weed host in field border areas adjacent to cotton fields prior to cotton planting.

Two approximately equal test areas were established in each year of which field borders in one were treated with herbicide to control broadleaf weeds. Herbicide applications were initiated 23 February 2000 and 19 March 2001. A fall application of herbicide was made to the treated area in 2001 and then was spot treated in March of 2002. Strike 3™, a combination of 2,4-D, mecoprop, and dicamba (Riverside Product Label, Terra Industries Inc., Sioux City, IA) was applied at 2.22 kg ai/ha (1.37 + 0.73 + 0.12 kg ai/ha for 2,4-D, mecoprop, and dicamba, respectively) to kill broadleaf weeds.

Each test area in 2000 was divided into two approximately equal quadrants from which four sample areas with a consistent population of weed host were identified for sample collections. In 2001 and 2002, each test area was expanded and each area was divided into four approximately equal quadrants from which three or four sample areas were identified for sample collection. Four locations within each sample area were chosen from which weed and tarnished plant bug data were collected. A 7.62-meter (m) rope marked in 0.31-m increments was placed through the wild host to provide consistency in data collection. Weed density and species identification was determined by counting the number of weed hosts in a 0.25 m^2 PVC square placed at random to four of the marked increments along the rope. The weed density and species data were taken prior to the herbicide treatments and three to four weeks post treatment. Tarnished plant bug adults and nymphs were collected from 25 sweeps in each of the four locations within a sample area in the near vicinity of the weed density samples using a standard sweep net (38 cm diameter). Each sample was placed in 3.785 L plastic ziplock bag. The plastic bags were placed in a freezer for 12 to 24 hours then TPB adults and nymphs were counted. Field border sampling was initiated in February prior to herbicide treatments and sweep net data from the field borders were collected weekly continuing through the first week of June.

Cotton fields in each test area were sampled for TPB beginning in June. Sweep net samples were made at five sites in each quadrant in 2000. At each of the five sites, four sets of 25 sweeps were made in the cotton field. In 2001 and 2002, one to two cotton fields in each quadrant were chosen at random each week to determine TPB populations in cotton fields. Fields were sampled by walking down the cotton row at five sites in each field. Five sets of 20 sweeps were made while traveling through the field. The number of TPB adults and nymphs were determined in the field.

Averaged across years, pretreatment weed counts were not different in the two areas and averaged 38 and 47 weeds/m^2 in the treated and nontreated, respectively. After herbicide treatments, weed counts in the treated area fell to approximately 2.0 weeds/m^2. Weed counts in the nontreated also fell resulting in a count of 20 weeds/m^2. Weed density reductions in the nontreated area could by attributed to weed senescence and burndown applications by the producer.

In 2000, differences in the number of tarnished plant bugs caught in field borders were higher from early to mid April throughout May. Adult numbers in the treated area did not exceed two insects in 25 sweeps and nymph numbers remained below one in 25 sweeps. In the nontreated area, adult numbers began to increase in early April and peaked on 23 May at 16 in 25 sweeps. In contrast, nymph numbers in the nontreated area peaked in mid April and declined through May.

Differences in adult TPB between the treated and non-treated area were evident by 9 April in 2001. Tarnished plant bug nymph populations did not begin to build until the end of April and differences between the treated and non-treated area were not distinguishable until 3 May. Tarnished plant bug numbers in the treated area were no greater than 1.5 insects in 25 sweeps at any rating date. In the non-treated area TPB numbers peaked at 10 and 11 in 25 sweeps for adults and nymphs, respectively.

In the treated area in 2002, adult and nymph numbers were below three in 25 sweeps. Adults captured in 25 sweeps peaked at 17 on 11 April in the nontreated area. In general, nymph numbers in 2002 were lower than in the other years. The highest number of nymphs, seven in 25 sweeps, was caught on 2 April.

Cotton field sweeps revealed erratic numbers with no differences in the two areas. This was partially due to Boll Weevil Eradication Program sprays and insecticide applications by the producers.

Shortly after the initiation of the project, burndown for corn planting began. As many of the fields were sprayed with burndown chemicals, so were the field border and ditch areas. Some sites had to be abandoned. The field border areas that were not dessicated with burndown chemicals were bush hogged throughout the summer. This had a significant impact on TPB host plants and consequently the population. Boll weevil eradication blanket sprays at pinhead square in these areas began on 26 May 2000. Tarnished plant bug numbers fell to zero after the initiation of these sprays. Weekly malathion applications by air continued for approximately four weeks. Cotton fields were sprayed weekly with mist trucks throughout June, July, and August 2000. In addition, the consultant for this area made nearly routine applications of acephate (Orthene 90SP) along field borders and in areas that cotton fields were adjacent to corn to control TPB migrating from these areas. Although malathion sprays and routine maintenance of the field borders reduced the populations of TPB, early season sweep data in field borders indicate that populations can reach substantial numbers.