

DISCIAS VERNBERGI, NEW SPECIES, A CARIDEAN
SHRIMP (CRUSTACEA: DECAPODA: BRESILIIDAE)
FROM THE NORTHWESTERN ATLANTIC

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Abstract.—*Discias vernbergi*, n. sp. is described from specimens collected in coastal waters off the southeastern United States. *Discias vernbergi* is most closely related to *D. serrifer* Rathbun, an eastern Pacific form. The uropods of both species are characterized by having the outer margin of the exopods armed with teeth; however, *D. vernbergi* can be distinguished by: (1) having fewer lateral teeth (4 to 6) on the uropodal exopod, (2) having at least two more pairs of terminal spines on the telson, and (3) by lacking a posterior middorsal process on abdominal somite 2. *Discias vernbergi* is the third species of the genus known to occur in the western Atlantic.

In his review of the family Bresiliidae, Kensley (1983) recognized six valid species of *Discias* Rathbun, 1902. The type species, *D. serrifer* Rathbun, 1902, was described from three adult females collected from the Galapagos Islands and later reported from the Juan Fernandez Islands (Bals 1922). Three other Pacific species are currently recognized: *D. exul* Kemp, 1920 (= *D. mvitae* Bruce, 1976) from the coasts of India, Kenya, South Africa, and Australia (Kemp 1920; Bruce 1970, 1976; Kensley 1981, 1983); *D. musicus* Holthuis, 1981, from the Marianas Islands; and *D. brownae* Kensley, 1983, from Australia. *Discias atlanticus* Gurney, 1939, was originally described from the western Atlantic (Bermuda), but has since been reported from East Africa (Holthuis 1951), the Red Sea (Williamson 1970) and West Africa (Bruce 1975), as well as several additional western Atlantic locations (Monod 1939, Gore and Wilson 1978, Gore 1981, Kensley 1983). *Discias serratorostris* Lebour, 1949, appears to be endemic to the northwestern Atlantic and is known from Bermuda, Florida, and Belize (Lebour 1949, Wilson and Gore 1979, Kensley 1983).

Specimens of an undescribed species of

Discias collected during the Project Hourglass cruises off the West Coast of Florida, and MARMAP and R/V *Eastward* cruises off the coasts of Georgia and South Carolina were made available to us for study. The description of this new species is presented here.

Carapace length (CL) is measured from the postorbital angle to the posterior most part of the carapace.

Discias vernbergi, new species
Figs. 1-3

Discias sp.: Kensley 1983:3 (in key).

Material examined.—Holotype, 1 ovigerous ♀, CL 3.8 mm (USNM 221748), Hourglass sta D, 65 na mi W of Egmont Key, Florida, 27°37'N, 83°58'W, 55 m, R/V *Hernan Cortez*, 12 Sep 1967. Paratypes, FLORIDA: 1 ovigerous ♀, CL 2.7 mm and 1 ♂, CL 2.5 mm (USNM 221749), Hourglass sta M, 92 na mi W of Sanibel Island light, Florida, 26°24'N, 83°43'W, 73 m, R/V *Hernan Cortez*, 9 Mar 1967.—1 ♂ CL 2.3 mm (FSBC I 32280), Hourglass sta E, 78 na mi W of Egmont Key, 27°37'N, 84°13'W, 73.2 m, R/V *Hernan Cortez*, 2 Aug 1966.—2 ovigerous ♀♀, CL 3.0 mm and 3.1 mm (FSBC

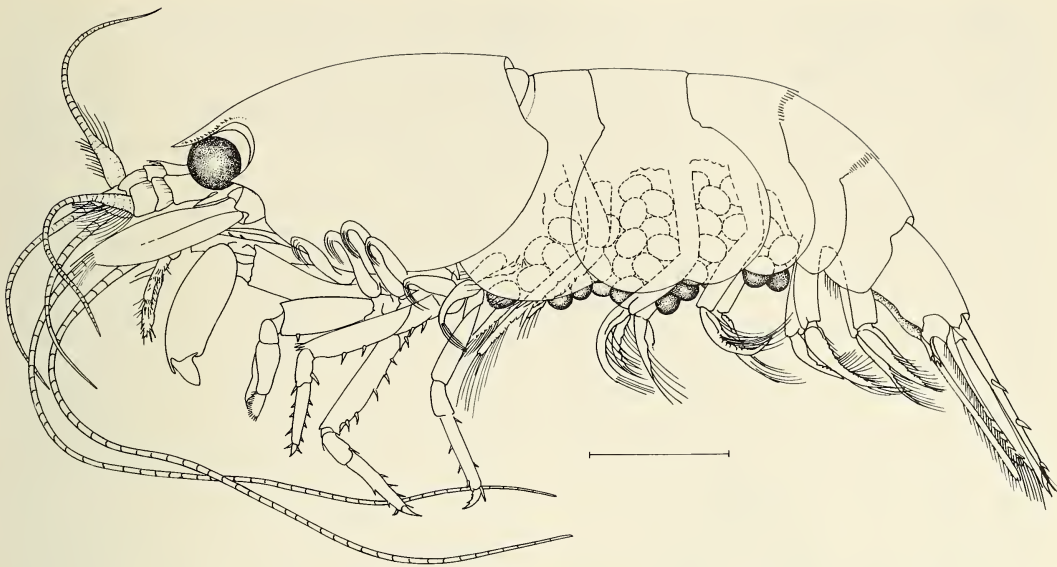


Fig. 1. *Discias vernbergi*: Lateral view of ovigerous female. Scale = 2.0 mm.

I 32281), Hourglass sta M, 92 na mi W of Sanibel Island light, 26°24'N, 83°43'W, 73.2 m, R/V *Hernan Cortez*, 6 Aug 1966.—2 ♂♂, 3 ♀♀, 1 ovigerous ♀, CL 2.5 mm, 2.3 mm, 2.3 mm, 2.0 mm, 1.7 mm and 3.0 mm, resp., (FSBC I 32282), Hourglass sta M, 92 na mi W of Sanibel Island light, 26°24'N, 83°43'W, 73 m, R/V *Hernan Cortez*, 5 Sep 1966.—1 ovigerous ♀, CL 3.6 mm (MESC 6179-10526) Hourglass sta M, 92 na mi W of Sanibel Island light, 26°24'N, 83°43'W, 73 m, R/V *Hernan Cortez*, 5 Sep 1966.—1 ♂, CL 3.5 mm (FSBC I 32283), Hourglass sta D, 65 na mi W of Egmont Key, 27°37'N, 83°58'W, 55 m, R/V *Hernan Cortez*, 12 Apr 1967.—1 ♂, CL 1.9 mm (FSBC I 32284), Hourglass sta E, 78 na mi W of Egmont Key, 27°37'N, 84°13'W, 73 m, R/V *Hernan Cortez*, 12 May 1967.—1 ovigerous ♀, CL 2.9 mm (GCRL I 86-1127), Hourglass sta M, 92 na mi W of Sanibel Island light, 26°24'N, 83°43'W, 73 m, R/V *Hernan Cortez*, 16 May 1967.—1 ♀, CL 1.7 mm (FSBC I 32285), Hourglass sta E, 78 na mi W of Egmont Key, 27°37'N, 84°13'W, 73 m, R/V *Hernan Cortez*, 6 Oct 1967.—1 ♂, CL 2.3 mm (FSBC I 32286), Hourglass sta M, 92 na mi W of

Sanibel Island light, 26°24'N, 83°43'W, 73 m, R/V *Hernan Cortez*, 12 Oct 1967.—1 ♂, 1 ovigerous ♀, CL 3.2 mm and 4.1 mm, resp., (FSBC I 32287), Hourglass sta D, 65 na mi W of Egmont Key, 27°37'N, 83°58'W, 55 m, R/V *Hernan Cortez*, 21 Nov 1967. GEORGIA: 1 ovigerous ♀, CL 3.9 mm (USNM 221750), R/V *Eastward* sta E-33-M (70-71), 120 na mi E of Savannah, 32°06.8'N, 79°12.6'W, 74 m, coll. B. Boothe, 24 Mar 1971.—1 ♀, CL 3.1 mm (USNM 221751), R/V *Dolphin* sta 86 (0575273), 115 na mi E of Savannah, 32°01.5'N, 79°21.7'W, 66 m, coll. B. Boothe, 18 Sep 1975.

Specimens have been deposited in the collections of the National Museum of Natural History (USNM), Washington, D.C.; the Florida Department of Natural Resources (FSBC), St. Petersburg, Florida; the Marine Environmental Sciences Consortium (MESC), Dauphin Island, Alabama; and Gulf Coast Research Laboratory Museum (GCRL).

Diagnosis.—Rostrum narrow, acute, armed laterally with 20–30 fine teeth (serrations) on each side. Abdominal somite 2 lacking posterior, middorsal process. Man-

dibular palp biarticulate, with 5–13 setae on distal article. Exopod of uropod with 4–6 cuspidate teeth on distal half of lateral border. Telson with 6 pairs of terminal spines.

Description.—Carapace slightly less than $\frac{1}{3}$ total length, smooth, without spines or teeth except for acute suborbital angle; anterior and posterior borders rounded. Rostrum short, $\frac{1}{3}$ to $\frac{2}{5}$ carapace length, dorsoventrally flattened, acute, increasing in width toward orbit; width at anterorbital angle $\frac{3}{4}$ length; with middorsal ridge not extending past posterior edge; shallow groove located on either side of ridge; lateral margin minutely serrate, with 18–30 spinules extending entire length to posterior part of orbit.

Eyes large, circular, amber colored in alcohol, reaching level of anterior part of rostrum.

Antennules short, flagella extending only $\frac{1}{3}$ antennal length. Peduncle with proximal segment $\frac{2}{3}$ peduncle length; stylocerite acute, elongate, slightly more than $\frac{2}{3}$ length and $\frac{1}{3}$ width of proximal segment. Upper flagellum arising from mid-segment of lateral surface of distal antennular segment; proximal segment tapering distally, thickened, composed of 6–8 fused articles, bearing 50+ twisted aesthetascs. Lower flagellum arising from distomedial edge of distal segment, slightly longer and more slender than upper; border with long setae.

Antennal flagellum long, 2–3 times length of carapace; basicerite with acute process on distal margin; scaphocerite (antennal scale) elongate, subrectangular, slightly broader at midlength than at distal end, with 40–50 long, plumose setae along mesial edge to distal end, lateral margin entire; carpocerite (fifth antennal segment) short, extending as far as distal $\frac{1}{3}$ to $\frac{1}{2}$ of scaphocerite.

Mandible deeply cleft, with incisor and molar processes and palp. Molar process longer than incisor, with numerous small teeth on both edges distally. Incisor curved, broader, with 4–6 prominent teeth on truncate distal end; lateralmost tooth smallest; anteriormost tooth of series on distal mar-

gin longest. Two-segmented palp arising lateral to base of incisor. Palp spatulate, equal in length to molar process; proximal segment slightly longer than distal; adults with 5–13 pinnate setae on “paddle-shaped” distal segment.

Maxilla 1 with broad, tapering palp and 2 lobed processes. Palp large, robust, width slightly less than $\frac{1}{2}$ that of base of distal process, bearing 1–2 short, stiff, setae and 1 elongate seta. Distal process narrowly quadrate, 4 pinnate setae on lateral margin, 2 rows each with 20+ denticulate, spinelike setae on medial border; dorsal surface with 1 row of 30–40 fine, pinnate setae near medial border. Proximal process $\frac{1}{3}$ to $\frac{1}{2}$ size of distal process and more oval, with 10–20 pinnate setae on upper border and 30–40 denticulate/spinulose setae on medial edge.

Maxilla 2 somewhat rectangular, scaphognathite elongate, with basal and coxal endites, and long slender palp. Scaphognathite subrectangular, distal part 3 times as long as proximal part, with 60–80 marginal plumose setae. Basal endite bilobed, with distal lobe overlapping proximal lobe anteriorly; distal lobe oval to subtriangular, with 3–5 pinnate setae on upper, lateral margin, and two rows each of 20–30 pinnate/denticulate setae on medial border; proximal lobe subrectangular to triangular, $\frac{1}{3}$ size of distal lobe, straight medial border bearing 2 rows each of 30–40 stiff denticulate/pectinate setae. Coxal endite rounded, overlapping proximal margin of basal endite, bearing 20–30 marginal, pinnate setae. Palp arising between bases of scaphognathite and distal part of basal endite, bearing 1 long simple seta.

First maxilliped robust, with large basal endite and well developed caridean lobe. Palp broad, arising between caridean lobe and basal endite, twisted, with 1–3 simple setae, extending slightly beyond distal part of basal endite. Caridean lobe elliptical, margin with 25–30 pinnate setae; lash elongate, arising from distomedial margin of caridean lobe just anterior to palp, with 2–

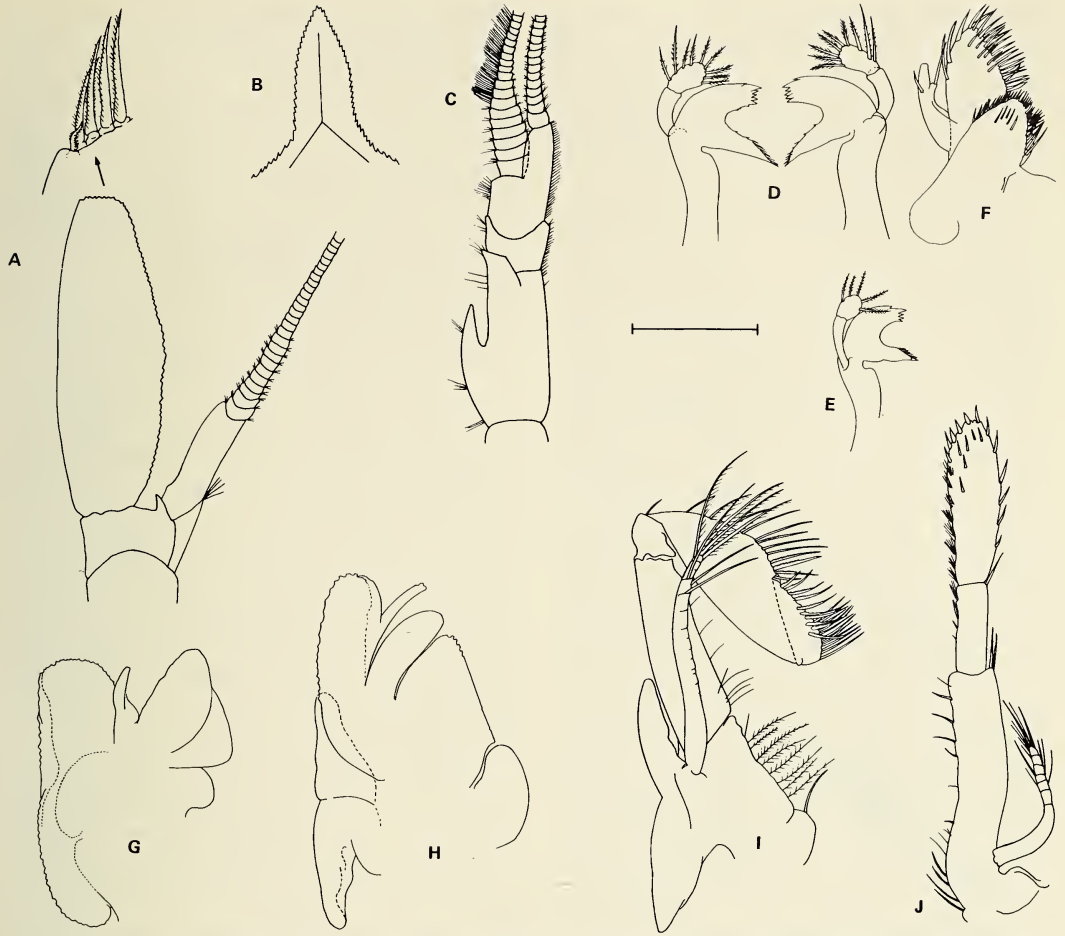


Fig. 2. *Discias vernbergi*, A-I, F-J, ovigerous female; E, male. A, Antennal peduncle with enlargement of distolateral corner of antennal scale; B, Rostrum, dorsal aspect; C, Antennular peduncle; D, Left and right mandibles; E, Right mandible; F, Maxilla 1; G, Maxilla 2; H, Maxilliped 1; I, Maxilliped 2; J, Maxilliped 3. Scale, A-C, J = 1.25 mm; D-I = 0.4 mm.

4 simple setae at apical tip, extending just beyond level of caridean lobe. Basal endite large, triangular, lateral margin with 2-3 rows each of 20-30 thick, denticulate setae; distal margin with few pinnate setae. Coxa with bilobed epipod and triangular coxal lobe. Coxal lobe small, overlapping proximal edge of basal endite, with few marginal setae. Epipod feebly elongate, located at proximal base of caridean lobe and only slightly longer than lobe.

Second maxilliped robust, with large, functional endopod, elongate exopod, and bilobed epipod. Endopod with small, tri-

angular dactyl bearing 2 rows each with 15-20 long, stout, sharply denticulate setae on margin; propodus large, broadly triangular, with 15-20 pinnate setae on anteromedial border, 4-5 finer pinnate setae on lateral margin. Carpus small, quadrate, bearing 0-1 setae on distomedial margin; ischium and merus fused, equal in length to propodal segment, with 15-25 pinnate, plumose setae on lateral border; basal segment triangulo-quadrate, 1/3 length of ischiomeral segment, with 10-12 lateral pinnate setae. Exopod arising from distomedial border of basis, very slender, barely overreaching ischio-

merus, bearing 3–5 long, plumose setae at tip. Coxa broad, with large epipod; small notch at lateral margin of coxal-basal junction. Epipod fused to entire medial edge of basis, equal in length to merus. Distomedial edge of coxa with 1–2 pinnate setae.

Third maxilliped strong, extending slightly beyond scaphocerite, with prominent exopod and twisted endopod. Basis subquadrate, with exopod and 10+ pinnate setae on medial border. Endopod 3-segmented. Terminal segment of endopod twisted, flattened, elliptical, wedge-shaped in cross-section, equal in length to antepenultimate segment and 3 times longer than broad, proximodorsal margin with 6–8 broad, stout spines, ventral margin with 5–6 longer pinnate setae; lateral aspect devoid of any setae or spines; medial surface bearing 7–8 groups of 4–6 stiff, denticulate setae per group. Penultimate segment of endopod narrow, subcylindrical, slightly bowed, devoid of any setae except 1–2 at extreme medial border; length 0.6 that of terminal segment. Antepenultimate segment twisted, bowed, with subparallel sides; medial border with 6–14 sparse, pinnate setae; 1–2 plumose setae at extreme distolateral apex. Exopod feebly elongate, with 16+ pinnate setae on distal part, reaching penultimate segment of endopod. Coxa subrhomboidal, with rigid flange on mesiolateral border and with 4–5 setae medially.

All pereopods with well-developed exopods. First pereopods twisted, bowed, extending almost to tip of scaphocerite; ischium and merus twisted, subequal, similar. Palm compressed, slightly bowed dorsally, swollen proximally, tapering toward distal end, about 3 times longer than width at proximal end; medial border with 2 rows of numerous denticulate setae, ventrally with row of stiff, denticulate setae. Dactyl compressed, suboval, slightly broader than long, with laminar cutting edge; inner aspect smoothly concave; 7–8 short, fine setae on lateral margin and 3–4 setae at distolateral edge; movable finger articulating in groove formed by bipartite processes of short fixed

finger (when fully extended, cutting edge actually semicircular); fixed finger slightly upturned distally, with 1–2 short and 1 long setae on middle of outer border; ventral aspect of groove with laminar cutting edge (lacking in dorsal aspect); distal edge of fixed finger with 3–5 pinnate setae; distoventral portion of palm produced as flattened process extending beyond hinge of dactyl. Fused ischiomerus club-shaped, $\frac{3}{4}$ length of palm, with distal portion 1.5 times proximal width; medial border straight, proximal $\frac{3}{4}$ with 16–25 simple pinnate setae; extreme distolateral edge with 1–3 stiff setae; distal end, hollow, cup-shaped, accommodating proximal end of palm and carpus. Carpus small, compressed; dorsal and ventral borders each with 1–3 setae; carpus almost indiscernible, only seen in dorsal and medial view (being hidden in cup-shaped depression of proximal end of ischiomerus). Basis robust, triangular, with straight, setose ventral border, with strong exopod. Exopod with 15–20 setae distally. Coxa small but robust.

Second pereopods shorter than and not as stout as first. Palm 3–4 times longer than wide, 2.5 times length of dactyl, distally twisted, compressed, proximally subcylindrical, with numerous setae on lateral margin. Chela compressed, with very spinous teeth along cutting edges; longer and stiffer spinous teeth distally; movable finger with 14 spines; fixed finger with 11 spines and one elongate spine on medial border; hinge of fixed and movable fingers with long, sharp spine on dorsal aspect. Carpus suboval, short, stout; easily discernible and not compressed as in pereopod 1, lacking setae and spines. Ischiomerus fused, width $\frac{1}{2}$ length, slightly longer than palm. Few short setae at ischiomerocarpal joint; distodorsal extremity with proximal sharp spine. Basis stout, with strong exopod; 3–5 setae on ventral margin. Coxa with few ventral setae.

Third, fourth, and fifth pereopods similar, depressed; third longest, extending anteriorly to tip of chela of first; fifth shortest, weakest. Dactyl of each short, slender, tapering, $\frac{1}{4}$ length of propodus; inner margin

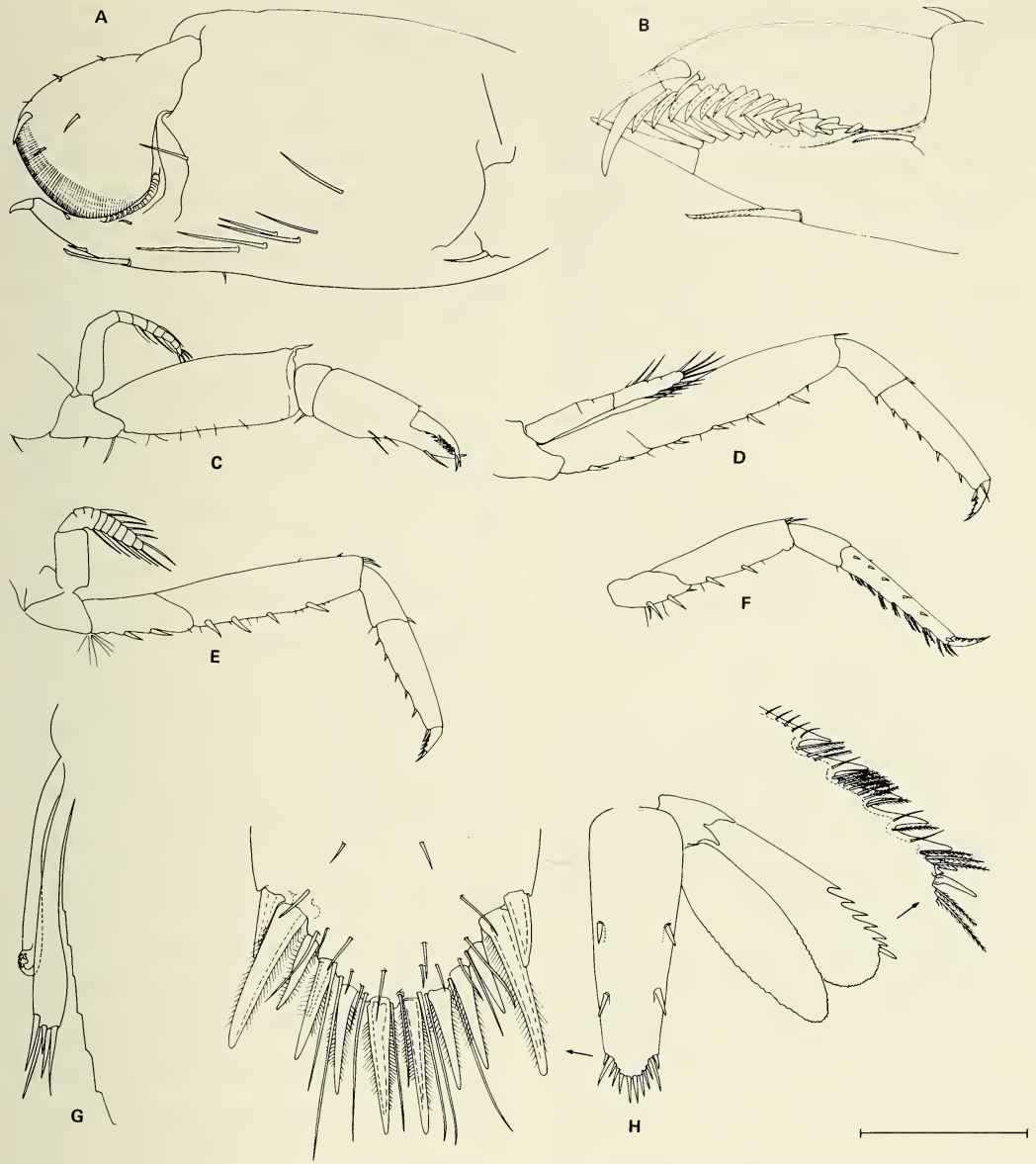


Fig. 3. *Discias vernbergi*, A-F, H, ovigerous female; G, male. A, Pereopod 1, dactyl and propodus; B, Pereopod 2, dactyl and fixed finger of propodus; C-F, Pereopods 2-5; G, Appendix masculina and appendix interna, pleopod 2; H, Telson and uropods. Scale, A = 0.6 mm; B, G = 0.3 mm; C-F, H = 1.25 mm.

denticulate, with 5-7 acute teeth; 1 long acute spine and numerous setae at propodal/dactylar joint. Dactyl of pereopod 5 rotated 180° anteriorly. Propodus moderately twisted, triangular in cross-section, twice length of carpus; ventral border with 4-6 strong spines and medial row of 4-8 groups of 1-4 denticulate setae each. Carpus sub-

rectangular; 1-2 acute spines on distolateral portion. Merus slightly longer than length of carpus plus propodus; 4-7 spines on ventral border and smaller lateral spine at distal margin. Ischium almost equal in length to carpus; 2-3 stout spines on lateral edge; 3 setae at joint of ischium and coxa. Coxa with 2 setae at coxal/basal joint. Exopod

flattened; with 20+ setae at distal third and extending to $\frac{3}{4}$ length of merus.

Pleopod 1 of male with basipodite slightly shorter than exopod; exopod tapering distally, with many plumose setae along distal margins; endopod elongate, $\frac{1}{3}$ to $\frac{1}{4}$ length of exopod, lateral surface bearing 2–4 spines, distal margin with 5–9 long setae. Pleopod 2 of male with exopod slightly longer than basipodite, tapering distally, with numerous plumose setae; appendix masculina $\frac{1}{2}$ length of exopod, with 5–7 distal plumose setae; appendix interna $\frac{7}{8}$ length of appendix masculina, narrowly elongate, with 6–9 terminal hooks.

Abdominal pleura and tergites smooth, with numerous setae on ventral border. Abdominal segments (1–6) lacking middorsal spine on posterior margin. First 4 somites with anterior and posterior parts smoothly curved. Somite 5 with blunt, angular, posteroventral margin; $\frac{2}{3}$ length of 6; latter $\frac{1}{2}$ to $\frac{2}{3}$ length of telson.

Telson subrectangular with 2 pairs of stiff, dorsal, submarginal spines; anterior pair located $\frac{1}{3}$ length of telson; posterior pair located at $\frac{2}{3}$ telson length. Posterior margin of telson with 6 pairs of terminal spines; second and innermost pairs longest; finer setae between each spine.

Uropods subelliptical; rami almost equal in length, slightly shorter than telson; acute, spinose process on distolateral margin of basis; another on distodorsal surface at same level as lateral margin of basis. Outer uropodal ramus (exopod) with 4–6 cuspidate, smoothly acute, immovable teeth on distal half of lateral margin; small, movable spine at extreme distolateral edge; fine pinnate setae dorsal to and in between teeth. Numerous plumose setae on lateral, medial, and terminal margins of exopods and endopods.

Variation.—Based on the specimens we examined during this study, the number of setae on the mandibular palp may vary with size and sex. Small specimens (less than 2.0 mm CL) of both sexes have a tear-drop shaped palp with 0–4 setae. Adult male specimens have a spatulate palp with 5–7

setae (one of the seven specimens examined had 10 setae). Ten of the 12 adult female specimens have spatulate palps with 8–13 setae, and the palps of the remaining two specimens have six setae.

The setal number also may vary depending on which side (right or left) the palp is located. Of six specimens in which both left and right palps were examined, three had different numbers of setae, with more setae found on the left palp than on the right.

Dentition on the uropodal exopods was also found to vary according to size. Smaller individuals (less than 2.0 mm CL) of both sexes have exopods with 2–3 immovable teeth, while adults of both sexes bear 4–6 teeth. Rarely does one side have a different number of teeth than the other.

Known distribution.—East coast (Georgia) and Gulf coast (west Florida) of the southeastern United States in depths of 54 to 74 meters.

Etymology.—This species is named for F. John Vernberg of the Belle W. Baruch Coastal Research Institute, University of South Carolina, in recognition of his many contributions to marine zoology.

Size and sexual maturity.—Of the 22 specimens examined, eight were males and 14 were females. Nine of the 14 females were ovigerous, with 20–50 large, oval eggs per specimen. Adult females had a size range of 2.7–4.1 mm carapace length and 10.8–15.3 mm total length; adult males, 2.3–3.5 mm carapace length and 10.1–11.4 mm total length. Immature females were those with 1.7–2.3 mm carapace length and 8.0–10.1 mm total length; the one immature male had a carapace length of 1.9 mm and a total length of 8.7 mm.

Remarks

Discias vernbergi can be distinguished from the other six species of the genus by the following combination of characters: (1) the lanceolate shape of the serrate rostrum; (2) spatulate form and number of setae on the biarticulate mandibular palp; (3) the

presence, number, and position of lateral teeth on the exopod of the uropod; (4) the greater number of terminal spines on the telson, and (5) the absence of posterior mid-dorsal process on abdominal somite 2. *Discias vernbergi* appears to be most closely related to the type species, *D. serrifer*. Both species have lateral teeth on the exopod of the uropods, a character that immediately distinguishes them from the other described species of the genus. *Discias vernbergi* differs from *D. serrifer* by: (1) lacking a posterior, middorsal process on abdominal somite 2, (2) having fewer lateral teeth on the uropodal exopods, and (3) having more terminal spines on the telson. In *D. vernbergi* there are 4–6 lateral teeth which are confined to the distal half of the exopods (Fig. 3H), whereas, in *D. serrifer* there are 8–11 lateral teeth which occur along $\frac{3}{4}$ to $\frac{4}{5}$ the length of the exopod. There are six pairs of terminal spines on the telson of *D. vernbergi* (Fig. 3H), at least two pairs more than any of the other described species, including *D. serrifer*.

In his key to the species of *Discias*, Kensley (1983) indicated that the antennal scale of *D. vernbergi* (= *Discias* sp.) was armed with a distolateral tooth, but we were unable to recognize this structure. The subacute distolateral corner of the antennal scale could be interpreted as a vestigial tooth (see Fig. 2A), but we do not consider it as such. *Discias atlanticus* is the only species of the genus having a distolateral tooth on the antennal scale, and in this species the spine is minute and poorly developed.

Two other species, *D. atlanticus* and *D. serratirostris*, have been previously reported from North American continental waters. *Discias atlanticus* apparently has a wide tropical-subtropical distribution and has been reported from the northern and eastern Atlantic, Red Sea, western Pacific (see Kensley 1983). At present, *Discias serratirostris* and *D. vernbergi* are known only from the northwestern Atlantic region. *Discias serrifer*, which has been collected only from the Galapagos and Juan Fernandez islands

(Rathbun 1902, Balss 1922) is the only species reported from the eastern Pacific. There are no records of the genus from the southwestern Atlantic. The lack of records for species of *Discias* in the southwestern Atlantic and large areas of the Pacific is probably due more to inadequate sampling in these regions than to the actual distribution pattern of the genus.

Discias vernbergi occurs at greater depths than the other described species of the genus. Off Georgia and west Florida it was taken in depths exceeding 70 m. In the eastern Gulf of Mexico, *Discias atlanticus* and *D. serrifer* are both known from depths as great as 55 m (Kensley 1983). The remaining species of the genus have been reported from depths of 33 m or less. However, these records, like the distribution data, may be an artifact of sampling.

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