

**DYSMICOCOCCUS FERRIS AND SIMILAR GENERA
(HEMIPTERA: COCCOIDEA: PSEUDOCOCCIDAE) OF THE GULF STATE
REGION INCLUDING A DESCRIPTION OF A NEW SPECIES AND NEW
UNITED STATES RECORDS**

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Abstract.—A key to the species of *Dysmicoccus*, *Oracella*, and *Paradoxococcus* of the Gulf State Region is presented. *Dysmicoccus radinovskyi* Miller and Miller, n. sp., is described and illustrated from the adult female, third-instar female, and second-instar female. *Dysmicoccus merrilli* (Ferris) is a **new synonym** of *Dysmicoccus boninsis* (Kuwana). *Dysmicoccus grassii* (Leonardi), *Dysmicoccus mackenziei* Beardsley, and *Dysmicoccus neobrevipes* Beardsley represent new distribution records.

Key Words: mealybugs, Coccoidea, Pseudococcidae, Gulf State Region, new species, *Dysmicoccus*, *Oracella*, *Paradoxococcus*

Ferris (1950) described *Dysmicoccus* with the intention of making *Pseudococcus* a natural group. It appears that characters chosen by Ferris may have been less than successful in this endeavor since some authors (Beardsley 1966, Miller and McKenzie 1971) have questioned the monophyly of *Dysmicoccus*. *Dysmicoccus*, as currently understood, is characterized by having the following combination of characters: lack oral-rim tubular ducts; have 5 or fewer conical setae in the cerarii; have auxiliary setae in cerarii anterior of the anal lobe pair; and have 17 or fewer pairs of cerarii. The genus currently includes 110 species worldwide with 39 species occurring in the Nearctic Region (Ben-Dov and German 2001a, Ben-Dov, et al. 2001). Woody and herbaceous plants serve as hosts, including many grasses (Kosztarab 1996). Keys to species referable to the Nearctic Region have been provided by several authors including: Ferris (1950, 1953),

McKenzie (1962, 1964, 1967), Miller and McKenzie (1973), Williams and Granara de Willink (1992), and Kosztarab (1996).

In the United States, five species are of economic concern: *Dysmicoccus boninsis* (Kuwana) on sugar cane, *Dysmicoccus vacinii* Miller and Polavarapu on blueberries, *Dysmicoccus wistariae* (Green) on yews, and *Dysmicoccus brevipipes* (Cockerell) and *Dysmicoccus grassii* (Leonardi) on many hosts including several economic plants.

Oracella is a monotypic genus containing *Oracella acuta* (Lobdell). As with *Dysmicoccus*, Ferris (1950) erected *Oracella* with the intent of making *Pseudococcus* a more natural group. *Oracella*, as currently understood, is characterized by having the following combination of characters: lack of oral-rim tubular ducts, with 2 conical setae in the cerarii, with auxiliary setae in cerarii anterior of the anal lobe pair, with dorsal and ventral multilocular pores, with few oral-collar tubular ducts, and with less than

17 pairs of cerarii. Although, there is some evidence that *Oracella* is congeneric with *Dysmicoccus*, we do not think it wise to consider them synonyms at this time, pending an analysis of the monophyly of the genus. However, we include *Oracella* here because of its similarities to *Dysmicoccus*. Occurring primarily in southeastern United States (Lobdell 1930, Ben-Dov 1994, Kosztarab 1996) on *Pinus* spp., *Oracella acuta* can reach pest levels following repeated pesticide applications (Clarke et al. 1992). *Oracella acuta* has been accidentally introduced into China where it is a serious pest (Kosztarab 1996).

Paradoxococcus McKenzie is also a monotypic genus similar to *Dysmicoccus* with *Paradoxococcus mcdanieli* McKenzie (1962) as the type species. *Paradoxococcus* is characterized by having the following combination of characters: lack of oral-rim tubular ducts, with 2 conical setae in the cerarii, with auxiliary setae in cerarii anterior of the anal lobe pair, lack of multilocular pores, presence of large oral-collar tubular ducts, and with less than 10 pairs of cerarii.

The purpose of this paper is to provide a key to species of *Dysmicoccus*, *Oracella*, and *Paradoxococcus* of the Gulf State Region. In addition, a new species description and synonymies are also presented.

MATERIALS AND METHODS

The Gulf State Region, as defined in this paper, encompasses the U.S. states that contact the Gulf of Mexico including: Alabama, Florida, Louisiana, Mississippi, and Texas. Terminology follows that of Williams and Granara de Willink (1992) and Gimpel and Miller (1996) for adult females and immatures. Measurements were made with an ocular micrometer using a Nikon E600 compound microscope. Numbers and measurements of adult females are for 10 specimens and are given as an average followed by the range in parentheses. Holotype measurements and numbers are recorded separately in parentheses. Descriptions

of third-instar females and the second-instar female are based on six and one specimens, respectively. Associated enlargements of various structures on the illustrations are not proportional. Depositories of specimens are: The Natural History Museum (BMNH), London, United Kingdom; Florida State Collection of Arthropods (FSCA), Gainesville, Florida; Museum National d'Histoire Naturelle (MNHN), Paris, France; University of California, Davis (UCD); National Museum of Natural History (USNM), Coccoidea Collection, Beltsville, Maryland. Information listed in the Specimens Examined section is verbatim from information recorded on the microscope slides. The abbreviation "ad." refers to adult specimens and "sl." refers to slide(s).

RESULTS

New Synonymy

While examining specimens and descriptions of species to be included in the key, we discovered that *Dysmicoccus merrilli* (Ferris) and *D. boninsis* (Kuwana) were remarkably similar. Each species has: (1) Cerarii that are restricted to the abdomen and have 1 or 2 on the head; (2) translucent pores that are present and abundant on the hind coxa and are absent or few on the tibia; and (3) oral-collar tubular ducts that are present over most of the dorsal surface, but are absent or greatly reduced in number on the first and eighth abdominal segments and on the metathorax. The only difference that we could find or mentioned in the literature was the shape of the circulus which is small and oval in *D. merrilli* and generally larger and more rectangular in many specimens of *D. boninsis*. However, after examining a long series of specimens it became apparent that *D. boninsis* occasionally has a small, oval circulus similar to the one in *D. merrilli*. The variable shape of the circulus on *D. boninsis* was illustrated by Williams and Watson (1988). Therefore, we consider *D. merrilli* (original combination *Trionymus*

merrilli Ferris 1953) as a junior, subjective synonym of *D. boninsis* (original combination *Dactylopius* (*Pseudococcus*) *boninsis* Kuwana 1909), **new synonymy**.

NEW UNITED STATES RECORDS OF
INVASIVE SPECIES

Through the courtesy of Avas B. Hamon, FSCA, we examined all *Dysmicoccus* specimens in the FSCA collection. Our examination confirmed Hamon's identifications and revealed two species for the Gulf State Region which are new records of distribution. *Dysmicoccus mackenziei* Beardsley is known from Mexico, Central America, Jamaica, and Italy (Ben-Dov and German 2001c). In the United States, it was previously known only from California on *Tillandsia punctulata* Schlecht. & Cham. (Beardsley 1965), an ornamental flowering plant. The Florida material represents a new eastern United States distribution record. Collection data for *D. mackenziei* is as follows: UNITED STATES: FLORIDA: Miami, 14-II-1985, D. Barger, on *Tillandsia* sp., (5 ad. ♀ on 5 sl.) FSCA; Tampa, Hillsborough, 28-XI-1988, C. Kamelhair, on *Tillandsia utriculata*, (3 ad. ♀ on 3 sl.) FSCA.

Dysmicoccus neobrevipes Beardsley has been recorded from many countries in the Neotropical Region and is known from southern Asia and the Pacific (Ben-Dov and German 2001d). *Dysmicoccus neobrevipes* feeds on many hosts of economic importance including various ornamental plants and food crops (Williams and Granara de Willink 1992). Originally described from Hawaii (Beardsley 1959), it has not been recorded from the continental United States until now. Therefore, this represents the first continental U.S. record. Collection data for *D. neobrevipes* is as follows: UNITED STATES: FLORIDA: Miami-Dade Co., Miami, 2-X-1978, P. Chobrdá, on (?) *Furcraea* sp. (nr. *Agave* sp.), (3 ad. ♀ on 3 sl.) FSCA; 22-VIII-1985, L. D. Howerton, on *Yucca elephantipes* [= *Yucca guatemalensis*], (4 ad. ♀ on 4 sl.) FSCA; 9-X-1986, D. Leone et al., on *Agave desmettiana*, (4 ad.

♀ on 4 sl.) FSCA; Orange Co., Apopka, 15-XI-1983, P. Gibson, on *Yucca elephantipes* [= *Yucca guatemalensis*], (2 ad. ♀, 4 third-instar ♀ on 6 sl.) FSCA; 16-II-1984, C. Phelps, on *Yucca* sp., (3 ad. ♀ on 3 sl.) FSCA; 9-IV-1990, A. Capitano, on *Agave angustifolia*, (2 ad. ♀ on 2 sl.) FSCA.

Additionally, specimens identified as *Dysmicoccus grassii* (Leonardi) (= *Dysmicoccus alazon* Williams) were also present in the USNM collection. Previously known from Nigeria, much of the Neotropical Region, Sicily, and the Canary Islands (Ben-Dov and German 2001b), records of *D. grassii* represent new distribution data for the United States. Collection data for *D. grassii* are as follows: UNITED STATES: FLORIDA: Brevard Co., Cocoa Beach, 22-V-1970, J. MacGowan, on *Coccoloba* sp., (1 ad. ♀) USNM; Collier Co., Marco, 30-IV-1975, R. F. Denno, J. A. Davidson, and D. R. Miller, on *Coccoloba* sp., (1 ad. ♀) USNM; Dade Co., Key Biscayne, 12-I-1966, S. Nakahara, on *Coccoloba uvifera*, (1 ad. ♀) USNM; Cape Florida State Park, Crandon Pk., Key Biscayne, 8-XII-1970, S. Nakahara, on *Coccoloba uvifera*, (7 ad. ♀ on 2 sl.) USNM; Key Biscayne, 4-IV-1974, R. F. Denno and D. R. Miller, on *Coccoloba* sp., (6 ad. ♀ on 3 sl.) USNM; Matheson Hammock Pk., 4-IV-1974, R. F. Denno and D. R. Miller, on *Rhizophora* sp., (1 ad. ♀) USNM; Lake just N. of Mahogany Hammock, 9-IV-1974, D. R. Miller and R. F. Denno, on *Persea borbonia*, (1 ad. ♀) USNM; Adams Key, 24-II-1977, D. R. Miller, on *Coccoloba diversifolia*, (1 ad. ♀) USNM; Miami Lakes, 26-IV-1977, M. Corman, on *Callistemon citrinus*, (1 ad. ♀) USNM; Indian River Co., nr. Orchid, 8-V-1975, R. F. Denno, J. A. Davidson, and D. R. Miller, on *Coccoloba uvifera*, (3 ad. ♀ on 2 sl.) USNM; Monroe Co., 19-VI-1969, D. Simberloff, on *Rhizophora mangle*, (3 ad. ♀ on 3 sl.) USNM; Key Largo, 3 mi. N. Jct. Hgwy 1 and 905, 5-IV-1974, R. F. Denno and D. R. Miller, on *Ficus* sp., (1 ad. ♀) USNM; Key Largo nr. N. end, 8-IV-1974, R. F. Denno and D. R. Miller, on *Lys-*

iloma latisiliquum, (7 ad. ♀ on 4 sl.) USNM; Sarasota Co., Osprey, 17-V-1971, C. J. Bickner, on *Codiaeum* sp., (1 ad. ♀) USNM.

Material determined as *Dysmicoccus bispinosus* Beardsley is also present in the collections of FSCA and USNM. We suspect that current concepts of this species are too broad and anticipate that Florida specimens will eventually be discovered to be one or more different species. Therefore, this taxon is not treated here.

KEY TO SPECIES OF *DYSMICOCOCCUS*
ORACELLA, AND *PARADOXOCOCCUS* OF THE
GULF STATES REGION (ADULT FEMALES)

- | | | | | | |
|------|---|----|--------|--|----|
| 1 | Circulus present | 2 | 8(2) | Dorsal oral-collar ducts absent from abdomen and thorax; translucent pores absent from hind coxa | 9 |
| - | Circulus absent | 11 | - | Dorsal oral-collar ducts present on abdomen and thorax; translucent pores present on hind coxa | |
| 2(1) | With 17 pairs of cerarii | 3 | | <i>Dysmicoccus boninsis</i> (Kuwana) | |
| - | With less than 17 pairs of cerarii | 8 | 9(8) | Abdominal cerarii each predominantly with more than 2 conical setae | |
| 3(2) | Body setae normally not more elongate on dorsomedial area of abdominal segment 8 than on other areas of dorsum | 4 | | <i>Dysmicoccus difficilis</i> (Lobdell) | |
| - | Body setae on dorsomedial area of abdominal 8 conspicuously longer than on other areas of dorsum | | - | Abdominal cerarii each with 2 or fewer conical setae | 10 |
| | <i>Dysmicoccus brevipes</i> (Cockerell) | | 10(9) | Multilocular pores present on dorsum; discoidal pores absent near eyes | |
| 4(3) | Dorsal body setae short, longest seta on dorsum of abdominal segment 8 less than ½ width of anal ring | 5 | | <i>Oracella acuta</i> (Lobdell) | |
| - | Dorsal body setae long, longest seta on dorsum of abdominal segment 8 more than ½ width of anal ring | | - | Multilocular pores absent from dorsum; discoidal pores present near eyes | |
| | <i>Dysmicoccus morrisoni</i> (Hollinger) (in part) | | 11(1) | With 17 pairs of cerarii | 12 |
| 5(4) | Abdominal cerarii predominantly each with 2 conical setae | 6 | - | With fewer than 17 pairs of cerarii | 14 |
| - | Abdominal cerarii predominantly each with more than 2 conical setae | 7 | 12(11) | Oral-collar tubular ducts forming continuous ventral row across medial area of abdominal segment 5 | 13 |
| 6(5) | Cluster of oral-collar tubular ducts present laterad of anterior spiracles; ventral abdominal multilocular pores present on segments 4-8 (occasionally absent from segment 4) | | - | Oral-collar tubular ducts on medial area of ventral abdominal segment 5 either entirely absent or not forming continuous row | |
| - | Cluster of oral-collar tubular ducts absent laterad of anterior spiracles; ventral abdominal multilocular pores present on segments 6-8 | | | <i>Dysmicoccus lasii</i> (Cockerell) | |
| | <i>Dysmicoccus texensis</i> (Tinsley) | | 13(12) | Oral-collar tubular ducts forming continuous ventral row across medial area of abdominal segment 6; apical antennal segment either partially or completely divided; oral-collar tubular duct orifices smaller than diameter of trilobular pore | |
| 7(5) | Hind coxa with translucent pores; opening of largest oral-collar tubular ducts approximately equal to diameter of multilocular pores | | | <i>Dysmicoccus radinovskiy</i> Miller and Miller, n. sp. | |
| - | Hind coxa without translucent pores; opening of largest oral-collar tubular ducts less than diameter of multilocular pores | | - | Oral-collar tubular ducts on medial area of abdominal segment 6 either entirely absent or not forming continuous row; apical antennal segment undivided; oral-collar tubular duct orifices larger than diameter of trilobular pore | |
| | <i>Dysmicoccus neobrevipes</i> Beardsley | | | <i>Dysmicoccus diodium</i> (McConnell) | |
| | | | 14(11) | Multilocular pores absent; with less than 8 pairs of cerarii | |
| | | | | <i>Paradoxococcus mcdanieli</i> McKenzie | |
| | | | - | Multilocular pores present; with more than 8 pairs of cerarii | 15 |
| | | | 15(14) | Abdominal cerarii each predominantly with more than 2 conical setae; with 13 or fewer pairs of cerarii | |
| | | | | <i>Dysmicoccus obesus</i> (Lobdell) | |
| | | | - | Abdominal cerarii each predominantly with 2 conical setae; with 15 or more pairs of cerarii | |
| | | | | <i>Dysmicoccus milleri</i> Kosztarab | |

***Dysmicoccus radinovskyi* Miller and
Miller, new species**

(Figs. 1–3)

Suggested Common Name: Dr. Rad's
Mealybug

Holotype.—An adult female holotype is hereby designated with left label "HOLOTYPE *Dysmicoccus radinovskyi* Miller & Miller"; right label "Dade Co., Fla. Everglades Nat. Park 18 X 1972 W.H. Pierce on *Psychotria undata*" [= *Psychotria nervosa*] (USNM). All specimens listed in the Specimens Examined section are paratypes except for the holotype.

Etymology.—This species is named in honor and memory of Millersville University of Pennsylvania biology professor, Dr. Syd Radinovsky, better known to his students as "Dr. Rad." In his 34 years at Millersville University, Dr. Rad's enthusiasm for the biological sciences was unparalleled. His support for students was without equal. A field biologist in the true sense, Dr. Rad loved to talk about and visit unique habitats. It is fitting that the type localities of *D. radinovskyi* are from some of Dr. Rad's beloved unique habitats: South Florida, the Everglades, and the Florida Keys.

ADULT FEMALE

(Fig. 1)

Field features.—Body white, covered with mealy wax. Mealybugs adhere to roots of *Psychotria* plants when pulled up; usually found on roots of *Psychotria* growing as understory in hammocks along barrier islands of east central Florida (K. Hibbard, personal communication).

Slide-mounted characters.—Body 1.08 (1.00–1.21) mm long (holotype 1.02 mm), 0.75(0.64–0.92) mm wide (holotype 0.80 mm)

Dorsum with 17 pairs of cerarii (Fig. 1O); cerarii 1–11 and 13–14 with 2 conical setae; cerarii 12, 15, with 3(2–3) conical setae (holotype 3); cerarii 16–17 with 3 (3–4) conical setae (holotype 3–4); all with auxiliary setae and associated trilocular

pores. Anal-lobe cerarius (Fig. 1I) with 3(1–4) auxiliary setae (holotype 3) (Fig. 1J), 2 conical setae (holotype 2) (Fig. 1K), 20(18–24) trilocular pores (holotype 18) (Fig. 1L), 2(1–4) discoidal pores (holotype 3) (Fig. 1M). Multilocular pores absent; trilocular pores (Fig. 1N) scattered nearly evenly over surface; discoidal pores present, about μ diameter of trilocular pore. Oral-collar tubular ducts absent. Longest submedial seta on segment VII 18(13–25) μ long (holotype 25 μ); 4 submedial setae on segment VIII, longest seta 19(13–28) μ long (holotype 28 μ).

Anal-ring seta 100(88–113) μ long (holotype 100 μ); 1.5(1.2–1.6) (holotype 1.6) times as long as width of anal ring.

Venter with multilocular pores (Fig. 1G) usually in posterior and anterior bands on segments VI–VII and restricted to posterior band on segment VIII, occasionally with 1 or 2 pores on posterior margin of segments V; occasionally with 1 multilocular pore near base of pro- and mesocoxa. Trilocular pores scattered throughout. Discoidal pores common, of same size as on dorsum. Oral-collar tubular ducts of 1 size (Fig. 1F), orifice smaller than diameter of trilocular pore, present in medial and mediolateral areas of abdominal segments III–VII, few ducts near coxae. Setae as follows: 4 cisanal (Fig. 1H), longest 39(30–45) μ long (holotype 45 μ); longest anal-lobe seta 119(105–130) μ long (holotype 113 μ); longest seta on hind trochanter 82(63–88) μ long (holotype 78 μ).

Circulus absent. Labium 129(113–143) μ long (holotype 133 μ). Antennae 7–8 segmented with apical segment partially or fully subdivided (Fig. 1A), 273(263–288) μ long (holotype 263 μ). Eye with associated discoidal pore (Fig. 1B). Legs with translucent pores restricted to hind femur and tibia, ventral surface (when leg is lying flat as shown in illustration) without pores, dorsal surface of femur (Fig. 1D) with 18(12–22) pores (holotype 12), dorsal surface of tibia (Fig. 1D) with 15(12–18) pores (holotype 12). Hind femur 137(130–142) μ

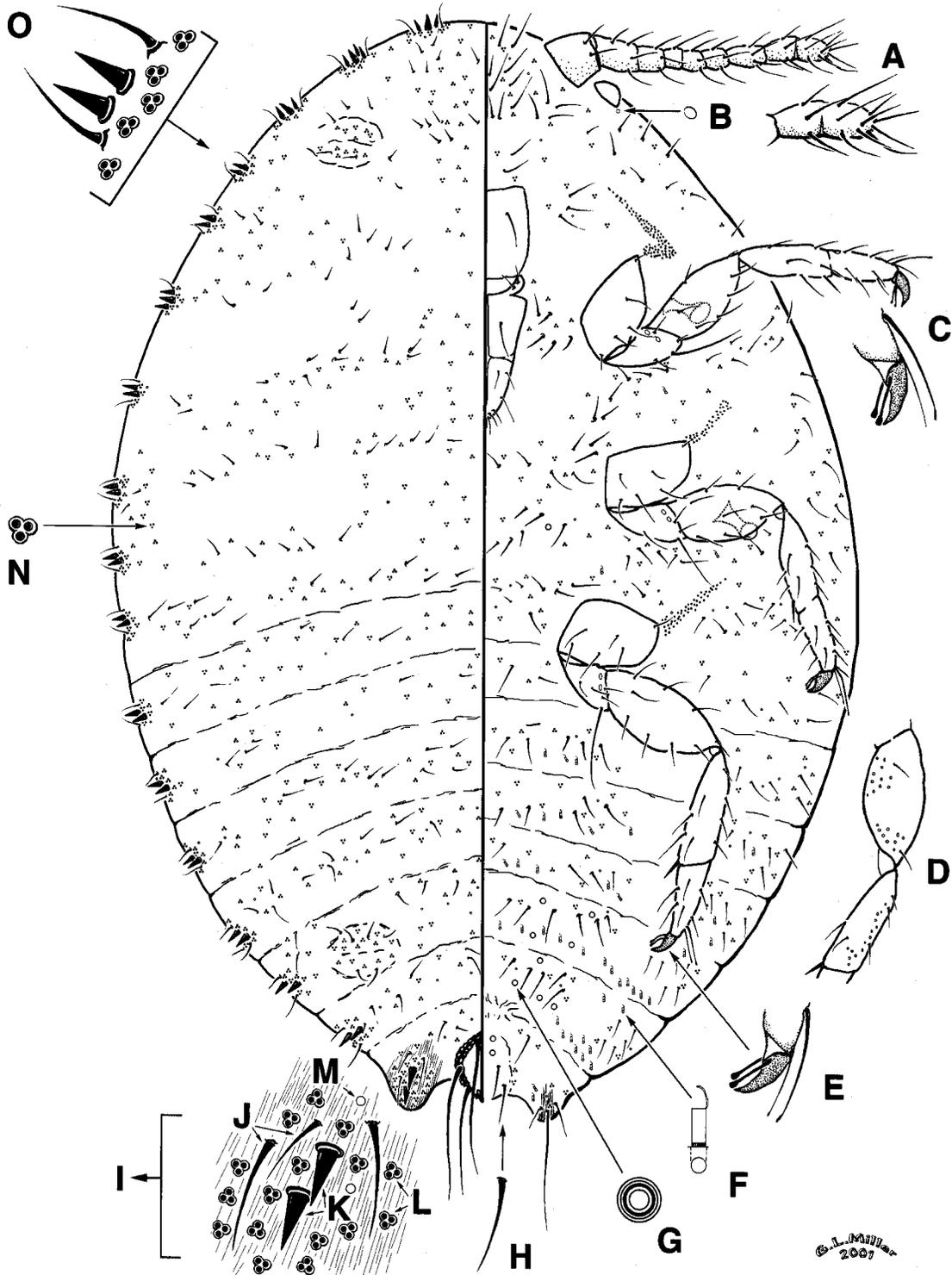


Fig. 1. Adult female of *Dysmicoccus radnovskyi*. A, Antenna and detail of terminal segment; B, Discoidal pore near eye; C, Tarsal claw and digitules of fore leg; D, Dorsal surface translucent pores of femur and tibia; E, Detail of tarsal claw and digitules of hind leg; F, Oral-collar tubular duct; G, Multilocular pore; H, Cisanal seta; I, Anal-lobe cerarius; J, Auxiliary seta; K, Cerarian seta; L, Trilocular pore; M, Discoidal pore; N, Trilocular pore; O, Cerarius.

long (holotype 130 μ); hind tibia 121(113–138) μ long (holotype 115 μ); hind tarsus 81(75–88) μ long (holotype 80 μ). Tibia/tarsus 1.5(1.3–1.7) (holotype 1.4); femur/tarsus 1.7(1.6–1.8) (holotype 1.6). Length of hind femur divided by greatest width of hind femur 2.4(2.1–2.9) (holotype 2.9). Hind tibia with 14(12–16) setae (holotype 14). Claw digitules on all legs clubbed, approximately same size. Tarsal digitules on hind 2 pairs of legs clubbed, each tarsus with 1 digitule noticeably longer and with club slightly larger than other (Fig. 1E); tarsal digitules on front pair of legs of 2 different sizes and shapes, 1 digitule clubbed and robust, other digitule without club, slender (Fig. 1C).

Notes.—The above description is based on 124 specimens from 17 localities. *Dysmicoccus radinovskiy* is unusual with the terminal antennal segment being either entirely or partially subdivided, the circulus is absent, and the oral-collar tubular ducts are of 1 size. This species is close to *D. diodium* but differs by the diameter of the oral-collar tubular ducts which are smaller than the diameter of trilocular pores (*D. diodium* has oral-collar tubular ducts larger than the diameter of trilocular pores), the oral-collar tubular ducts forming a continuous row across the medial area of ventral abdominal segment 6 (*D. diodium* either lacks oral-collar tubular ducts or only has a few scattered oral-collar tubular ducts in the medial area of ventral abdominal segment 6), and the subdivided terminal antennal segment (*D. diodium* does not have a subdivided terminal antennal segment).

The adult female can be distinguished from the third and second instars by having multilocular pores, translucent pores on hind femur and tibia, and a vulva.

THIRD-INSTAR FEMALE

(Fig. 2)

Slide-mounted characters.—Body 0.74 (0.69–0.80) mm long, 0.43(0.40–0.48) mm wide.

Dorsum with 17 pairs of cerarii; cerarii

1–11, 13–14, and 16 with 2 conical setae; cerarii 12, 15, 17 with 3(2–3) conical setae; all with auxiliary setae. Anal-lobe cerarius with 1(1–3) auxiliary setae, 2 conical setae, 15(13–17) trilocular pores, 1 discoidal pore. Multilocular pores absent; trilocular pores scattered nearly evenly over surface; discoidal pores present, about $\frac{1}{3}$ diameter of trilocular pore. Oral-collar tubular ducts absent. Longest submedial seta on segment VII 13(10–15) μ long; 2 submedial setae on segment VIII, longest seta 13(10–15) μ long.

Anal-ring seta 87(78–100) μ long; 1.6(1.5–1.8) times as long as width of anal ring.

Venter without multilocular pores; trilocular pores scattered throughout. Discoidal pores scarce, of same size as on dorsum. Oral-collar tubular ducts uncommon, one size, present anterior to clypeus and lateral mesothorax. Setae as follows: 4 cisanal, longest 25(15–35) μ long; longest anal-lobe seta 95(92–98) μ long; longest seta on hind trochanter 67(66–70) μ long.

Circulus absent. Labium 108(98–113) μ long. Antennae 6-segmented, 227(213–237) μ long. Legs without translucent pores. Hind femur 111(105–118) μ long; hind tibia 88(83–93) μ long; hind tarsus 77(75–80) μ long. Tibia/tarsus 1.1(1.1–1.2); femur/tarsus 1.4(1.4–1.5). Length of hind femur divided by greatest width of hind femur 2.8(2.6–3.0). Hind tibia with 9(9–10) setae. Claw and tarsal digitules same as adult female.

Notes.—The above description is based on 5 specimens from 3 localities. The third-instar female can be distinguished from all other instars by its 6-segmented antennae, absence of multilocular pores, and 13–17 trilocular pores on anal-lobe cerarii.

SECOND-INSTAR FEMALE

(Fig. 3)

Slide-mounted characters.—Body 0.56 mm long, 0.31 mm wide.

Dorsum with 17 pairs of cerarii although some cerarian setae are not distinct from

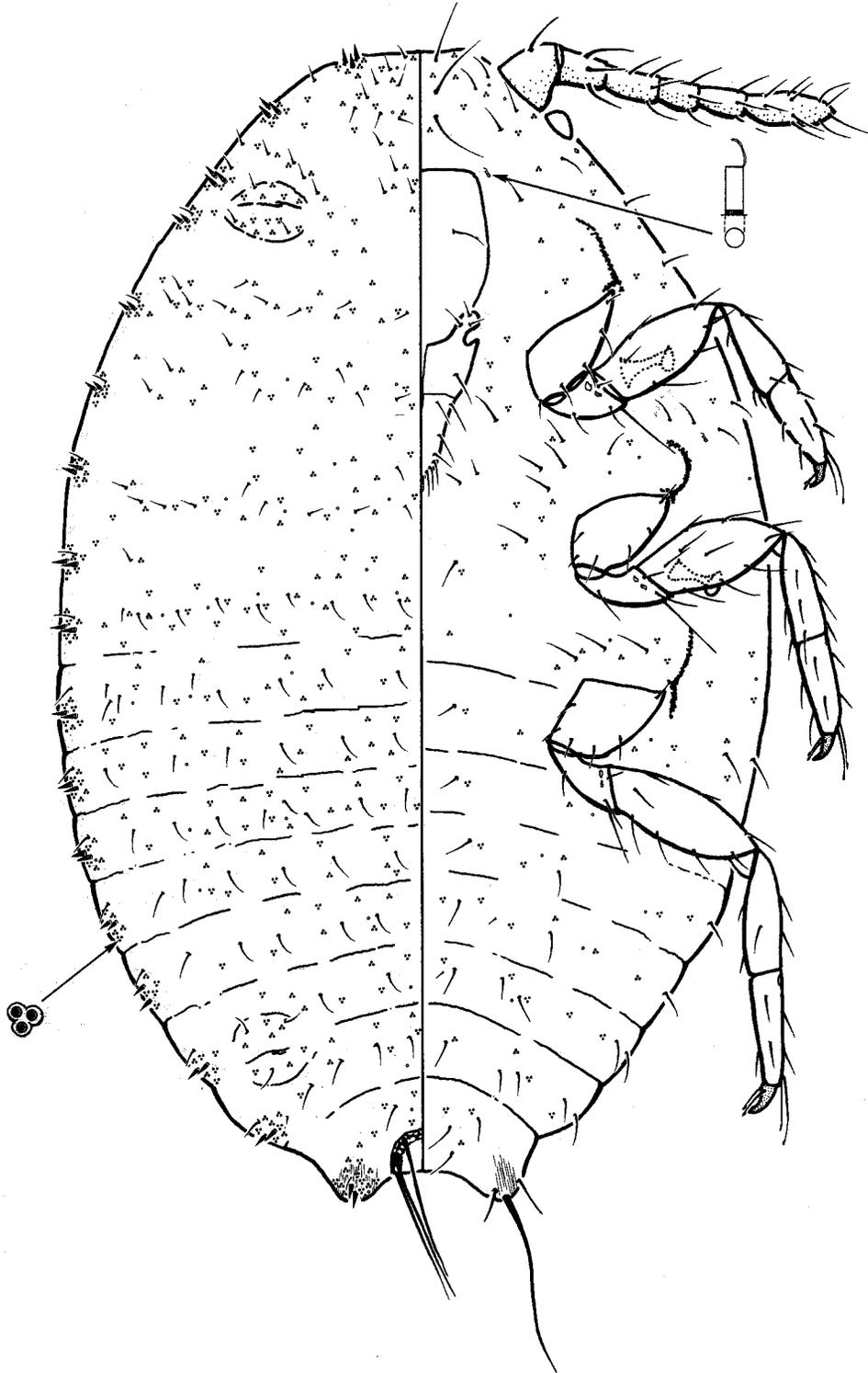


Fig. 2. Third-instar female of *Dysmicoccus radinovskyi*.

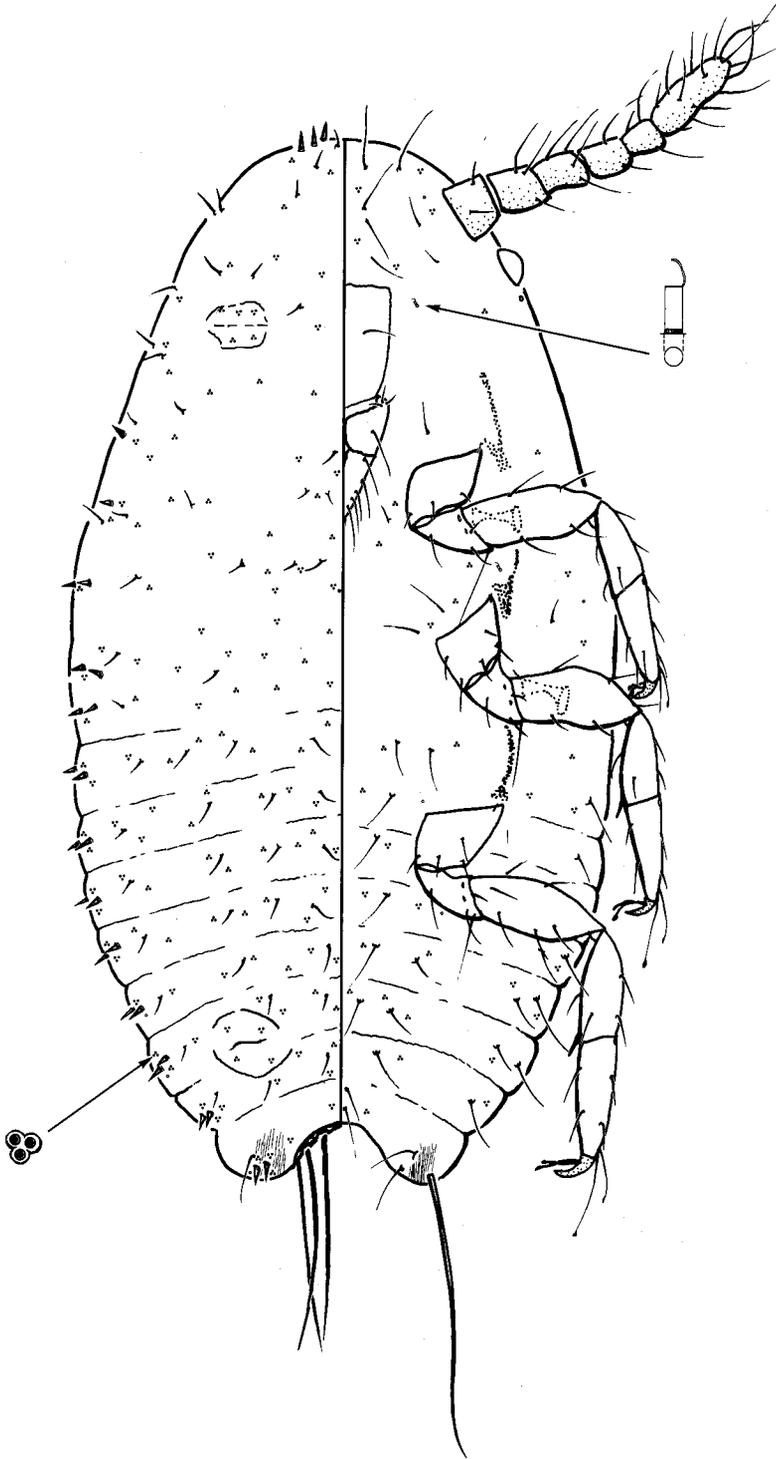


Fig. 3. Second-instar female of *Dysmicoccus radinovskiy*.

auxiliary setae; cerarii 1–7, with 2 distinct conical setae; cerarius 17 with 3 conical setae; all with auxiliary setae. Anal-lobe cerarius with 1 auxiliary seta, 2 conical setae, 7 trilocular pores, 1 discoidal pore. Multilocular pores absent; trilocular pores scattered nearly evenly over surface; discoidal pores about μ diameter of trilocular pore. Oral-collar tubular ducts absent. Longest submedial seta on segment VII 5 μ long; submedial setae absent on segment VIII.

Anal-ring seta 63 μ long; 1.6 times as long as width of anal ring.

Venter without multilocular pores; trilocular pores scattered throughout. Discoidal pores scarce, of same size as on dorsum. Oral-collar tubular ducts uncommon, one size, present lateral to clypeus and lateral mesothorax. Setae as follows: 4 cisanal, longest 23 μ long; longest anal-lobe seta 80 μ long; longest seta on hind trochanter 50 μ long.

Circulus absent. Labium 75 μ long. Antennae 6-segmented, 175 μ long. Legs without translucent pores. Hind femur 80 μ long; hind tibia 63 μ long; hind tarsus 63 μ long. Tibia/tarsus 1.0; femur/tarsus 1.3. Length of hind femur divided by greatest width of hind femur 2.6. Hind tibia with 9 setae. Claw and tarsal digitules same as adult female.

Notes.—The above description is based on 1 specimen from 1 locality. The second-instar female can be distinguished from all other instars by its 6-segmented antennae, absence of multilocular pores, and 5 trilocular pores on anal-lobe cerarii.

SPECIMENS EXAMINED

Paratypes.—UNITED STATES: FLORIDA: Brevard Co.: Florida Beach, S. side of Mullett Creek Rd., 26-II-2001, K. Hibbard, on *Psychotria nervosa* (28 ad. ♀, 1 second-instar ♀ on 6 sl.) BMNH, MNHN, UCD, USNM; Broward Co.: Ft. Lauderdale, 4-X-1982, M. McDonald, on *Psychotria nervosa* (3 ad. ♀ on 3 sl.) FSCA; 3-XI-1987, T. Phillips, on *Psychotria* sp. (2 ad. ♀ on 2 sl.) FSCA; Charlotte Co.: 3 mi. E. Punta

Gorda, 21-XI-1980, Z. Smith, on *Psychotria* sp.[?] (3 ad. ♀ on 3 sl.) FSCA; Collier Co.: Collier Seminole State Pk., Juct. of 92 and 41, 11-IV-1974, D. R. Miller and R. F. Denno, on *Psychotria* sp. (6 ad. ♀, 2 3rd ♀ on 4 sl.) FSCA, USNM; Miami-Dade Co.: Miami, 31-VIII-1972, P. Pullara, on *Psychotria nervosa* (1 ad. ♀) FSCA; Everglades Nat. Park, 18-X-1972, W. H. Pierce, on *Psychotria nervosa* (3 ad. ♀, 1 3rd ♀ on 4 sl.) FSCA, USNM; Miami, 29-IX-1972, W. H. Pierce, on *Psychotria nervosa* (2 ad. ♀ on 2 sl.) FSCA, USNM; 31-IX-1972, W. H. Pierce, on *Psychotria nervosa* (1 ad. ♀) FSCA; on coast east of Perrina, 4-IV-1974, R. F. Denno and D. R. Miller, on *Psychotria nervosa* (9 ad. ♀ on 4 sl.) FSCA, USNM; lake just N. of Mahogany Hammock, 9-IV-1974, D. R. Miller and R. F. Denno, on crinkle leaf—*Psychotria* sp. (7 ad. ♀ on 4 sl.) FSCA, USNM; N. Miami Beach, 5-VI-1986, D. Gruber and L. Davis, (3 ad. ♀ on 3 sl.) FSCA; Indian River Co.: nr. Orchid, 8-V-1975, R. F. Denno, J. A. Davidson, and D. R. Miller, on *Psychotria* sp. (4 ad. ♀ on 2 sl.) USNM; Orchid, 1.7 mi. N. of S.R. 510 on N. Jungle Tr., 23-II-2001, K. Hibbard, on *Psychotria nervosa* (42 ad. ♀, 2 3rd ♀ on 7 sl.) USNM; Manatee Co.: Ellenton, 15-I-1980, J. Felty and Z. Smith, on *Psychotria nervosa* (3 ad. ♀ on 3 sl.) FSCA, USNM; Monroe Co.: Key Largo, 8-IV-1974, D. R. Miller and R. F. Denno, on *Psychotria* sp. (8 ad. ♀ on 4 sl.) FSCA, USNM; 25 mi. west of 41 intersection of 94, 10-IV-1974, R. F. Denno and D. R. Miller, on *Psychotria* sp. (3 ad. ♀ on 3 sl.) FSCA, USNM; Palm Beach Co.: West Palm Beach, 16-I-1967, N. Bezona, on *Psychotria nervosa* (2 ad. ♀ on 2 sl.) FSCA; St. Lucie Co.: Port St. Lucie, 25-X-1982, K. Hibbard, on *Psychotria nervosa* (2 ad. ♀ on 2 sl.) FSCA; White City, 7-X-1982, K. Hibbard, on *Psychotria nervosa* (2 ad. ♀ on 2 sl.) FSCA.

CONCLUSIONS

With the description of *D. radinovskiyi*, a total of 12 species of the genus are known

from the Gulf State Region of the United States. Newly published records of *D. grassii*, *D. mackenzii* and *D. neobrevipes* alert economic entomologists to the presence of three new pest species either in Florida or the continental United States.

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