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OBSERVATIONS ABOUT SOME UNUSUAL COTTON PESTS IN TENNESSEE DURING 2003

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Abstract

The following is intended to document observations on the biology, injury potential and management of several relatively unusual pests that occurred in Tennessee cotton fields during 2003. These pests include the clouded plant bug (*Neurocolpus nubilus*), Japanese beetle (*Popillia japonica*), corn root aphid (*Anuraphis maidiradicis*), and snails and slugs (Mollusca). With the exception of the clouded plant bug, economic damage appeared to be confined to only a few fields. The cotton square borer (*Strymon melinus*) and variegated leafroller (*Platynota flavedana*) were also observed in cotton more commonly than usual in 2003, but they are often present in low numbers every year and are not discussed here.

Clouded Plant Bug

Clouded plant bugs (Fig. 1) have been a common occurrence in many fields of West Tennessee during the last two years, particularly the southern counties of Crockett, Madison, Henderson, Haywood, Lauderdale, Tipton, Fayette, Hardeman, Chester, and McNairy. This species is slightly larger than the tarnished plant bug. Besides cotton, its host range includes evening primrose, goldenrod, honeysuckle, Johnsongrass, morningglory, smart weed, stink weed, soybean, alfalfa, button bush, black willow, and others (1). Although annually present in low numbers, this insect was the dominant plant bug species in many fields during 2003, and many fields were treated specifically for clouded plant bugs on one or more occasions. Early-season (pre-bloom) populations of clouded plant bugs were composed mostly of adults, and feeding injury appeared to be similar to that of tarnished plant bug, causing square abscission. Once blooming began, overlapping generations of nymphs and adults were often present and persisted until physiological cutout. Feeding on larger squares, in blooms and on small bolls was reminiscent of that by the tarnished plant bug. During late-season, immatures and adults congregated on squares and within blooms, but significant boll feeding (cat-facing) was also observed as the crop matured. Unlike stink bugs, the feeding insects did not appear to specifically target developing seed within bolls. However, injured bolls sometimes abscised or the lint was stained. After bloom, "working" treatment thresholds of 10 bugs per 100 plants or 20% damaged, thumb-sized bolls were suggested. However, specific thresholds have not been developed for the clouded plant bug. When high populations of nymphs were present, a single insecticide application was sometimes not sufficient, often giving 60-70% control of clouded plant bug populations. Nevertheless, limited insecticide testing indicated that pyrethroid insecticides and insecticides typically used for control tarnished plant bug provided a similar level of suppression (Table 1).

Japanese Beetle

Since its introduction to New Jersey about 80 years ago, adult Japanese beetles have become a very common pest of many ornamental tree and shrub species throughout much of the eastern United States (2,3,4). The larva is a white grub that is also an important pest of turfgrass in the same area (2,3,4). In the Cotton Belt, the current distribution of Japanese beetles include Virginia, North and South Carolina, northern and central Georgia, most of Alabama, Middle Tennessee, and a few counties in West Tennessee and north Mississippi. Isolated infestations are often observed near nursery and vegetable operations, presumably where insects are unintentionally introduced. This pest spends most of its life cycle underground, with adults in middle and West Tennessee emerging during the early summer. Immigrating beetles injure cotton by skeletonizing foliage. However, feeding on flower petals also occurs. Adults are gregarious and typically concentrated into isolated spots of fields and on leaves of individual plants (Fig. 2). Intervention with insecticides is generally not justified as economic damage rarely, if ever, occurs. However, many broad spectrum insecticides such as pyrethroids, carbaryl and acephate appear to provide excellent control of adults. Soybeans appear to be preferred over cotton, and potential defoliation to emerging soybeans resulted in the treatment of one field in Middle Tennessee 2003.

Corn Root Aphid

Populations of corn root aphids (Fig. 3) were found in only two fields of cotton (Carroll County, TN) in West Tennessee. However, they may have been present at low levels in many fields. The most common hosts of the corn root aphid include the roots of cotton, corn, and smartweed. Other documented hosts are broomcorn, crabgrass, dock, foxtail, knotweed, mustard, pigweed, plantain, purslane, ragweed, sorghum, sorrel, squash and wheat (5). This aphid is similar in size to the cotton aphid, *Aphis gossypii*, but is typically blue-greenish color. The corn root aphid is highly dependent upon ants, especially the cornfield ant. Aphid eggs overwinter within ant nests, and ants inoculate the roots of host plants in the spring with newly-emerged nymphs (5). The ants then feed on honeydew produced by the aphids. Over 15-20 generations per year are possi-

ble. Aphids damage plants by feeding on phloem and stunting seedlings. Although no economic thresholds have been established for this pest in cotton, infestations can apparently be reduced or prevented by controlling weedy weed hosts in the spring and by tillage. Deep tillage reduces co-occurring populations of ants on which the aphid is dependent (5). Consequently, infestations of corn root aphids are more likely in reduced-tillage fields. The use of at-planting insecticides such as Temik (aldicarb) has been purported to reduce aphid populations, either directly or indirectly by affecting mutualistic ant populations. Seed treatments were used in the two infested fields observed in West Tennessee.

Snail and Slugs

High populations of snails are routinely observed in no-till cotton fields in Tennessee. Although some species of snails are phytophagous, most found in cotton are detritivores and plant damage is seldom observed in cotton. In 2003, minor defoliation was observed in one cotton field in Shelby County. In contrast, most terrestrial slugs are generalistic plant feeders, and many are known pests (6). Economic injury is known to occur in soybean and corn (6,7), particularly in the Midwest. Slug infestations in cotton fields of West Tennessee were widespread during 2003, albeit mostly of minor consequence. These slugs were tentatively identified as marsh slugs, *Deroceras laevis* (Fig. 4). Slug damage was highly associated with the practice of reduced tillage and infestations were particularly prevalent in no-till fields previously planted in corn. Damage was primarily confined to seedling plants and was characterized by irregularly-shaped feeding holes on the leaves or leaf margins (Fig. 4). Plants were occasionally "cut" similar to that caused by cutworm injury, resulting in seedling death and stand reduction. Several fields experienced significant stand loss. In these circumstances, yield loss could not be definitively documented but appeared likely. Damage was most severe in fields that were wet when planted, resulting in a partially open seed furrow. The opened furrow may have served as a harborage to slugs, concentrating their feeding on emerging seedlings. Adult slugs may live six or more months. Overwintering is accomplished as eggs, although juveniles and adults may remain active throughout the year in warm climates. It is presumed that infestations resulted from the feeding first-generation slugs, from overwintered eggs, that had fed on weed hosts in the field prior to planting.

Slug control with insecticides is generally not effective, and a trial conducted in West Tennessee during 2003 appeared to confirm this observation (Table 2). Treatment using a metaldehyde bait (e.g., Deadline MP) is often recommended for homeowner/garden use. Application of this product on a commercial scale is expensive, and sufficient quantities are often not readily available. Some control success in corn has been reported by making applications of urea-based nitrogen at night, but the efficacy of this treatment is erratic (6).

References

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Table 1. Results of a replicated insecticide trial for clouded plant bugs in cotton (Crockett County, TN; 9/9/03). Insecticides were applied with a CO_2 backpack sprayer calibrated to deliver 15 gallons/acre. Each four-row X 75 ft plot was evaluated two days after treatment by counting the number of bugs on 100 squares, blooms or small bolls per plot (Investigators: S. Stewart and R. Buntin). In this test, insects were concentrated in plant terminals.

Treatment	Product rate per acre	Total CPB per 100 fruit (2 DAT)	
Untreated		11.7	a
Centric 40WG (thiamethoxam)	1.5 oz	2.7	b
Leverage 2.7 (imidacloprid + cyfluthrin)	2.0 oz	0.7	b
Bidrin 8E (dicrotophos)	6.0 oz	1.0	b
Vydate 3.77E (oxamyl)	10 oz	0.7	b
Karate 2.08E (cyhalothrin)	1.85 oz	0.0	b
Mustang Max 0.8E (zeta-cypermethrin)	3.0 oz	0.0	b
Orthene 90S (acephate)	0.37 lb	2.7	b
Lorsban 4E (chlorpyrifos)	8.0 oz	0.7	b

Means not followed by a common letter are significantly different ($P < 0.05$, Fisher's protected LSD).

Table 2. Results of a replicated insecticide trial for slugs in cotton (Lauderdale County, TN; 6/6/03). Insecticides were applied with a CO_2 backpack sprayer calibrated to deliver 15 gallons/acre. Each four-row X 50 ft plot was evaluated three days after treatment by counting the number of slugs per six row feet that were within six inches of the seed furrow (Investigators: S. Stewart and J. Parker).

Treatment	Product rate per acre	Slugs per 6 ft of row (3 DAT)	
Untreated		4.20	a
Bidrin 8E (dicrotophos)	8.0 oz	5.33	a
Sevin 4XLR (carbaryl)	1.5 qt	5.00	a
Lorsban 4E (chlorpyrifos)	1.0 qt	3.67	a
Mustang Max 0.8E (zeta-cypermethrin)	3.5 oz	3.00	a
Commercial bait (3.5% metaldehyde + 4.5% carbaryl)	58 lb	3.33	a

Means not followed by a common letter are significantly different ($P < 0.05$, Fisher's protected LSD).

Figure 1. Clouded plant bug adult (left), nymph (center), and boll damage (right).

Figure 2. Japanese beetles skeletonizing cotton leaf.

Figure 3. Corn root aphids infesting the roots of cotton.

Figure 4. Slugs and the damaged caused to seedling cotton plants.