CYCLOPOID COPEPODS OF THE GENUS *PARANTHESSIUS* ASSOCIATED WITH MARINE PELECYPODS IN THE WEST INDIES

ARTHUR G. HUMES
Department of Biology, Boston University, Boston, Massachusetts 02215

ABSTRACT

Paranthessius dissidens, n. sp. is described from the mantle cavity of the pelecypods *Pseudochama radians* in Jamaica and Puerto Rico and *Chama sinuosa* in Puerto Rico; and *P. caribaeus,* n. sp. from *Chama sinuosa* in Barbados, Jamaica, and Puerto Rico, and from *Pseudochama radians* in Jamaica. A key is provided for the genus *Paranthessius.*

The pelecypods *Pseudochama radians* Lamarck and *Chama sinuosa* Broderip, widespread in the West Indies, have already been reported by Humes (1968) as hosts for the myicolid copepod *Pseudomyicola spinosus* (Raffaele & Monticelli, 1885). These two members of the family Chamidae harbor also in their mantle cavities two other poecilostomes, the new species of *Paranthessius* described below.

The figures have been drawn with the aid of a camera lucida. The letter after the explanation of each figure refers to the scale at which it was drawn. The abbreviations used are: A_1 = first antenna; A_2 = second antenna; L = labrum; MD = mandible; P = paragnath; MX_1 = first maxilla; MX_2 = second maxilla; MXPD = maxilliped; P_1 = leg 1; and P_4 = leg 4.

The measurements of the length of the body have been made in all cases from specimens in lactic acid and do not include the setae on the caudal rami. In the spinal and setal formulas for legs 1-4, the Roman numerals indicate spines and the Arabic numerals represent setae. The lengths of the segments of the first antenna have been measured along their posterior nonsetiferous margins.

The new copepods were collected by the author during field work in 1959, supported by a grant (G-8628) from the National Science Foundation of the United States. The study of the specimens has been aided by another grant (GB-8381X) from the National Science Foundation.

The pelecypod hosts were identified by the late Richard W. Foster of the Museum of Comparative Zoology, Harvard University.

Family LICHOMOLGIDAE Kossmann, 1877
Genus *Paranthessius* Claus, 1889
Paranthessius dissidens, n. sp.
Figs. 1-25

Type-Material.—38♀♀, 28♂♂, and 1 copepodid from 15 specimens of *Pseudochama radians* Lamarck, in 0.5 m, Rackham's Cay, near Port

Royal, Jamaica, Aug. 31 and Sept. 3, 1959. Holotype ♀, allotype, and 50 paratypes (30♀♀, 20♂♂) deposited in the United States National Museum, Washington, and the remaining paratypes in the author's collection. The United States National Museum numbers are: USNM 127237 for the holotype; USNM 127236 for the allotype; and USNM 127238 for the 50 paratypes.

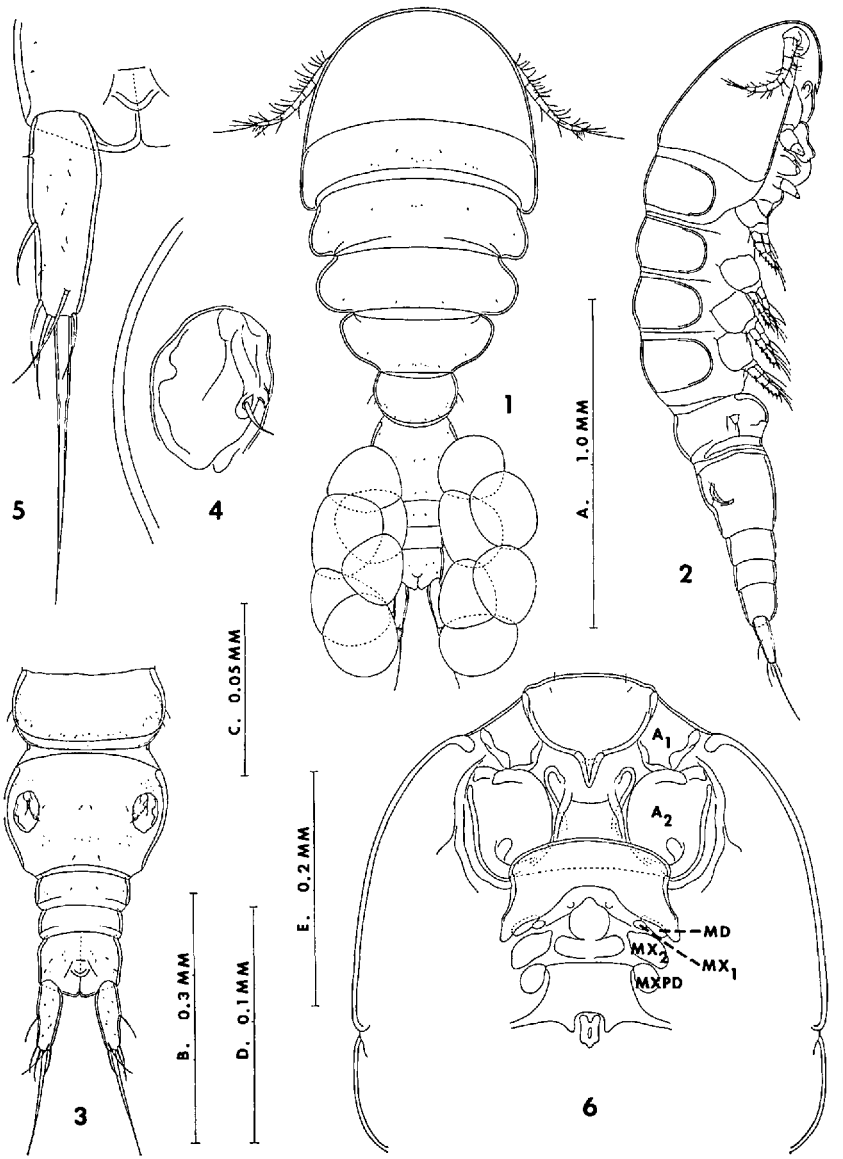
Other Specimens.—FROM *Pseudochama radians*: 1♀ and 5♂♂ from 3 hosts, in 0.5 m, Corona del Diablo, a small reef south of Magüeyes Island, near La Parguera, southwestern Puerto Rico, July 31; and 30♀♀ and 18♂♂ from 8 hosts, in 1 m, Caballo Ahogado, south of Magüeyes Island, near La Parguera, Aug. 19.

FROM *Chama sinuosa* BRODERIP: 46♀♀ and 43♂♂ from 13 hosts, in 0.5 m, Cayo Terremoto, southeast of La Parguera, Aug. 6; 2♀♀ from 9 hosts, in 0.5 m, Cayo Terremoto, Aug. 15; 6♀♀ and 12♂♂ from 17 hosts, in 0.5 m, Caballo Ahogado, south of Magüeyes Island, near La Parguera, Aug. 11; and 12♀♀ and 10♂♂ from 13 hosts, in 1 m, Caballo Ahogado, Aug. 19.

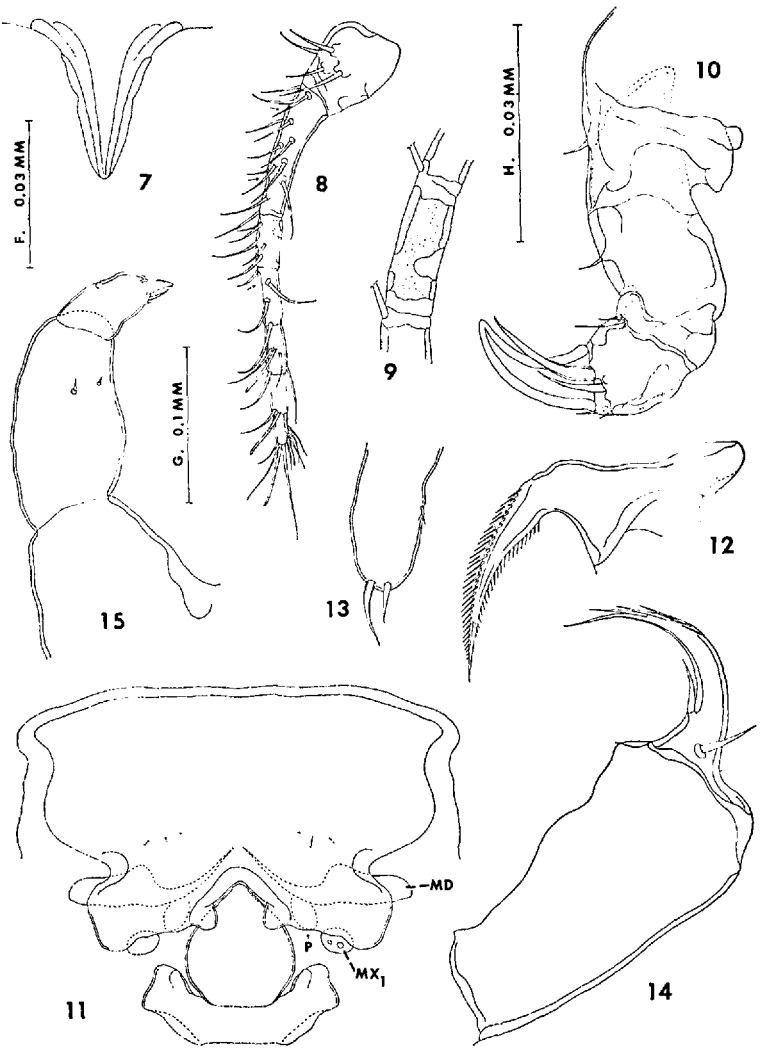
Female.—The body (Figs. 1 and 2) has a moderately broad and dorsoventrally somewhat flattened prosome. The length is 1.12 mm (range, 1.05-1.19 mm) and the greatest width 0.40 mm (range, 0.39-0.42 mm), based on 10 specimens. The ratio of length to width of the prosome is 1.53 : 1. The segment of leg 1 is distinctly set off from the head by a dorsal and lateral furrow. The epimeral areas of the metasomal segments are rounded.

The segment to which leg 5 is attached (Fig. 3) is 88μ × 187μ. Between this segment and the genital segment there is a ventral intersegmental sclerite (Figs. 2 and 21). The genital segment in dorsal view is 140μ × 196μ, a little wider than long, with rounded lateral margins. The areas of attachment of the egg sacs are located dorsolaterally near the middle of the segment. Each area (Fig. 4) bears a small naked seta 8μ long and a spiniform process. The three postgenital segments are 44μ × 113μ, 33μ × 104μ, and 55μ × 101μ, respectively, from anterior to posterior. The posteroventral border of the anal segment is unornamented.

The caudal ramus (Fig. 5) is moderately elongated, 80μ × 31μ in greatest dimensions, the ratio being 2.58 : 1. The outer lateral seta is 23μ long, the outermost terminal seta 26μ, the innermost terminal seta 23μ, the dorsal pedicellate seta 43μ, and the two median terminal setae 33μ (outer; unjointed, slender, and weak) and 115μ (inner; strongly developed with a weak joint). All the setae are naked. The ramus bears a minute (3μ) setule on its proximal outer margin and its dorsal surface is ornamented with a few hairs (sensilla) and refractile points.



FIGURES 1-6. *Paranthessius dissidens*, n. sp., female: 1, dorsal (A); 2, lateral (A); 3, urosome, dorsal (B); 4, area of attachment of egg sac, dorsal (C); 5, caudal ramus, dorsal (D); 6, cephalosome, ventral (E). Letters in parentheses refer to magnification scales.



FIGURES 7-15. *Paranthessius dissidens*, n. sp., female: 7, beak of rostrum, ventral (F); 8, first antenna, with three arrows indicating positions of aesthetes in the male, dorsal (G); 9, third segment of first antenna, ventral (C); 10, second antenna, posterior (C); 11, labrum and immediate postoral area, with mandibles and paragnaths indicated by dashed lines, ventral (C); 12, mandible, anterior (H); 13, first maxilla, anterior (H); 14, second maxilla, inner (F); 15, maxilliped, antero-inner (F). Letters in parentheses as in Figure 1.

The dorsal surfaces of the prosome and urosome bear ornamentation as indicated in Figures 1 and 3. The ventral surface of the urosome has very little ornamentation. The ratio of the length of the prosome to that of the urosome is 1.43 : 1.

The egg sac (Fig. 1) is elongated, about 390μ × 160μ, extends a little beyond the caudal ramus, and contains six relatively large, irregular eggs whose approximate diameter is 120μ.

The rostrum (Fig. 6) has a short, well-sclerotized beak with hyaline marginal lamellae (Fig. 7).

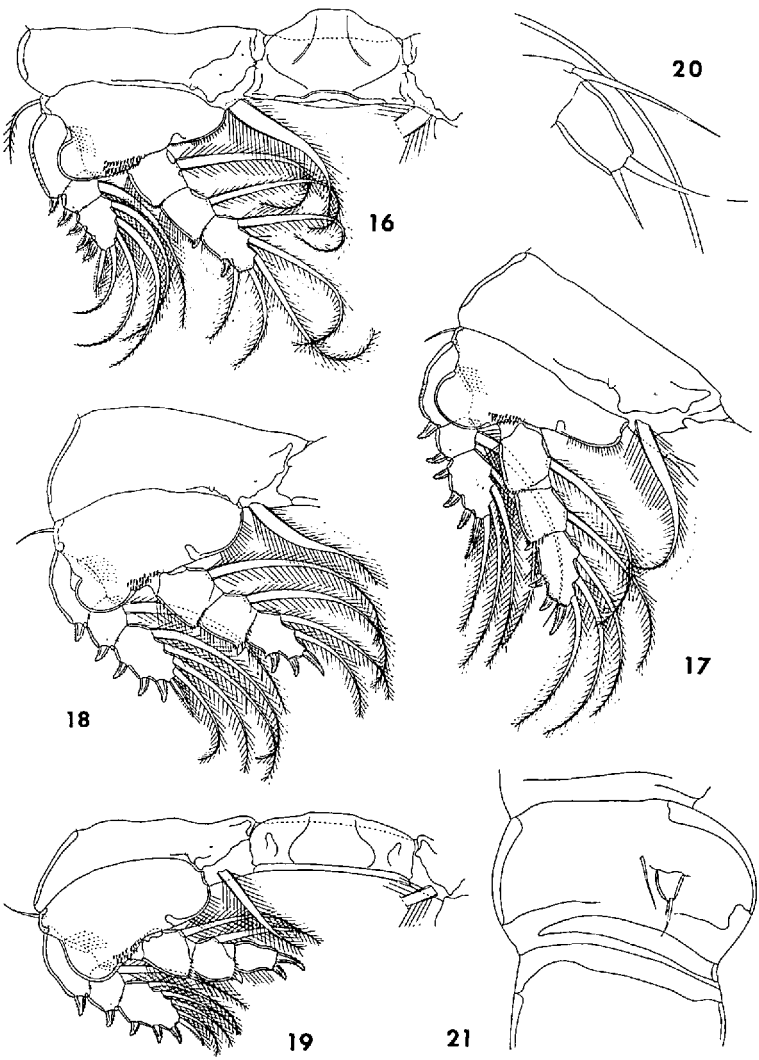
The first antenna (Fig. 8), 260μ in length and seven-segmented, is slender except for the relatively large first segment. The third segment has a sclerite on its ventral surface (Fig. 9). The lengths of the segments are: 22μ (50μ along its anterior margin), 69μ, 35μ, 33μ, 30μ, 22μ, and 21μ, respectively. The formula for the armature is: 4, 13, 6, 3, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete. All the setae are naked.

The second antenna (Fig. 10) is four-segmented and relatively short and robust. The armature is: 1, 1, 3 (one seta very minute and not easily seen), and I,5. All the setae are naked. The stout claw is 58μ along its axis.

The labrum (Figs. 6 and 11) is broad, with a well-sclerotized and almost straight anterior border. The two lobes on the posteroventral margin are widely separated, and there is a pair of small accessory lobes medially near the indentation. In front of the labrum, between the insertions of the second antennae, there is a pair of strongly sclerotized areas (Fig. 6), which are produced ventrally (Fig. 2). Behind the labrum there is a prominent median "labium," which in lateral view (Fig. 2) is protuberant.

The mandible (Fig. 12) has a long slender blade bearing spinules along each side. The paragnath is not easily seen, but consists of an inconspicuous lobe anteromedial to the first maxilla and covered by the labrum in ventral view (Fig. 11). The first maxilla (Fig. 13) bears two terminal naked setae and a proximal setule. The second maxilla (Fig. 14) has a large, unornamented first segment. Its second segment is slender and bears the usual elements, all naked. The terminal lash is attenuated and bears a row of long spinules along one edge. The maxilliped (Fig. 15) is three-segmented, relatively small, and weakly sclerotized. The second segment bears two small naked setae, and the third segment bears a seta, has a minute spiniform process, and terminates in a larger, almost clawlike, process.

The postoral area is as shown in Figure 6. A sclerotized line connects the bases of the maxillipeds, the ventral surface posterior to this line being only slightly protuberant (Fig. 2).



FIGURES 16-21. *Paranthessius dissidens,* n. sp., female: 16, leg 1 and intercoxal plate, anterior (D); 17, leg 2, anterior (D); 18, leg 3, anterior (D); 19, leg 4 and intercoxal plate, anterior (D); 20, leg 5, ventral (F); 21, segment to which leg 5 is attached, lateral (G). Letters in parentheses as in Figure 1.

Legs 1-4 (Figs. 16, 17, 18, and 19) have three-segmented rami. The armature of these legs is as follows:

P_1	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,4 enp 0-1; 0-1; I,5
P_2	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,4 enp 0-1; 0-1; I,II,3
P_3	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,4 enp 0-1; 0-1; I,II,2
P_4	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,4 enp 0-1; 0-1; II

The inner margin of the basis in leg 1 bears a row of slender spinules, but in legs 2-4 has long hairs. The last segment of the exopod of legs 2-4 bears only four setae, instead of five as in other species of *Paranthessius,* and the second segment of the endopod of legs 2 and 3 has only one inner seta, instead of two as in other members of the genus. The last segment of the endopod of leg 4 is $22\mu \times 12\mu$ in greatest dimensions, with the two terminal barbed spines 7μ (outer) and 12μ (inner).

Leg 5 (Figs. 20 and 21), carried ventrally and largely hidden in dorsal view (Fig. 3), has a small, unornamented, free segment measuring $16\mu \times 9\mu$, and its two terminal setae are 22μ (outer) and 11μ (inner) long. The seta on the body near the free segment is 30μ long. All three setae are naked.

Leg 6 is represented by the small seta and spiniform process near the attachment of each egg sac (Fig. 4).

The color in life in transmitted light is translucid; the eye is pink.

Male.—The metasomal segments (Fig. 22) are less expanded than those of the female. The length is 0.94 mm (range, 0.87-0.99 mm) and the greatest width is 0.32 mm (range, 0.30-0.33 mm), based on 10 specimens. The ratio of length to width of the prosome is 1.45 : 1.

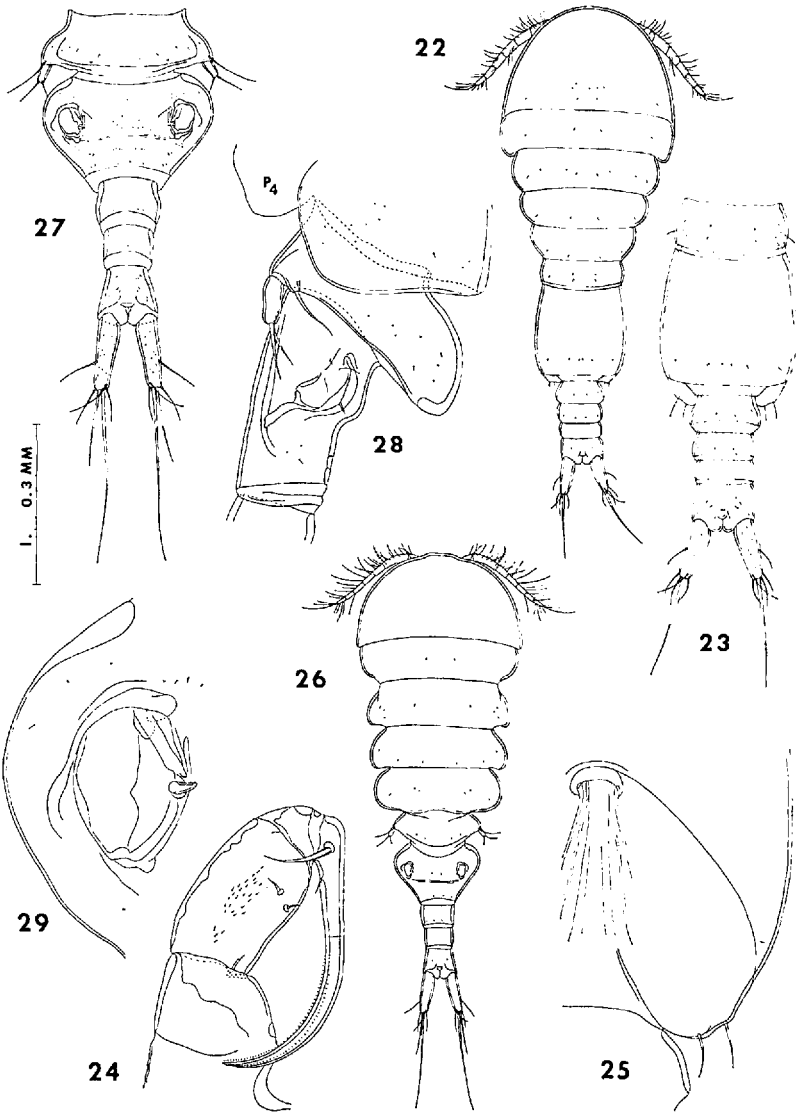
The segment to which leg 5 is attached (Fig. 23) is $57\mu \times 135\mu$. Between this segment and the genital segment there is no ventral intersegmental sclerite. The genital segment is elongated, $187\mu \times 169\mu$. The four postgenital segments are $42\mu \times 88\mu$, $36\mu \times 81\mu$, $29\mu \times 75\mu$, and $44\mu \times 77\mu$, respectively, from anterior to posterior.

The caudal ramus is similar to that of the female, being only slightly smaller, $73\mu \times 28\mu$.

The surfaces of the body are ornamented as in the female. The ratio of the length of the prosome to that of the urosome is 1.10 : 1.

The rostrum is like that of the female.

The first antenna resembles that of the female, but three aesthetes are



FIGURES 22-29.—22-25, *Paranthessius dissidens,* n. sp., male: 22, dorsal (A); 23, urosome, dorsal (I); 24, maxilliped, inner (C); 25, leg 6, ventral (D).—26-29, *Paranthessius caribaeus,* n. sp., female: 26, dorsal (A); 27, urosome, dorsal (I); 28, segment to which leg 5 is attached and genital segment, lateral (E); 29, area of attachment of egg sac, dorsal (D). Letters in parentheses as in Figure 1.

added (at the positions of the three arrows in Fig. 8), so that the formula is: 4, 13 + 2 aesthetes, 6, 3 + 1 aesthete, 4 + 1 aesthete, 2 + 1 aesthete, and 7 + 1 aesthete.

The second antenna, labrum, mandible, paragnath, first maxilla, and second maxilla are like those of the female. The maxilliped (Fig. 24) is relatively small, and four-segmented, assuming that the proximal part of the claw represents a fourth segment. The first and third segments are unarmed. The second segment bears two small inner setae and a patch of minute spinules. The claw is 76μ along its axis and bears two narrow fringes along its distal half.

The postoral area resembles that of the female.

Legs 1-4 are like those of the female, with the same formula for the armature. No sexual dimorphism is present.

Leg 5 is like that of the female.

Leg 6 (Fig. 25) consists of a posteroventral flap on the genital segment and bears two naked setae 18μ and 22μ long.

The spermatophore was not seen.

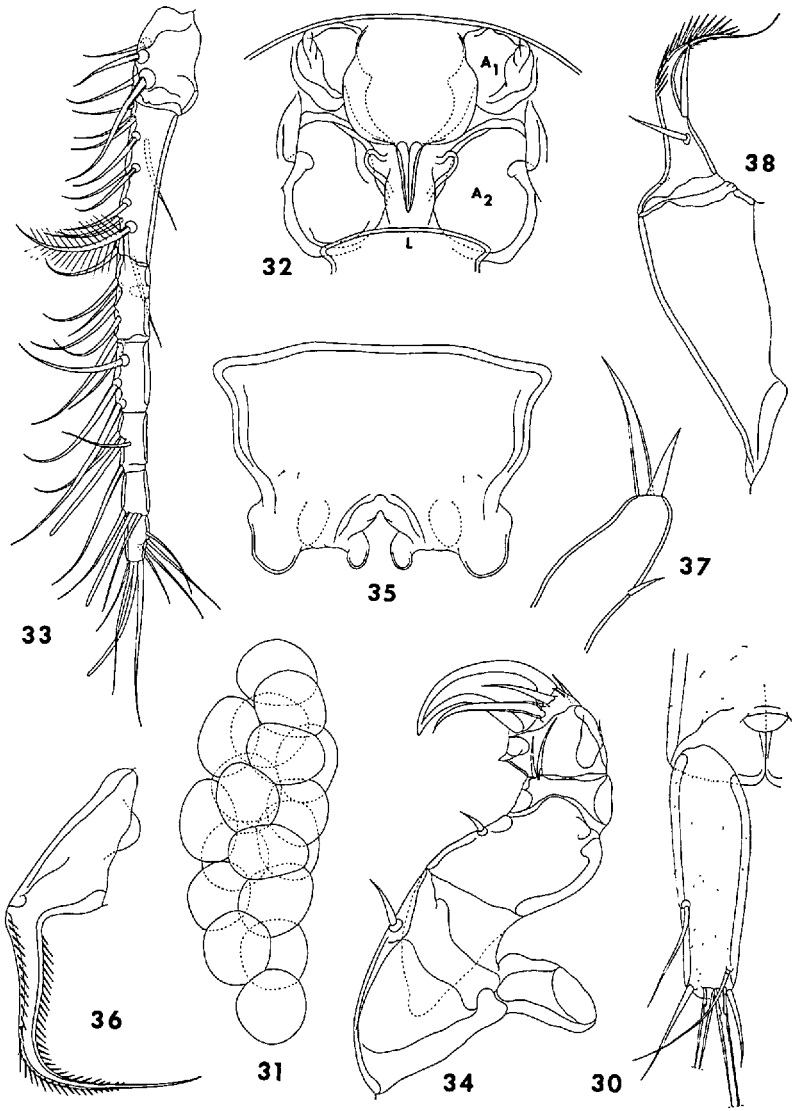
The color in life is like that of the female.

Etymology.—The specific name *dissidens,* from Latin = sitting apart or disagreeing, refers to the unusual setation in legs 2-4 in this species.

Comparison With Related Species.—Paranthessius dissidens differs from all known species in the genus in the armature of legs 2 and 3. The usual pattern in these legs for the last segment of the exopods is III,I,5 (II,I,5 in leg 3 of *P. anemoniae* Claus, 1889, according to Bocquet & Stock [1959a]), and that for the second segment of the endopods is 0-2. In the new species, however, these two segments are armed III,I,4 and 0-1, respectively.

Insofar as can be determined from existing descriptions, in most species of *Paranthessius* the two median terminal setae on the caudal ramus are jointed near their bases, and the outer seta is roughly one-half to two-thirds the length of the inner seta. In *P. dissidens,* however, the slender, weak outer seta lacks a distinct joint and is less than one-third the length of the strongly developed and weakly jointed inner seta. (In *P. haploceras* Bocquet & Stock, 1959b, the outer seta is about twice as long as the inner one.)

P. dissidens differs from other species in which the egg sac is known in having only six relatively large eggs in each sac. The new species described below has 18-20 eggs in its egg sac. *P. tivelae* Illg, 1949, has about 30 eggs. Several other species far exceed this number, with about 120 small eggs in *P. columbiae* (Thompson, 1897) according to Illg, 1949.



FIGURES 30-38. *Paranthessius caribaeus,* n. sp., female: 30, caudal ramus, dorsal (G); 31, egg sac, dorsal (B); 32, rostrum, ventral (E); 33, first antenna, dorsal (G); 34, second antenna, posterior (D); 35, labrum, with paragnaths indicated by dashed lines, ventral (D); 36, mandible, anterior (F); 37, first maxilla, posterior (F); 38, second maxilla, inner (C). Letters in parentheses as in Figure 1.

Paranthessius caribaeus, n. sp.
Figs. 26-51

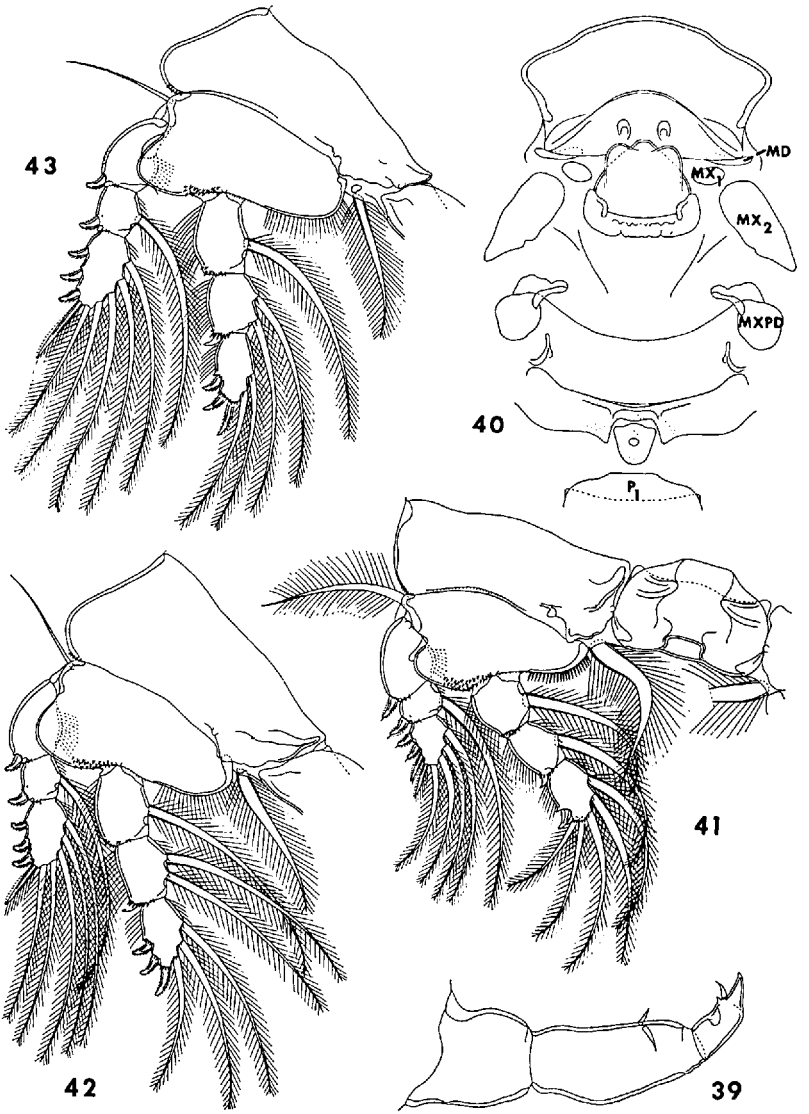
Type-Material.—74 ♀♀ and 64 ♂♂ from 29 specimens of *Chama sinuosa* Broderip, in 2 m, Six Men's Bay, north of Speightstown, St. Peter, Barbados, June 30 and July 8, 1959. Holotype ♀, allotype, and 110 paratypes (60 ♀♀, 50 ♂♂) deposited in the United States National Museum, Washington, and the remaining paratypes in the author's collection. The United States National Museum numbers are: USNM 127223 for the holotype; USNM 127224 for the allotype; and USNM 127225 for the 110 paratypes.

Other Specimens.—FROM *Chama sinuosa*: 8 ♀♀ and 7 ♂♂ from 13 hosts, in 0.5 m, Cayo Terremoto, southeast of La Parguera, southwestern Puerto Rico, Aug. 7; 35 ♀♀, 30 ♂♂, and 1 copepodid from 17 hosts, in 0.5 m, Caballo Ahogado, south of Magüeyes Island, near La Parguera, Aug. 11; 2 ♀♀ and 1 ♂ from 2 hosts, in 3 m, Arrecife Laurel, southwest of La Parguera, Aug. 13; 11 ♀♀ from 9 hosts, in 0.5 m, Cayo Terremoto, Aug. 15; 17 ♀♀ and 12 ♂♂ from 12 hosts, in 0.5 m, Caballo Ahogado, Aug. 19; 30 ♀♀ and 25 ♂♂ from 17 hosts, in 1 m, Caballo Ahogado, Aug. 19; 8 ♀♀ and 12 ♂♂ from 12 hosts, in 1 m, Rackham's Cay, off Port Royal, Jamaica, Aug. 31; and 8 ♀♀ and 14 ♂♂ from 19 hosts, intertidal, Rackham's Cay, Sept. 3.

FROM *Pseudochama radians* LAMARCK: 1 ♂ (10 hosts examined), in 0.5 m, Rackham's Cay, off Port Royal, Jamaica, Aug. 31.

Female.—The body (Fig. 26) has a more slender prosome than in *P. dissidens,* with the segment of leg 4 about as broad as that of leg 3. The length is 1.42 mm (range, 1.25-1.50 mm), and the greatest width is 0.51 mm (range, 0.45-0.54 mm), based on 10 specimens. The ratio of the length to width of the prosome is 1.52 : 1. The segment of leg 1 is distinctly set off from the head. The epimeral areas of the metasomal segments are rounded.

The segment to which leg 5 is attached (Fig. 27) is 112μ × 310μ, as seen dorsally. The dorsum of this segment is raised in a conspicuous median lobe (Fig. 28). Between this segment and the genital segment there is no ventral intersegmental sclerite. The genital segment in dorsal view is almost cordiform, greatly expanded laterally in its anterior half and gradually constricted posteriorly; in lateral view the segment is slender, its anterior half thicker than its posterior half. The areas of attachment of the egg sacs are located dorsolaterally near the middle of the segment. Each area (Fig. 29) bears a small, naked, spiniform seta, 10μ long. The three postgenital segments are 78μ × 117μ, 65μ × 88μ, and 88μ × 109μ,



FIGURES 39-43. *Paranthessius caribaeus,* n. sp., female: 39, maxilliped, antero-inner (C); 40, labrum and postoral area, ventral (G); 41, leg 1 and intercoxal plate, anterior (G); 42, leg 2, anterior (G); 43, leg 3, anterior (G). Letters in parentheses as in Figure 1.

respectively, from anterior to posterior. The posteroventral border of the anal segment bears on each side a row of extremely small spinules.

The caudal ramus (Fig. 30) is elongated, 143μ × 47μ in greatest dimensions, the ratio being 3.10:1. The outer lateral seta is 64μ long, the outermost terminal seta 55μ, the innermost terminal seta 44μ, and the dorsal pedicellate seta 77μ; the two median terminal setae are 127μ (outer) and 341μ (inner) long, both inserted a little dorsally over an unornamented ventral flap. All the setae are naked. The ramus bears minute hairs (sensilla) and refractile points on both dorsal and ventral surfaces.

The dorsal surfaces of the prosome and urosome are ornamented as indicated in Figures 26 and 27. The ventral surface of the urosome is more sparsely ornamented. The ratio of the length of the prosome to that of the urosome is 1.32:1.

The egg sac (Fig. 31) is elongated (700μ × 270μ), extends a little beyond the caudal ramus, and contains 18-20 eggs, each approximately 125μ in diameter.

The rostrum (Fig. 32) has a slender, well-sclerotized beak with narrow, hyaline marginal lamellae.

The first antenna (Fig. 33) is seven-segmented and about 310μ in length. The proximal anterior margin of the first segment is angular. The third segment has a ventral sclerite similar to that in *P. dissidens*. The lengths of the segments are: 17μ (46μ along its anterior margin), 87μ, 46μ, 42μ, 36μ, 26μ, and 26μ, respectively. The formula for the armature is the same as in *P. dissidens*. All the setae are naked, except for one distal seta on the second segment, which is prominently haired.

The second antenna (Fig. 34) resembles generally that of *P. dissidens*. The inner margin of the fourth segment is produced to form an unornamented crest. The claw is 60μ along its axis.

The labrum (Fig. 35) and the immediate postoral area (Fig. 40) are similar in major respects to those of *P. dissidens*.

The mandible (Fig. 36) has a long, slender, bilaterally spinulose blade arising at an angle from the base. The paragnath consists of an obscure lobe with a few hairs (see Fig. 48 of the male) anteromedial to the first maxilla and is concealed by the labrum in ventral view. The first maxilla (Fig. 37) and second maxilla (Fig. 38) are armed much like those of *P. dissidens*. The maxilliped (Fig. 39) is more slender than in *P. dissidens*, but has similar armature.

The area between the maxillipeds and the first pair of legs (Fig. 40) is only slightly protuberant; it has a line connecting the bases of the maxillipeds and more posteriorly has a well-sclerotized transverse sclerite (which is lacking in *P. dissidens*).

Legs 1-4 (Figs. 41, 42, 43, and 44) have three-segmented rami. The armature of these legs is as follows:

P_1	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,4 enp 0-1; 0-1; I-5
P_2	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,5 enp 0-1; 0-2; I,II,3
P_3	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,5 enp 0-1; 0-2; I,II,2
P_4	coxa 0-1	basis 1-0	exp I-0; I-1; III,I,5 enp 0-1; 0-1; II

On the basis of leg 1, the outer seta is strong and conspicuously haired, and the inner margin bears a row of slender spinules; in legs 2-4, the outer seta is more slender and naked, and the inner margin has long hairs. The last segment of the endopod of leg 4 is $24\mu \times 18\mu$ in greatest dimensions, with the two terminal spines 11μ (outer) and 20μ (inner) long.

Leg 5 (Fig. 45) has an unornamented free segment measuring $42\mu \times 16\mu$; its two terminal setae are 44μ (outer) and 30μ (inner) long. The adjacent seta on the body is 55μ long. All three setae are naked.

Leg 6 is represented by the spiniform seta near the attachment of each egg sac (Fig. 29).

The color in life in transmitted light is translucid, the claws of the second antennae are brownish, the eye red.

Male.—The body (Fig. 46) resembles in general form that of the female, but the metasomal segments are relatively not as wide. The length is 1.22 mm (range, 1.13-1.31 mm) and the greatest width is 0.42 mm (range, 0.40-0.45 mm), based on 10 specimens. The ratio of the length to width of the prosome is 1.56 : 1.

The segment to which leg 5 is attached (Fig. 47) is $73\mu \times 198\mu$, and lacks the dorsal lobe seen in the female. Between this segment and the genital segment there is no ventral intersegmental sclerite. The genital segment is about as long as wide, $237\mu \times 234\mu$, in dorsal view widest in its posterior part. The four postgenital segments are $68\mu \times 109\mu$, $57\mu \times 95\mu$, $48\mu \times 83\mu$, and $70\mu \times 94\mu$, respectively, from anterior to posterior.

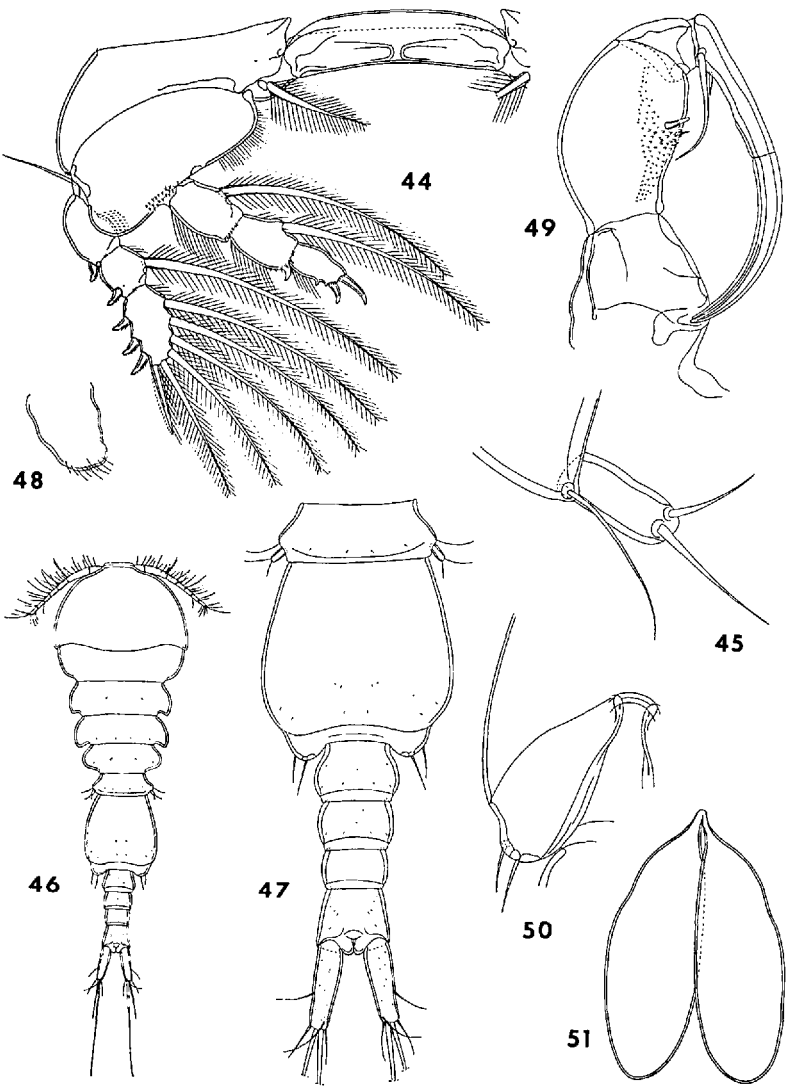
The caudal ramus is like that of the female, but slightly smaller, $113\mu \times 39\mu$.

The surfaces of the body are ornamented as shown in Figures 46 and 47. The ratio of the length of the prosome to that of the urosome is 1 : 1.

The rostrum is like that of the female.

The first antenna resembles that of the female, but has three aesthetes added, as in the male of *P. dissidens*.

The second antenna, labrum, mandible, paragnath (Fig. 48), first maxilla, and second maxilla are like those of the female. The maxilliped (Fig. 49) has on the second segment a spiniform seta, a smaller, slender, hyaline seta, and a patch of short spines. The claw is 136μ along its axis.



FIGURES 44-51.—44-45, *Paranthessius caribaeus,* n. sp., female: 44, leg 4 and intercoxal plate, anterior (G); 45, leg 5, dorsal (C).—46-51, Male: 46, dorsal (A); 47, urosome, dorsal (B); 48, paragnath, ventral (H); 49, maxilliped, inner (D); 50, leg 6, ventral (E); 51, spermatophores, attached to female, dorsal (B). Letters in parentheses as in Figure 1.

The postoral area resembles that of the female.

Legs 1-4 are like those of the female, with the same armature and without sexual dimorphism.

Leg 5 (Fig. 47) resembles that of the female, but its free segment is smaller, measuring $23\mu \times 10\mu$.

Leg 6 (Fig. 50) consists of the usual posteroventral flap on the genital segment and bears two naked setae, 39μ and 44μ long.

The spermatophore (Fig. 51), attached to the female in pairs, is elongated and measures $308\mu \times 115\mu$, not including the neck.

The color in life is like that of the female.

Etymology.—The specific name *caribaeus* alludes to the occurrence of this copepod in three areas of the Caribbean Sea (Barbados, Puerto Rico, and Jamaica).

Comparison With Related Species.—Paranthessius caribaeus has several characteristic features that in combination serve to distinguish it from other species in the genus. These are: the shape of the genital segment in the female, the dorsal lobe on the segment to which leg 5 is attached in the female, and the feathered seta on the second segment of the first antenna and on the outer side of the basis of leg 1.

The new species and *P. dissidens* have certain features in common, which suggest a close relationship. In both, there is a pair of rounded sclerotized areas (as in Figs. 6 and 32) between the rostrum and labrum, the labrum has a pair of small accessory lobes (as in Figs. 11 and 35), and the mouthparts are strikingly similar.

The formula III,I,5 on the last segment of the exopod of leg 4 (as in all specimens of *P. caribaeus*) occurs occasionally in two other species, *P. barneae* (Pelseneer, 1929), according to Bocquet & Stock (1958b), and *P. protothacae* Humes, 1967. In both of these species, however, the more frequent formula for this segment is II,I,5.

Within the genus *Paranthessius,* the armature of legs 1-4 shows considerable variation. The usual formula seems to be that well-illustrated by Sars (1918) for his *P. validus.* Such a formula occurs in 11 species. (The formula of I,4 given by Illg [1949] for the last segment of the endopod of leg 1 in *P. columbiae* [Thompson, 1897] and in his four new species, *P. panopeae, P. tivelae, P. saxidomi,* and *P. perplexus,* seems to be an error and probably should be I,5. Although Illg stated on p. 416 that the formula for *P. panopeae* is the same as that of *P. columbiae* [given on p. 406 as one spine and four setae], his figure 36C of *P. panopeae* shows the formula as I,5.)

In seven species, the formula of legs 1-4 departs in certain respects from the usual condition. In *P. anemoniae* Claus, 1889, the formula for the exopod of leg 3 is I-0; I-1; II,I,5, and that for the endopod of leg 4

is 0-1; 0-2; III, according to Bocquet & Stock (1959a). In *P. panopeae,* the endopod of leg 4 is 0-1; 0-1; III (Illg, 1949). In *P. myxicolae* Bocquet & Stock, 1958a, the exopod of leg 1 is I-0; I-1; III,I,3 and that of leg 4 is I-0; I-1; II,I,4. In *P. barneae* and *P. protothacae,* the exopod of leg 4 may occasionally be I-0; I-1; III,I,5, as mentioned above. Finally, in *P. dissidens* and *P. caribaeus,* the formulas of legs 1-4 show the characteristic differences already mentioned.

Key to the Species of the Genus *Paranthessius*

Although Illg (1949) included *Diogenidium nasutum* Edwards, 1891, in this genus, it has been omitted here since Stock (1968) has shown *Diogenidium* to be a valid genus. The species described by Reddiah (1960) as *P. colmani* is also not included, since it is a junior synonym of *P. haploceras* Bocquet & Stock, 1959b (information in letter from J. H. Stock, Feb. 15, 1968). Two species, *P. barneae* and *P. protothacae,* have been entered twice in the key because of the variable armature on the exopod of leg 4.

For definitive identification this artificial key should be supplemented by comparison with available descriptions and, if possible, with determined specimens.

1. First antenna with first 2 segments bearing respectively 1 and 2 powerful recurved spines. (From polychaete, *Myxicola infundibulum*) ..... *P. myxicolae* Bocquet & Stock, 1958

   First antenna without such spines 2

2. Last segment of endopod of leg 4 with 3 spines 3

   Last segment of endopod of leg 4 with 2 spines 4

3. Rostrum with a beak; last segment of second antenna with 1 claw; caudal ramus of ♀ with ratio 7 : 1. (From pelecypod, *Panope generosa*) ..... *P. panopeae* Illg, 1949

   Rostrum rounded, linguiform; last segment of second antenna with 3 claws; caudal ramus of ♀ about 3.5 : 1. (From actiniarian, *Anemonia sulcata*) (see Bocquet & Stock, 1959a) ..... *P. anemoniae* Claus, 1889

4. Last segment of exopod of legs 2 and 3 with formula III,I,4; second segment of endopod of legs 2 and 3 with 0-1. (From pelecypods, *Pseudochama radians* and *Chama sinuosa*) ..... *P. dissidens,* n. sp.

   Last segment of exopod of legs 2 and 3 with formula III,I,5; second segment of endopod of legs 2 and 3 with 0-2 5

5. Last segment of exopod of leg 4 with formula III,I,5 6
   Last segment of exopod of leg 4 with formula II,I,5 8
6. Caudal ramus of ♀ very elongated, a little longer than 3 post-genital segments together, its setae shorter than the ramus itself. (From pelecypods, *Barnea candida* and *Pholas dactylus*) (see Bocquet & Stock, 1958b) ..... *P. barneae* (Pelseneer, 1929)
   Caudal ramus of ♀ about 3:1 to 4:1, its longest seta longer than the ramus itself 7
7. Rostrum rounded, without a pronounced beak; first antenna with all setae naked. (From pelecypod, *Protothaca thaca*) ..... *P. protothacae* Humes, 1967
   Rostrum with a distinct beak; first antenna with a conspicuously feathered seta on segment 2. (From pelecypods, *Pseudochama radians* and *Chama sinuosa*) ..... *P. caribaeus,* n. sp.
8. First antenna with segments 1-4 expanded, segments 5-7 slender. (From pelecypods, *Schizothaerus nuttalli* and *Protothaca tenerrima*) (see Illg, 1949) ..... *P. columbiae* (Thompson, 1897)
   First antenna with segments 1-4 not unusually expanded 9
9. Caudal ramus distinctly shorter than anal segment, ratio about 1.38:1. (Host unknown) ..... *P. validus* (Sars, 1918)
   Caudal ramus longer than anal segment 10
10. Last segment of second antenna with 3 almost setiform claws; ♀ less than 1 mm in length. (Host unknown) (see Stock & Kleeton, 1963) ..... *P. parvus* (Sars, 1918)
    Last segment of second antenna with 1 claw; ♀ more than 1 mm in length 11
11. Free segment of leg 5 in ♀ broad, almost triangular rather than subrectangular in outline, ratio about 1.44:1. (From ascidians, *Styela clava* and ? *Cynthia* sp.) (see Gotto, 1961) ..... *P. cynthiae* (Brian, 1934)
    Free segment of leg 5 in ♀ elongated, slender, subrectangular rather than triangular 12
12. Genital segment of ♀ wider than long, with two lateral lobes extending forward on each side. (From pelecypod, *Saxidomus nuttalli*) ..... *P. perplexus* Illg, 1949
    Genital segment of ♀ without such lobes and either about as long as wide or longer than wide 13
13. Two spines on endopod of leg 4 not greatly different in length,

ratio between them distinctly less than 2 : 1, not greater than 1.57 : 1 14

Two spines on endopod of leg 4 markedly different in length, ratio between them at least 2 : 1 19

14. Rostrum rounded 15

Rostrum with a beak 16

15. Caudal ramus of ♀ 3.4 : 1; prosome of ♀ usually tumid, ratio of length to width 1.38 : 1. (From pelecypod, *Mesodesma donacium*) ..... *P. mesodesmatis* Humes, 1967

Caudal ramus of ♀ 4 : 1; prosome of ♀ not tumid, ratio of length to width 1.9 : 1. (From pelecypod, *Protothaca thaca*) ..... *P. protothacae* Humes, 1967

16. Beak in the form of a strongly recurved hook; distal inner margin of last segment of endopod of leg 4 without spinous processes. (From pelecypod, *Cardium* [= *Laevicardium*] *crassum*) ..... *P. haploceras* Bocquet & Stock, 1959

Beak straight or only slightly bent; distal inner margin of last segment of endopod of leg 4 with small spinous processes 17

17. Setae on caudal ramus very short, much shorter than ramus itself. (From pelecypods, *Barnea candida* and *Pholas dactylus*) (see Bocquet & Stock, 1958b) ..... *P. barneae* (Pelseneer, 1929)

Setae on caudal ramus as long or longer than ramus 18

18. Second segment of second antenna of ♀ with small spinules on inner margin; distal inner margin of last segment of endopod of leg 4 with one small spinous process. (From pelecypods, *Cardium edule, C.* [= *Laevicardium*] *crassum, Solen marginatus, Ensis siliqua, Spisula solida, S. subtruncata, Lutraria lutraria, Meretrix chione, Tapes pullastra, T. decussatus, Macoma balthica,* and *Mactra stultorum*) (see Bocquet & Stock, 1959b; and Reddiah, 1960) ..... *P. rostratus* (Canu, 1891)

Second segment of second antenna of ♀ without spinules on inner margin; distal inner margin of last segment of endopod of leg 4 with 2 small spinous processes. (From pelecypods, *Pecten glaber, P. tigerinus, P. opercularis, P. varius,* and *Anomia ephippium*) (see Bocquet & Stock, 1959b) ..... *P. pectinis* (Pesta, 1909)

19. Caudal ramus of ♀ about 5.5 : 1; distal inner margin of last segment of endopod of leg 4 with 2 small spinous processes. (From pelecypod, *Tivela stultorum*) ..... *P. tivelae* Illg, 1949

Caudal ramus of ♀ about 3.5 : 1; distal inner margin of last segment of endopod of leg 4 without distinct spinous processes. (From pelecypod, *Saxidomus nuttalli*) ..... *P. saxidomi* Illg, 1949

SUMARIO

COPÉPODOS CICLÓPIDOS DEL GENERO *Paranthessius* ASOCIADOS CON LOS PELECÍPODOS MARINOS EN LAS ANTILLAS

Se describen *Paranthessius dissidens* n. sp. procedente de la cavidad del manto de los pelecípodos *Pseudochama radians* de Jamaica y Puerto Rico y *Chama sinuosa* de Puerto Rico y *P. caribaeus* n. sp. procedente de *Chama sinuosa* de Barbados, Jamaica y Puerto Rico y *Pseudochama radians* de Jamaica. Se da una clave para el género *Paranthessius.*

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