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The Asian mango flower beetle, *Protaetia fusca* (Herbst),
and *Euphoria sepulcralis* (Fabricius) in Florida and the West Indies
(Coleoptera: Scarabaeidae: Cetoniinae)

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Abstract. The mango flower beetle, *Protaetia fusca* (Herbst), an Asiatic pest of several commercial crops, was first found in Florida in 1985. All subsequent Florida specimens are recorded here, as well as the first documented records from the Bahamas and Barbados. Illustrations are provided and comparisons are made to the similar native *Euphoria sepulcralis* (Fabricius), which is also recorded for the first time from the Bahamas. Extensive host records and a bibliography (especially tracking *P. fusca* spread in Hawaii) are included.

Introduction

My first encounter with this pest was in June, 1979, when specimens were forwarded to me for identification from Ms. Gwendolyn Griffiths, Central Agricultural Station, Nassau, Bahamas. Because the species is so distinctive (Fig. 1), I immediately recognized some as the Asian *Protaetia fusca* (Herbst), and others as *Euphoria sepulcralis* (Fabricius) (Fig. 2). Both were new records from the Bahamas. Subsequently *P. fusca* was found in Florida and Barbados.

Description. Both species are typical of the scarab subfamily Cetoniinae, being somewhat flattened dorsally, the head barely visible from above. Both dorsally have variable patterns of scales, some of which can be rubbed off, contributing to many synonyms being created for *E. sepulcralis*. They can be recognized readily by the accompanying habitus illustrations (Fig. 1-2). In addition, the dorsal surface of *P. fusca* is matte and somewhat velvety; that of *E. sepulcralis* is shiny. Each elytron of *P. fusca* terminates in a spine at the sutural apex (Fig. 4), but *E. sepulcralis* has no such spine (Fig. 5). The pattern formed by the pygidium and elytral apices is composed of scales and is similar but distinct (Fig. 6, *P. fusca*; 7, *E. sepulcralis*), both appearing to mimic the head of a bee. Because this is the part exposed while beetles are headlong into a flower, it could serve as a deterrent for a predator. Male genitalia are equally distinctive in caudal view; that of *P. fusca* is asymmetrical and twisted to the left (Fig. 3, 9), whereas it is symmetrical in *E. sepulcralis* (Fig. 8, 10). Immature stages of *P. fusca* have been described by Simpson (1990), along with notes on its biology.

Distribution. *Protaetia fusca* has long been known to be widespread in most of southeast Asia, the Philippines, the Dutch East Indies, parts of Australia, Fiji, India, and Mauritius, and had been first collected in Hawaii in 1949 (Maehler, 1950). It was somewhat surprising that it suddenly appeared in the Caribbean. *Euphoria sepulcralis* is similar in general appearance, and although extremely abundant in the eastern U.S., it had not been found previously in the West Indies. Subsequent records for *P. fusca* in Florida and Barbados are listed below. It appears to be transported easily in cargo. Although not known to be established in California, it was intercepted 4 times each in 2003 and 2004 from Hawaii (Gaimari, 2005:52). In a report for the Australian government, Schotman (1989) reported distribution as "Bahamas, Barbados, United States, China (Hong Kong), Singapore". The first 3 localities were partially based on my verbal reports, but did not include specific records. In the U.S. it is known only from 3 southern counties in Florida.

Bahamas. Both species were first found in Nassau. Griffiths (*in litt.*) indicated that *Protaetia* had been seen only 4 times, each limited to one or two specimens. Her assessment was that the population was limited, and that Diazinon had given good control. No further information has been received on this infestation. Specimens (numbers in parentheses) of both species are in the Florida State Collection of Arthropods (FSCA) from: (1) Eleuthera, Rainbow Bay, 1-VII-1992, R.W. & D.B. Wiley. Subsequently, *E. sepulcralis* was collected on (2) Eleuthera, Rainbow Bay, 16-26-X-1985, J.R. Wiley; (2) Eleuthera, Rainbow Bay, 21-26-XI-1993, J.R. & S.C. Wiley; Eleuthera, Governor's

Harbor, 20-V-1993, FSCA Bahama Survey Team. It was recently collected on Andros Island, Bowen Sound, 23-VII-2006, M.C. Thomas, and Andros Island, Cactus Coppice, 26-VII-2006, R. Turnbow

Barbados. *Protaetia fusca* is here formally recorded from this island for the first time. Bennett and Alam (1985) published a list of insects recorded from Barbados, including 18 species of Scarabaeidae. In the Cetoniinae they listed only *Protaetia* sp. [sic]. During an FAO sponsored trip there I had the opportunity to examine these 5 specimens and identified them as *P. fusca*, with the following data: Barbados: St. Phillips, Grove Plant, 6-X-82, M.M. Alam, on *Cajanus indicus*.

Florida. A recent (2006) check with Dr. Charles Brodel at the USDA, APHIS, inspection station in Miami indicated that *P. fusca* had not been intercepted there since 1985, when their current data base was established. *Protaetia fusca* was intercepted on July 22, 1982, at a nursery in Plymouth (Orange Co.), Florida by D. Phelps, in sphagnum moss surrounding roots of Madagascar dragon tree (*Dracaena marginata* Lam.), imported from a nursery in Hawaii. No further specimens were collected then or subsequently in the vicinity. The first field collected specimen was found in Pompano Beach (Broward Co.), Florida on Dec. 27, 1985, by B. Seligman and D. Leone on grapefruit leaves, *Citrus x paradisi* Macfad. Surveys were immediately initiated and no subsequent specimens were found. Two years later, several specimens were collected near the initial find.

Because this is an invasive species, and to track its spread, the following Florida records are listed in chronological order and have voucher specimens in the FSCA: **Broward Co.**, Hollywood, 28-I-1987, C. Sarakas, citrus foliage; Pompano Beach, 11-III-1987, B. Seligman, mango flowers; Pompano Beach, 25-III-1987, B. Seligman & R.E. Woodruff; Hollywood, 2-VII-1987, C. Sarakas, citrus; **Dade Co.**, North Miami, 5-VII-1989, D. Gruber, Fruitfly trap in guava; **Palm Beach Co.**, Boca Raton, 26-II-1990, M. Wittek, spice plant; **Broward Co.**, Hollywood, 28-VI-1990, F. Smyth, D. Clinton, *Citrus sinensis* (L.) Osbeck; **Broward Co.**, Dania, 10-I-1992, R. Carpenter, *Ptychosperma elegans*; **Palm Beach Co.**, Riviera Beach, Peanut Island (intracoastal), 13-XI-1992, P. Girr; **Dade Co.**, Miami, 14-II-2000, E. Pulland & K. Laboutiller, feeding on *Murraya paniculata* (L.) Jack; **Dade Co.**, Coconut Grove, 17-III-1999, R. Sanders, *Conocarpus erectus* L. var. *sericeus* DC; **Broward Co.**, Sunrise, 16-IX-2002, B. Cairns, *Citrus sinensis* (L.) Osbeck. No specimens seem to have been collected

in the past 4 years. Peck and Thomas (1998:63) cited the above 3 counties (without further data), although the genus is not listed in their index.

Because the native *E. sepulcralis* is common throughout Florida, and it was recently treated (Thomas, 1998), only new records from the **Bahamas** are listed above.

Hosts and economic importance. Adults of both species are "flower beetles" and feed on pollen, as well as some fermenting materials. Both *E. sepulcralis* and a related European species are occasionally pests in bee hives, where they bore through the combs like a tank, impervious to the bee stings. They are undoubtedly attracted there by the pollen. For *P. fusca*, Maehler (1950:9) reported that "...in Queensland the adults have been found to attack nests of a stingless bee, *Trigona*, probably for the honey." In Florida, *E. sepulcralis* has also caused problems when it was attracted in numbers to freshly painted white yachts in Miami. Beetles became mired in the paint, requiring expensive cleaning and complete repainting.

Beetles of both species damage various kinds of ornamental flowers, especially roses. Most of the damage is mechanical, in their efforts to obtain the pollen or nectar. At the same time, they may be passively involved in cross pollination. It is very likely that both species take advantage of pollen sources available, and there seems to be little host specificity. The name "mango flower beetle" probably arose because they are native to the same area, and mango produces abundant flowers (attractive to many other insects as well). Hosts are recorded above for Florida specimens. In no case were there more than 3 specimens, and no damage was reported. However, many other hosts for larvae and adults are recorded in the literature, especially in Hawaii, and these are summarized here:

Arrow (1910: 154) listed larvae as damaging roots of canna plants in India. Maehler (1950: 9) reported that adults attack *Cassia brewsteri* in Queensland and fed on male flowers of coconut in Malaya. He indicated that larvae were reported breeding in vegetable refuse (Java) and in coffee mill refuse (Malaya). In Hawaii, Chilson (1950: 20) reported adults on "...corn tassels, blossoms of mango, yellow ginger and candle flower (*Cassia alata*)." Sakimura (1950: 173-4) indicated that "...an extremely dense concentration [Hawaii] of grubs was observed in a pile of sugar mill mud press and leaf mold." In an experiment to determine food preferences of larvae, he determined that they did not feed on pineapple roots, but ate primarily "high trash content" of the soil. Peterson

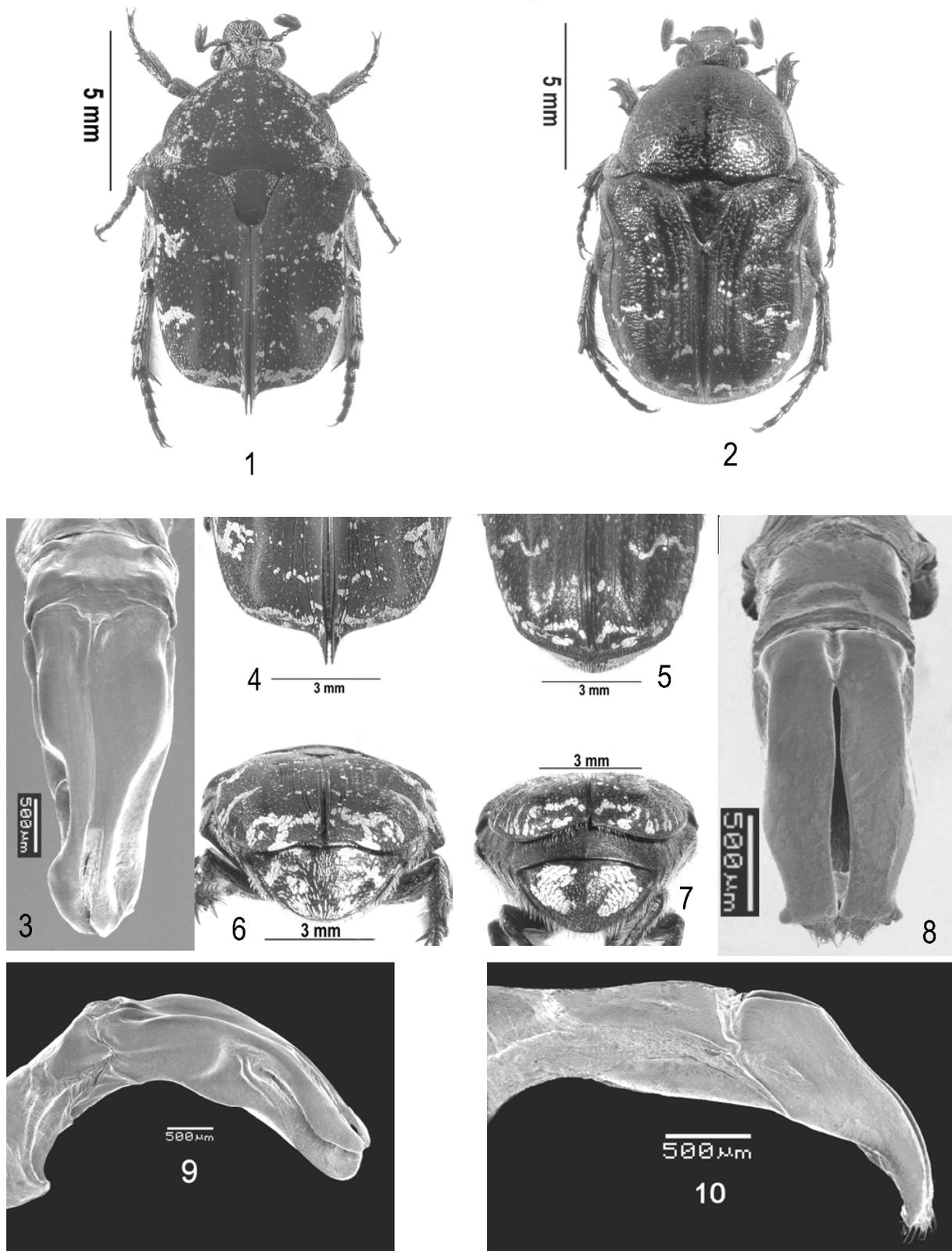


Fig. 1,3,4,6,9: *Protactia fusca* (Herbst); Fig. 2,5,7,8,10: *Euphoria sepulcralis* (Fab.). Fig. 1,2: habitus; 3,8: genitalia (caudal); 4,5: elytral tip (dorsal); 6,7: pygidium (caudal); 9,10: genitalia (lateral).

(1951) indicated that adults feed day and night on mango flowers in Hawaii, where they "...seemed to be directed to stamens and pistils; the individual flowers sheared off at the juncture of the calyx and peduncle." He also found "...considerable damage to blossoms of candle bush (*Cassia alata*), the individual flowers being sheared from the bloom spike and the petals eaten." Weber (1952: 351) reported it damaging pigeon pea in Honolulu, where beetles chewed through buds to get at the ovaries. In another Honolulu location, Look (1952: 363) found adults attacking blossoms, pods, and stems of *Crotalaria saltiana*. Pemberton (1954: 266) reported the first economic damage in Hawaii, when adults were "...causing much damage to roses..." in a commercial rose garden. Maehler (1954: 282) observed beetles feeding on nectar of white ginger in Honolulu. Weber (1954:290) found beetles consuming leaflets of Poinciana trees on Oahu. Gressitt (1960: 168) reported that it "...had been reported doing considerable damage to maize in a garden on Maui...and also crawling into the ears and feeding on the kernels." Cartwright and Gordon (1971: 293) indicated that "...adults are attracted to lights...probably the primary reason for their wide dispersal by commerce."

Biological control. Maehler (1950: 9) reported that a parasitic wasp, *Scolia vollenhoveni* Saussure [Scoliidae], parasitized this species in Malaya. Davis (1958: 358; 1959: 65) listed two wasp introductions into Hawaii for biological control of *P. fusca*: *Campsomeris annulata* (Fabricius) [Scoliidae] from Guam, and *Tiphia paralella* Smith [Tiphidae] from Mauritius.

Taxonomy. *Protaetia fusca* (Herbst, 1790) was listed in the recent "Checklist of the Scarabaeoidea of the Nearctic Realm" by Smith (2003), although no specific records were shown. The following synonyms were listed in that checklist: *Cetonia atomaria* Fabricius, *Cetonia mandarina* Weber, *Cetonia fictilis* Newman, *Protaetia taiwana* Nijima & Kinoshita, and *Protaetia bourgoini* Paulian.

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