INSECTS AND MITES NEW TO FLORIDA SUGARCANE

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ABSTRACT

The number of insect and mite species attacking sugarcane in Florida has increased in recent years. Five pest species were newly discovered during the 31-year period 1964 to 1995. These included one species indigenous to Florida having no previous association with sugarcane and four invasive species new to the Everglades Agricultural Area where sugarcane is grown. Reported here are six species that were discovered for the first time infesting Florida sugarcane during the eight-year period 1995 to 2003. They included: the desert corn flea beetle, Chaetocnema ectypa Horn (Coleoptera: Chrysomelidae); a leafmining buprestid beetle, Aphanisticus cochinchinae seminulum Obenberger (Coleoptera: Buprestidae); an armored scale, Duplachionaspis divergens (Green) (Hemiptera: Diaspididae); a spider mite, Oligonychus grypus Baker and Pritchard (Acarina: Tetranychidae); the Diaprepes root weevil Diaprepes abbreviatus (L.) (Coleoptera: Curculionidae); and the pink sugarcane mealybug, Saccharicoccus sacchari (Cockerell) (Hemiptera: Pseudococcidae). Infestations of the scale D. divergens and the spider mite O. grypus were found infesting sugarcane in greenhouses. Damage resembling that caused by O. grypus was found in several commercial cane fields but may have been caused by other spider mite species associated with Florida sugarcane. Although adults of the leafmining buprestid A. cochinchinae seminulum and the Diaprepes root weevil were found in commercial fields, larval infestations of these species have not yet been reported.

INTRODUCTION

The species complex of arthropods associated with sugarcane in Florida continues to diversify. The number of phytophagous species has increased over time, with some of the new species being indigenous to Florida but with no known previous association with sugarcane, such as the large scarab grub Tomarus (=Ligyrus) subtropicus Blatchley. However, most of the new species are invasive and entirely new to the Everglades Agricultural Area where sugarcane is grown. New insect pests of sugarcane and other crops continue to invade Florida (Frank and
McCoy, 1992; Thomas, 2004). Since 1971, exotic insect pests have been arriving and becoming established in Florida at a rate of about 10 species per year, or about one new species every five weeks (Frank and Thomas, 2004).

Although the rate of immigration into Florida by exotic pests seems to have held relatively steady over the past 30 years, the source of the immigrant species has changed (Frank and Thomas, 2004). Earlier in this time period, the major source of immigrants was the New World tropics (the Caribbean, Central America, South America), but during the 1990s, there was a steady increase in species from other parts of the world, especially Asia (Frank and Thomas, 2004). Numbers of immigrant species from the Old World now almost equal those from the New World (Frank and Thomas, 2004).

An early review of insects associated with sugarcane in Florida was presented by Ingram et al. (1938) and later expanded by Gifford (1964) and Hall (1988). Insects listed by Hall (1988) that invaded Florida after Gifford’s 1964 report included the sugarcane aphid *Melanaphis sacchari* (Zehntner) and the sugarcane delphacid, *Perkinsiella saccharicida* Kirkaldy. Two new insect pests invaded Florida sugarcane during the 1990s, the lacebug, *Leptodictya tabida* (Herrich-Schaeffer) (Hall and Bennett, 1994), and the West Indian cane weevil *Metamasius hemipterus* (L.) (Sosa et al., 1997).

Reported here are five insects and a mite new to Florida sugarcane over the past eight years.

**MATERIALS AND METHODS**

The date and location of the first observation on sugarcane of five insect and one mite species are given. Any plant damage observed is described. A detailed description of each species is then provided.

**RESULTS AND DISCUSSION**

The desert corn flea beetle, *Chaetocnema ectypa* Horn (Coleoptera: Chrysomelidae).

Damage to sugarcane leaves by this insect was first noted on June 19, 2000, in the vicinity of Clewiston in Hendry County. The insect pest responsible for the damage was discovered on June 21, 2000 and was identified as the desert flea beetle *Chaetocnema ectypa* (Figures 1, 2, 3, 4) by A. S. Konstantinov. The plant damage was characterized by an etching of leaf epidermal tissue (Figures 5 and 6).

The adults of *C. ectypa* are well characterized and illustrated in the most current revision of the Nearctic *Chaetocnema* (White, 1996). The beetles (Figure 1) are small (1.30 – 1.75 mm in length), gossy dark brown to black with antennae pale brown at basal half and dark brown at apical half; pro- and mesofemora brown, metafemora dark brown, often all femora light apically; rest of legs pale brown to brown. From the most similar species, *C. pulicaria* Melsheimer, *C. ectypa* can be reliably separated only based on the shape of male genitalia, which are clearly asymmetrical in *C. pulicaria* and symmetrical in *C. ectypa* (Figure 4).
Chaetocnema ectypa is a relatively common species with about 6000 specimens in the collection of the National Museum of Natural History of which 1,137 have been mounted and examined by White (1996). It is known to be widely distributed across the south-western regions of the United States, east to Manitoba and Louisiana. Its presence in Florida constitutes a substantial eastern extension of its range since White (1996) and Riley et al. (2003).

Chaetocnema ectypa is recorded from a variety of hosts mainly from Poaceae (Avena, Bambusa, Distichis spicata (L.) Greene, Hordeum murinum L., H. sativum Pers., rice [Oryza sativa], bluegrass [Poa], Sorghastrum, Sorgum durra (Forssk.) Stafp., S. halepense (L.) Pers., Sudan grass [S. sudanense (Piper) Starf], Triticum aestivum L., and Zea mayas L.) (Clark et al., 2004). Beyond Poaceae, C. ectypa has been recorded from Apiaceae (carrot – Daucus carota L.), Asteraceae (Baccharis, safflower – Carthamus tinctorius L.), Brassicaceae (turnip – Brassica rapa L.), Chenopodiaceae (Beta vulgaris L., Salsola kali L.), Convolvulaceae (sweet potato – Ipomoea batatas (L.) Lam.), Cucurbitaceae (cucumber – Cucumis sativus L., pumpkin – Cucurbita), Fabaceae (peanut – Arachis hypogaea L., Medicago sativa L., pole bean – Phaseolus vulgaris L.), Lauraceae (avocado – Persea americana Mill.), various Linaceae, Pinaceae, Salicaceae, Solanaceae, and Tamaricaceae (Clark et al., 2004). However, Clark et al. (2004) conclude that “no non-poaceous plants are probably not normal hosts” (page 40). Clark et al. (2004) also cite sugarcane as a host of C. ectypa.

The adult beetle can hop away like a flea when disturbed and can also fly. Information on the biology and life cycle of C. ectypa was not available when this report was written, but we suspect this species is not that different from other Chaetocnema species, in which eggs are laid in the soil, developing larvae feed on roots, pupation occurs in the soil, and adults emerge from the ground to feed on leaves. Some flea beetle species are known to transmit diseases to corn and other crops, but whether C. ectypa might vector any sugarcane diseases is not known. A survey during June 2000 confirmed the following cultivars were attacked by adult beetles: CL77-797, CP73-1547, CL82-789, CP80-1743, and CL81-1453. The pest possibly has been present at low population levels in Florida sugarcane in the past, with environmental conditions during spring and early summer, 2000, being very favorable for it. The desert corn flea beetle’s importance as a pest of cane is not known.

A leafmining buprestid beetle, Aphanisticus cochinchinae seminulum Obenberger (Coleoptera: Buprestidae).

An insect species never observed in Florida sugarcane by the senior author was found resting on leaves in a commercial field located about 10 km south east of Clewiston during June, 2000. No damage to leaves by the insect was noted. Adults of the insect were identified as a leafmining buprestid beetle, Aphanisticus cochinchinae seminulum, by R. L. Westcott.

The insect is native to Malaysia and Southeast Asia and was first described from specimens collected in Singapore (Obenberger, 1929). It is known to attack sugarcane in Java (Indonesia) but is not regarded as an economic pest probably because it is under biological control. It was discovered in sugarcane in Hawaii during 1984 (Heu, 1986a; Heu, 1986b) and in Texas during 1994 (Wells and Jackman, 1995). The beetle was found in northeast Gainesville,
Alachua County, Florida, during 1995 in association with Gama grass (*Tripsacum dactyloides* (L.)L.) (Halbert and Meade, 1995) and later in St. Lucie County (Halbert, 1995a).

The following information on *A. cochinchinae seminulum* was taken largely from Chang (1984) and Heu (1986a, 1986b). The adult beetle is tiny and elongated in shape (2.5 to 3.5 mm long and 1.2 mm wide, blunt anteriorly and narrowly tapered posteriorly) and glossy blackish-bronze in color with faint metallic reflections (Figure 7). The adult feeds on leaf tissue and makes microscopic linear feeding marks. Females lay a single, yellow-white egg on a leaf and cover it with an oblong glossy black coating. The egg hatches into a legless, orange-yellow larva that has a flattened, elongated body tapered to the rear. The larva makes a mine in the leaf by tunneling between the upper and lower leaf epidermal layers. The mine is initially reddish in color and linear up to 100 mm long but only 0.5 mm wide. Later the mine is widened to 3-4 mm in the lower one-third to one-half portion of the mine, thus forming a blotch of dead tissue which often appears puffy. At the top of the linear mine, there is often a tiny, dark brown, glossy blister over the healthy tissue. This is the egg casing from which the larva emerged. Pupation occurs in the mine within 2-3 weeks. The pupa is initially orange-yellow but turns brown-black. The adult beetle emerges about 14 days later, chewing a hole through the dead leaf tissue associated with the mine. In Hawaii, up to nine mines have been found on a single sugarcane leaf. Sometimes when multiple mines are present on a leaf, they merge together and form a large patch of dead tissue. Intuitively, if enough mines are present on leaves then leaves could die and cane growth and yield could be negatively affected. The beetle has been considered of little or no significance in Hawaii as a pest of cane.

Two parasitic wasps, *Closterocerus tricinctus* Ashmead and *Eulophus femoralis* Zehntner, have been reported to attack a related beetle in Java (*Aphanisticus consanguineus* Tisema) (Chang 1984). These parasitoids apparently provide good biological control and therefore might be tried for controlling *A. cochinchinae seminulum* should the need arise. A parasitoid (species name not available at the time this report was written) has been found attacking *A. cochinchinae seminulum* in Hawaii, and it might be worthwhile to consider importing this parasitoid into Florida should the miner become a problem.

An armored scale, *Duplachionaspis divergens* (Green) (Hemiptera: Diaspididae).

The invasive armored scale *Duplachionaspis divergens* was found infesting sugarcane in a greenhouse (U. S. Sugar Corporation, Research Department, Clewiston, FL) during 2003. No infestations of the scale have yet been reported in fields of commercial sugarcane in Florida.

The earliest known record of this species occurring in Florida is September 2000. The current known world distribution of this scale insect includes: Australia, USA (Florida), Colombia, Venezuela, India, Sri Lanka, Taiwan, Thailand, Algeria, China, Egypt, and Japan. The geographical origin for this scale is unknown but is suspected to be either the Oriental or the Palearctic Region. Lastra and Gomez (1997) reported its occurrence in the Western Hemisphere from collections made on sugarcane in Colombia in November 1996; however, specimens collected by Fred D. Bennett in Venezuela on sugarcane detected its presence in the Western Hemisphere as early as April 1991 (G. Hodges, personal communication).
Duplachionaspis divergens (Figure 8) has a white, elongate (about 3.5 times as long as wide) scale cover with light brown terminal exuvia. By flipping the scale cover off, the body of the adult female is yellow in color, elongate (1.46 mm long and 0.64 mm wide) with four to five lateral lobes. There are few species of armored scales with elongate white covers occurring on grasses in Florida. Some of the scales that D. divergens resemble are those in the genus Haliaspis. However, species of Haliaspis are almost always associated with wetland grasses and are generally smaller in size (1.0 mm). Other elongate species can be found on bamboo but are very small (less than 1.0 mm) and often thread-like in appearance. Other armored scale species found on grass hosts besides bamboo in Florida are oval to circular in shape and are usually found in the crown of the grass rather than on the leaves. Little is known about the biology of this insect in Florida. Lastra and Gomez (1997) reported information on the life cycle of this scale on sugarcane in Colombia. In that study, females produced an average of 130 eggs with crawlers emerging about 8 days after egg deposition. This scale insect is known to produce multiple generations per year.

The overall economic significance of this scale insect is unknown, but it is only known to feed on grasses. Pruthi and Rao (1942) reported it as a minor pest of young sugarcane plants in India; therefore, it is a potential pest of sugarcane in Florida. The scale infests sugarcane leaves (Figure 9) and leaf-sheaths (Figure 10). This species has been found on and is a potential pest of St. Augustine grass (Stenotaphrum secundatum (Walt.) Kuntze), an important lawn grass; Bahia grass (Paspalum notatum Flugge), an important pasture grass; and saltmarsh cordgrass (Spartina alterniflora Loisel), an important marsh grass (Bruno 1999).

A spider mite, Oligonychus grypus Baker and Pritchard (Acarina: Tetranychidae).

An infestation of a spider mite, Oligonychus grypus (identification by Cal Welbourn), was discovered infesting sugarcane in greenhouses in Clewiston and Canal Point, Florida during March, 2002. This species was originally described from sugarcane and grasses in Zaire and has been reported from sugarcane in Brazil by Flechtmann (1996) and Australia (Beard et al., 2003). The mite feeds on the underside of leaves, and damage by the mite in Brazil has been described as “intense yellow punctuations on leaves, which later turned red and dried completely.” Taxonomic identification of O. grypus required examination of male mites. Damage resembling that by O. grypus to commercial sugarcane was observed in several fields during March, but whether the damage was actually caused by this recently introduced species could not be confirmed because male specimens could not be found. It remains possible that the damage in these fields was caused by other Oligonychus species known to infest Florida sugarcane, O. pratensis (Banks) or O. stickneyi (McGregor). O. grypus has subsequently been found on various grasses in several counties in southern Florida.

Pink sugarcane mealybug, Saccharicoccus sacchari (Cockerell) (Hemiptera: Psuedococcidae).

The pink sugarcane mealybug, Saccharicoccus sacchari was detected in southeast Florida (Dade County) in 1944 (Frank and Thomas, 2004). The mealybug (Figure 11) was first found in sugarcane within the Everglades Agricultural Area in Palm Beach County during 1995 by O. Sosa (Halbert, 1995b) and identified by G. Hodges. A slight infestation was found in
commercial sugarcane near Canal Point, Florida during 1996 (Halbert, 1996). The mealybug was found in commercial cane in Hendry County during 1999 (Halbert, 1999). The pest status of *S. sacchari* in Florida sugarcane has not been assessed, but general observations have indicated the mealybug may be of little economic importance. Generally, biological control of sugarcane mealybugs in conjunction with healthy-seedcane programs help keep these pests in check. No research has been conducted on biological control of *S. sacchari* in Florida sugarcane.

**The Diaprepes root weevil, Diaprepes abbreviatus (L.) (Coleoptera: Curculionidae).**

The Diaprepes root weevil, *Diaprepes abbreviatus*, is invasive to Florida and occurs naturally in the Lesser and Greater Antilles where it attacks sugarcane and citrus (Bennett et al., 1990). This weevil is an important pest of sugarcane in Barbados and Puerto Rico. The weevil was first reported in Florida during the 1960s in the vicinity of Orlando (Woodruff, 1968; Schroeder and Jones, 1983). Since that time, the pest has spread slowly in the state. Florida sugarcane growers have been on the lookout for infestations of the weevil for many years. During the 1980s and 1990s, the weevil was found well outside the Everglades Agricultural Area, primarily in citrus and ornamental plants. Low levels of the weevil were detected in close proximity to sugarcane during the late 1990s in Moore Haven on citrus and ornamentals and in Canal Point on ornamentals, but none could be found in sugarcane. During 2002, adult weevils (Figure 12) were found in sugarcane fields spanning to the southeast from Moore Haven to just northwest of Clewiston. These weevils were generally associated with alternate host plants growing near or within commercial sugarcane fields, notably hemp sesbania [*Sesbania exaltata* (Raf.) Rydb. Ex A. W. Hill] and sickle pod [*Cassia obtusifolia* L.]. Although we did not excavate any cane to determine whether larvae were present, no signs of damage by larvae were observed during 2002 or during 2003. Damage by larval infestations in Puerto Rico generally results in stunted, dehydrated sugarcane plants (Figure 13). Larvae feed on roots and tunnel into the crown of a stool and up into below-ground portions of stalks (Figure 14). If economic infestations develop in Florida sugarcane, flooding may hold some potential for controlling larvae in the soil (Shapiro et al., 1997), and adult weevils could be controlled with insecticides (Nigg et al., 2004). Maintaining fields free of weed species used by the adult weevils as food plants may be a first line of defense against larval infestations in sugarcane.

**REFERENCES**


Figure 1. Adult desert corn flea beetle. Photo by D. G. Hall.

Figure 2. Adult desert corn flea beetle, close-up of dorsum of the beetle. Photo courtesy of A. Konstantinov.

Figure 3. Adult desert corn flea beetle, scanning electron microscope image of the beetle's head. Photo courtesy of A. Konstantinov.
Figure 4. Adult desert corn flea beetle, drawing of male genitalia. Photo courtesy of A. Konstantinov.

Figure 5. Three desert corn flea beetles and damage. Photo by D. G. Hall.

Figure 6. Damage to sugarcane leaves by the desert corn flea beetle. Photo by D. G. Hall.
Figure 7. Leafmining buprestid beetle, *Aphanisticus cochinchinae seminulum*. Photo by Steve Valley, Oregon Department of Agriculture.

Figure 8. Adult female cover of *Duplachionaspis divergens*. Photo by Avas Hamon, FDACS-DPI.

Figure 9. A sugarcane leaf infested by the scale *Duplachionaspis divergens*. Photo by D. G. Hall.
Figure 10. A sugarcane leaf-sheath infested by the scale *Duplachionaspis divergens*. Photo by D. G. Hall.

Figure 11. Pink sugarcane mealybugs. Photo by D.G. Hall.
Figure 12. Adult *Diaprepes* root weevil. Photo by USDA-ARS.

Figure 13. Damage to sugarcane in Puerto Rico by larvae of the *Diaprepes* root weevil (cane plant on the left damaged, cane plant on the right not damaged). Photo by D.G. Hall.

Figure 14. Larva of the *Diaprepes* root weevil removed from an excavated cane stalk in Puerto Rico. Photo by D.G. Hall.