

THREE NEW SHRIMPS, AND SOME INTERESTING NEW RECORDS OF DECAPOD CRUSTACEA FROM A DEEP-WATER CORAL REEF IN THE FLORIDA KEYS

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Abstract.—A small collection of 55 specimens of decapod crustaceans, obtained using a research submersible on a deep-water coral reef off Key Largo, Florida, produced one new genus and three new species of natantian shrimp, plus several major range extensions to the continental United States for other decapods. The new taxa included *Veleroniopsis kimallynae* new genus and species, and *Pontoniopsis paulae*, new species, in the Palaemonidae, and *Odontozona libertae*, new species, in the Stenopodidae. The discovery of new taxa in depths of less than 100 m suggests that the cryptic, coral-associated decapod crustacean fauna may be richer than previously suspected.

The decapod crustacean fauna of the Florida Keys has long been recognised as being both speciose and numerous. Although no comprehensive specific inventory has ever been conducted, the fauna is considered relatively well known as a result of several regional and monographic studies (e.g. Rathbun's monographs on brachyurans), which included species whose ranges extended either to, or north- or southward through the Florida Keys. As might be expected, the intertidal and shallow subtidal decapods are relatively better known than their deeper-living counterparts, because of the various logistical problems encountered in sampling deep, rocky or reeflike areas using either conventional surface-towed gear, or SCUBA.

In June 1979 a geophysical and biological survey of deep-water coral reefs off Key Largo, Florida was conducted by the Office of Coastal Zone Management for NOAA, using a manned research submersible. Among the 55 specimens of decapod crustaceans collected were 2 new genera and 4 new species. Included in the new taxa was a remarkable new genus of axiid shrimp, described elsewhere (Kensley and Gore, 1980), an unusual new genus of palaemonid shrimp, as well as the first western hemispheric record for the rare Indo-West Pacific genus *Pontoniopsis* (Palaemonidae), and the second western hemispheric record for the stenopodid shrimp genus *Odontozona*. Other notable range extensions included the first western hemispheric record for the alpheid shrimp *Alpheopsis trispinosus* (Stimpson), and the first continental United States record for the pagurid crab genus

Nematopaguroides Forest & St. Laurent, from Brazil. Additional continental U.S. records included specimens of *Pseudocoutierea antillensis* Chace (Palaemonidae) and *Synalpheus sanctithomae* Coutière (Alpheidae), the former previously known from the unique type-specimen, and the latter from a small type-series collected at various localities in the lesser Antilles. The collection was thus remarkable both for the novelty of the contained taxa, and from the fact that 11% of the 55 specimens, comprising 36 species, were new to science.

Materials and Methods

The specimens in this report were collected from a series of 5 of 10 stations occupied by the Research Submersible Johnson-Sea-Link I, operated by the Harbor Branch Foundation, Inc. Station data are listed in Table 1. In the following report, only new species, and new or interesting records of previously known species are considered. The few remaining taxa in the collections, all relatively common associates of coralline habitats, were of less consequence and will not be discussed further, although they are listed in Table 2. Catalog numbers for the species include those of the National Museum of Natural History, Washington, D.C. (USNM) for new or exceptionally interesting taxa, and the Indian River Coastal Zone Museum (IRCZM) at Link Port, Ft. Pierce, Florida. With the exception of holotypes, most paratypes, and those species noted below in the text, the remainder of the collection has been deposited in the Indian River reference collections.

Measurements were made with a substage micrometer calibrated to an ocular reticle on a dissecting stereomicroscope, and the abbreviations are as follows: rcl, rostral carapace length, measures the medial length from the distal rostral tip to the posterior carapace margin; sl, shield length, was used only with the pagurid species, and is the length of the carapace from the rostrum posteromedial to the cervical groove.

The three new species in this study are named for my research assistants, Mrs. Paula M. Mikkelsen, Miss Kim Allyn Wilson, and Mrs. Liberta E. (Scotto) Poolt, in recognition of their cheerful and willing help both in the field and in the laboratory over the past 8 years.

Section Caridea
Family Bresiliidae Calman, 1896
Discias atlanticus Gurney, 1939

Material examined.—1 ♀; rcl 3.2 mm; IRCZM 89:3802.

The single specimen constitutes the second record for the continental United States, the species having been previously reported from the central eastern Florida coast by Gore and Wilson (1978). Members of the genus are

Table 1.—Collection data for decapod crustaceans associated with the deep reef survey, Key Largo Marine Sanctuary.

I-S-L dive no.	Date	Locality	Coordinates	Collection method	Depth (m)	Habitat
I-679	03-VI-79	French Reef	Not available	Manipulator	42.1	Coralline rock
I-679	03-VI-79	French Reef	Not available	Manipulator	76.2	Coralline rock
I-681	04-VI-79	French Reef	25°02.08'N 80°19.27'W	Lockout diver	37.5	Algae and rock
I-682	04-VI-79	Carysfort Reef	25°10.30'N 80°12.82'W	Manipulator	62.5	<i>Meoma ventricosa</i> and sandy bottom
I-687	06-VI-79	Carysfort Reef	25°10.20'N 80°13.23'W	Lockout diver	27.4	Scleractinia
I-688	06-VI-79	Elbow Reef	25°07.79'N 80°14.32'W	Manipulator	56.4	Sponge, with <i>Siliquaria modesta</i> colony
I-690	07-VI-79	Elbow Reef	25°07.70'N 80°15.90'W	Manipulator	18.3	Relict <i>Montastrea</i> with <i>Eunicea</i> sp.

Table 2.—List of decapod crustacean species collected during the deep reef survey Key Largo Marine Sanctuary.

Family	Genus/species	Station	No./Sex
Alpheidae	<i>Alpheopsis trispinosus</i> (Stimpson)	I-679	1 ♀
		I-688	3 ♂♂, 2 ♀♀
	<i>Alpheus amblyonyx</i> Chace	I-690	1 ♀
	<i>Alpheus normanni</i> Kingsley	I-690	1 ♂, 1 ♀ ovigerous
	<i>Synalpheus pandionis</i> Coutière	I-690	1 ♂
	<i>Synalpheus sanctithomae</i> Coutière	I-681	1 ♂
		I-690	1 ♀ ovigerous
	<i>Synalpheus townsendi</i> Coutière	I-690	1 ♂
	<i>Synalpheus</i> sp. (?townsendi)	I-690	1 ♂
Bresiliidae	<i>Discias atlanticus</i> Gurney	I-679	1 ♀
Hippolytidae	<i>Thor manningi</i> Chace	I-682	1 ♀ ovigerous
Palaemonidae	<i>Pontoniopsis paulae</i> sp. nov.	I-682	1 ♂
	<i>Pseudocoutierea antillensis</i> Chace	I-687	2 ♀♀ ovigerous
	<i>Veleroniopsis kimallynae</i> n. gen. et sp.	I-690	1 ♂
Processidae	<i>Processa</i> cf. <i>tenuipes</i> Manning & Chace	I-679	1 ♀
Stenopodidae	<i>Odontozona libertae</i> n. sp.	I-688	2 ♂♂, 1 ♀ (spent)
Axiidae	<i>Coralaxius abelei</i> Kensley & Gore	I-679	1 ♀
Paguridae	<i>Nematopaguroides</i> cf. <i>fagei</i> Forest & St. Laurent	I-690	1 ♂
Galatheidae	<i>Munida angulata</i> Benedict	I-679	1 ♀ ovigerous
		I-681	1 ♂
		I-682	3 ♀♀ ovigerous
		I-688	1 ♂, 1 ♀ ovigerous
		I-690	1 ♂, 1 ♀
Xanthidae	<i>Actaea bifrons</i> Rathbun	I-681	1 ♀ ovigerous
		I-690	1 ♀
	<i>Melybia thalamita</i> Stimpson	I-688	1 ♀
		I-690	1 ♂, 1 ♀, 1 juv.
	<i>Micropanope nuttingi</i> (Rathbun)	I-690	1 ♀ ovigerous
	<i>Micropanope sculptipes</i> Stimpson	I-679	1 ♂, 2 ♀♀
		I-681	1 ♂ juv.
		I-688	1 ♂, 2 ♀♀, 1 juv.
	<i>Micropanope</i> sp.	I-688	1 juv.
	Juvenile xanthid	I-688	1 (crushed)
	<i>Pilumnus</i> sp.	I-690	1 ♂ juv.
<i>Pseudomedaeus distinctus</i> (Rathbun)	I-679	1 ♀ juv.	
Majidae	<i>Mithrax acuticornis</i> Stimpson	I-679	1 ♂

known associates with sponges, usually in water shallower than 40 m. The 76 m record in this study is the deepest yet for the species. Chace and Brown (1978) discussed the status of and reason for synonymizing the family Disciadiidae with the Bresiliidae.

Family Palaemonidae Rafinesque, 1815

Subfamily Pontoniinae Kingsley, 1878

Pontoniopsis paulae, new species

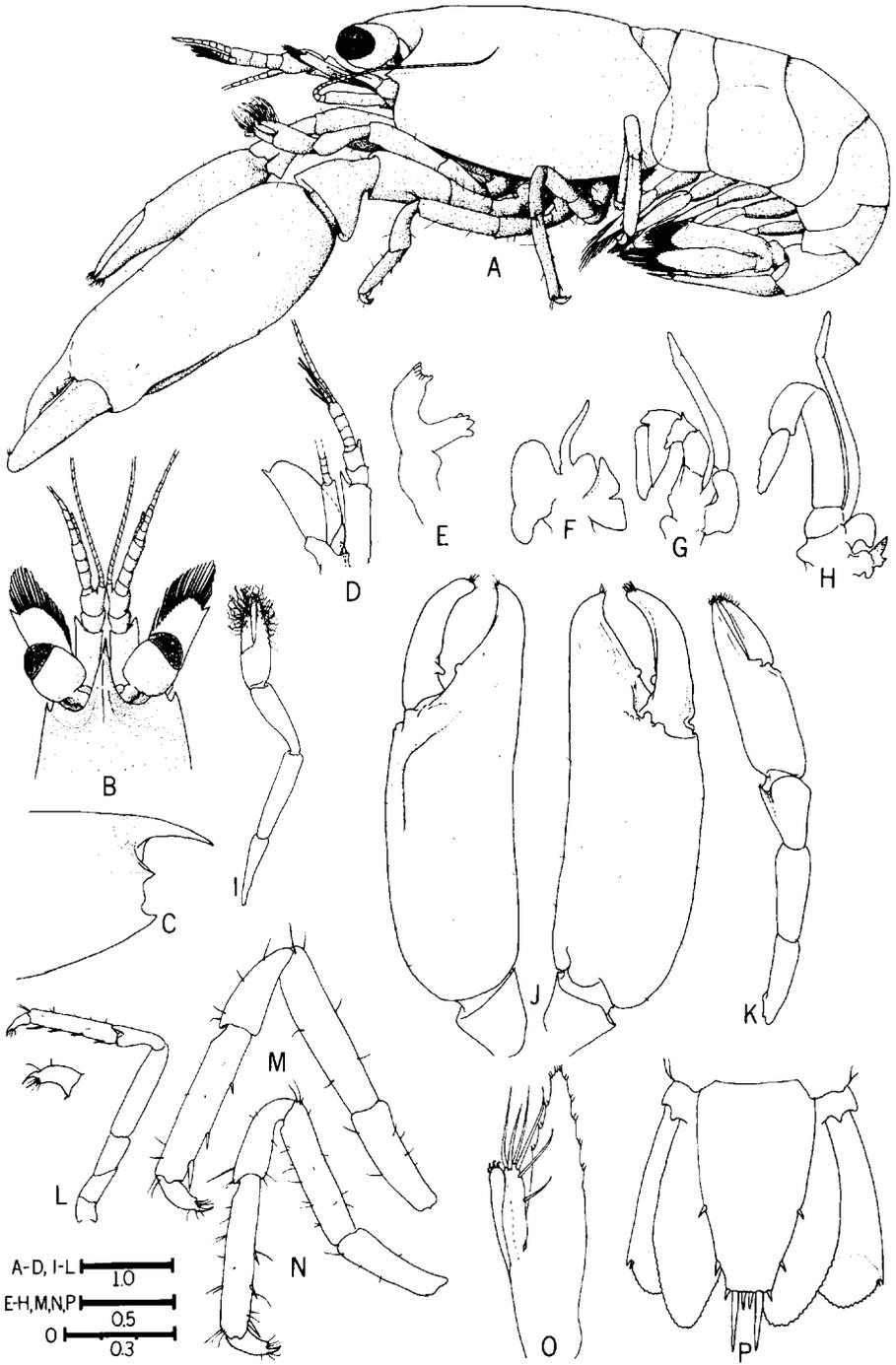
Fig. 1A-P

Material examined.—Holotype, 1 ♂; cpl 3.2 mm; USNM 181240.

Diagnosis.—A small, short, heavy-bodied smooth pontoniine shrimp with a short acute rostrum, and a massive major second cheliped bearing a distinct subdistal medial groove, which appears as if ventrally located when cheliped is seen in lateral view.

Description.—Carapace smooth, shining, without grooves or ornamentation; rostrum compressed, toothless, faintly carinate, acutely triangular in dorsal view, produced into spinelike point, narrower than eye width, falling short of distal margin of basal antennular segment; adrostral depressions absent; orbital margin distinctly concave, shallowly excavate into frontal margin, basal margin underlying ophthalmic peduncles. Lower margin of orbit produced anteriorly into short, sharp, obscurely carinate antennal spine; no other carapacial spines present. Eyes noticeably ovoid, large dark corneas. Basal antennular segment elongate, distolateral margin a spinous projection extending to anterior margin of following segment, this and third segment about equal in length and width; stylocerite very reduced, only slightly produced laterally, rounded, covered by proximomesial expansion of scaphocerite; latter lamellate, twice as long as wide, extending beyond antennular peduncle, anterior margin convex, a distolateral spine overreaching same; basal antennal peduncular segment unarmed, carapocerite similarly so, latter narrowly cylindrical, about 5 times longer than wide, falling short of distal end of basal segment of antennule. Mandibles without palp, molar process with 4 blunt teeth, incisor with 7 bluntly rounded spines. Maxillule and maxilla not dissected to avoid further damage to specimen. All maxillipeds with well-developed exopods; maxilliped 1 with caridean lobe well developed, bearing elongate lash, endopod entirely absent, a distinctly bilobed, rectangular epipod; maxilliped 2 and 3 as illustrated, both with well-developed epipod; maxilliped 3 barely attaining base of carapocerite and antennular peduncle, a poorly developed arthrobranch present.

Pereopods 1 and 2 chelate. First pereopods equal, extending beyond distal margin of antennular peduncle, chela reaching beyond scaphocerite; former short, somewhat inflated, gaping, fingers 0.6 times longer than palm, distally hirsute; carpus 0.8 times length of either chela or merus, about equal to ischium, all segments smooth, unarmed. Second pereopods dissimilar, extending greatly beyond first pair. Major chela massive, smooth, unarmed, inflated, elongate, sparsely setose; a distinct longitudinal groove subdorsally on distal medial surface, opening into deep transverse notch paralleling angle of fixed finger; fingers curved, gaping, shorter than palm, comprising about $\frac{1}{3}$ length of chela, equal to about half length of palm, a small rounded



tooth basally on cutting edge of each; 2 bluntly rounded teeth, plus several small tubercles basally at exterior junction of dactyl and palm (Note: this surface held ventrally when animal is alive, Fig. 1A); tips of both with small tuft of hair; carpus short, smooth, shining, widely expanded distally, inner distal angle a bluntly rounded tooth; merus 1.2 times longer than carpus, proximally compressed, distally inflated, ventral surface flattened; ischium compressed, shorter than merus, about equal in length to carpus. Minor second pereopod shorter than major, chela elongate, conically cylindrical; fingers curving laterally without noticeable gape, comprising about 0.4 length of chela, $\frac{3}{4}$ length of palm, unarmed; carpus oblatelately pyramidal, expanded distally, ventrally excavate along distal margin, 0.8 times length of merus; latter cylindrical, equal in length to compressed ischium, all 3 segments unarmed. Pereopods 3, 4, 5, similar in configuration, slender, segments decreasing in length in relation to respective meri as follows: propodus (0.9), carpus (0.6), dactyl (0.3); ventral margin of pereopod 3 propodus with 3–4 spines, remaining legs with 3, other segments unarmed; dactyls compressed, falcate, tips drawn into elongate, curved hooklike spine, not bifid, but ventral margin with rectangular dentiform prominence only slightly developed into supernumerary tooth. All pereopods apparently lacking epipods.

Abdominal somites smooth, shining, unarmed; posterolateral margins of somites 1–3 bluntly rounded, those of somites 4–5 more truncate; telson about 1.4 times longer than somite 6, shorter than uropods, with 2 pairs lateral spines placed just posterior to midpoint, and at posterior $\frac{1}{7}$ of length, respectively; posterior margin with 3 pairs spines, intermediate pair about 4 times length of submedian, 6 times length of lateral pair at posterodistal margin; uropods longer, narrower, than telson proper, distolateral angle of exopod with strong, fixed tooth, followed by much smaller, movable spine; a very faint diarsis present.

Gill formulae not determined to avoid further damage to specimen.

Ecology.—The single male was collected from the ventral surface of the spatangoid echinoid *Meoma ventricosa* Lamarck, 1816, and is apparently commensal with this species. The only other species in the genus, *Pontoniopsis comanthi* Borradaile, 1915 is a littoral form and a known commensal

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Fig. 1. *Pontoniopsis paulae*. Male, holotype. A, Lateral view; B, Cephalothorax, anterior region; C, Same, lateral view; D, Antennule and antenna, ventral view; E, Mandible; F, Maxilliped 1; G, Maxilliped 2; H, Maxilliped 3; I, Left pereopod 1; J, Pereopod 2, major (left) chela, outer view (left), inner view (right); K, Pereopod 2, minor (right) chela, outer view; L, Left pereopod 3, and detail of dactyl; M, Left pereopod 4; N, Left pereopod 5; O, Appendix masculina, left pleopod 2; P, Tailfan, dorsal view. Scale lines as indicated.

with the crinoid *Comanthus timorensis* (Mueller) according to Borradaile (1917). No crinoids were noted in the area where *P. paulae*, a decidedly deeper water species, was collected.

Remarks.—Although agreeing in the generic diagnosis with characters defining *Pontoniopsis* as provided by Borradaile (1917) and also delineated in Holthuis' (1952b) key, the Floridan species is not closely related to either *Pontoniopsis comanthi* Borradaile, 1915, or to *Pontoniopsis* sp. noted by Potts (1915) and apparently redescribed by Borradaile in his 1917 paper. Holthuis (1952b) synonymized the latter with *P. comanthi*, although several characters in Borradaile's description differed from those described by Holthuis from his specimen. *Pontoniopsis paulae* may be quickly distinguished from *P. comanthi* by several important and easily observed features. The most easily noticed of these include the distally-grooved major second cheliped, the different relative lengths of the cheliped fingers to their respective palms, the more spiniform rostrum, the lack of a postorbital marginal groove, the position of the lateral spines on the telson and the different lengths of the posterior submedian and intermediate pairs, and by the distolateral tooth of the scaphocerite which overreaches the anterior margin of the lamella. These and other features are summarized in Table 3 where the 2 species may be easily compared.

The new species also shows some resemblance to *Dasella herdmaniae* Lebour 1939, a pontoniine shrimp commensal with the ascidian *Herdmania* in the Indian Ocean. In addition to the characters cited above, *P. paulae* differs from *D. herdmaniae* in the armature of the dactyls on the walking legs, in the absence of a palp on maxilliped 1, and in the much shorter rostrum which does not extend beyond the very large eyes. Dr. A. J. Bruce (*in litt.*) agreed that the two species bore a superficially close resemblance to each other, but will demonstrate in a forthcoming paper still other differences between the two taxa, emphasizing carapacial characters overlooked by Lebour in her original description.

Distribution.—The genus *Pontoniopsis* was heretofore known from only a few specimens recorded from the Indo-West Pacific (Holthuis, 1952b). The discovery of the species described herein is the first time the genus has been reported from the western North Atlantic. Presently it is known only from the type-locality, Carysfort Reef, off Key Largo, Monroe County, Florida (JSL I-682, Table 2).

Pseudocoutierea antillensis Chace, 1972

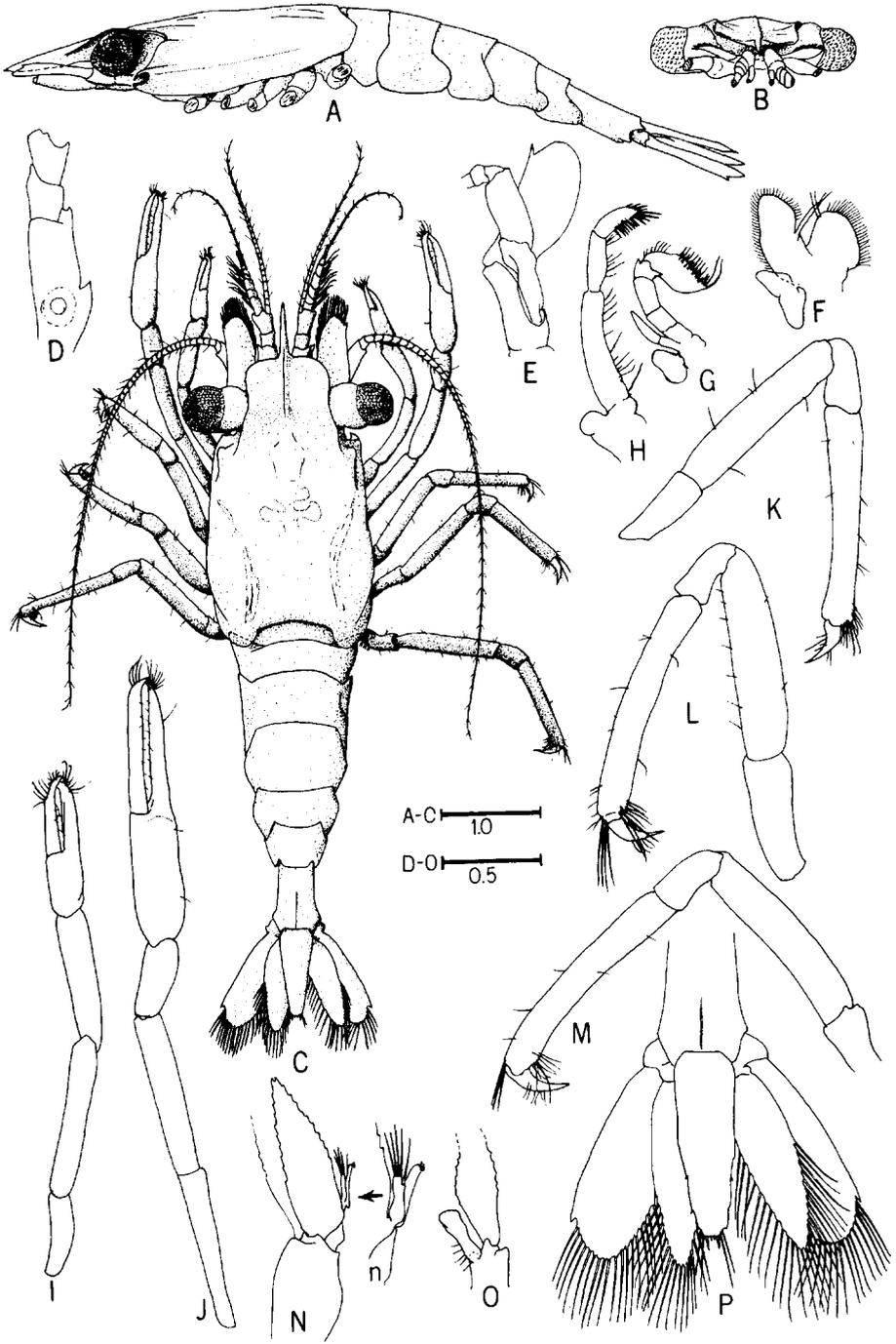
Material examined.—2 ♀♀, ovigerous; rcl 3.9, 3.6 mm; IRCZM 89:4666.

Both specimens agreed in every respect with the description given by Chace, who also compared his new species with the eastern Pacific *P. elegans* Holthuis, 1951, the only other member in the genus. Both species

Table 3.—Comparison of morphological characters in two species of *Pontoniopsis*.

	<i>Pontoniopsis paulae</i>	<i>Pontoniopsis comanthi</i> [fide Holthuis, 1952b]
Rostrum:	Narrow, spiniform	Lanceolate, compressed
Carapace:	Smooth	Posterior margin or orbit with oblique groove behind
Abdomen:	Somites truncately rounded	Somites broadly rounded
Telson:	1.4× longer than somite 6; Spines placed 0.6, 0.8× length	Slightly longer than somite 6; Spines placed 0.6, 0.8× length
Posterior spines:	Intermediate 4× larger than submedial; 6× larger than posterolateral	Submedial greater than half length of intermedial
Stylocerite:	Greatly reduced	Extending beyond middle of basal segment
Scaphocerite:	Extending beyond antennule peduncular segments; Distolateral spine reaches beyond lamella margin	Extending slightly beyond antennule peduncular segments; Distolateral spine falls short of lamella margin
Mandible:	Molar with 4 processes, incisor with 7 processes	Molar with 4 processes, incisor with 3 processes
Maxilliped 1:	No palp	Palp present
Maxilliped 3:	Arthrobranch present; appendage extending barely to carapocerite base	Arthrobranch absent; appendage extending well beyond carapocerite base
Pereopod 1:	Chela reaching beyond scaphocerite; fingers longer than palm; carpus shorter than chela	Chela and carpus reaching beyond scaphocerite; fingers equal to palm; carpus longer than chela
Pereopod 2:	Longer than pereopod 1; fingers shorter than palm	Shorter than pereopod 1; fingers longer than palm
Pereopods 3–5:	Tips not bifid; obtuse prominence present	Tips bifid; obtuse prominence not mentioned.

are rare, but this may be a consequence of their habitat, rocky reeflike regions with associated gorgonians and antipatharians, and thus an area not easily sampled by conventional surface-towed gear. The 2 specimens from Florida constitute the first continental United States record for the species, which was previously known only from the type-locality, Saba Bank, northwest of the Leeward Islands, approximately 1900 km southeast of Key Largo.



Veleroniopsis, new genus

Fig. 2A-P

Diagnosis.—A small, flattened pontoniine shrimp with a noticeably rectangular rostrum. Body dorsoventrally depressed overall, carapace smooth, without spination of any kind; rostrum well developed, elongate, widely expanded proximally, subrectangular distally, forming shelflike expansions over eyes, with prominent median compressed, knifelike rostral spine; eyes large, pigmented; scaphocerite well developed; mandibles without palp; maxilliped 2 with exopod, maxilliped 3 lacking same, and without pleurobranch. Posterior orbital margin inflated, a noticeable postorbital tubercle; anterior margin of carapace recurved to form tubelike opening into branchial chamber. Pleura of first 5 abdominal somites more or less broadly rounded or truncate, without ventral spines. Pereopods smooth, thin, elongate, dactyli of last 3 pairs simple. Telson with 2 pairs of spines on posterior margin.

Type-species.—*Veleroniopsis kimallynae*, new species (see below).

Etymology.—A combination of *Veleronia*, a palaemonid genus to which the new taxon shows some resemblance, and “*opsis*” from the Greek, “having the appearance of.” Gender feminine.

Remarks.—The new genus bears much resemblance in a variety of characters to several genera, including *Lipkebe* Chace, 1969, *Veleronia* Holthuis, 1951, *Anchistioides* Paulson, 1875, *Pontonides* Borradaile, 1917, and *Neopontonides* Holthuis, 1951. *Veleroniopsis* has, perhaps, its closest relationships with the western Atlantic *Lipkebe holthuisi* and species of the eastern Pacific *Veleronia*, especially in the notched anterior margin of the carapace which forms a tubular opening into the branchial chamber, by the rather obsolete or ill-defined posterolateral orbital margin, the third maxilliped lacking an exopod, by the broadly truncate rostrum expanded into eaves above the orbits, and the simple dactyli of the last 3 pairs of pereopods. The new genus differs from *Veleronia* in possessing a well-developed lash on the first maxilliped (although this lash is also present in *Lipkebe*), a second maxilliped with a well-developed exopod (absent in *Lipkebe*), and in having a noticeable postorbital tubercle (in *Lipkebe* a spine is present at this position). The dactyli of the walking legs in *Lipkebe* show a superficial

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Fig. 2. *Veleroniopsis kimallynae*. Male, holotype. A, Lateral view; B, Frontal view; C, Dorsal view; D, Antennule, dorsal view; E, Antenna, ventral view; F, Maxilliped 1; G, Maxilliped 2; H, Maxilliped 3; I, Left pereopod 1; J, Left pereopod 2; K, Right pereopod 3; L, Left pereopod 4; M, Left pereopod 5; N, Left pleopod 2 (exopod omitted); n, same, detail of appendix masculina; O, Left pleopod 1, detail of endopod; P, Tailfan, dorsal view. Scale lines as indicated.

resemblance to those in the new genus, but the chelipeds differ in relative lengths of the fingers to the palms among the three genera discussed.

Although *Veleroniopsis* shares with the genus *Anchistioides* exopods on maxillipeds 1 and 2, a postorbital tubercle, and 2 pairs (occasionally only 1 pair in the latter genus) of the telsonal marginal spines, the general morphology of *Anchistioides*, such as the laterally compressed body and rostrum (the latter being toothed), the presence of an antennal spine, and the minutely bifid dactyli on the last 3 pereopod pairs allows easy distinction.

Both *Pontonides* and *Neopontonides* resemble *Veleroniopsis* in some features. However, in the former 2 genera the rostrum is either entirely depressed without dorsal teeth, or is distally compressed, often with a variable number of dorsal teeth, respectively. *Pontonides* is primarily an Indo-West Pacific genus, exhibiting a distinct antennal spine, and rather large and well-developed chelipeds, as opposed to no antennal spine, and elongate, thin chelipeds in *Veleroniopsis*. *Neopontonides*, presently known from a single species each in the eastern Pacific and western Atlantic, is easily separated from *Veleroniopsis* by the form and dentition of the rostrum, as noted above, by the presence of an endopod on the first maxilliped, and the absence of an exopod on maxilliped 2. Moreover, both *Pontonides* and *Neopontonides* carry 3 pairs of spines on the telsonal margin, thus sharing this feature with *Lipkebe* and *Veleronia*, but not *Anchistioides* or the new genus.

Two other genera showing a superficial resemblance to *Veleroniopsis* are *Coutierea* Borradaile, 1917, and *Pseudocoutierea* Holthuis, 1951. Both of the latter genera have well-developed antennal spines, the rostral expansions are armed with either sharp supraocular teeth or elongate spines (similar to that seen in *Lipkebe*), and the abdominal pleura of somites 3-5 are drawn into sharp teeth, all features which are lacking in the new genus.

Veleroniopsis seems to be yet another genus with relationships toward those pontoniine genera which have dispensed with, or are in the evolutionary process of eliminating, exopods on the maxillipeds. It differs from all of these in retaining (at least in the male) the exopod on the second maxilliped. Several of these same genera share dorsoventrally depressed carapaces, expanded or modified frontal or rostral regions, and in at least 2 instances having the anterolateral carapace margin modified into a tubelike opening into the branchial chamber. It is, perhaps, also significant that these genera have few species, usually 1 or 2, suggesting that the evolutionary factors which produced this morphology, while successful to some degree, have left little room for further expansion. The genera in question are also known associates of coral reefs and reef-type habitats, including gorgonid soft corals in some cases, all habitats where the ability to utilize small cracks and crevices, or to lie more or less appressed against a substrate, may have conferred selective advantage to the species against predation. Shaw et al.

(1977), following an earlier suggestion by Bruce (1976) that the genus *Lipkebe* would probably prove to be a commensal, confirmed the relationship with the crinoid *Comactinia meridionalis meridionalis* (Agassiz 1865). The very close similarity between *Veleroniopsis* and *Lipkebe* suggests a similar possibility, although no crinoids were noted in the habitat at the time the new genus was collected.

Chace (1969) discussed the status of the various genera noted above, establishing his new genus *Lipkebe* with some hesitation because the presumably generic characters used to define the other genera had resulted in several monotypic taxa. Regrettably, *Veleroniopsis* becomes yet another presently monotypic genus in this taxonomic grouping, although reconsideration of perhaps the most important generic distinction, that of the presence of an exopod on maxilliped 2, could conceivably allow its placement in Chace's *Lipkebe*. Until further material becomes available, or the generic groupings revised, I believe the establishment of the new genus to be warranted.

Veleroniopsis kimallynae, new species

Material examined.—1 ♂; rel 3.2 mm; USNM 181241. Holotype male.

Description.—Carapace elongate, smooth, shining, naked, microscopically punctate, dorsoventrally depressed; rostrum shelllike, broadly expanded, flattened, elongate, excluding spine about $\frac{1}{3}$ carapace length, wider proximally, constricted mesially, bluntly rectangular distally, corners distinctly and broadly rounded, without spines; an elongate, acute, medial rostral spine, appearing bladefike in lateral view, unarmed dorsally and ventrally, reaching just beyond scaphocerite distal margin, extending posteriorly onto expanded rostral portion as thin, carinate medial ridge, becoming obsolete just posteriad to eyes; posterior orbital margins bluntly rounded, a postorbital tubercle forming noticeable prominence viewed dorsally, extending backward from which an obsolescent ridge, anterior margin sweeping obliquely forward and down past eyestalks to form thin plate, recurving laterally outward and ventrally to form thin tubelike opening for branchial chamber; lateral margin of latter very obscurely produced anteriorly into blunt angle, extending posteriad as thin ridge, becoming obsolete at posterolateral carapace margin; latter truncate, excavated dorsomedially; no supraorbital, antennal, branchiostegal or pterygostomial spines.

Eyes enlarged, well-developed, protuberant, pigmented, stalks unarmed. Antennular peduncle 3-segmented, barely reaching beyond tip of rostral spine; basal article longest, about 3 times length of second, about twice length of third, produced anterodistally into sharp tooth, mesially into sharply rounded small lobe, both extending to about midlength of following article; second article cylindrical, third truncate, both unarmed; upper flagellum with 5–6 fused, 3–4 unfused articles, plus elongate hairlike whip; lower

flagellum thin, reaching beyond both pairs of extended chelae; stylocerite reduced to small basal spine-tipped expansion on basal article. Antennal peduncle 3-segmented; carpocerite proximal segment unarmed, distal segment 2.7 times longer than wide, slightly overreaching proximal margin of antennular second article; scaphocerite unarmed basally, broadly lamellate, produced distally into rounded lobe reaching about midlength of antennular third article, greatly exceeding length of small, but distinct distolateral tooth; first flagellar segment rounded, ball-like, remaining articles relatively stout, sparsely setose, total length of flagella reaching region of second abdominal somite.

Mandibles, maxillule and maxilla not dissected; former without palp. Maxilliped 1 with well-developed bifid epipod, caridean lobe produced, a thin lash; endopod wanting; maxilliped 2 with thin, well-developed epipod, 2-segmented exopod, 5-segmented endopod, ultimate segment of latter with numerous sharp spines and stout setae; maxilliped 3 with epipod, lacking exopod; endopod 3-segmented, meral and carpal articles fused, ultimate segment with spines and stout setae as in maxilliped 2.

Pereopod 1 thin, chelate, reaching when extended beyond antennular peduncle; ischium truncate, slightly inflated distally, unarmed; merus about twice ischial length, smooth; carpus distally expanded, shorter than merus, unarmed; chela subequal to merus, fingers about equal to palmar length, gaping, upper crossing over lower, gape of movable finger with thin irregular tooth about midway, tips of both fingers with tuft of hairs and elongate, crooklike setae; except for sparsely scattered hairs cheliped naked. Pereopod 2 more robust than former, chelate, elongate, extending well beyond antennular peduncle by most of chelae; ischium elongate, smooth, unarmed; merus slightly shorter (about $\frac{5}{6}$ length) of ischium, barely inflated distally; carpus short, curved, slightly less than half meral length; chela heavy, elongate, about 3.5 times longer than carpus, fingers equal to palmar length, hooked at tip, each bearing small apical tuft of setae, gaping slightly but evenly, unarmed. Pereopods 3–5 similar in morphology to each other, smooth, unarmed, sparsely setose except distal margin of propodi which carry tufts of elongate setae and fine hairs, dactyli bluntly falcate, simple, without supernumerary teeth.

Sternal plate wide, flattened, smooth, shining. Abdominal somites dorsoventrally depressed, smooth, broadly and evenly rounded dorsally, very sparsely setose, unarmed; pleura truncately rounded, posterolateral angles on somite 3 bluntly angular, that of somites 4, 5, ellipsoidal; somite 6 about 2.3 times longer than fifth, a faint dorsomedial carina. Pleopods on somites 1–5, peduncles unarmed; rami elongate, foliaceous, first 2 pairs when extended forward reaching level of coxae of pereopod 3; pleopod 1 endopod modified into shortened, bluntly spatulate accessory gonopod bearing several setae basally; pleopod 2 with setose appendix masculina; endopods

shorter than exopods on all five pairs, those of second to fifth pairs with well-developed appendices internae.

Telson about 1.2 times as long as somite 6, narrow, rounded dorsally, 2 pairs of minute lateral spines on margins of posterior half, placed about $\frac{2}{3}$ and $\frac{5}{6}$ total telson length, respectively; posterior margin with 2 pairs spines, inner pair about $\frac{1}{3}$ length of outer, plus 4 elongate setae on posterodistal margins; uropodal exopod and endopod about equal in length, former more expanded, with distinct fixed spine at distolateral angle; endopod elongate, narrow, margins without spines; both appendages heavily setose.

Remarks.—As noted in the discussion under the generic description, *Veleroniopsis kimallynae* is an unusual palaemonid shrimp. Although appearing similar to the western Atlantic *Lipkebe holthuisi* Chace, and to species of the eastern Pacific genus *Veleronia*, it is easily distinguished from both of these by the rostral configuration, the telsonal spine and setal formula, and the exopod on the second maxilliped. The appendix masculina illustrations of *Lipkebe holthuisi* provided by Shaw et al. (1977) are superficially similar to that of *V. kimallynae*, but differ in lateral spination being present on the former species, but absent in the latter. Unfortunately, the female of *V. kimallynae* is as yet unknown so any variation or sexual dimorphism within the species remains to be determined.

The general habitat, relict *Montastraea* coral, may explain why the species has not been discovered until now, for unless such large and ponderous coral heads are carefully pulverized and the debris examined in sieves, many inquiline species will be missed.

Distribution.—Known only from the type-locality, Elbow Reef, off Key Largo, Monroe County, Florida (JSL I-690, Table 2).

Family Alpheidae Rafinesque, 1815
Alpheopsis trispinosus (Stimpson, 1861)
Fig. 3A–G

Material examined.—2 ♂♂, 2 ♀♀ (1 ovigerous); rcl 3.8, 3.6; 5.1, 2.3 mm; IRCZM 89:4667; 1 ♂, 89:4668; 1 ♀ ovigerous, gift to A. H. Banner.

The present material, with distinctly trispinose front, the carapace lacking any dorsal carinae, and both chelae bearing a distinct longitudinal groove, differs from all known western Atlantic species of *Alpheopsis*, although it is extremely close to *A. africanus* Holthuis, 1952a. The material was sent to Dr. and Mrs. A. H. Banner for confirmation, and they identified it as Stimpson's species, pointing out that the chelipeds in the Florida specimens were equal both in size and length, whereas those appendages in *A. africanus* are distinctly unequal. The Floridan specimens agreed in all important respects with the redescription and subsequent neotype designation for *A. trispinosus* (Banner and Banner, 1966), differing only in relative proportions

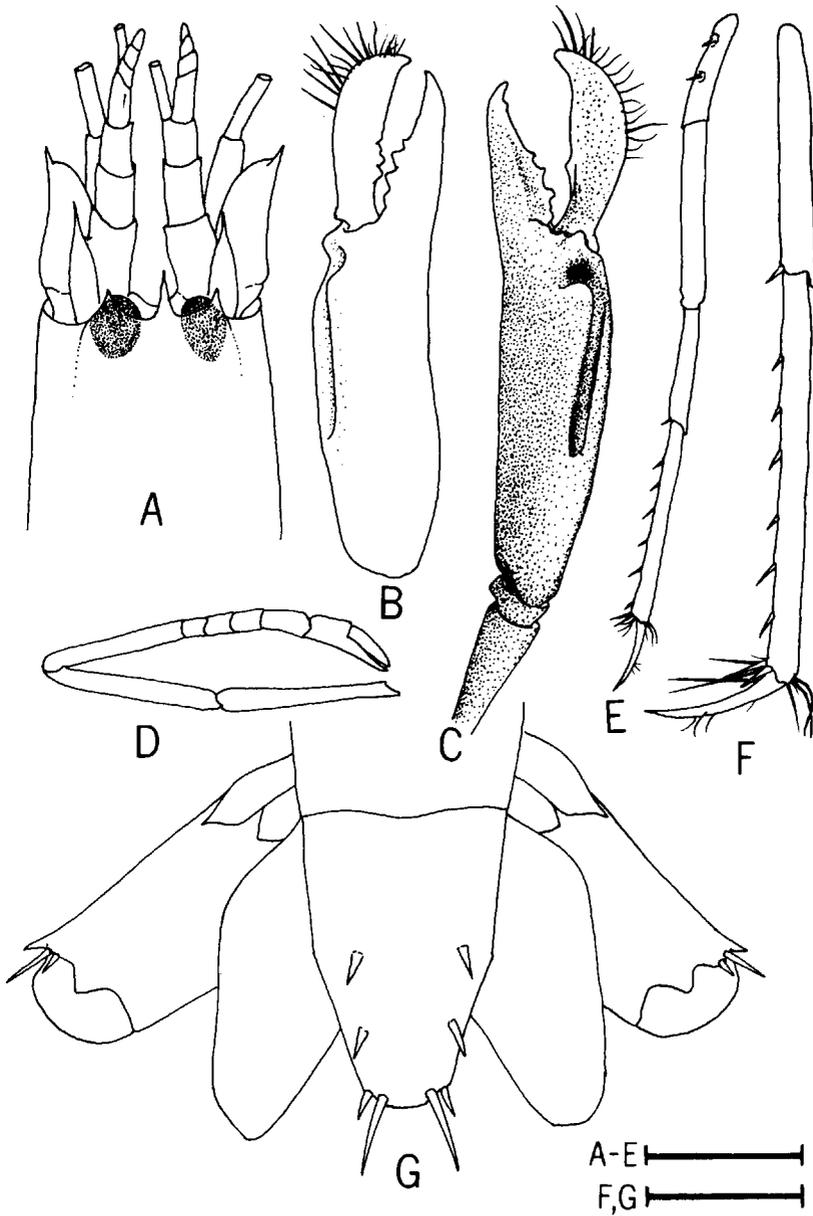


Fig. 3. *Alpheopsis trispinosus*. Male, IRCZM 89:4668. A, Cephalothorax, anterior region; B, Left major chela, lateral view; C, Same, dorsal view; D, Left pereopod 2; E, Right pereopod 3; F, Same, detail of distal articles; G, Tailfan, dorsal view. Scale lines equal 1.0 mm.

of rostral and frontal spines, carpal articles of pereopod 2, dactylar length on pereopods 3–5, and telsonal length-width ratio. None of these differences are, in my opinion, sufficiently significant to warrant establishment of a western Atlantic subspecies at this time. I thus concur with the suggestion made by Mrs. Banner (*in litt.*) that *Alpheopsis trispinosus* may be pantropical in distribution. Previous records in the literature are from the Australian region, with possible distribution in the tropical Pacific and perhaps in the eastern Atlantic off the Azores, as well (see Banner and Banner 1966).

Five other specimens (1 ♂, 3 ♀♀, ovigerous) collected from off the central eastern Florida coast by R/V Gosnold (G-222/274D; 27°52.5'N, 79°57.5'W, 75–98 m, Smith-MacIntyre grab, 28 February 1974.—G 246/709; 27°44.3'N, 79°58.0'W, 72 m, pipe dredge, 4 September 1974) possess a trispinose front and lack carapacial carinae. But unfortunately, all are missing chelipeds so specific identification remains tentative.

Alpheus amblyonyx Chace, 1972

Material examined.—1 ♀; rcl 2.9 mm; IRCZM 89:3791.

Previously recorded from Dominica, Puerto Rico, St. Thomas, Bahía de la Ascension, Quintana Roo, and the northwest Gulf of Mexico (Chace, 1972; Pequegnat and Ray, 1974), the Key Largo female is the second to be recorded from the continental United States. However, several other specimens of this species, as well as some which appear to be more closely allied to *Alpheus macrocheles* Hailstone, 1835, have been collected from offshore stations on the central eastern Florida coast by R/V Gosnold. The species range can thus be considered as extending from the lesser Antilles to eastern Florida. Depth range is from about 1 to 24 m. Some Indian River region material off central Florida collected by R/V Gosnold in 70–90 m, plus a single cheliped from 135–145 m, would extend the depth range considerably if all this material belongs to *A. amblyonyx*.

Synalpheus pandionis Coutière, 1909

Material examined.—1 ♂; rcl 3.9 mm; IRCZM 89:3789.

The species is rare in collections and was previously known from the eastern and western Gulf of Mexico, and the Virgin Islands southward to Barbados and Curacao. Undoubtedly a coral associated species, both the Key Largo specimen, and a spent female from off St. Lucie Inlet on the central eastern Florida coast, were taken from relict coral heads. The male was taken in 18 m, the female in 48 m, well within the recorded depth range from the intertidal to 80 m (Chace, 1972; Pequegnat and Ray, 1974).

Synalpheus sanctithomae Coutière, 1909

Material examined.—1 ♂, 1 ♀ ovigerous; rcl 3.9, 3.8 mm, respectively; IRCZM 89:3799, 89:3792.

The identification of the 2 specimens, which conformed quite well with Coutière's (1909) original account and illustrations, was confirmed by Dr. R. B. Manning who compared the Florida material with Coutière's syntypic series. Until now, the species was known from only 3 specimens, including the two designated as types by Coutière, collected off St. Thomas. The Key Largo material extends the range approximately 1800 km northwestward from the type locality, and constitutes the first continental United States record for the species. Although the color in life was not noted, the fingers on the major chela of the male from Key Largo are a distinct golden yellow after more than one year in preservative.

Family Hippolytidae Bate, 1888

Thor manningi Chace, 1972

Material examined.—1 ♀ ovigerous; rcl 2.2 mm; IRCZM 89:3795.

This widely distributed little grass shrimp has been found associated with intertidal grassflats, and subtidally (previously to 11 m) with living and dead coral. The single specimen from 62.5 m on Carysfort Reef, among algal covered rock, is the deepest yet recorded.

Family Processidae Ortmann, 1896

Processa cf. *tenuipes* Manning & Chace, 1971

Material examined.—1 ♀; rcl 5.9 mm; IRCZM 89:4669.

Although exhibiting general characters which allow it to be placed near *P. tenuipes* in Manning and Chace's (1971) key, the specimen differs from that species in having the distal interior angle of the stylocerite drawn into a distinct spine instead of bluntly angled, in having 12 and 33 articles in the merus and carpus of the second leg (instead of 5–9, 17–26, respectively), and in lacking the characteristic transverse row of fine hairs across the dorsal base of the telson. The specimen was compared with type-material in the National Museum of Natural History by Dr. R. B. Manning, who informed me (*in litt.*) that he suspects it to be undescribed. The single specimen is, unfortunately, incomplete, lacking the right pereopod 2, and several other walking legs, so establishing it as a new species must await additional material.

The Key Largo female was collected from coralline rock on a sandy substratum in 42–76 m. *Processa tenuipes* also appears to prefer deeper waters (31–331 m) and has been taken off North Carolina, in the northeastern Gulf of Mexico, and a single specimen from off Havana, Cuba. All were associated with fine sands or clay oozes.

Section Stenopodidea
Family Stenopodidae Huxley, 1878
Odontozona libertae, new species
Figs. 4A–C, 5A–L

Material examined.—1 ♂, Holotype, rcl 3.6, USNM 181242; 1 ♀, Allotype, rcl 3.2, USNM 181243; 1 ♂, paratype, rcl 2.8 mm (rostrum broken); USNM 181244.

Diagnosis.—A small, robust, heavy-clawed, spiny shrimp, with a distinct cincture of spinules along posterior margin of cervical groove, smooth abdominal somites, a heavily spined manus on pereopod 3, maxilliped 3 ischium with a ventrolateral row of spinules, and distinctly biunguiculate dactyls on the walking legs.

Description.—Rostrum compressed, bladelike, slender, straight, about $\frac{3}{4}$ or less carapace length, reaching distal margin of antennular second article, falling far short of scaphocerite tip; armed dorsally with 5, ventrally with 4–5 spines. Carapace short, robust, heavy, microscopically punctate; gastric region inflated, 2 pairs large medial spines about center and on posterior slope, 2–3 others of varying size on anterior slope above orbital margin; a smaller postorbital spinule; cervical groove distinct, postcervical groove less prominent, posterior margin of former with cincture of about 14 large, horizontal, anteriorly-directed spines; latter groove with interrupted transverse dorsal rows of about 8–10 smaller spinules, between which lie 2 larger spines, plus lateral row of 12–16 spinules of decreasing size, extending obliquely anteriad; dorsal and lateral carapace surface between these 2 grooves with scattered, short, forwardly-directed spinules. Posterodorsal margin concave, unarmed medially, a single row of 10–12 tiny spinules dorsolaterally, preceded by shorter, similar row of about 6; ventrolateral margins oblique, unarmed. Antennal spine large, massive, branchiostegal spine smaller, both with faint carina; pterygostomial spine smallest, may be doubled, posterior to which 1 or 2 larger spines parallel anteroventral margin; branchial ridge present, becoming more or less obsolete posteriad. Orbital margins formed medially from rostral base, becoming obsolete laterad; eyes large, corneas inflated, pigmented, an interrupted series of several small spinules along corneal base dorsally and anteriorly.

Antennular peduncle 3-segmented; basal segment elongate, exceeding length of following 2 articles, somewhat sculptured, curved dorsally, 1 or more small spinules on distal dorsal margin; second segment about $\frac{1}{8}$ length of first, third still smaller, both unarmed; flagella greatly elongate, whiplike, extending beyond telson when complete, articles noticeably setose. Antennal peduncle with 3 large segments, basal and penultimate largest, latter subglobose, 2 proximoventral, 2 distoventral spinules; carapocerite about $\frac{1}{3}$ length of scaphocerite, unarmed; scaphocerite blade narrow, elongate, lamellate, far overreaching rostral spine tip, 4 times longer than wide, spi-

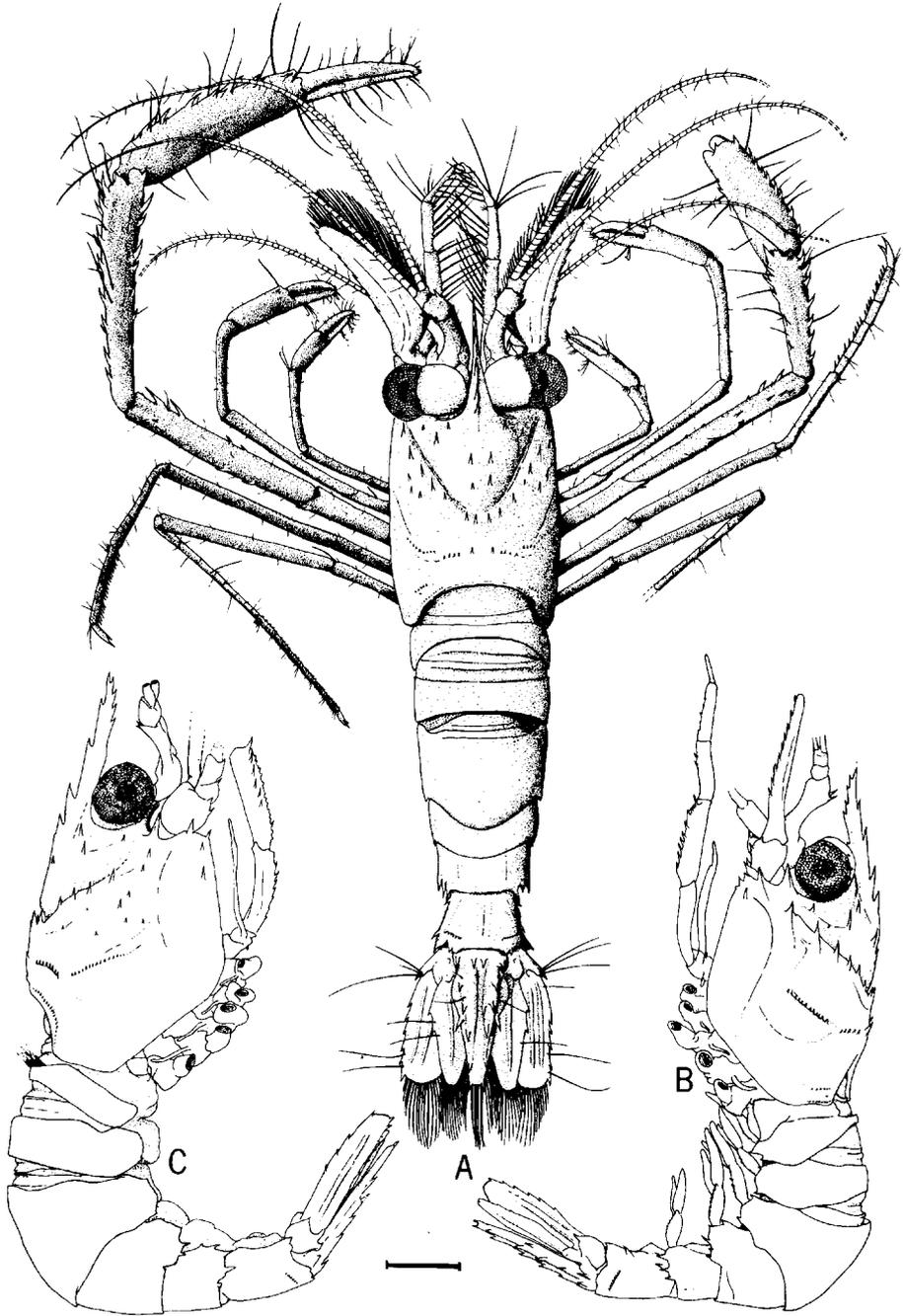
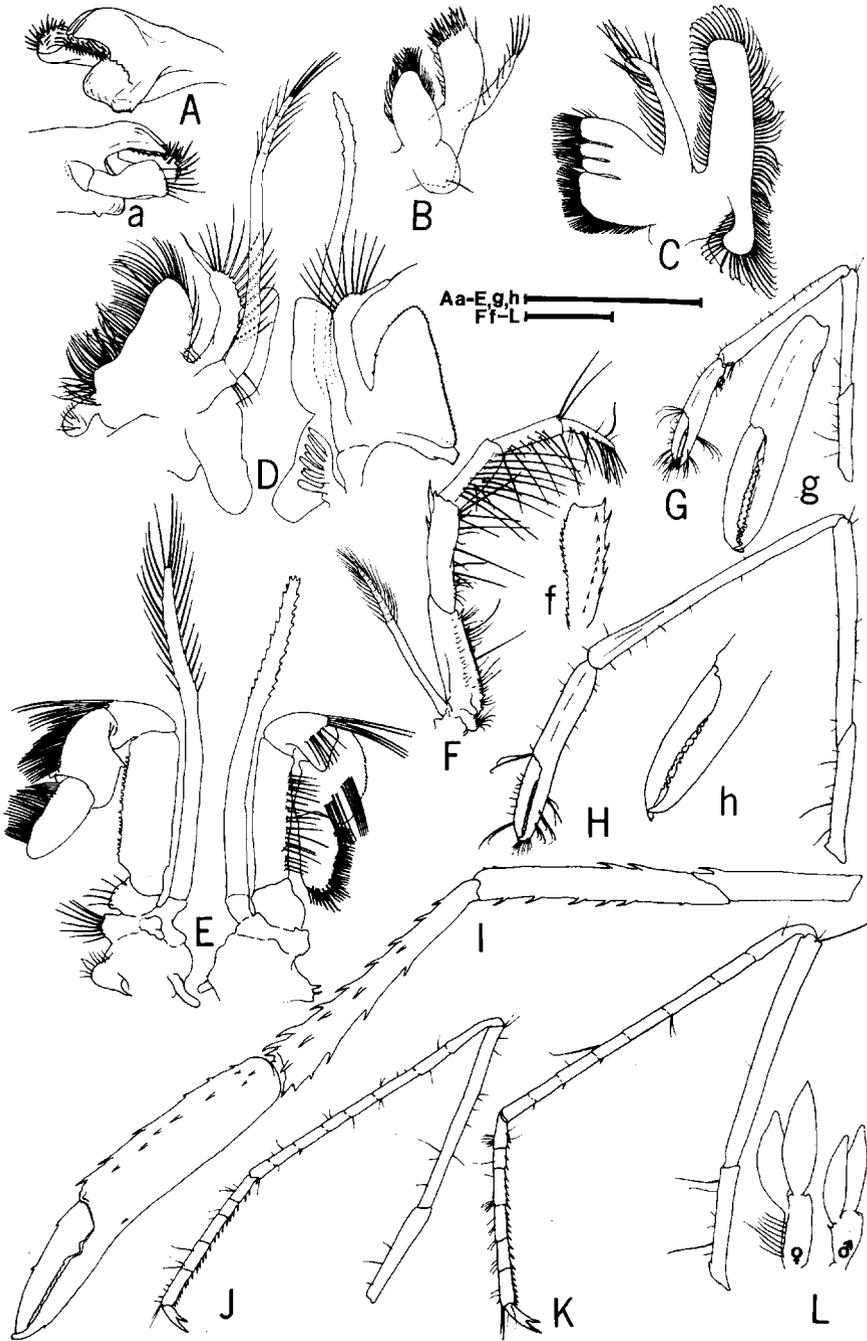


Fig. 4. *Odontozona libertae*. Male, holotype. A, Dorsal view; B, Lateral view, pereopods not illustrated; C, Female allotype, lateral view, pereopods not illustrated. Male right pereopod and chela broken. Scale lines equal 1 mm.

nulate along concave outer margin, a strong apical spine, heavily setose along convex inner margin, dorsal and ventral surfaces unarmed; flagella extremely long, whiplike, reaching to or beyond telson, articles noticeably setose.

Mandibles heavily chitinized, scoop-shaped molar process bluntly rounded, an oblique dentate protuberance, incisor process 2 strong blunt teeth; 3-segmented palp, setose along distal margin of second article, heavily spined over surface of third. Maxillule and maxilla as illustrated, both with well-developed endopod; coxal and basal endites distinct; scaphognathite heavily setose. Maxillipeds 1-3 with exopods; first maxilliped with large, bifid epipod, a distinctly setose endopod; second maxilliped endopod 5-segmented, a noticeable arthrobranch and simple epipod; third maxilliped endopod extremely elongate, reaching beyond scaphocerite tip by distal half of propodal, and entire dactylar segment, all except last article armed ventrally or ventrolaterally with series of small spinules; mesially a series of elongate, strong setae mesh with those on opposite appendage, plus several still longer setae at dactylar-propodal junction; exopod long, multiarticulate distally, attaining midlength of meral article; epipod simple.

First 3 pereopods chelate, elongate, increasing in size posteriad, all reaching to, or well beyond, scaphocerite tip; each with epipod. Pereopod 1 thin, smooth, without spines except for 2 distoventrally on carpus; latter article longest, ischium about 0.6 times length of same, 0.8 times length of merus; merus about $\frac{3}{4}$ length of carpus, inflated distally; chela about $\frac{3}{4}$ carpal length, compressed, distally hirsute, unarmed; fingers gaping, crossing at tips, with series of small, more or less evenly rounded or serrate teeth along length, becoming irregular distally; movable finger half length of palm. Pereopod 2 similar to first in shape, larger, more robust, unarmed; articles increasing in length from ischium to carpus, former about half carpal length, $\frac{2}{3}$ meral length; merus about 0.7 times carpus, inflated distally, without spines; chela about $\frac{2}{3}$ carpal length, compressed, bearing several separated tufts of long, distally curved setae, plus dense tuft of hairs apically; fingers gaping, with irregularly spaced, ragged teeth on cutting edges, crossing at tips, about 0.4 times length of palm. Pereopod 3 largest, most robust, articles increasing in length and armature distally; ischium about half length of chela, a single dorsodistal spine; merus about 0.6 times chela length, an interrupted series of short, curved spines along dorsal and ventral margins, strongest at distal angles; carpus about 0.8 times chela length, a paired series of 8-9 spines dorsally, becoming larger, more curved distally, a second series of single spines along ventral margin, enlarging as in preceding series; manus interiorly smooth, with 2 irregular paired rows of sharp spines along dorsal margin, a smaller spinule on mesioventral margin below propodal-dactylar junction; fingers thick, heavy, crossing at tips, angled slightly inward from plane of manus, about 0.7 times length of palm, slightly gaping, armed along



cutting edges with irregular series of minute spinules; movable finger with 2 small, widely-spaced mediadorsal spinules, plus single triangular basal tooth fitting into similarly shaped excavation on fixed finger. Pereopods 4 and 5 thin, fifth longest, carpi and propodi on both multiarticulate, dactyli distinctly biunguiculate. Pereopod 4 carpus longest, 8-segmented, length of segments numbered distally as: 5=7=8, 4, 6, 3, 2, 1, all unarmed; propodus about half carpal length, 5-segmented, lengths numbered distally increasing as: 2, 1, 4, 3, 5, all armed ventrally with short spinules, numbered from first to last 2, 4, 4, 4-5, 6-8; merus 0.7 times, ischium about 0.4 times, carpal length, both unarmed; a simple epipod. Pereopod 5 similar to preceding, carpus longest, eighth article indistinctly separated, segments increasing in lengths as 5, 8=7, 2, 6, 4, 3, 1, all unarmed; propodus about half carpal length, 6-segmented, lengths increasing as: 2, 5, 1=4, 3, 6, with ventral series of spinules progressing distally, 2, 3, 5, 5, 3, 7; ischium about $\frac{1}{3}$, merus about $\frac{2}{3}$ carpal length, both unarmed; no epipod.

Dorsal and lateral surfaces of abdominal somites without spines or spinules; first to third each with transverse grooves and carinae along anterior dorsal margin, sculptured so that posterior part of somite 2 and 3 raised up and overriding anterior carinae of same somites; third somite largest, posterior margin overlapping anterior margin of fourth, latter without transverse grooves or carinae; somite 5 smallest, smooth; somite 6 with single oblique row of small spinules on dorsolateral surface. Ventral and posterior margins of pleura in males more spinose than females, pleuron of somite 1 large, acute, directed ventrally, followed by smaller tooth at posteroventral margin; somites 2-4 with distinct spinous tooth at antero- and posteroventral angles, pleuron of somite 4 also produced ventromedially into tooth, plus 2 smaller spines dorsad to posteroventral angle; somite 5 posteroventral angle with teeth more noticeably spiny; somite 6 ventrolateral angle produced into distinct tooth, a single lateral spine, plus a second anterolateral spinule just beneath posterolateral series of preceding somite. Abdominal pleonal surface in male each with single median spine. Female abdominal sculpturing and armature on pleura more or less similar to that of male but much less developed; spines on abdominal pleonal surface lacking.

Pleopods on somites 1-5, those of first uniramous, remaining biramous;

←

Fig. 5. *Odontozona libertae*. Male, paratype. A, Left mandible, sternal view; a, Same, interior view; B, Maxillule; C, Maxilla; D, Left maxilliped 1, sternal view (left), interior view (right); E, Left maxilliped 2, sternal view (left), interior view (right); F, Maxilliped 3; f, Same, detail of meral article; G, Left pereopod 1; g, Same, detail of chela; H, Left pereopod 2; h, Same, detail of chela; I, Left pereopod 3; J, Left pereopod 4; K, Left pereopod 5; L, Pleopod 2, female allotype (left), male paratype (right). Scale lines equal 1.0 mm.

peduncles of males triangular in cross-section, serrated posteriorly, a small, short, sharp spinule basal to endopod; peduncles of females more lamellate, non-serrate, lacking spinule, but with row of straight thin setae; no appendix masculina; both sexes without appendices internae.

Uropodal peduncle produced distally into large sharp spine; dorsal surface of exopod with 2 longitudinal, unarmed carinae; lateral margin bearing 4–6 teeth, including largest at distolateral angle; endopods with single unarmed median carina, 2 lateral spines proximal half of appendage. Telson elongate, expanded proximally, narrowing distally, 2 longitudinal carinae on dorsal surface, separated by deep longitudinal groove; dorsal surface armed with 16 large, strong spines as follows: basally, one each laterally, plus a pair medially; these followed distally by 4 spines, paired on each carina (occasionally an extra spine as in holotype male), last pair of spines terminating each carina; 2 strongest spines on telson lateral margin about midlength, a smaller spine at each posterolateral angle. Uropodal and telsonal margins heavily clothed with long setae; individual longer, hairlike setae dorsally on same articles, including triple setae at base of uropodal peduncular spine.

Ecology.—The 3 specimens on which the preceding description was based were all collected from a sponge and *Siliquaria* (Mollusca) colony. It seems probable, based on the structure of the chelipeds, and the greatly lengthened antennular and antennal flagella, that the genus and species is a “cleaning shrimp.” Other members of the family, most notably the genus *Stenopus*, are well known for their symbiotic relationships with various species of reef-dwelling fishes, attracting attention of their hosts by waving and snapping their brightly colored flagella and rocking slowly from side to side. Regrettably, no behavioral observations were made when *Odontozona libertae* was collected so the exact behavioral sequence remains as yet unknown for this species.

Remarks.—The genus was previously known from West Africa and the Indo-West Pacific region (e.g. Holthuis, 1946) and it was only recently discovered to occur in the western Atlantic (Goy, in press). With the finding of the second species described herein, and thus constituting the first record for the continental United States, the genus may safely be considered to be established in the tropical western Atlantic.

Odontozona libertae differs from *O. spongicola* (Alcock and Anderson, 1899) in possessing spinules behind the cincture of the cervical groove, these being absent in the latter species. The new species differs from *Odontozona sculpticaudata* Holthuis, 1946, in the third abdominal somite, which lacks distinct longitudinal grooves, and in the absence of transverse grooves on somites 4–6. The carapace is also much less spinulose in the new species than in *O. sculpticaudata*. Although superficially resembling *Odontozona ensifera* (Dana, 1852) the new species is easily distinguished by the general armature on the abdominal pleura, by the lack of a transverse carina on

abdominal somite 3, by the more poorly armed rostrum, by the greatly reduced number of spinules on the postcervical groove, fewer paired spines on the telsonal carinae, the longer basal antennular segment, and by the scaphocerite greatly overreaching the tip of the rostral spine. The description of *Odontozona edwardsi* (Bouvier, 1908) is incomplete (*vide* Holthuis, 1946), but *O. libertae* is easily separated from this species by a greater number of segments in the carpus and propodus of pereopods 4 and 5 (8, 5; 8, 6; as opposed to 4, 5; 4, 5, in *O. edwardsi*). *Odontozona libertae* will be seen to differ from Goy's new species (in press) primarily by the less developed spinulation on the carapace of *O. libertae*, by the less sculptured abdominal somites, the distinctly spinose third chela, and a telsonal spine formula differing from Goy's material.

Distribution.—At present the species is recorded only from the type-locality, Elbow Reef, off Key Largo, Monroe County, Florida (JSL I-688, Table 2). The genus can be considered to be more or less pantropical, although it is not yet known from the eastern Pacific region.

Section Thalassinidea
Family Axiidae Huxley, 1879
Coralaxius abelei Kensley & Gore, 1980

Material examined.—1 ♀; rcl 4.5 mm; USNM 173629.

This species, described from the female collected off Key Largo, and additional material from Carrie Bow Cay, Belize, has been previously considered by Kensley and Gore (1980).

Section Anomura
Family Paguridae Latreille, 1803
Nematopaguroides cf. fagei Forest & St. Laurent, 1967

Material examined.—1 ♂ juv; sl 1.1 mm; IRCZM 89:4699.

Forest and St. Laurent's species was described from only 3 specimens, the male holotype and 2 very small (*ca.* 2 mm sl) females, one of which was ovigerous. If the Key Largo specimen is indeed this species, then it would appear that *N. fagei* is a remarkably small pagurid. The single specimen was collected from a habitat similar to that occupied by those originally described from Brazil, viz. coralline rock. Dr. Patsy A. McLaughlin who examined the Key Largo juvenile stated that it appeared to belong to *N. fagei*, but because of the small size positive identification could not be made. She noted that the Floridan specimen differed from the description of *N. fagei* in having fewer spines on the dorsal surface of the left cheliped carpus, the dactyl of the right cheliped lacked the minute tubercles described in the type from Brazil, and the telson was slightly different from that illustrated by Forest and St. Laurent (1967). The Floridan material, if correctly as-

signed, constitutes a range extension of approximately 6300 km northward from the type locality, off Recife, Brazil.

Family Galatheidae Samouelle, 1819

Munida angulata Benedict, 1902

Material examined.—3 ♂♂, 6 ♀♀ (5 ovigerous); rcl 4.6–5.0; 3.2–5.9 mm; IRCZM 89:3788, -3790, -3797, -3879, -3801.

Mrs. Barbara Shuler Mayo had previously informed me (*in litt.*) that Benedict's (1902) illustrations of *M. angulata* (Fig. 4, p. 253) and *M. media* (Fig. 12, p. 263) have been transposed, so that of *M. media* actually illustrates *M. angulata*, and *vice versa*. The oblique angle of the cheliped, to which the specific epithet *angulata* refers, is clearly seen in Benedict's Fig. 12. *Munida angulata* has been recorded from the Gulf of Mexico (Benedict, 1902; Pequegnat and Ray, 1974) and off the central eastern Florida coast (Avent et al., 1977). The Key Largo records suggest that the species will be found around the southern tip of the Floridan peninsula.

Discussion

It is not often that a collection as small as the one made available contains such a rewarding number of new genera, species, and records. This is especially true because the specimens were obtained in an area previously considered to be rather well known in regard to the decapod crustacean fauna. If nothing else the Key Largo collections underscore the caution that must be exercised when statements concerning the knowledge of such a fauna are made. The poorly sampled areas, such as the deeper, rocky and coralline reef areas, remain for the most part *terra incognita*, especially for the associated cryptic fauna inhabiting the crevices within relict or living coral heads. It may well be that further knowledge of this fauna can only be gained by *in situ* sampling using manned submersibles or lock-out divers, because of the attrition of nets and trawls towed from the surface in such topographically complex regions.

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Note added in proof: In the course of this study the manuscript and illustrations describing the 3 new species were sent to Drs. L. B. Holthuis and A. J. Bruce to obtain their advice. Because of delays, replies were not received until after the final manuscript was accepted for publication. According to Dr. Bruce, the new species of *Pontoniopsis* does not much resemble members of that genus, and only shows superficial resemblance to *Dasella*. Dr. Holthuis agreed but also thought it not close to *Dasella*, but rather to *Onycocaris*. Using Holthuis' (1955) key, the characters could conceivably place the new species either in *Pontoniopsis* or *Onycocaris*, based on rostral configurations. It does not, however, agree with any known species within the latter genus, using Bruce's key (J. nat. Hist., 1971, vol. 5, pp. 293-298). It is apparent, especially when Bruce's work with Indo-Pacific pontoniine shrimps is considered, that many species show intermediate relationships within established genera, often requiring (as Bruce has done) establishment of new genera. This may eventually prove to be the case with *Pontoniopsis paulae*. Until additional material becomes available, and the limits of the pontoniine genera to which *Pontoniopsis paulae* shows affinity are better defined, I have assigned the new species to *Pontoniopsis*.