

PROCEEDINGS

OF THE

BIOLOGICAL SOCIETY

OF

WASHINGTON

VOLUME 112 NUMBER 4

29 DECEMBER 1999

ISSN 0006-324X

THE BIOLOGICAL SOCIETY OF WASHINGTON

1998-1999

Officers

President: Richard P. Vari
President-elect: Brian F. Kensley

Secretary: Carole C. Baldwin
Treasurer: T. Chad Walter

Elected Council

Michael D. Carleton
W. Duane Hope
Susan L. Jewett

Rafael Lemaitre
Roy W. McDiarmid
James N. Norris

Custodian of Publications: Storrs L. Olson

PROCEEDINGS

Editor: C. Brian Robbins

Associate Editors

Classical Languages: Frederick M. Bayer
Plants: David B. Lellinger
Insects: Wayne N. Mathis
Vertebrates: Gary R. Graves

Invertebrates: Stephen L. Gardiner
Frank D. Ferrari
Rafael Lemaitre

Membership in the Society is open to anyone who wishes to join. There are no prerequisites. Annual dues of \$25.00 (for USA and non-USA addresses) include subscription to the *Proceedings of the Biological Society of Washington*. Annual dues are payable on or before January 1 of each year. Renewals received after January 1 must include a penalty charge of \$3.00 for reinstatement. Library subscriptions to the *Proceedings* are: \$40.00 for USA and non-USA addresses. Non-USA members or subscribers may pay an additional \$25.00 to receive the *Proceedings* by Air Mail.

The *Proceedings of the Biological Society of Washington* (USPS 404-750) is issued quarterly. Back issues of the *Proceedings* and the *Bulletin of the Biological Society of Washington* (issued sporadically) are available. Correspondence dealing with membership and subscriptions should be sent to:

BIOLOGICAL SOCIETY OF WASHINGTON
P.O. BOX 1897
LAWRENCE, KANSAS 66044, U.S.A.

Payment for membership is accepted in US dollars (cash or postal money order), checks on US banks, or MASTERCARD or VISA credit cards.

Manuscripts, corrected proofs, and editorial questions should be sent to:

EDITOR
BIOLOGICAL SOCIETY OF WASHINGTON
NATIONAL MUSEUM OF NATURAL HISTORY
WASHINGTON, D.C. 20560, U.S.A.

Known office of publication: National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560.

Printed for the Society by Allen Press, Inc., Lawrence, Kansas 66044

Periodicals postage paid at Washington, D.C., and additional mailing office.

POSTMASTER: Send address changes to PROCEEDINGS OF THE BIOLOGICAL SOCIETY OF WASHINGTON, P.O. Box 1897, Lawrence, Kansas 66044.

Ⓢ This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

4972
**New records of isopods from the Indian River Lagoon, Florida
(Crustacea: Peracarida)**

Brian Kensley and Marilyn Schotte

Department of Invertebrate Zoology, National Museum of Natural History,
Smithsonian Institution, Washington, D.C. 20560, U.S.A.

Abstract.—Fifteen species of isopod are recorded for the first time as occurring in the Indian River Lagoon. Two species are described as new: the janirid asellote *Iais floridana*, n. sp., which occurs commensally with *Sphaeroma terebrans* in low salinity water, and the sphaeromatid flabelliferan *Sphaeromopsis sanctaluciae*, n. sp., which is also recorded from the Orange River, Lee County, Florida, and from Islas de Juventud, Cuba. A brief discussion of protogyny in the sphaeromatid *Paradella diana*e is included.

The Indian River Lagoon, Florida, is the most biologically diverse estuarine system on the east coast of North America. As part of the Intra-coastal Waterway, it is subject to heavy usage by commercial and sport/recreational water traffic, and has seen heavy residential development along its shores. Given its important mixed-use resources, intensive study of the lagoon has been carried out for some time (see Richards 1995). Ongoing investigations by the authors of the crustacean fauna of the lagoon have revealed a number of isopod species not recorded in earlier studies (e.g., Kensley, Nelson, & Schotte 1995), although some of these may be known from the wider Florida region (see Camp, Lyons, & Perkins 1998). In part, these new records are the result of sampling in a wide variety of habitats, both in the main lagoon as well as in its tributary rivers and in the inlets that open to the sea. Twenty-five marine isopod species had previously been recorded from the IRL. The present paper documents 15 additional species and adds to the knowledge of the biodiversity of the Indian River Lagoon. Restricted synonymies, which include the original description plus any Florida records, and references that contain fuller synonymies are provided for most species. Collecting stations designated 'FTP'

are those of the authors'. Unless otherwise stated, all material is deposited in the collections of the National Museum of Natural History, Smithsonian Institution.

Suborder Anthuridea
Family Anthuridae

Cyathura polita (Stimpson, 1855)

Anthura polita Stimpson, 1855:393.—Harger, 1880:398-402, pl. XI, figs. 68-69.

Cyathura polita: Burbanck, 1959:507.—Kruczynski & Subrahmanyam, 1978:93.—Camp et al., 1998:132.

Material examined.—1 ♀, FTP-1, St. Lucie River, rotten wood in mangroves, 0.5 m, salinity 15-20 ppt., 29 May 1995.—1 ♀, FTP-22, Fort Pierce, Taylor's Creek near Rt. 1, rotten wood on muddy bank with cattails and *Spartina*, intertidal, 10 ppt., 25 Apr 1996.

Previous records.—East coast of America from the Gulf of Mexico to Canada.

Mesanthura pulchra Barnard, 1925

Mesanthura pulchra Barnard, 1925:145, fig. 9e.—Kensley & Schotte, 1989:49, fig. 19b; 52-53.—Camp et al., 1998:132.

Mesanthura decorata Menzies & Glynn, 1968:26, fig. 8a-i.

7 fringed setae and 8 simple setae; palp articles setose on mesial margins.

Pereopod 1, dactylus bearing 2 claws; pereopods 2–3, 5–7, dactyli each with 3 claws. Pereopod 4 considerably shorter than 3 or 5, dactylus with 2 claws, propodus with single stout distal claw. Pleopod 1, rami fused for about 4/5 of total length, distal lobes rounded, bearing 9 setae distally per side. Pleopod 2, protopod semicircular, canula not reaching beyond distal angle of protopod. Uropodal rami both longer than protopod, exopod about 1/3 longer than endopod, each with 4 elongate distal simple setae.

Female: Brood pouch containing up to 8 eggs. Pleonal operculum ovate, midlength about 2/3 greatest width, with 4 or 5 fine marginal setae.

Remarks.—Of the eight described species of *Iais* (see Wilson & Wägele 1994), at least three occur commensally with sphaeromatid isopods, as does the present species, which is found in association with *Sphaeroma terebrans*. Several species (e.g., *I. aquilei* Coineau, 1977; *I. elongata* Sivertsen & Holthuis, 1980; see Kensley 1994) also perform mate-guarding as is seen in the present material, with the male clasping a manca female with the shortened specialized pereopod 4.

Given that some species of *Sphaeroma*, especially those that bore into mangroves, have wide distributions, and have been implicated in introductions along with their commensals (Rotramel 1972, 1975), it is necessary to compare the present material closely with *I. californica* (found on *Sphaeroma quoyanum*), in case the present species was somehow introduced to the east coast of the United States, where *Sphaeroma terebrans* is the available host. However, *Iais floridana* more closely resembles *I. singaporensis* Menzies & Barnard, 1951 (see Müller & Brusca 1992) especially in the general habitus and in possessing rounded anterolateral lobes on the pereonites, than *I. californica* (Richardson, 1904). Comparison with recently collected mate-

rial of both *I. californica* and *I. singaporensis* reveals several differences that reinforce the view that the Florida material represents an undescribed species. The two distal articles of the antennule differ in proportions, the penultimate articles especially being more slender and elongate on the two previously described species. The antennal flagellum has fewer articles in the Florida material (13) than in *I. californica* (20) and *I. singaporensis* (24). The distal propodal spine of pereopod 4 in the male of *I. californica* is noticeably more elongate than in the Florida and Asian material. *Iais californica* is a larger species (δ 2.49 mm mean length, $n = 15$; ovigerous ♀ 2.55 mm mean length, $n = 11$) than either the Florida species (δ 1.34 mm mean length, $n = 10$; ovigerous ♀ 1.76 mm mean length, $n = 10$) or *I. singaporensis* (δ 1.3–1.7 mm, ovigerous ♀ 1.4–1.7 mm). The stylet of pleopod 2 of the male is more slender and elongate in the Florida species than in *I. singaporensis*.

Etymology.—The specific name derives from Florida, from whence the species is recorded.

Family Joeropsidae

Joeropsis coralicola Schultz & McCloskey, 1967

Joeropsis coralicola Schultz & McCloskey, 1967:103–107, figs. 1–39.—Kensley & Schotte, 1989:88, fig. 40g.—Camp et al., 1998:133.

Material examined.—11 specimens, sta FTP-5, Fort Pierce Inlet, on large barnacle clumps with orange sponge and algal turf on boulders inside inlet, shallow infratidal, 30 May 1995.

Previous records.—North Carolina to Florida Middle Grounds, Gulf of Mexico, 25–33 m.

Joeropsis tobagoensis Kensley & Schotte, 1994

Joeropsis tobagoensis Kensley & Schotte, 1994:482, 486, fig. 1a–o.

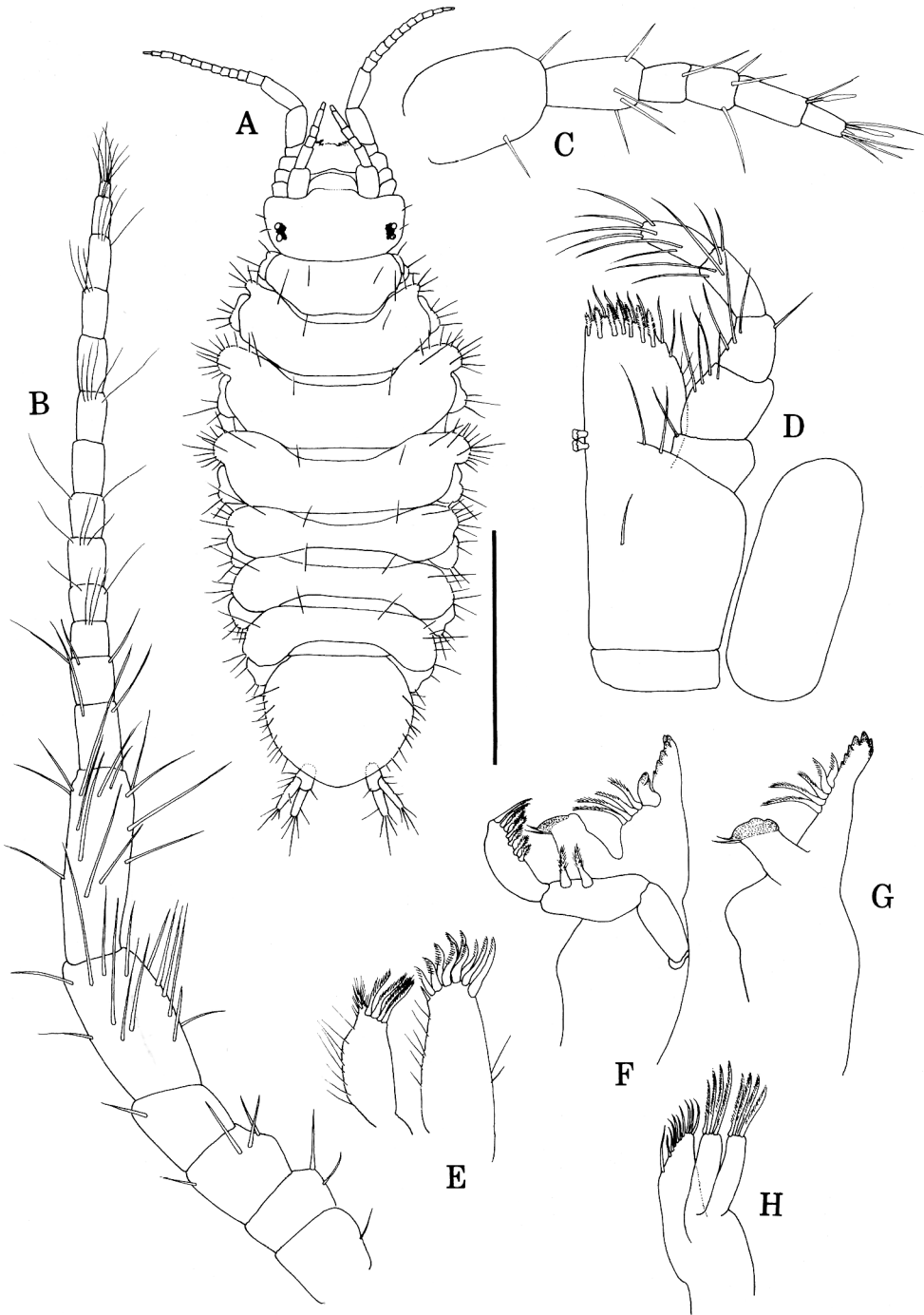


Fig. 2. *Iais floridana*, new species: A, habitus, dorsal view, scale = 0.5 mm; B, antenna; C, antennule; D, maxilliped; E, maxilla 1; F, left mandible; G, right mandible (palp omitted); H, maxilla 2.

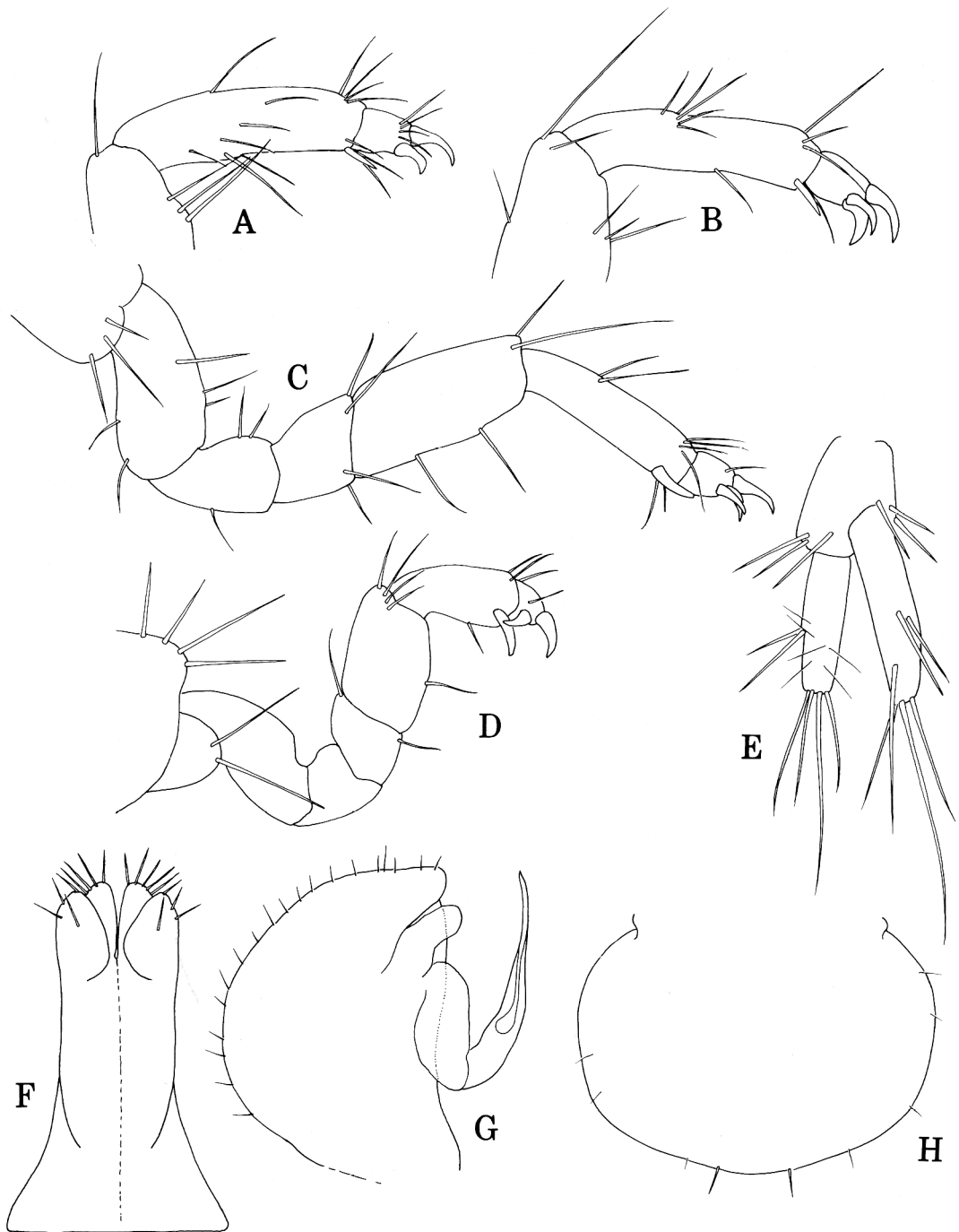


Fig. 3. *Iais floridana*, new species: A, pereopod 1 propodus and dactylus; B, pereopod 2, propodus and dactylus; C, pereopod 3; D, male pereopod 4; E, uropod; F, male pleopod 1; G, male pleopod 2; H, female operculum.

Material examined.—18 specimens, sta FTP-5, Fort Pierce Inlet, on large barnacle clumps with orange sponge and algal turf on boulders inside inlet, shallow infratidal, 30 May 1995.

Previous records.—Tobago, intertidal to 5 m.

Suborder Flabellifera

Family Cirolanidae

Anopsilana jonesi Kensley, 1987

Anopsilana jonesi Kensley, 1987:565–568, fig. 5a–j, 6a–h.—Camp et al., 1998:135.

Material examined.—1 ♀, sta FTP-12, North Fork St. Lucie River at Riverside Park on Port St. Lucie Blvd., rotten wood around dock, intertidal to 1 m, salinity 10 ppt., 1 Jun 1995.—1 ♂, 1 juv., sta FTP-27, Indian River Lagoon near mouth of Sebastian River, rotten submerged wood on small island, in low turf of *Enteromorpha* and *Ceramium*, 0.5 m, salinity 15 ppt., 17 Sep 1996.—1 ♂, 1 ♀, sta FTP-29, Sebastian River, first island inside mouth, on rotten wood at shore, salinity 15 ppt., 17 Sep 1996.

Previous records.—Belize; Florida; in estuarine mangroves.

Cirolana parva Hansen, 1890

Cirolana parva Hansen, 1890:340–341, pl. II, fig. 6–6b, pl. III, fig. 1–1d.—Bruce & Bowman, 1982:325–333, figs. 1, 2.—Kensley & Schotte, 1989:135, fig. 59d–e, 60.—Camp et al., 1998:135.

Material examined.—2 ♀, sta FTP-38, Sebastian Inlet State Park, gravel and pebbles in pockets around granite boulders, infratidal, 19 Sep 1996.—1 ♀, 1 juv., sta FTP-51, Sebastian Inlet State Park, south side of inlet, algal clumps on granite boulders, 0.5 m, 25 Jun 1997.—1 juv., sta FTP-52, Sebastian Inlet State Park, south side, shallow embayment at campsite in State Park, 1/2 mile from mouth in lagoon, 0.5 m, 25 Jun 1997.—1 juv., sta FTP-57, Sebastian Inlet State Park, lagoon near Co-

conut Point, sweep through *Syringodium* on Inlet side, 0.5–1 m, 26 Jun 1997.—1 juv., sta FTP-60, Wabasso Causeway Park, submerged rotten wood, 20–40 cm, 26 Jun 1997.

Previous records.—Panama; Belize; Cozumel, Mexico; Antilles to Florida Keys; Gulf of Mexico; N. & S. Carolina; intertidal to 55 m.

Family Corallanidae

Excorallana sexticornis (Richardson, 1901)

Corallana sexticornis Richardson, 1901: 518, fig 9.

Excorallana sexticornis: Delaney, 1989: 38.—Kensley & Schotte, 1989:165, figs. 75e–f, 76d–f.—Camp et al., 1998:135.

Material examined.—1 ♀, sta FTP-14, Ft. Pierce Inlet, barnacles, sponges, algal turf on blocks in inlet, intertidal, 23 Apr 1996.—1 ovigerous ♀, sta FTP-15, Ft. Pierce State Recreational Area, rotten wood piles with encrusting algae, intertidal, 23 Apr 1996.—1 ♀, 3 juvs., sta FTP-17, North Fork St. Lucie River, Riverside Park, rotten submerged wood on mud with numerous barnacles and shells, 10–50 cm, 23 Apr 1996.—2 ♀, sta FTP-33, Jim Island near Ft. Pierce Inlet, dead submerged wood at edge of mangrove island, with algal mat, 0–0.5 m, 18 Sep 1996.—1 ♀, sta FTP-38, Sebastian Inlet State Park, gravel inlet, south side, east of bridge, algal clumps, sponge on boulders, strong wave and wash action, 0.5–1.0 m, 26 Jun 1997.—1 ♀, sta FTP-61, North Hutchinson Island, near causeway, rocks with algal turf, 0.1 m, 27 Jun 1997.—1 ♂, 1 ♀, 1 juv., sta FTP-71, Ft. Pierce Inlet, north bank, algal turf on boulders, low tide level, 19 Aug 1998.

Previous records.—Belize; Puerto Rico; Cuba; Florida; shallow infratidal.

Family Sphaeromatidae

Cassidinidea ovalis (Say, 1818)

Naesa ovalis Say, 1818:484–485.—Richardson, 1900:224, 1901:537.

Cassidena lunifrons: Richardson, 1900: 222.

Cassidina lunifrons: Richardson, 1901:533, fig. 14.

Cassidiscia lunifrons: Richardson, 1905: 273, figs. 283–284.—Schultz, 1969:115, fig. 158.

Cassidinidea lunifrons: Hansen, 1905: 130.—Menzies & Frankenberg, 1966:44, fig. 20.—Kussakin, 1979:336, figs. 199–200.—Bruce, 1994:1151.

Cassidinidea ovalis: Schultz, 1969:115, fig. 159.—Kensley & Schotte, 1989:208, fig. 92b–e.—Bruce, 1994:1151, fig. 45.—Camp et al., 1998:136.

Dies arndti Ortiz & Lalana, 1980:161–164, figs. 1–8.

Dies barnardi Carvacho, 1977:14–17, figs. 4a–f, 5a–i.

Material examined.—1 ♀, FTP-1, North Fork St. Lucie River, rotten wood in mangroves, 0.5 m, salinity 1–20 ppt., 29 May 1995.—3 specimens, FTP-12, North Fork St. Lucie River at Riverside Park, Port St. Lucie Boulevard, rotten wood around dock, intertidal, salinity 10 ppt., 1 Jun 1995.—specimen, FTP-13, North Fork St. Lucie River at marina on Prima Vera Boulevard, dead submerged wood in shore grass at river's edge, 0.1 m, salinity 2.5 ppt., 1 Jun 1995.—4 specimens, FTP-17, Riverside Park on North Fork St. Lucie River, rotten submerged wood on mud with numerous barnacles and shells, 10–50 cm, salinity 0 ppt., 23 Apr 1996.—30+ specimens, FTP-23, mouth of North Fork St. Lucie River at U.S. Rt. 1 and Fern Rd., oysters shells and rocks on muddy bank, intertidal, salinity 0 ppt., 25 Apr 1996.—1 ovigerous ♀, FTP-29, Sebastian River, first island west of mouth, rotten submerged wood at shore, salinity 15 ppt., 17 Sep 1996.—1 specimen, FTP-30, same locality as above, in organic detritus, intertidal, 17 Sep 1996.—1 specimen, FTP-31, Sebastian River, island opposite MacDonald State Campground, submerged leaf litter, *Typha* and *Crinum* in shallow water, salinity 0 ppt., 17 Sep 1996.

Previous records.—Panama; Belize; Trinidad; Dominica; Cuba; Gulf of Mexico; Florida to New Jersey; intertidal–1 m.

*Paradella diana*e (Menzies, 1962)
Figs. 4, 5

*Dynamenopsis diana*e Menzies, 1962:341, fig. 3.

*Paradella diana*e: Harrison & Holdich, 1982:103, fig. 6.—Kensley & Schotte, 1989:224, fig. 98a–c.

Material examined.—3 ♂, FTP-14, Ft. Pierce Inlet, barnacles, sponges, algal turf on blocks in inlet, intertidal, 23 Apr 1996.—6 ♂, 14 ovigerous ♀, 30+ immature, FTP-15, Ft. Pierce Recreational Area, rotten wood piles with encrusting algae, intertidal, 23 Apr 1996.—6 ♂, 4 ovigerous ♀, 25+ immature, FTP-17, Riverside Park on North Fork St. Lucie River, rotten submerged wood on mud with barnacle shells, salinity 0 ppt., 10–50 cm, 23 Apr 1996.—1 ♂, 2 ovigerous ♀, 15+ immature, FTP-19, Jack Island near Ft. Pierce Inlet, *Caulerpa* and empty shells near oyster bank, 0.5 m, 24 Apr 1996.—100+ specimens, FTP-38, Sebastian Inlet State Park, gravel and pebbles in pockets around granite boulders lining inlet, infratidal, 0–32", 19 Sep 1996.—92 specimens, FTP-39, same locality, on encrusting orange sponge with red branching algae on jetty rocks ca. 100 ft from end of south jetty, 0.5 m, 19 Sep 1996.—2 ♂, 1 immature, FTP-42, same locality, 50 m west of bridge off south jetty, in *Caulerpa*, depth 6", 19 Sep 1996.—38 specimens, FTP-44, same locality, 50 ft inland from bridge, mixed algae on sandy/shelly bottom with rocks and boulders, 0.5 m, 19 Sep 1996.—1 ♂, 7 ♀, 2 juvs., FTP-45, same locality, red filamentous alga on rocks and south jetty wall, 30 cm, 19 Sep 1996.—1 ♂, 4 ovigerous ♀, 3 immature, FTP-46, Sebastian Inlet State Park, north side, gravel and pebbles among granite boulders ca. 100 m inside inlet, 10–50 cm, 20 Sep 1996.—12 ♂, 11 ovigerous ♀, 73 ♀, 40 juvs., FTP-48, Sebastian Inlet State

Park, south side, rubble and stones in 3" pools at top of shore, with blue-green alga, 25 Jun 1997.—1 ♂, 5 ♀, 1 juv., FTP-50, same locality, granite boulder shore inside of bridge, stones and rubble with low algal turf, at bottom of shore with strong wave and wash action, 25 Jun 1997.—6 subadult ♂, 3 ovigerous ♀, 4 ♀, 6 juvs., FTP-51, same locality, algal clumps on boulders inside of bridge, 0.5 m, 25 Jun 1997.—2 ♀, FTP-53, same locality, outside of bridge, algal clumps and sponge on boulders in strong wave and wash action, 26 Jun 1997.—1 ♂, 1 subadult ♂, FTP-54, same locality, boulders outside bridge, chunks of reef worm rock, 26 Jun 1997.—7 ovigerous ♀, 14 juvs., FTP-56, Sebastian Inlet State Park, lagoon near Coconut Point, *Enteromorpha/Ulva* mats exposed at low tide on boulders at top of shore, surface, 26 Jun 1997.—1 ♂, 4 ovigerous ♀, FTP-63, large boat canal at Smithsonian Marine Station, in floating *Sargassum*, at surface, 25 Jun 1997.—1 ♂, 4 ovigerous ♀, FTP-66, Sebastian Inlet State Park, chunks of reef worm tubes on rocks at low tide level, inside inlet, 0–50 cm, 18 Aug 1998.—4 subadults, 1 ovigerous ♀, FTP-68, same locality, gravel rubble and empty shells in pockets between rocks, inside inlet, 0–20 cm, 18 Aug 1998.—3 ovig ♀, FTP-69, same locality, algal turf with hydroids on granite boulders inside inlet, 0–50 cm, 18 Aug 1998.—3 ovigerous ♀, FTP-70, Ft. Pierce Inlet, north bank, reef worm tubes on boulders in inlet, low tide, surface, 19 Aug 1998.—2 ovigerous ♀, FTP-71, same locality, algal turf at low tide level on boulders, surface, 19 Aug 1998.

Previous records.—Baja California, Mexico; Queensland, Australia; Western Australia; Marshall Islands; Hong Kong; Puerto Rico; Florida; intertidal.

Remarks.—While *Paradella diana*e has previously been recorded from the IRL, an aspect of its biology has come to light that demands mention.

Fifty-one ovigerous females out of 182 examined (about 28%) were observed to

possess penes, suggesting that a protogynous sex change occurs in *P. diana*e. In Fig. 4C, a scanning electron micrograph, the ovigerous female shows both the opening of the marsupium between the fourth pereopod bases, and penes that are characteristic of a subadult male. The penes of the adult male are long, very slender in the distal half, tapering to acute apices and extending beyond the endopod of pleopod 1 by nearly 50%. The ovigerous hermaphrodites show no retention of either appendix masculina or adult penes, which suggests that protandry is not the condition here. This would seem to be the first record of protogyny in the sphaeromatid subfamily Dynameninae. Among the Isopoda, protandrous sex change is well known in the families Anthuridae (Wägele 1979), Cymothoidae (Brusca 1981), several families of the suborder Epicaridea (Kozloff 1987), and in at least one oniscidean (Brook et al. 1994). Members of the Sphaeromatidae known to exhibit protogyny are members of other subfamilies: *Gnorimosphaeroma oregonense* (Dana, 1853), *G. luteum* Menzies, 1954 (both Sphaeromatinae), and *Paraleptosphaeroma glynni* Buss & Iverson, 1981 (Cassidininae). Bruce (1994:1132) further mentions observing hermaphroditism in *Paracassidina munna*, having "developed male characters in . . . pleopod 2" as well as oostegites in the same specimen. Pleopod 2 in the ovigerous females of *P. diana*e did not display any male characters. The proportion of ovigerous females with penes in *G. oregonense* (31% of females collected in the field) is comparable to that of *P. diana*e recorded here. Brook et al. (1994) provide a discussion of the adaptive value of protogyny as compared to protandry, the commoner reproductive strategy in Crustacea.

Paradella quadripunctata (Menzies & Glynn, 1968)

Fig. 6

Dynamenella quadripunctata Menzies & Glynn, 1968:60–61, fig. 28a–n.

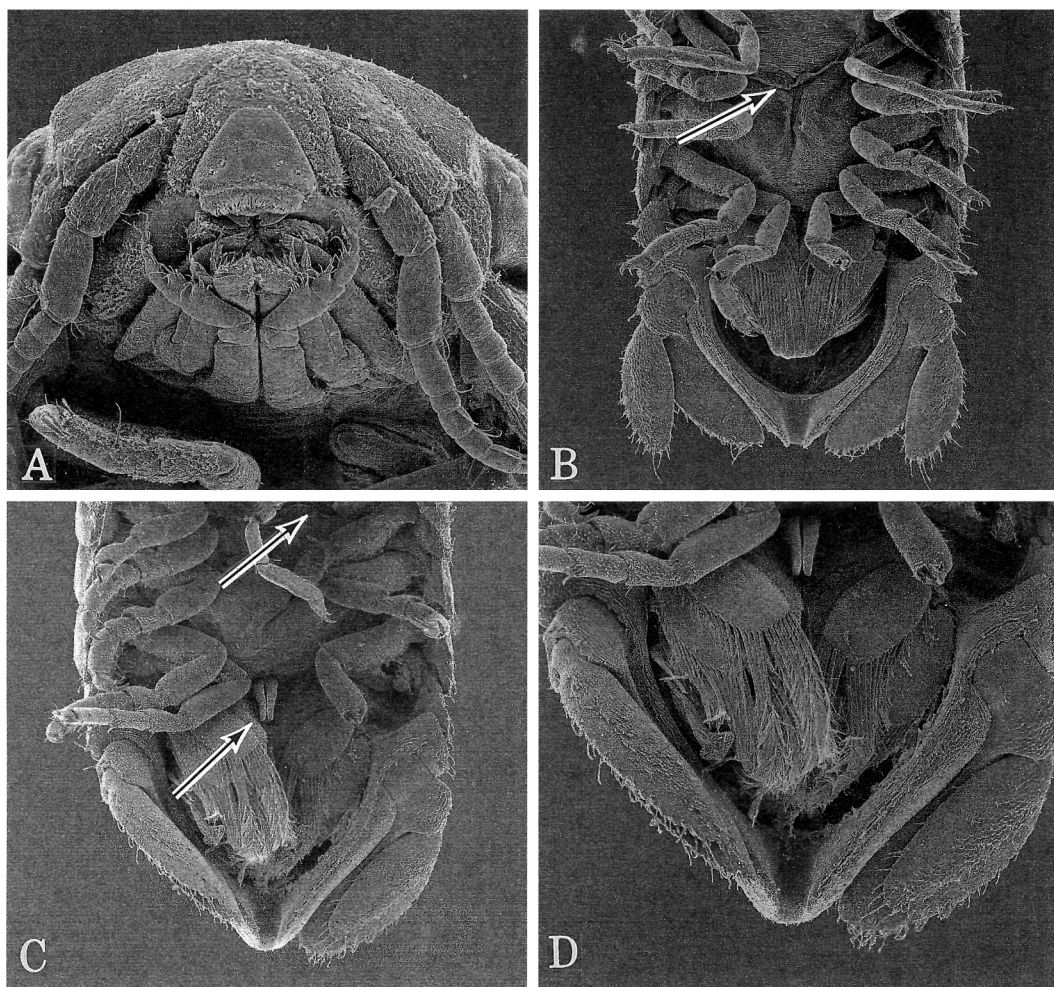


Fig. 4. *Paradella diana*: A, ventral cephalon; B, ovigerous female, ventral view, arrow indicating opening of brood pouch between fourth pereopods; C, ovigerous female with brood pouch opening and penes; D, ovigerous female, close-up of ventral pleotelson and penes.

Paradella quadripunctata: Harrison & Holdich, 1982:101.—Kensley & Schotte, 1989:224–225, fig. 98f–g.—Camp et al., 1998:136.

Material examined.—1 ovigerous ♀, FTP-38, Sebastian Inlet State Park, gravel and pebbles in pockets around granite boulders lining inlet, infratidal, 0–32", 19 Sep 1996.—1 immature, FTP-50, Sebastian Inlet State Park, south side, granite boulder shore inside of bridge, in stones and rubble with algal turf at bottom of shore with strong wave action, 25 Jun 1997.—24 im-

mature, FTP-51, same locality, algal clumps on boulders, 0.5 m, 25 Jun 1997.—25+ immature, same locality, FTP-53, south side, outside bridge, algal clumps and sponge on boulders in strong wave and wash action, 0.5–1.0 m, 26 Jun 1997.—1 subadult ♂, 80+ immature, FTP-54, same locality, south side, boulders in inlet, outside of bridge, in chunks of reef worm rock, 26 Jun 1997.—5 immature, FTP-59, Sebastian Inlet State Park, lagoon near Coconut Point, 26 Jun 1997.—25+ immature, FTP-62, North Hutchinson Island, Recreation Park,

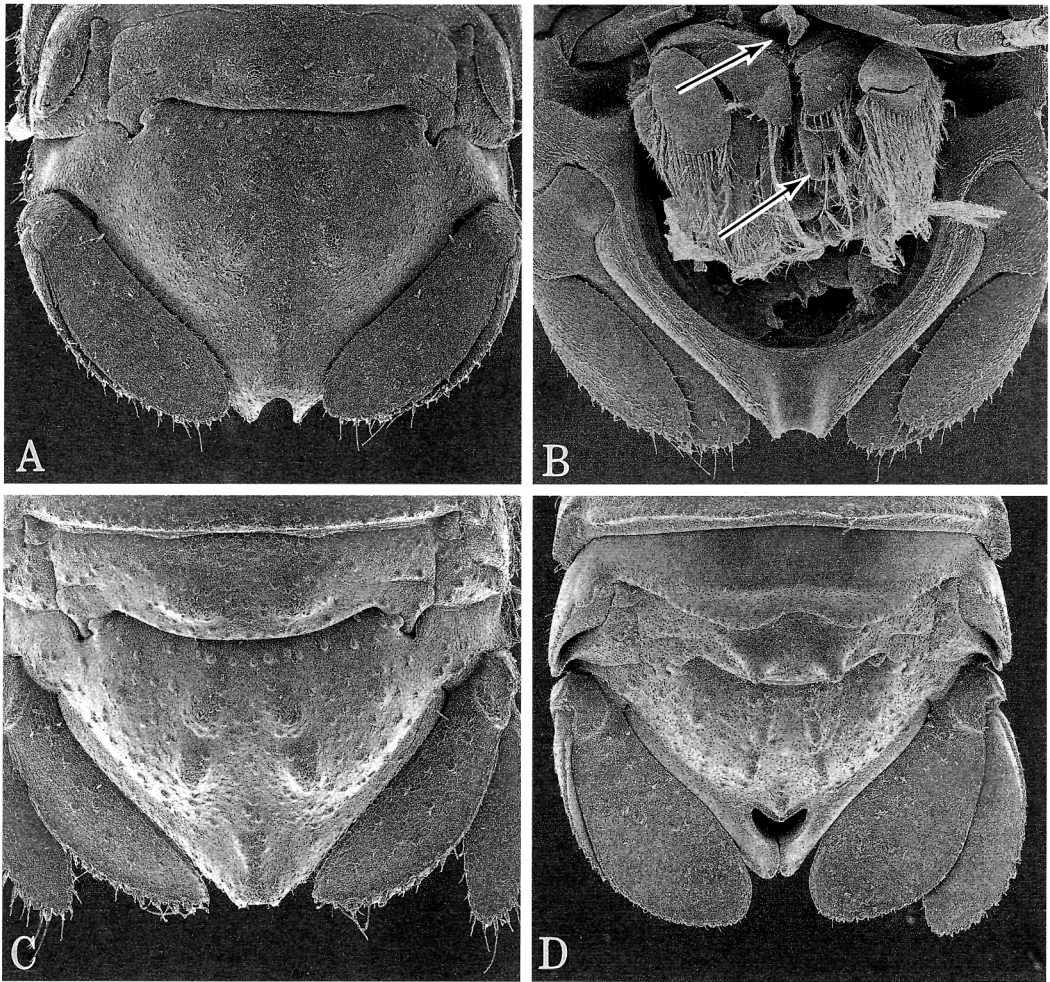


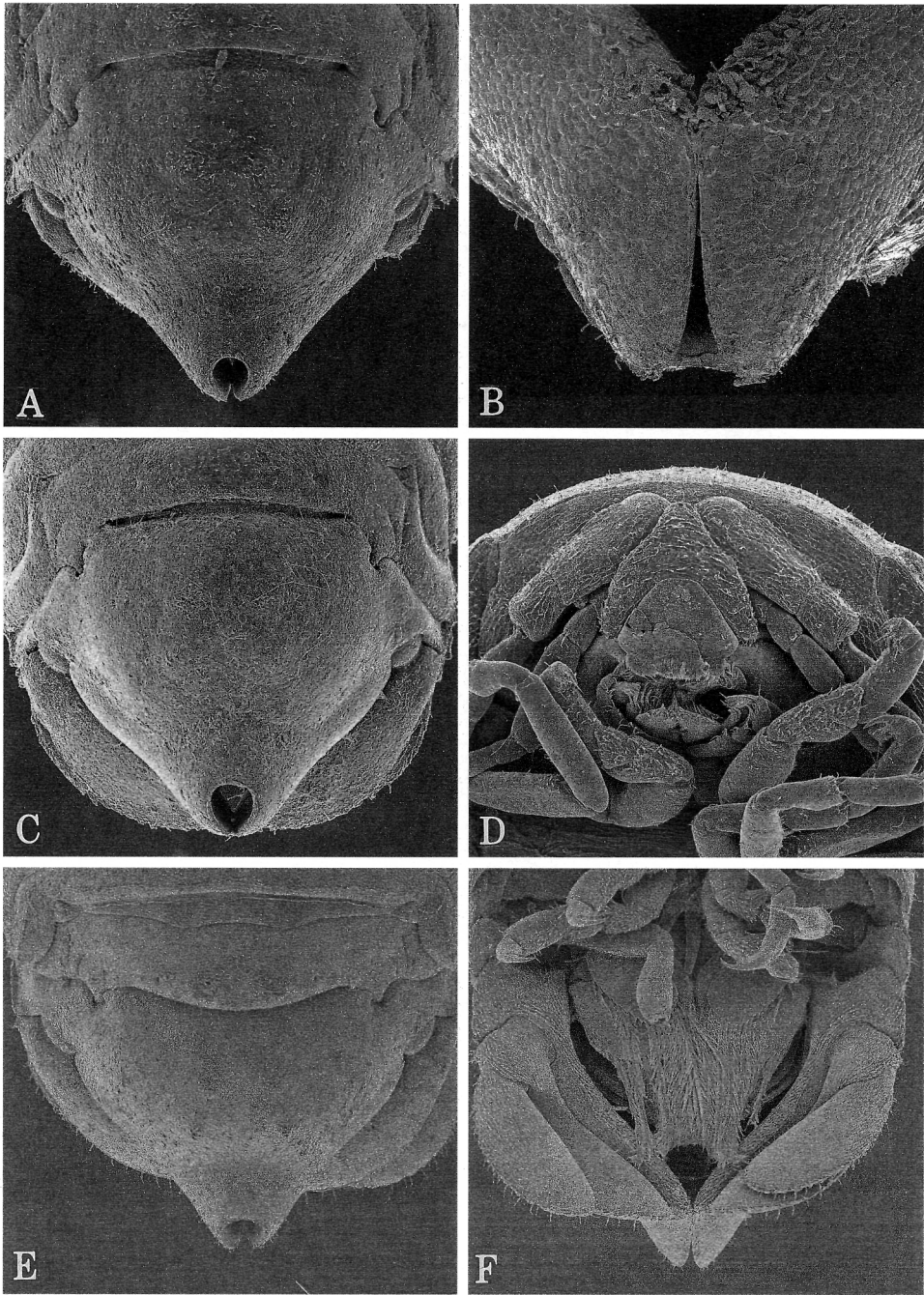
Fig. 5. *Paradella diana*: A, sub-adult male, dorsal pleotelson; B, sub-adult male, ventral pleotelson, arrows indicating immature penes and appendix masculina; C, ovigerous female, dorsal pleotelson; D, mature male, dorsal pleotelson.

1483
 rotten wood in shallow water, < 1 m, 27 Jun 1997.—8 subadult ♂, FTP-66, Sebastian Inlet State Park, chunks of reef worm tubes on rocks at low tide, inside inlet, 0–50 cm, 18 Aug 1998.—1 ovigerous ♀, FTP-67, same locality, algal turf at low tide inside inlet, 0.5–1 m, 18 Aug 1998.—1 ovigerous ♀, FTP-68, same locality, gravel rubble, empty shells between rocks inside inlet, 0–20 cm, 18 Aug 1998.—1 ovigerous ♀, 3 immature, FTP-69, same locality, algal turf mixed with hydroids on granite boulders inside inlet, 0–50 cm, 18 Aug 1998.—2 subadult ♂, 1 ovigerous ♀, FTP-70, Ft.

Pierce Inlet, north bank, reef worm tubes on boulders in inlet, low tide, 19 Aug 1998.—2 subadult ♂, 2 immature, FTP-71, same locality, algal turf on boulders at low tide level, 19 Aug 1998.—2 subadult ♂, 3 ovigerous ♀, FTP-72, Warton Beach rocks off Rt. A1A, algal turf growing on beach rock at bottom of shore, 0–50 cm, 20 Aug 1998.

Previous records.—Dominican Republic; Puerto Rico; U.S. Virgin Is.; Florida; Bermuda; intertidal–1 m.

Remarks.—Although no adult males were collected, identification was based on



5708
 Fig. 6. *Paradella quadripunctata*: A, allotype, ovigerous female, ex USNM 119307, dorsal pleotelson; B, ventral pleotelson; C, ovigerous female, Indian River specimen; D, ovigerous female, ventral cephalon lamina; E, sub-adult male, dorsal pleotelson; F, sub-adult male, ventral pleotelson.