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The Marine Isopod Crustacea of the Gulf of California. I. Family Idoteidae

RICHARD C. BRUSCA[1] AND BARRY R. WALLERSTEIN[2]

ABSTRACT

The valviferan isopods of the Gulf of California are reviewed, including eight species in four genera. One rediscovered species (*Eusymmerus antennatus*) and two new species (*Colidotea findleyi* and *Erichsonella cortezi*) are fully described. Two of the Gulf idoteids appear to be of subtropical or tropical origin (*Eusymmerus antennatus* and *Colidotea findleyi*), whereas the others appear to be cold or warm temperate derived species (*Erichsonella cortezi*, *Idotea aculeata*, *I. urotoma*, *I. stenops*, *I. resecata*, and *I. wosnesenskii*). These findings suggest, as other distributional data have, that the family Idoteidae is composed largely of cool to warm temperate-centered taxa, with few modern genera and species having evolved in the lower latitudes (e.g., *Eusymmerus*, *Colidotea*, and some species of *Erichsonella*). Members of this family, in the tropical and subtropical east Pacific, are generally found in association with littoral and shallow-water algae, especially species of *Sargassum*. Four species of *Idotea* are extremely wide-ranging forms, suggesting that members of this genus may be considerably more eurythermal than previously suspected. *Idotea wosnesenskii* and *I. resecata* range from the Gulf of California to Alaska; *I. stenops* ranges from Baja California (or possibly the Gulf of California) to Oregon; and *I. urotoma* ranges from the Gulf of California to Puget Sound.

INTRODUCTION

Over the past six years the senior author has accumulated a large collection of marine isopods from the coasts of Sonora, Sinaloa and Baja California. In addition the authors had available the idoteid isopod material of the Allan Hancock Foundation, the California Academy of Sciences, and the National Museum of Natural History, Smithsonian Institution.

Although several significant biological expeditions have been made into the Gulf of California (summarized and discussed by Steinbeck and Ricketts, 1941; Fraser, 1943; Goldman, 1951; Rodin and Groves, 1959; and others), few publications on marine isopods have resulted from these efforts. The present paper represents the first of a series intended to describe the marine isopod fauna of that region. Keys to the higher taxa of this group may be found in Brusca (1973 and In press). Three recent publications discuss the idoteid isopod fauna of California (Menzies

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and Waidzunas, 1948; Menzies, 1950; Miller and Lee, 1970). Idoteid terminology in this paper follows that of Menzies (1950), and all synonymies of species of *Idotea* are subsequent to that publication. Zoogeographic provinces are based on Briggs (1974) and Brusca (1975 and In press).

The authors take pleasure in expressing their gratitude to Dr. Dorothy E. Bliss (AMNH) and to Dr. Bernard C. Abbott (AHF). We are indebted to our colleague Miss Janet Haig, for her continual assistance during the preparation of this paper. In addition, appreciation is extended to Drs. Thomas E. Bowman (National Museum of Natural History, Smithsonian Institution) and Fahmida Rafi (National Museum of Canada) for critically reviewing the manuscript. Miss Mary Ellen Pippin and her staff greatly assisted us with the literature search and Mr. Richard (Paco) Winn prepared the illustrations of the *Idotea* species (fig. 1). Abbreviations of institutions are as follows: AMNH (the American Museum of Natural History); AHF (Allan Hancock Foundation); NMNH (National Museum of Natural History, Smithsonian Institution).

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FAMILY IDOTEIDAE DANA (BY MIERS, 1881)

Valviferan isopods with body generally dorsoventrally depressed; first pair of antennae usually shorter than second; flagellum of antenna 1 usually of 1 article; maxillipedal palp of 3-5 articles; pleon composed of 1-3 free segments; uropoda usually uniramous.

SUBFAMILY IDOTEINAE DANA, 1853

Uropods uniramous (except in *Cleantis*); all pereopods similar, never subchelate; head not laterally expanded.

KEY TO THE SPECIES OF IDOTEIDAE KNOWN FROM THE GULF OF CALIFORNIA

1. Pleon composed of 3 distinct segments; flagellum of antenna 2 multiarticulate 2
   Pleon composed of one segment; flagellum of antenna 2 multiarticulate *or* reduced to 1 article 6
2. Maxillipedal palp of 4 articles (fig. 1A) . . . . . *Idotea* (*Idotea*) *urotoma*
   Maxillipedal palp of 5 articles 3
3. Eyes transversely (dorsoventrally) elongate; apex of frontal process with median notch; maxilliped with 1, 2, or 3 coupling hooks (fig. 1E). . . . . *Idotea* (*Pentidotea*) *stenops*
   Eyes oval or reniform; apex of frontal process entire or slightly concave; maxilliped with 1 coupling hook 4
4. Posterior border of pleotelson strongly concave; frontal process narrow and pointed, extended beyond frontal lamina 1 (fig. 1B) . . . . . *Idotea* (*Pentidotea*) *resecata*
   Posterior border of pleotelson convex, with small median lobe; frontal process blunt or widely angular, not extended beyond margin of frontal lamina 1 5
5. Pleonite 1 with acute lateral borders; eyes reniform; pereopod 7 with distinct tufts of setae on articles 4-6 (fig. 1C) . . . . . *Idotea* (*Pentidotea*) *wosnesenskii*
   Pleonite 1 without acute lateral borders; eyes circular; pereopod 7 without tufts of setae on articles 4-6 (fig. 1D). . . . . *Idotea* (*Pentidotea*) *aculeata*
6. Flagellum of antenna 2 multiarticulate (fig. 2H). . . . . *Colidotea findleyi*, new species
   Flagellum of antenna 2 of a single article . . .7
7. Lateral margins of pleon smooth and gently convex; pleon with anterior segment indicated by a suture line (figs. 4, 5). . . . . *Eusymmerus antennatus*
   Lateral margins of pleon expanded posteriorly; pleon without suture lines (figs. 6,7) . . . . . *Erichsonella cortezi*, new species

GENUS *IDOTEA* FABRICIUS, 1799

Eyes lateral; maxillipedal palp composed of 4-5 articles; pleon composed of two segments plus the pleotelson; pleonal segment 3 indicated by partial suture lines on lateral margins of pleotelson.

SUBGENUS *IDOTEA*

Maxillipedal palp composed of 4 articles.

Idotea (*Idotea*) *urotoma* Stimpson, 1864
Figure 1A

Synonymy. Ricketts, Calvin and Hedgpeth,

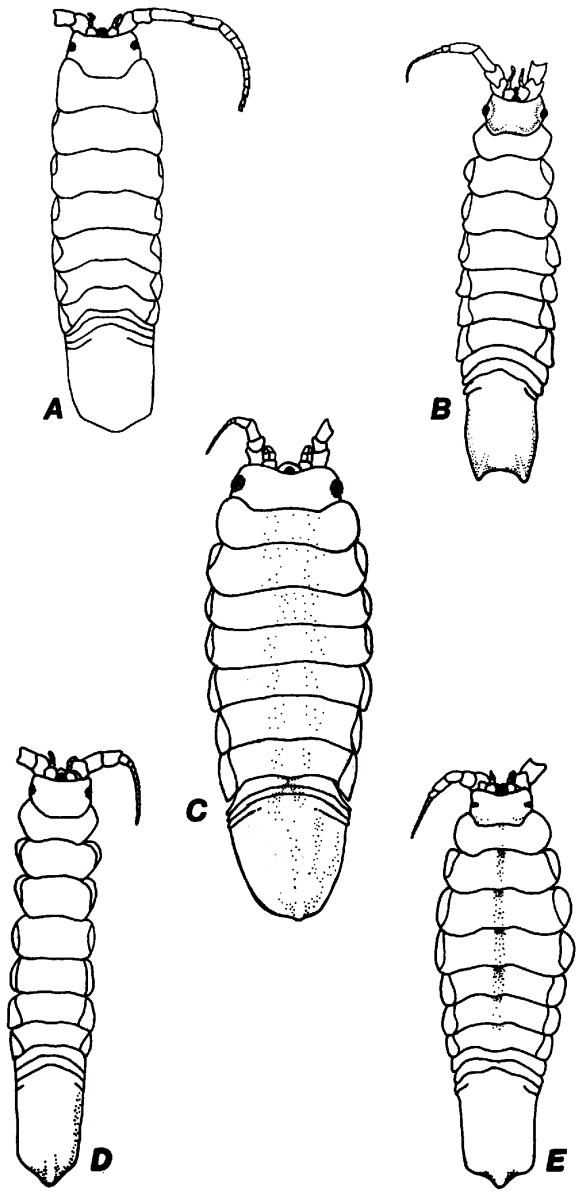

FIG. 1. *Idotea* of the Gulf of California. A. *Idotea* (*Idotea*) *urotoma*. B. *Idotea* (*Pentidotea*) *resecata*. C. *Idotea* (*Pentidotea*) *wosnesenskii*. D. *Idotea* (*Pentidotea*) *aculeata*. E. *Idotea* (*Pentidotea*) *stenops*.

1968, p. 243; Kozloff, 1974, p. 149; Miller, 1975, pp. 289, 290, 305; Allen, 1976, p. 216.

Diagnosis. Supra-antennal line weakly bilobed medially. Frontal process elongate, apex blunt; frontal lamina 1 not exceeding length of frontal process, with produced sides and a deep median concavity; frontal lamina 2 not visible in dorsal view. Lateral margins of cephalon converging anteriorly. Eyes small, quadrangular. Maxilliped with one coupling hook; apical article of palp without long setae on outer border. Posterior border of pleotelson obtusely pointed; in females the posterolateral borders are usually not irregular, whereas in males the first half of each

posterolateral border is slightly concave and the posteromedial part is convex and provided with a distinct but minute median tooth. Conspicuous, short, posteriorly projecting, posterolateral angles formed on the pleotelson of some male specimens.

Distribution and Remarks. Although formerly known from Puget Sound to Ensenada (including the Channel Islands of California), we have examined specimens from the entire west coast of Baja California, as well as one collection containing numerous individuals from Bahía La Paz, in the Gulf of California. We also have records from Guadalupe Island. Like certain other members of the genus, *I. urotoma* now appears to be a highly eurythermal species, ranging through at least three major marine zoogeographic provinces (by Briggs, 1974: Oregonian, Californian, and Cortez provinces). Collections made in distinctly warm water locales, such as Bahía La Paz, rule out the possibility of southern records being representative of isolated regions of cold water upwelling. All specimens from Baja California with identified habitats were taken from algae-covered rocks, from the intertidal zone to a depth of 8 m.

SUBGENUS *PENTIDOTEA* RICHARDSON, 1905

Adult with maxillipedal palp composed of 5 articles.

Idotea (Pentidotea) aculeata Stafford, 1913
Figure 1D

Synonymy. Schultz, 1969 p. 73; Miller and Lee, 1970, p. 795; Kozloff, 1973, p. 252; Kozloff, 1974, p. 149; Miller, 1975, pp. 291, 306; Allen, 1976, p. 215.

Diagnosis. Supra-antennal line slightly concave; frontal process broadly triangular with apex bluntly acuminate and often somewhat concave; frontal process shorter than frontal lamina 1; frontal lamina 1 broadly triangular; frontal lamina 2 not visible in dorsal view. Eyes subcircular. Maxilliped with one coupling hook. Epimeres of pereonites 6-7 with acute posterolateral angles. First pleonite with long, straight, lateral borders. Pleotelson elongate, with slightly concave posterolateral borders and a large, elongate, bluntly pointed, median posterior projection (base of which nearly covers median third of posterior margin of pleotelson).

Distribution and Remarks. This species was previously known to range from Dillon Beach (central California) to San Diego. We have examined specimens from outer Baja California (Isla Cedros) and from Bahía La Paz in the lower Gulf of California. The specimens from La Paz were taken from intertidal sand flats with scattered rocks, algae, and coral heads. The water temperature was 24.2°C. The specimens from Isla Cedros were collected on algae-covered rocks in the low intertidal region.

Idotea (Pentidotea) stenops Benedict, 1898
Figure 1E

Synonymy. Miller, 1968, p. 21; Ricketts, Calvin and Hedgpeth, 1968, pp. 132, 201, 489; Schultz, 1969, p. 74; Miller and Lee, 1970, p. 796; Kozloff, 1974, p. 149; Iverson, 1975, p. 167; Miller, 1975, pp. 290, 306; Allen, 1976, p. 216.

Diagnosis. Supra-antennal line slightly concave; frontal process elongate, exceeding forward extent of frontal lamina 1, and with apex notched; frontal lamina 1 triangular; frontal lamina 2 not visible in dorsal view. Eyes transversely elongate (dorsoventral) and narrow. Maxilliped with one to three coupling hooks. First pleonite with lateral borders straight. Pleotelson with sharply rounded posterolateral angles and a produced posterior median projection.

This species is the largest *Idotea (sensu lato)* occurring on the Pacific Coast of North America.

Distribution and Remarks. A single specimen (28 mm.) is recorded from the Gulf: Baja California Sur, reef near Punta San Telmo (approx. 25°20'N); Jan. 16, 1947; Carl L. Hubbs party; one male. In addition, numerous records exist from the outer coast of Baja California, from Tijuana to Punta Eugenio.

This species, formerly known only from Oregon (Coos Bay) to California (Pt. Conception), has been previously considered a cold temperate form. Its presence on the Pacific shores of Baja California and in the Gulf of California now firmly establishes it as a more wide-ranging, warm-to-cold temperate species. It is typically found on algae-covered rocks in the low inter-

tidal zone. Based on Robinson (1973), the yearly range of offshore sea surface temperatures for the outer Baja coast collection localities is approximately 14-17°C, whereas that of the Gulf is 18-28°C. It is possible, however, that these Mexican distributional records represent collections made in areas of cold water upwelling. Two of the three west Baja records are indeed from areas of known seasonal upwelling: Punta Eugenio and Punta Descanso.

Idotea (*Pentidotea*) *resecata* Stimpson, 1857
Figure 1B

Synonymy. Miers, 1881, p. 8; Menzies and Barnard, 1959, pp. 6, 24; Ricketts, Calvin and Hedgpeth, 1968, pp. 243, 302, 489; Miller, 1968, p. 20; Hinton, 1960, p. 164; Schultz, 1969, p. 71; Miller and Lee, 1970, p. 796; Jones, 1971, p. 364; Lee and Gilchrist, 1972, p. 1; Kozloff, 1973, p. 252; Kozloff, 1974, p. 149; Miller, 1975, pp. 290, 306; Iverson, 1975, p. 167; Allen, 1976, p. 216.

Diagnosis. Supra-antennal line distinctly concave but having a small median convexity; frontal process narrow and pointed, or occasionally distally excavate, exceeding frontal lamina 1 in length; frontal lamina 1 broadly rounded; frontal lamina 2 not visible in dorsal view, apex minutely cleft. Eyes variable, usually pyriform with apex directed posteriorly, but occasionally ovate to round. Eye often surrounded by a clear area, characteristically bordered by a heavily pigmented band. Maxilliped with one coupling hook. Posterolateral border of seventh epimeral plates angular. Posterior border of pleotelson in adult markedly concave, with projecting lateral angles above each of which is an anteriorly directed carina.

Distribution and Remarks. *Idotea* (*Pentidotea*) *resecata* was previously known to range from southeast Alaska (Karta Bay) to Los Coronados Islands (off San Diego), plus a single record (Iverson, 1975) from the mouth of the Gulf of California. The Gulf specimen was taken at sea, quite likely from drifting seaweed. In addition, we have examined numerous specimens from Rocas Alijos (*ca.* 116°W 25°N) and Bahía Trotola (west coast of Baja California Sur). The extreme distribution of this species is unusual, and it is presently known to traverse at least three major marine zoogeographical provinces: the Aleutian, Oregonian, and Californian.

Like other members of the family this species is characteristically found in association with algae-covered rocky littoral habitats.

Idotea (*Pentidotea*) *wosnesenskii* Brandt, 1851
Figure 1C

Synonymy. Miers, 1881, p. 8; Brusca, 1966, p. 146; Ricketts, Calvin and Hedgpeth, 1968, pp. 196, 489; Schultz, 1969, p. 73; Miller and Lee, 1970, p. 796; Kozloff, 1973, pp. 85, 134, 252, 257; Kozloff, 1974, p. 149; Miller, 1975, pp. 289, 290, 306.

Diagnosis. Supra-antennal line evenly concave; frontal process wide, with a blunt evenly rounded apex, and shorter than frontal lamina 1; frontal lamina 1 wider than frontal process and triangular in shape; frontal lamina 2 visible in dorsal view, triangulate, apex blunt. Eyes reniform, with convex edge directed posteriorly. Maxilliped with one coupling hook. Epimeral plates of seventh pereonite with acute posterolateral edges. First pleonite with acute lateral edges. Pleotelson with evenly rounded posterior margin, having no suggestions of posterolateral angles, and with a minute median lobe.

Distribution and Remarks. We have recorded *Idotea* (*Pentidotea*) *wosnesenskii* from only one locality in the Gulf of California, Bahía Pichilinque (near La Paz). It was taken by the U.S. Fisheries steamer *Albatross* in 1911 (USNM 69575). This collection contains two specimens, 19 and 12 mm. long. The previously known distribution of this species was from San Francisco Bay (California) to the Aleutian Islands (Alaska), and for this reason it has long been considered a temperate species. The single record of this isopod from the lower Gulf suggests its occurrence there is an anomaly (or the result of labeling error). Bahía Pichilinque is not known to be an area of upwelling currents.

GENUS *COLIDOTEA* RICHARDSON, 1905

Maxillipedal palp of 4 articles; antenna 2 with multiarticulate flagellum; pleon composed of a single segment, with one pair of partial lateral sutures.

Colidotea findleyi, new species
Figures 2, 3

Diagnosis. Supra-antennal line strongly concave, bisected by a medial process; frontal process distally excavate; antenna 1 composed of 4 articles; antenna 2 composed of 3-14 articles; lacina mobilis of mandibles large (nearly as large as incisor process) and present on both right and left mandible; endite of maxilliped with one coupling hook; pereonal epimeres (=coxal plates) 2-7 distinct, but small and directed ventrally; posterior margin of pleotelson strongly acuminate.

Description. Length 4-22 mm.; elongate, 6-7 times as long as broad; surface smooth.

Cephalon almost as long as wide, with a single medial conical elevation; supra-antennal line strongly concave, bisected by a medial process; frontal process distally excavate. Eyes large, varying from oval to subpyriform. Antenna 1 composed of 4 articles, the fourth being the single, flagellar article, with terminal esthetascs (fig. 2I); flagellum of antenna 2 multiarticulate, composed of 3-14 articles (usually = 7-11) (fig. 2H). Mandible with protuberant, 4- or 5-cuspid incisor; lacina mobilis nearly as large as incisor process, with spines and complex setation, present on both right and left mandibles; molar process large and flat, with short teeth and setae, proximal margin with three large plumose setae (fig. 2D). Exopod of maxilla 1 with five large apical spines and several serrate setae; endopod with plumose setae (fig. 2B). Maxilla 2 trilobate, two lobes with serrate setae, the third with plumose setae (fig. 2E). Maxillipedal endite with one coupling hook (fig. 2A).

Pereonites slightly produced posterolaterally; first pereonite narrowest and shortest; pereonites 2-5 subequal; pereonites 6-7 shorter than 2-5. Epimeres 2-7 distinct, but small and directed ventrally. Pereopoda 1-7 slender and ambulatory, terminating in reflexed dactyl with bifid unguis; pereopod 1 with comb and serrate setae on inner margin of propodus (fig. 2C); pereopod 5 as illustrated (fig. 2F).

Pleotelson with posterolateral angles obtuse, tapering to form a strongly acuminate posterior border. Uropod with single large plumose seta on inner distal angle of basis (fig. 3A). First pleopod strongly setose, all margins of lower lamella with plumose setae (fig. 3B); pleopod 2 strongly setose, upper lamella with apical and marginal plumose setae and simple marginal setae, lower lamella with apical plumose setae and simple marginal setae (fig. 3C); pleopoda 3-4 with simple setae only (fig. 3D, E); pleopod 5 with setae on one margin of upper lamella only (fig. 3F).

MATERIAL EXAMINED

Holotype and Allotype: Mexico, Sonora, 5 mi. N of Cabo Tepoca (Puerto Lobos); 30°17′N; beach seine on sand over bedrock with exposed rocks and vegetation; water depth 1 meter; June 5, 1969; Lloyd T. Findley. Holotype, AHF 6910; allotype, AHF 6910a.

Paratopotypes: Same data as holotype; two females, one male; deposited in the National Museum of Natural History.

Paratypes:

– Mexico, west coast of central Baja California, 20 miles E of Punta Eugenio ("Hancock Cove"); 27°28′47″N, 114°43′07″W; rocky intertidal; Nov. 2, 1951; *Velero IV*; seven females, one male; deposited in the American Museum of Natural History.

– Mexico, Sonora, Puerto Peñasco; in low intertidal, on *Sargassum*; water temperature 26°C; June 8, 1975; R. C. Brusca; one male.

– Mexico, Sonora, Puerto Peñasco; in low intertidal on *Sargassum*; July 10, 1972; R. C. Brusca; two females, one male.

– Mexico, Sonora, Bahía Kino; April 15, 1972; Charles E. Lehner; one male.

– Mexico, Sonora, Puerto Peñasco; minus 4 ft. tidal level; December 2, 1967; two females.

– Mexico, Baja California Norte (Gulf of California), *ca.* 40 mi. S. San Felipe; on *Sargassum*, in low intertidal zone; Jan. 2, 1976; R. C. Brusca and B. Wallerstein, nine females, 12 males.

– Mexico, Gulf of California, south shore Tiburon Island (shingle beach); Jan. 25, 1940; *Velero III*; one female.

– Mexico, Guadalupe Is., 5-15 ftms.; December 18, 1949; *Velero IV* No. 1914-49; 10 females, seven males.

– Mexico, Guadalupe Is.; December 9, 1946; Carl Hubbs; one female.

Remarks. Only two other species of *Colidotea* have been described: *C. rostrata* (Benedict) from southern California, and *C. edmondsoni* Miller

from Hawaii. The addition of a third species to the genus is significant in that it represents the first record of this genus from the subtropical east Pacific and lends supportive evidence to the concept of a tropical origin for this genus. *Colidotea findleyi* is distinct from the other two species of the genus, resembling in many ways species of the genus *Idotea* (especially in general body symmetry and pleotelson shape). *Colidotea findleyi* is easily distinguished from other members of the genus by the following combination of characters: elongate body (length 6-7 times width); strongly acuminate pleotelson; and, the large number of flagellar articles in antenna 2. The number of flagellar articles in antenna 2 increases with age and size of the specimen.

Ecology and Distribution. Colidotea findleyi is presently known from the central outer coast of Baja California, Guadalupe Island, and a cluster of records in the central and upper Gulf of California. This disjunct distribution may indeed exist, but the fact that the outer coast records are so far south (to lat. 27°28′N) suggests that it is artificial, a result of insufficient collecting records along the lower Baja peninsula. Many species of littoral invertebrates that have long been thought to possess an upper west Baja-upper Gulf disjunct distribution, have recently been found to occur along the southern shores of Baja California (Brusca, In press).

Three of the 11 records are from the brown algae *Sargassum* spp., whereas the remainder are from the rocky littoral region where these algae presumably existed at the time of collection. We have observed that this isopod not only habitually clings to the *Sargassum*, lying parallel to the stipe and fronds, but its color in life exactly matches that of the alga upon which it is found (a dark olive brown). Lee (1966) has described the ability of *Idotea* (*Pentidotea*) *montereyensis* to change its color to match that of the algae on which it occurs.

Colidotea findleyi appears to be restricted to the low intertidal region, below the +1 foot tidal level (Brusca, In press) to a depth of at least 1 m. It quite probably occurs at all depths in which *Sargassum* occurs.

Ovigerous females have been found in summer (June and July) and winter (November through January).

Etymology. This new species of *Colidotea* is named in honor of Lloyd T. Findley for his contribution of type specimens, as well as a great deal of additional material upon which this and other isopod studies have been based.

GENUS *EUSYMMERUS* RICHARDSON, 1899

Maxillipedal palp of 4 articles; antenna 2 with flagellum composed of a single clavate article; pleon of a single segment, plus one indicated by a pair of lateral, partial sutures.

Eusymmerus antennatus Richardson, 1899
Figures 4, 5

Synonyomy. Richardson, 1899a, p. 852; Richardson, 1899b, p. 273; Richardson, 1905, p. 399; Schultz, 1969, p. 83.

Diagnosis. Supra-antennal line medially concave; frontal process slightly excavate; eyes expanded dorsoventrally, on extreme lateral edge of cephalon; antenna 1 composed of 4 articles; antenna 2 composed of 5 articles; endite of maxilliped with one coupling hook; appendix masculinum of males robust, cylindrical and extended well beyond terminal margin of pleopod 2.

Description. Length 2.6-12 mm.; body elliptical; length 2.5-3.5 times width; surface smooth.

Cephalon width 2-3 times length; with a medial dorsal tubercle of varying size. Supra-antennal line medially concave; frontal process slightly excavate. Eyes ovate, expanded dorsoventrally, on extreme lateral edge of cephalon. Antenna 1 composed of 4 articles, the fourth being a single, subclavate flagellar article with terminal esthetascs (fig. 4H); antenna 1 extended to middle of second article of antenna 2. Antenna 2 composed of 5 articles, the fifth being a single flagellar article bearing short setae (fig. 4I). Right mandible with a prominent, 4-cuspid incisor; lacina mobilis large, slightly smaller than incisor process, with spines and short setae; molar process large and flat, with tufts of elongate spines on distal and lower margins (fig. 4D). Left mandible with an additional three-pointed spine between incisor and lacina mobilis. First maxilla simple, exopod with 10 large apical spines and lateral setae; endopod with a dorsal process terminating in two large, setose spines (fig. 4B). Maxilla 2 trilobate, with complex setation as in figure 4E.

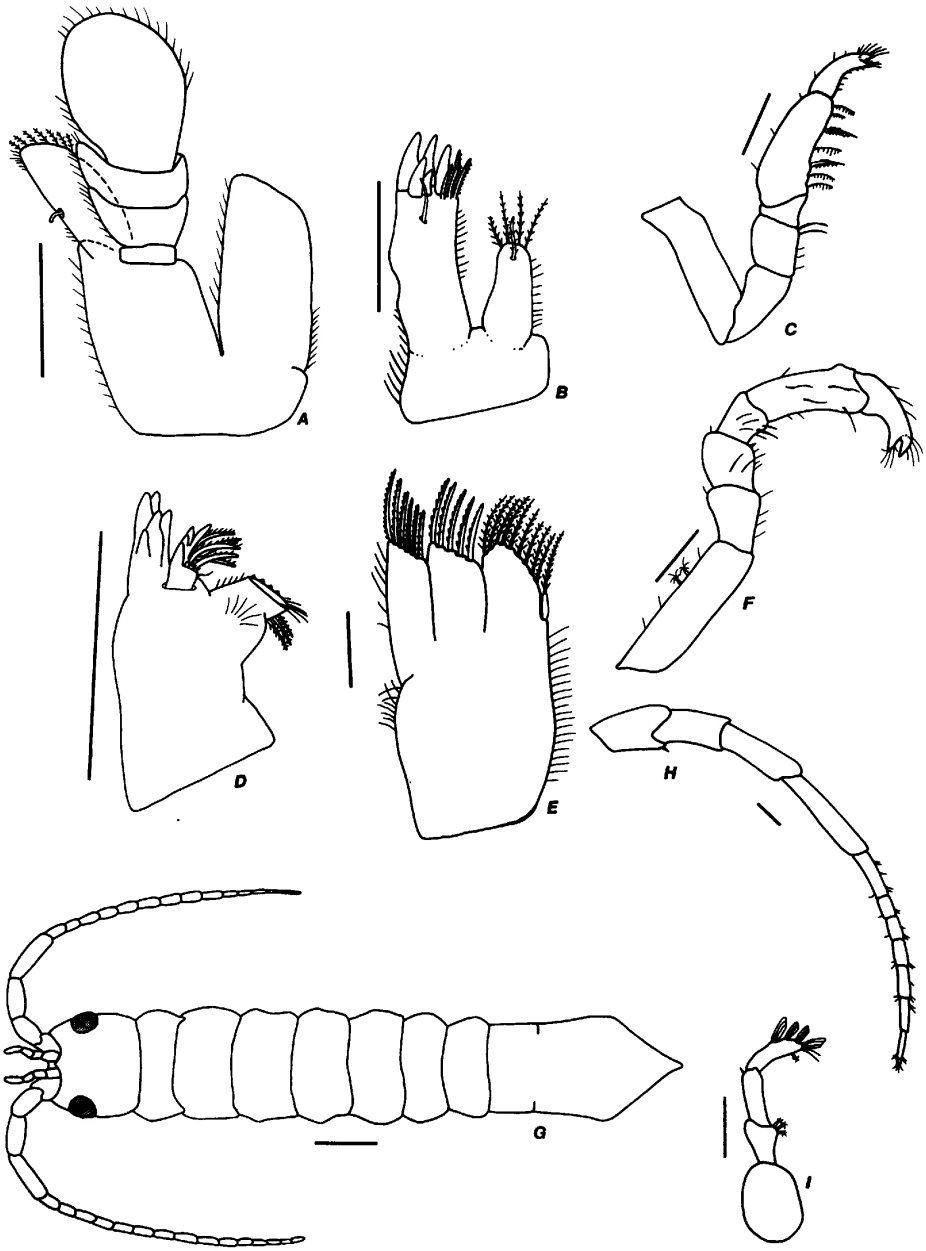

FIG. 2. *Colidotea findleyi*, female. A. Maxilliped. B. Maxilla 1. C. Pereopod 5. D. Mandible. E. Maxilla 2. F. Pereopod 1. G. Adult, dorsal view. H. Antenna 2. I. Antenna 1. [Scale marks = .5 mm.]

Maxilliped with setose palp, of 4 articles; endite with one coupling hook (fig. 4A).

Lateral margins of pereonites expanded; pereonite 3 widest; epimeres thin and translucent, fused with somites 1-5. Pereonite 1 produced anterolaterally to posterior edge of eyes, concave on anterior margin; pereonites 6-7 tapering abruptly posteriorly, each with a distinct, rounded epimere, directed posteriorly. Pereopoda 1-7 slender and ambulatory, terminating in

a reflexed dactyl with a bifid unguis; pereopod 1 with robust spines on inner margin (fig. 4F); pereopod 5 weakly spinose (fig. 4C).

Posterolateral angle of pleotelson obtuse; terminal margin of pleotelson rounded. Uropod uniramous, with a single, large, plumose seta on outer distal angle of the basis (fig. 5A). Pleopoda bilamellar; lamellae of pleopod 1 strongly setose (fig. 5B); pleopod 2 with upper lamella strongly setose and lower lamella weakly setose (fig. 5C); appendix masculinum of males robust, cylindrical, and extended well beyond terminal margin of pleopod 2; pleopoda 3-5 simple (figs. 5D-F).

MATERIAL EXAMINED

Previous records. Holotype only. Mexico, outer coast of central Baja California, Abrejos Point. On green mud in 10 m. of water.

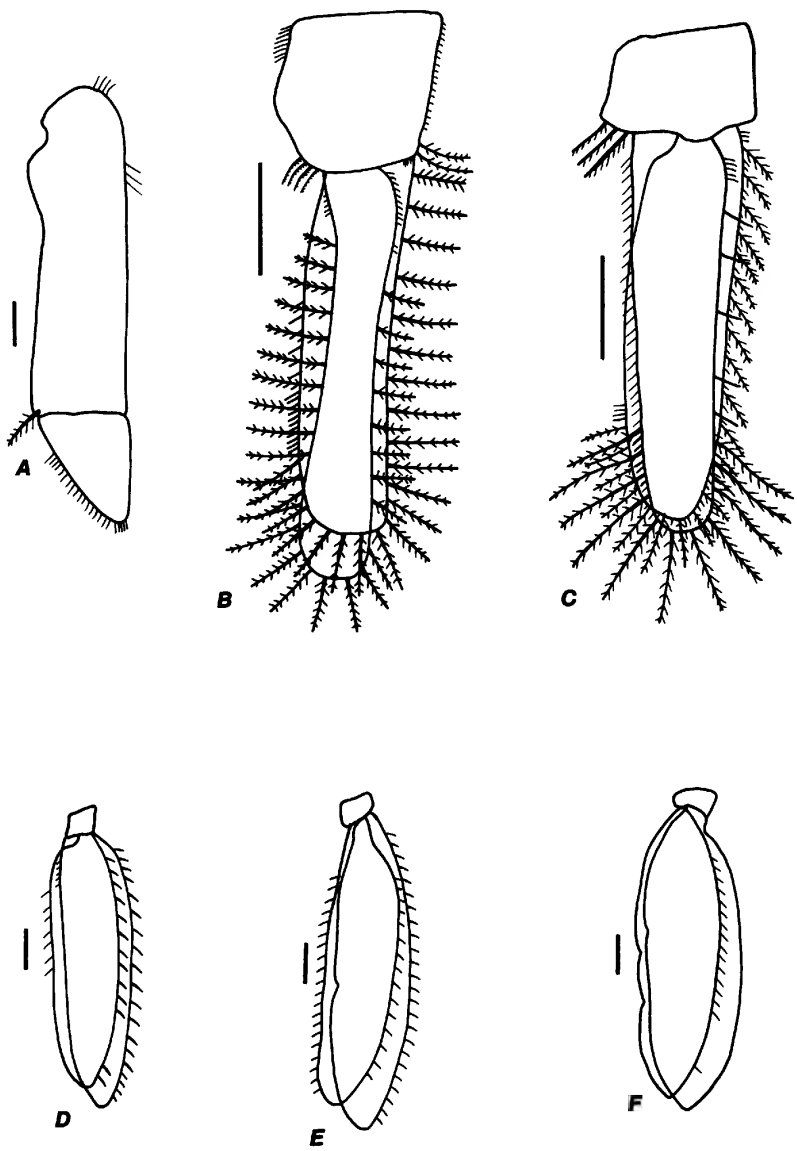

FIG. 3. *Colidotea findleyi*, female. A. Uropod. B. Pleopod 1. C. Pleopod 2. D. Pleopod 3. E. Pleopod 4. F. Pleopod 5. [Scale marks = .5 mm.]

NEW RECORDS

– Mexico, west coast of central Baja California, Punta Eugenio; rocky intertidal; November 1, 1951; *Velero IV*; one male.

– Mexico, west coast of central Baja California; October 1946; E. Yale Dawson.

– Mexico, Sonora, Bahía Algodones (10 m. N of Guaymas); 10 m. on mud bottom; March 24, 1970; D. A. Thomson; two females.

– Mexico, Sonora, Bahía San Francisco (approx. 6 mi. N of Guaymas); November 20, 1946; E. Yale Dawson; eight males, two females.

– Mexico, Guerrero, Acapulco, Bahía Santa Lucia; September 1, 1946; Carl Hubbs; one male.

– Mexico, Baja California Sur (west coast), Bahía Santa Maria; 17-20 m.; *Velero III* 281-34; March 7, 1934; one male.

– Mexico, Oaxaca, granite headland S of Salina Cruz; water temp. 25°C; January 10, 1947; E. Yale Dawson; two males.

– Mexico, Sonora, Puerto Peñasco; on *Sargassum*; R. C. Brusca and B. Wallerstein; April 16, 1976; two males.

Remarks. This rediscovery of *Eusymmerus antennatus* is the first record since the original description. Richardson's (1899a, 1899b) original description of this species was based on a single individual, and subsequently reproduced in her publications of 1900 and 1905. In none of these treatments did she adequately figure the appendages and for this reason all new figures have been prepared. Our specimens, compared with Richardson's brief description, differ in two ways: antenna 2 is composed of 5 articles, not 6 as she stated (although she consistently illustrated only 5 articles); and the eyes are in fact situated entirely lateral, not dorsal. The position of the eyes is particularly significant in that it is a character used by Richardson to distinguish this monotypic genus from related genera.

Ecology and Distribution. Richardson's specimen was collected in 1888 by the *Albatross* Expedition (Station No. 2835). It was taken on "green mud" in approximately 10 m. of water. In her original description she incorrectly stated that this specimen was taken from 48 fm. Apparently she read one line above the correct line when checking the original *Albatross* station data, as station 2834 was indeed in 48 fm. of water. Our Gulf of California material (Bahía Algodones) was also taken in 10 m. of water on a muddy bottom. In addition, however, we have examined material collected on the rocky intertidal shores of outer Baja California, Sonora, and Oaxaca.

It would appear that *Eusymmerus antennatus* occurs from the intertidal zone to depths of at least 20 m., and is found on muddy bottoms as well as on exposed rocky shores. This range of habitat is unusual for a benthic invertebrate, particularly a member of the isopod suborder Valvifera, whose members are generally quite habitat specific.

Although present records indicate a highly disjunct distribution for this isopod, there is no reason to doubt it ranges from the upper Gulf of California (and central west Baja) south at least as far as the state of Oaxaca. These records firmly establish *Eusymmerus* as a member of the tropical east Pacific fauna. Gravid females have been recorded only during the month of March.

GENUS *ERICHSONELLA* BENEDICT (IN RICHARDSON, 1901)

Maxillipedal palp composed of 4 articles; antenna 2 with single clavate flagellar article; pleon composed of single segment, usually without suture lines.

Erichsonella cortezi, new species
Figures 6, 7

Diagnosis. Pereon with 4-5 tall, spinelike tubercles along middorsal line; supra-antennal line concave, bisected by a slight median protrusion; frontal process broad and distally excavate; antenna 1 composed of 4 articles; antenna 2 composed of 5 articles; both right and left mandibles with lacina mobilis; endite of maxilliped with one coupling hook; pereopod 5 with large spinelike tubercles on basis.

Description. Length 5.2-15 mm; body elongate; 5.5-6 times as long as broad; pereon with 4-5 tall spinelike tubercles along middorsal line.

Cephalon about as long as broad, with a large, multilobed tubercle on dorsum; supra-antennal line concave, bisected by a slight median protrusion; frontal process broad and distally excavate. Eyes large, subcircular. Antenna 1 composed of 4 articles, the fourth being a single flagellar article and bearing paired esthetascs (fig.

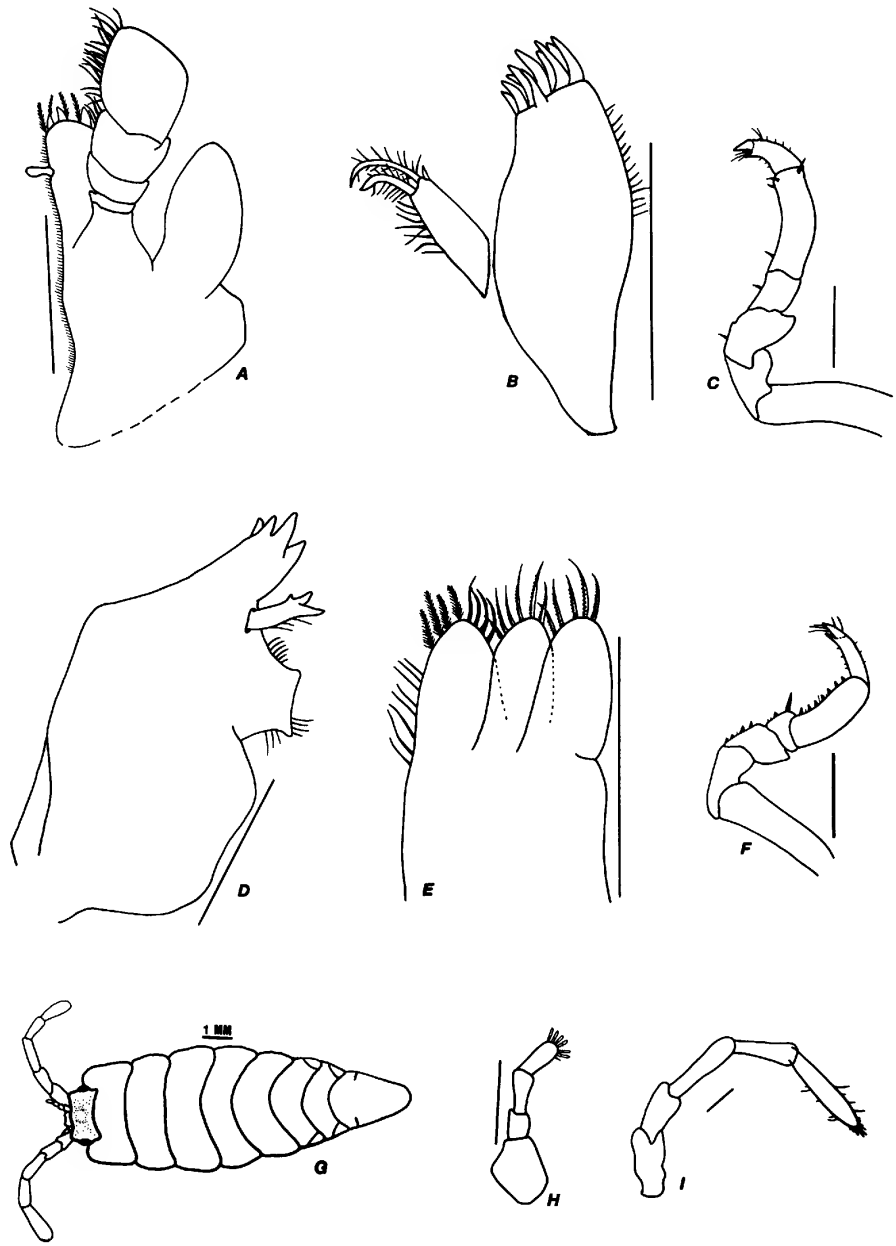

FIG. 4. *Eusymmerus antennatus*, female. A. Maxilliped. B. Endopod and exopod of maxilla 1. C. Pereopod 5. D. Right mandible. E. Maxilla 2. F. Pereopod 1. G. Adult, dorsal view. H. Antenna 1. I. Antenna 2. [Scale marks = 1 mm.]

6H); antenna 2 composed of 5 articles, the fifth being the single, clavate flagellar article (fig. 6I). Mandible with a protuberant, four-cuspid incisor; both left and right mandible (of male and female) with lacina mobilis; lacina mobilis with three large spines and numerous fringed setae; molar process large, with a serrate edge and numerous setae (fig. 6D). Maxilla 1 with nine large apical spines; palp with three apical, plumose setae and numerous simple lateral setae (fig. 6B).

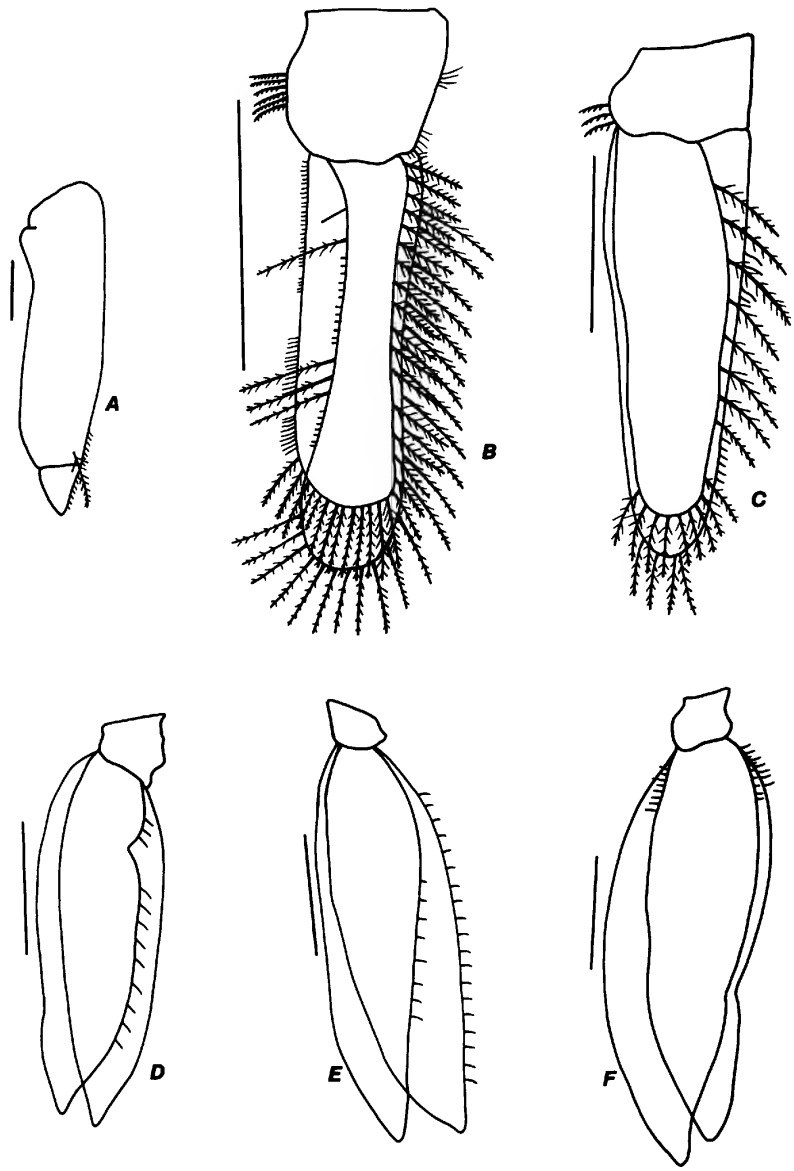

FIG. 5. *Eusymmerus antennatus*, female. A. Uropod. B. Pleopod 1. C. Pleopod 2. D. Pleopod 3. E. Pleopod 4. F. Pleopod 5. [Scale marks = 1 mm.]

Maxilla 2 trilobed, two lobes with comb and toothed setae, the third lobe with plumose setae (fig. 6E). Maxilliped with palp of 4 articles; endite with one coupling hook; setation as in figure 6A.

Epimeres distinct on pereonites 2-7 (first pair fused to segment). Pereonites 1-4 (or 1-5) with tall mediodorsal spines; young individuals often with mediodorsal spines only on pereonites 1-2 or 1-3; pereonite 1 shortest; 3-4 longest, widest and subequal; 5-7 decreasing in size posteriorly. Pereopoda 1-7 ambulatory, terminating in a reflexed dactyl with a bifid unguis. Pereopod 1 with comb setae on leading margin of propodus;

inner margin with simple setae (fig. 6F); pereopod 5 with six large spinelike tubercles on basis and setation as figured (fig. 6C).

Pleon composed of a single segment, with no indication of suture lines. Posterolateral borders expanded, then tapering posteriorly to a rounded apex. Uropoda uniramous, with a single large, plumose seta on posterolateral margin of basis (fig. 7A). All pleopoda bilamellar. First pleopod with upper lamella heavily setose, bearing both

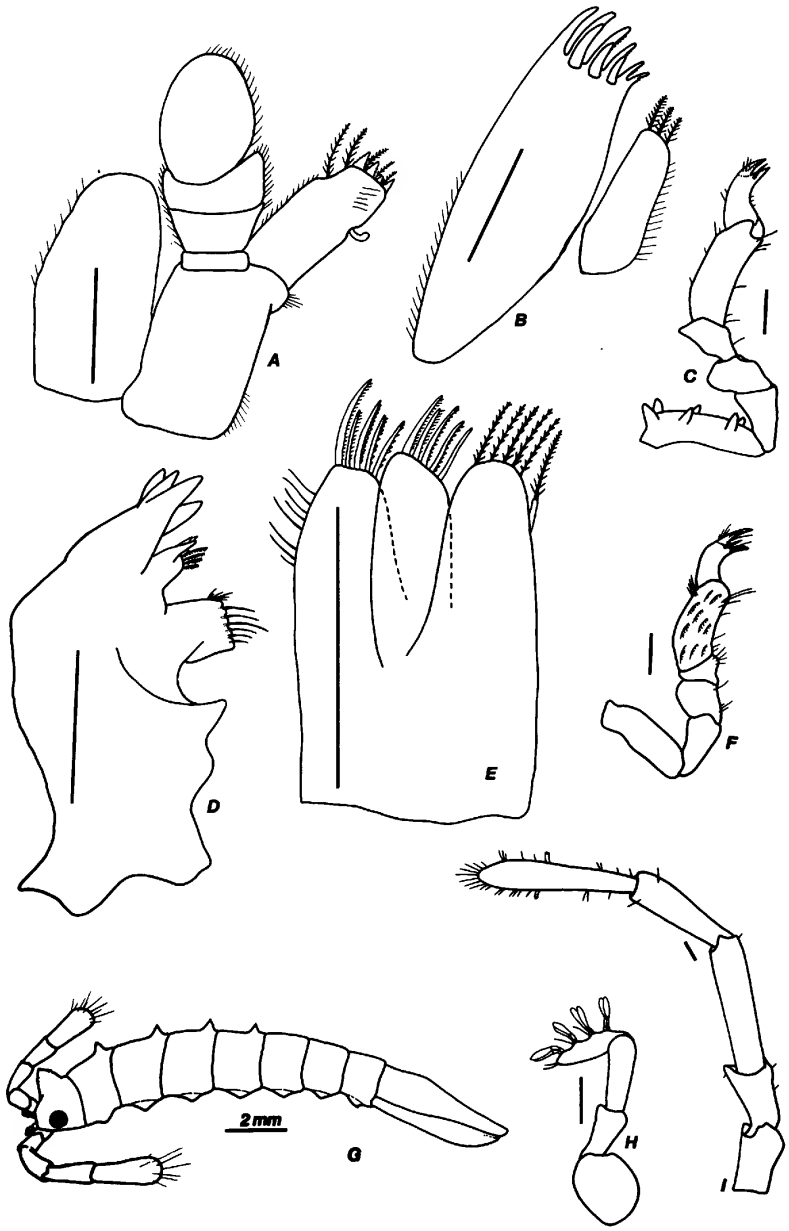

FIG. 6. *Erichsonella cortezi*, male. A. Maxilliped. B. Exopod and endopod of maxilla 1. C. Pereopod 5. D. Mandible. E. Maxilla 2. F. Pereopod 1. G. Adult, lateral view. H. Antenna 1. I. Antenna 2. [Scale mark = .25 mm.]

plumose and simple setae; lower lamella with plumose setae on only one margin (fig. 7B). Pleopod 2 with upper lamella bearing plumose setae on one margin; lower lamella with plumose setae at tip only; appendix masculinum of males greatly elongate (fig. 7C). Pleopoda 3-5 with simple setae only (figs. 7D-F).

MATERIAL EXAMINED

Holotype (male): Mexico, Sonora, Puerto Peñasco; 31°19′N; in algal mat of low intertidal (approx. 0 tide level); Dec. 30, 1970; R. C. Brusca; AHF 706.

Allotype (female): Mexico, Sonora, Puerto

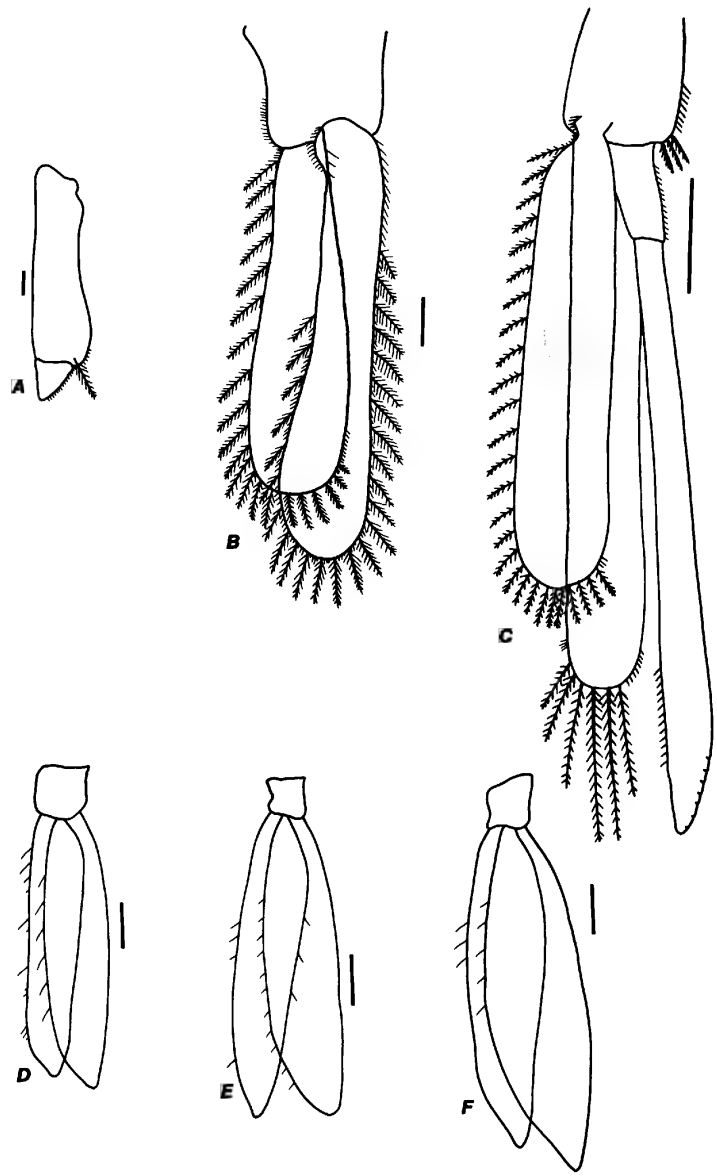

FIG. 7. *Erichsonella cortezi*, male. A. Uropod. B. Pleopod 1. C. Pleopod 2. D. Pleopod 3. E. Pleopod 4. F. Pleopod 5. [Scale mark = .25 mm.]

Peñasco; rocky intertidal; March, 6, 1970; AHF 706a.

Paratopotypes:

– Mexico, Sonora, Puerto Peñasco; in tidepool; March 18, 1972; Mary Price; one male.

– Mexico, Sonora, Puerto Peñasco; from *Sargassum* sp. in rocky low intertidal (approx. +1 tide level); June 8, 1975; R. C. Brusca; one male; deposited in the American Museum of Natural History.

Remarks. Prior to this publication, five species of *Erichsonella* were known from North America. Four of these possess dorsal spines, as in *E. cortezi*: *E. floridana* Benedict (in Richardson, 1901), *E. filiformis tropicalis* Menzies and Glynn, 1968, *E. pseudoculata* Boone, 1923, and *E. crenulata* Menzies, 1950. The former two species are presently known only from Florida and the Caribbean region. The latter two are both southern California forms.

Erichsonella cortezi appears to be most closely related to *E. pseudoculata*, as both of these species have large, spinelike tubercles on the basis of the posterior pereopoda, as well as the similar body spination. *Erichsonella pseudoculata* was placed in the newly erected monotypic genus *Ronalea* by Menzies and Bowman (1956), although Menzies and Frankenberg (1966) placed it back in *Erichsonella*. With regard to *E. crenulata*, although Menzies (1950) labeled his figures of this species as "male paratype," he actually figured the female allotype. Examination of the type specimens has shown the female to possess short dorsal spines on pereonites 1-5 and a trituberculate elevation on the cephalon; the males lack both pereonal spines and tubercles on the cephalic hump. Thus, a distinct sexual dimorphism appears to exist in *E. crenulata.*

Erichsonella cortezi can be distinguished from all other members of the genus by the following combination of characters: a single row of 4-5 large mediodorsal spines on the pereon; six large spinelike tubercles on basis of pereopoda 2-6; the body length (5.5-6 times the width); and the unique shape of the pleon.

Ecology and Distribution. Erichsonella cortezi is presently known from only a single locality, in the northern Gulf of California. A number of other invertebrates are known to be northern Gulf endemics. These forms are often associated with a cold, winter-tolerant fauna, and indeed, the holotype of *E. cortezi* was collected in late December. Although extensive collecting in the southern Gulf may eventually demonstrate that this valviferan occurs in more southern latitudes, it seems probable that it will prove to be a Gulf of California endemic. Many, if not most, of the invertebrates that were formerly thought to be northern Gulf endemics have indeed been found in the southern Gulf (albeit in reduced numbers) as more collections have been examined from this region (Brusca, In press). *Erichsonella cortezi* may represent an evolutionary product of the disjunct distribution, produced subsequent to the last glaciation, of *E. pseudoculata* or a common ancestor.

Erichsonella cortezi appears to be, as so many members of this family are, strongly associated with the littoral algal habitat. Like *Colidotea findleyi*, the color of *E. cortezi* perfectly matches that of the *Sargassum* upon which it has been found clinging. Both of these species appear to be restricted to the lower intertidal regions and probably the shallow subtidal, where *Sargassum* occurs.

Etymology. This species is named for its type region, the Sea of Cortez.

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