McLay, 1991

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With my best wishes,
Colin McLay

J. Martin

Bull. Mus. natl. Hist. nat., Paris, 4ᵉ sér., **13**, 1991,
section A, nᵒˢ 3-4 : 457-481.

A small collection of deep water sponge crabs (Brachyura, Dromiidae) from French Polynesia, including a new species of *Sphaerodromia* Alcock, 1899

by Colin L. McLay

Abstract. — This paper reports on a small collection of sponge crabs (Brachyura : Dromiidae) from French Polynesia, mostly collected by the Service Mixte de Contrôle Biologique des Armées (SMCB) during 1984-1990 using baited traps from depths of 100-1120 m. These crabs came from depths between 190-450 m. In addition one specimen came from 3-5 m on a coral reef near Moorea. The collection includes *Cryptodromiopsis tridens* Borradaile, 1903*a*, *Petalomera wilsoni* (Fulton and Grant, 1902), and *Sphaerodromia ducoussoi* sp. nov. With the description of the new species, the opportunity is taken to review the genus *Sphaerodromia* which now contains four species : *S. kendalli* (Alcock and Anderson, 1894), *S. nux* Alcock, 1899*b*, *S. brizops* McLay and Crosnier, 1991, and *S. ducoussoi* sp. nov. *S. lethrinusae* Takeda and Kurata, 1976, does not belong in this genus. The genus *Sphaerodromia* must be considered the most primitive known genus of the Dromiidae and comparison with *Dynomene devaneyi* Takeda, 1977 (Dynomenidae), shows many similarities. The only substantial difference is that *Sphaerodromia* has phyllobranchiate gills while those of *D. devaneyi* are transitional between trichobranchiate and phyllobranchiate. An hypothesis about the nature of the ancestral dromiids is presented. The generic position of each of the other dromiid species from French Polynesia is considered and the need for generic revision of the Dromiidae, employing a wider range of characters, is emphasized. The characters which should be used include : the presence or absence of epipods in the chelipeds and legs, extent of development of the uropod plates on the abdomen, features of the orbit and antenna, male pleopods, the abdominal locking mechanism, female sternal grooves and the development of spines on and around the dactyls of the legs. Indications of how some of the dromiids should be rearranged are given. The new records and species add to the known dromiid fauna of French Polynesia *Cryptodromia canaliculata* Stimpson, 1858 and *C. coronata* Stimpson, 1858 and bring the total to five species. The biogeographic relations of these species are similar to those already identified by Forest and Guinot (1962) for the other French Polynesia Brachyura.

Résumé. — Cet article concerne une petite collection de Dromiidae provenant de la Polynésie française, récoltés pour la plupart par le Service Mixte de Contrôle biologique des Armées (SMCB) qui, entre 1984 et 1990, a effectué de nombreuses pêches au moyen de casiers, à des profondeurs comprises entre 100 et 1120 m. Les crabes étudiés ici ont été récoltés entre 190 et 450 m. Il s'y ajoute un spécimen capturé entre 3 et 5 m sur un récif près de Moorea. La collection comprend *Cryptodromiopsis tridens* Borradaile, 1903, *Petalomera wilsoni* (Fulton et Grant, 1902) et *Sphaerodromia ducoussoi* sp. nov. La description d'une nouvelle espèce de *Sphaerodromia* fournit l'occasion de revoir ce genre qui renferme maintenant quatre espèces : *S. kendalli* (Alcock et Anderson, 1894), *S. nux* Alcock, 1899*b*, *S. brizops* McLay et Crosnier, 1991 et *S. ducoussoi* sp. nov. *S. lethrinusae* Takeda et Kurata, 1976 n'appartient pas à ce genre. Le genre *Sphaerodromia* peut être considéré comme le plus primitif des genres de la famille des Dromiidae et une comparaison avec *Dynomene devaneyi* (Dynomenidae) montre de nombreuses similitudes. La seule différence importante est que *Sphaerodromia* possède des phyllobranchies tandis que *D. devaneyi* présente des branchies intermédiaires entre des trichobranchies et des phyllobranchies. La position générique de chacune des autres espèces de Dromiidae de Polynésie française est examinée et la nécessité d'une révision des Dromiidae, faisant intervenir un éventail plus grand de caractères, est soulignée. Les caractères qui devraient être pris en considération comprennent : la présence ou l'absence d'épipodes sur les péréiopodes, le développement des lames uropodales, les particularités de l'orbite et de l'antennule, les pléopodes mâles, le mécanisme de blocage de l'abdomen, les sillons sternaux de la femelle et le développement des épines sur et au voisinage des dactyles des péréiopodes. Des indications sur la manière dont certaines espèces de la famille pourraient être reclassées sont fournies. Les récoltes étudiées ici portent à cinq le nombre des espèces connues de la Polynésie française, seules *Cryptodromia canaliculata* Stimpson, 1858, et *C. coronata* Stimpson, 1858, ayant été, auparavant, signalées de cette région. Les relations biogéographiques de ces espèces sont similaires à celles mentionnées par Forest et Guinot (1962) pour les autres brachyoures de la Polynésie française.

C. L. McLay, *Department of Zoology, University of Canterbury, Christchurch, New Zealand.*

INTRODUCTION

This paper reports the occurrence of a small number of dromiid crabs from French Polynesia, including Mururoa, Takapoto, Makemo and Tuanake in the Tuamotu Archipelago, Moorea in the Society Islands and Raevavae in the Austral Islands. The collection includes *Petalomera wilsoni* (Fulton and Grant, 1902), *Cryptodromiopsis tridens* Borradaile, 1903*a*, and a new species of *Sphaerodromia* Alcock, 1899*a*. For the known species these records represent significant extensions of their distribution in the Pacific. Up to the present the only dromiids known from French Polynesia were *Cryptodromia canaliculata* Stimpson, 1858, and *C. coronata* Stimpson, 1858 (Forest and Guinot, 1962). The collections were made by C. Bouchon, Muséum national d'Histoire naturelle, Paris, from Moorea, and by Joseph Poupin, Service Mixte de Contrôle Biologique des Armées, from the other sites. I am very grateful to both these people for the opportunity to study this material, which has been deposited in the Muséum national d'Histoire naturelle, Paris.

Apart from *Sphaerodromia lethrinusae* Takeda and Kurata, 1976, which should be excluded from this genus (McLay and Crosnier, 1991), there are three other species of *Sphaerodromia* : *S. kendalli* (Alcock and Anderson, 1894), *S. nux* Alcock, 1899*b*, and *S. brizops* McLay and Crosnier, 1991. With the addition of the new species of *Sphaerodromia*, the opportunity is taken to review the relationships between all the species in this genus, and to compare some of the important characters with a species of *Dynomene* (Dynomenidae Ortmann, 1892). This comparison establishes *Sphaerodromia* as the most primitive genus of the Dromiidae and demonstrates the similarity of the species of *Sphaerodromia* to this dynomenid. For the other species in this collection, the important characters are identified and the errors or omissions of earlier workers are clarified.

In this work I indicate the important characters which should be used in subsequent generic revision of the Dromiidae. The dromiid genera have not been revised since Borradaile (1903*b*) and with the discovery of many new species, a great deal of confusion has arisen because the genera were defined using a very limited range of, sometimes, vague characters. For this reason, a necessary part of the revision will be accurate redescription of most of the dromiid species. In this paper I use the terms 'chelipeds', and 'legs' to refer to the five pairs of pereiopods. These limbs fall naturally into three groups according to their role : 1) the chelipeds, used for feeding as well as cutting out of pieces of other living organisms for concealment, 2) the first two pairs of legs, used for walking, and 3) the last two pairs of legs, used for carrying the camouflage over the dorsal surface. The propodi and dactyli of the legs are equipped with thorn-like structures which are referred to as spines, although they are no doubt setal in origin. The antennal articles, which are all mobile, are referred to as ‘segments 1-4’ : these correspond to coxa (or urinal segment), fused basis-ischium, merus and carpus. A well developed exopod is fused to the second segment and the point of attachment is usually marked by a shallow groove.

Genus **SPHAERODROMIA** Alcock, 1899*a*

Sphaerodromia Alcock, 1899*a* : 16; 1899*b* : 152; 1901 : 38. — Balss, 1922 : 106. — Sakai, 1936*b* : 15.

The following definition is largely based on Alcock (1901) with the addition of information about the male pleopods, the uropods, and clarification of the situation regarding pereiopod epipods and podobranchs.

Carapace sub-globose, front broadly triangular, grooved in the midline, rostrum not developed, continuous with supra-orbital margin. Carapace surface gradually rounded, surface tomentose, as are limbs. Chelipeds longer and stouter than first two pairs of legs, which are not nodose; last two pairs of legs smaller, similar in size, not reaching the ground, but only the last pair is sub-dorsal. Cheliped with an epipod and well developed podobranch, first two pairs of legs also have epipods, with or without podobranchs; gills are phyllobranchiate. Female sternal grooves end wide apart behind the genital openings. First male pleopod with a small, rounded terminal plate, second pleopod simple, needle-like with an exopodite on the basis. Vestigial pleopods are present on male segments 3-5. Uropod plates well developed, visible externally and occluding up to approximately half the sub-terminal abdominal segment from the lateral margins.

Sphaerodromia ducoussoi sp. nov.

(Pl. IA; figs. 1a-d, 2a-h, 3a-d)

Material. — French Polynesia, Tuamotu Archipelago, Tuanake, stn 253, 16°37.3′S, 144°13.3′W, trap, 450 m, 05 June 1990 : 1 ♂ holotype, CW = 43 mm, CL = 43.2 mm (MNHN-B 22172) (Poecilasmatid cypris stage barnacle on epistome; one juvenile, on right mandibular palp and one adult *Poecilasma* sp. on right mandible). — Mururoa Island, trap, ?400 m, 1984 : 1 ♀ paratype, CW = 40.9 mm, CL = 41.4 mm (MNHN-B 22173).

Types. — Both specimens have been deposited in the Muséum national d'Histoire naturelle, Paris, under the registration numbers MNHN-B 22172 and 22173.

Description

Except where indicated the description is based on the male specimen.

Carapace approximately as wide as long, narrowed anteriorly, broadly convex longitudinally, more strongly convex laterally in the anterior half, surface uniformly finely granulated with fine, short setae; H-shaped cardiac grooves curved, terminating posteriorly in cardiac pits which mark the end of faint branchial grooves (more evident near the carapace margins). Rostrum not prominent, bilobed, lateral rostral teeth separated by shallow groove; margin of rostrum extends uninterrupted around the entire supraorbital margin and on to the rounded suborbital lobe which is very prominent in dorsal view; medial corner of suborbital lobe blunty rounded. First segment of antenna beak-like medially, gaping and twisted, surface of second segment convex, distomedial corner not produced, exopod fixed and produced beyond the joint of third and fourth segments, tip truncate and sloping dorsally, ratio of length (i.e. exopod + basis) to width of basis = 2.1. Ratio of antennal flagella to CW = 0.28. Dorsal surface or orbit has a ridge separating off a region which accommodates the corneal region of the eye. Cornea well developed, dark brown, eyestalk carries fine, short setae externally, eye can be totally hidden from dorsal view when folded. Subhepatic region strongly inflated, with scattered larger granules. Anterolateral border of carapace begins near and at the level of the postorbital corner, broadly rounded and divided into three almost equal sections; the first two sections each have 8-9 larger rounded granules and the second notch marks the branchial groove. Posterior carapace margin concave and paralleled by a distinct groove.

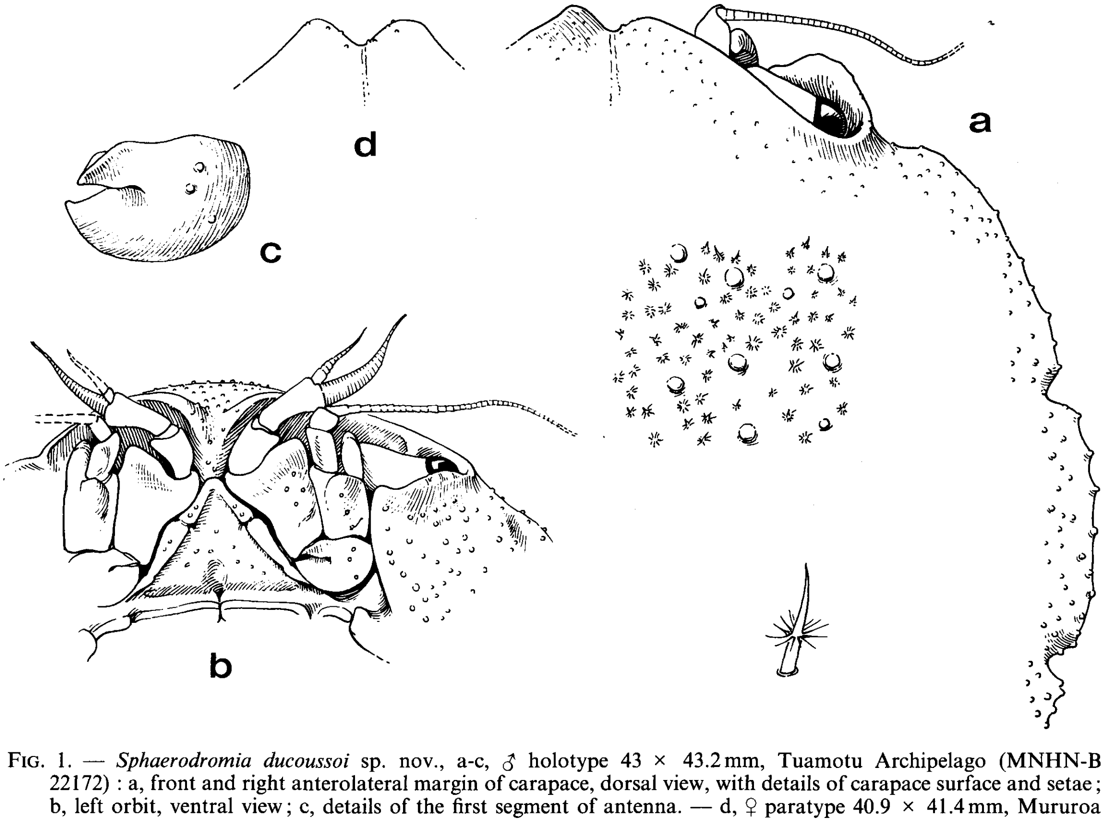

Fig. 1. — *Sphaerodromia ducoussoi* sp. nov., a-c, ♂ holotype 43 × 43.2 mm, Tuamotu Archipelago (MNHN-B 22172) : a, front and right anterolateral margin of carapace, dorsal view, with details of carapace surface and setae; b, left orbit, ventral view; c, details of the first segment of antenna. — d, ♀ paratype 40.9 × 41.4 mm, Mururoa Island (MNHN-B 22173), outline of rostrum.

All drawings are at the same scale except for details which are at a higher magnification.

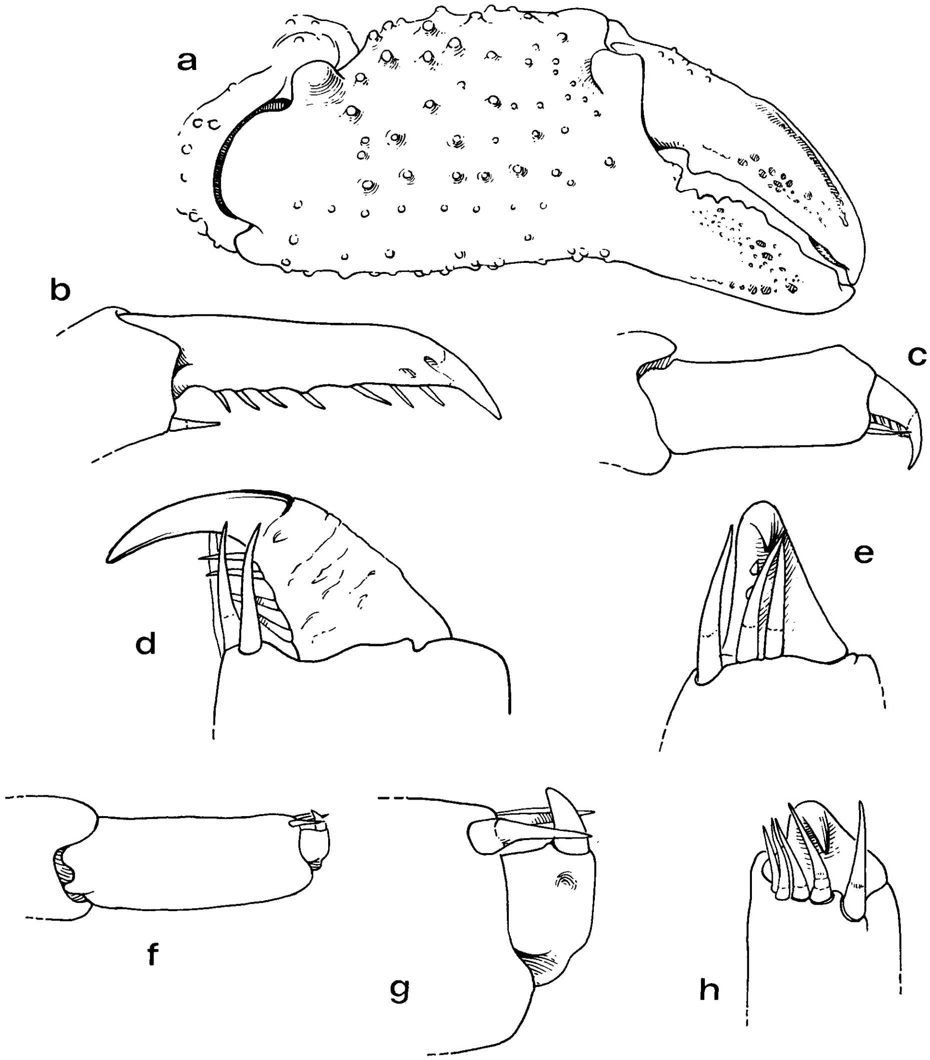

FIG. 2. — *Sphaerodromia ducoussoi* sp. nov., ♂ holotype 43 × 43.2 mm, Tuamotu Archipelago (MNHN-B 22172) : a, right chela, setae omitted; b, dactylus of 2nd right leg, posterior view; c, propodus and dactylus of 3rd right leg, posterior view; d, *idem*, tip, anterior view; e, *idem*, tip, ventral view; f, propodus and dactylus of 4th right leg, posterior view; g, *idem*, tip, posterior view; h, *idem*, tip, dorsal view.

Fig. 2a is at the same scale as in fig. 1; figs 2b, c, and f are at a higher scale; figs 2d, e, g, and h are at an even higher magnification.

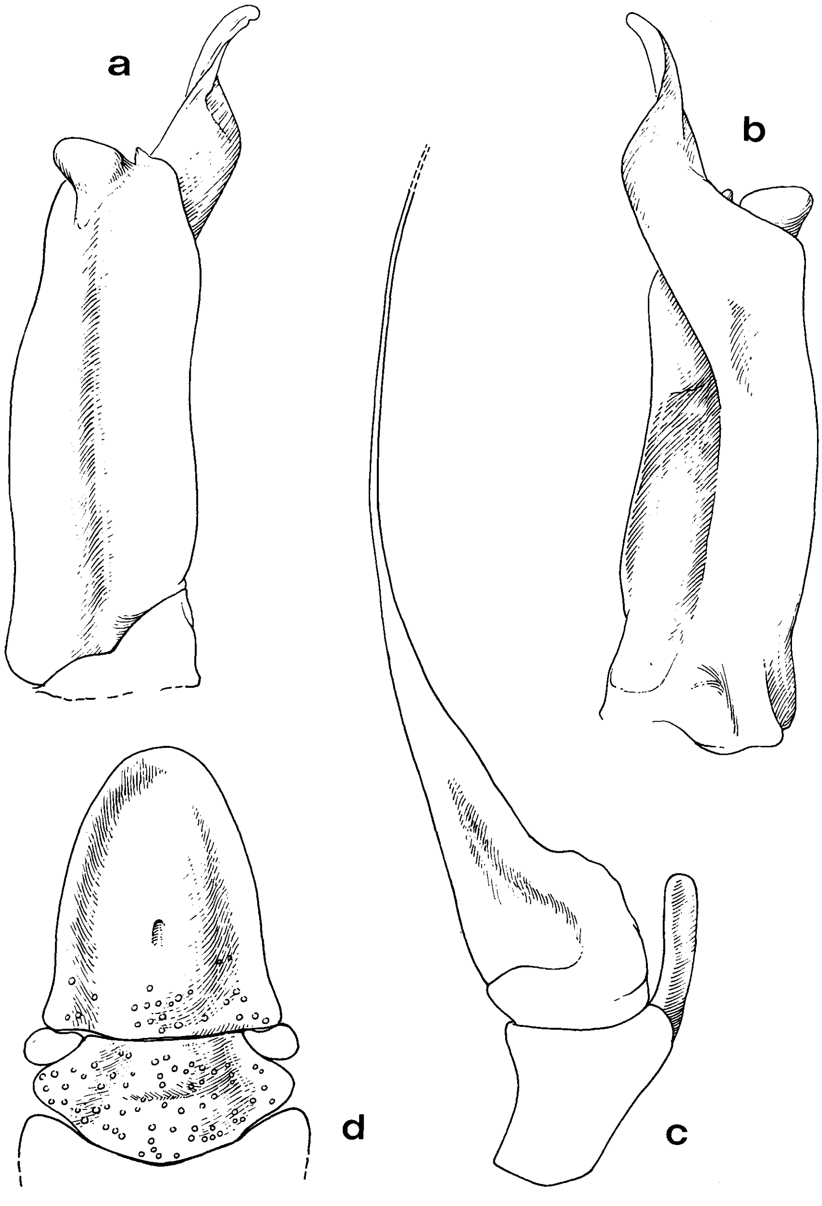

FIG. 3. — *Sphaerodromia ducoussoi* sp. nov., ♂ holotype 43 × 43.2 mm, Tuamotu Archipelago (MNHN-B 22172) : a, left first pleopod, dorsal view, setae omitted; b, *idem*, ventral view; c, left second pleopod, ventral view; d, telson and penultimate abdominal segment with uropods.

All the drawings are the same scale except for fig. 3d which is at a lower scale.

All limbs fringed with short, stout setae. Chelipeds well developed with a large epipod bearing a small podobranch (all gills are phyllobranchiate — stacked leaf-like plates). Merus trigonal, inferior surface and margins with scattered rounded granules, outer face of carpus with 16-17 prominent rounded granules, upper half of propodus similarly adorned. Fingers pink-white, stout, hollowed out internally, fixed finger armed with 6 proximal teeth (first largest), moveable finger with a large proximal tooth which engages with teeth on the other finger. Fingers close along most of their length with tips coarsely dentate. Internal face of propodus densely pubescent. First two pairs of legs with epipods, podobranch of first leg very small, absent in second leg. Both legs as long as chelipeds, segments not knobbed, elongate, narrow, scattered small granules, propodi distinctly longer than dactyli (ratio = 1.6), inferior distal corner of propodi armed with a single short spine overlapping with dactyl for a short distance, inner margin of dactyls armed with 6-7 short spines all of similar size. Last two pairs of legs similar to first two pairs except shorter, each about the same length. Dactyl of third leg strongly curved, opposed by 3 short propodal spines and bearing 3 accessory spines on the inner margin; dactyl of fourth leg very short and opposed by 5 small propodal spines, no accessory spines.

Abdomen of 6 free segments, telson longer than wide (although wider than long in the mature female), tip broadly rounded; uropod plates well developed and visible externally, lying between the bases of first and second legs when the abdomen is closed but they are not involved in locking the abdomen. The abdominal locking mechanism consists of finely denticulate ridges on the coxae of leg 1 and leg 2; the coxal ridge of the first leg engages with the margin of the proximal corner of the telson, while the coxal ridge of the second leg engages with the inner face of the joint between the fifth and sixth abdominal segments. Abdominal segments 3-5 of male have vestigial pleopods. Female sternal grooves very weakly developed, ending inconspicuously wide apart behind genital openings. First male pleopod stout, openly grooved to carry needle-like second pair; distal end of endopodite bears a blunt lateral knob and a semi-oval, curved medial plate; basis of second pleopod has a short, blunt exopodite.

ETYMOLOGY. — The species is named after the head of the S.M.C.B., R. DUCOUSSO who encourages research on the deep-sea fauna of French Polynesia and who provided some funds for the illustration of this paper.

DISCUSSION

Of the four species in this genus, *Sphaerodromia ducoussoi* sp. nov. most closely resembles *S. nux* (Alcock, 1899*b*), but differs in the following ways : sub-orbital margin produced as a prominent rounded lobe (not so prominent in *S. nux*), anterolateral margin divided into three granulated sections (continuous and granulated in *S. nux*), length/width ratio of antennal basis = 2.1 (1.6 in *S. nux*), ratio of antennal flagella to CW only 0.28 (0.42 in *S. nux*), ratio of propodi/dactyli of first two pairs of legs = 1.6 (1.3 in *S. nux*), and accessory spines on inner margins of dactyli of last pair of legs absent (present in *S. nux*). Furthermore the podobranchs of *S. ducoussoi* are different : the cheliped epipod is large with a well developed podobranch and podobranch on second leg is absent (as in *S. nux*) but the podobranch on first leg is very small (absent in *S. nux*). *S. nux* is known only from the type locality, Gulf of Martaban, Burma, from Madagascar and Seychelles and Reunion Island, all localities in the Indian Ocean.

The only genus of the Dromiidae which has received detailed attention is *Dromia* Weber, 1795; Forest (1974) made a comparative study of all known species of this genus thereby defining the limits of variation which might be expected within a genus of this family. This paper provides a model which should guide future work on the genera of the Dromiidae. The important characters of the species of *Sphaerodromia* are shown in table 1 which also includes *Dynomene devaneyi* Takeda, 1977 for comparison. Firstly, the following characters are shared by the species of *Sphaerodromia* : they all have a rounded, unornamented carapace with at the most a few small granules on the anterolateral margins, an antennal exopod extending beyond the joint of segments 3-4, bluntly rounded tip and fitting closely against base of eyestalk, distomedial corner of second segment of antenna not produced, epipods are present on the chelipeds and first two pairs of legs, a podobranch is present on the chelipeds (and sometimes the legs) all gills are phyllobranchiate, stacked leaf-like plates, vestigial pleopods are present on male abdominal segments 3-5, the male abdominal locking mechanism involves serrated ridges on the coxae of the first two pairs of legs, the first male pleopods have an apical plate and simple blunt tip, the second male pleopods are needle-like and with an exopodite on the basis, male uropods are well developed and not involved in the abdominal locking mechanism (although the male of *S. kendalli* is unknown, it seems likely to share these features), the female sternal grooves end apart behind the base of the second walking leg (although the female of *S. brizops* is unknown it is likely to be similar), and the dactyl spines on the last two pairs of legs are similar in arrangement and number. In addition, all the *Sphaerodromia* spp. have propodi longer than dactyli on the first two pairs of legs (it should be noted that this ratio increases with crab size and all the ratios in the table are for mature animals).

Table 1. — Comparison of important characters for *Sphaerodromia* spp. and *Dynomene devaneyi*. Reference should be made to the text for explanation of each character.

Species	*D. devaneyi*	*S. brizops*	*S. kendalli*	*S. ducoussoi*	*S. nux*
Orbital ridge	weak, vertical	strong, horizontal	strong, vertical	weak, vertical	strong, vertical
Anterolateral teeth	3	13-15 granules	0	0	appr. 15 granules
Distomedial extension of 2nd antennal segment	none	none	none	none	none
Male uropods	large	small	?	small	small
Male PL1	apical plate	apical plate	?	apical plate	apical plate
Exopod on male PL2	present	present	?	present	present
Male PL3-PL5	present	present	?	present	present
Ending of sternal grooves	apart, behind leg 2	?	apart, behind leg 2	apart, behind leg 2	apart, behind leg 2
Presence of epipods	chela + leg 1 + leg 2	chela + leg 1 + leg 2	chela + leg 1 + leg 2	chela + leg 1 + leg 2	chela + leg 1 + leg 2
Size of podobranchs	large + sm. + sm.	large + sm. + sm.	large + sm. + sm.	large + sm. + abs.	large + sm. + abs.
Leg 1 dactyl spines	0 + 0 + 3	1 + 0 + 8	0 + 0 + 6	1 + 0 + 7	1 + 0 + 6
Leg 2 dactyl spines	0 + 0 + 3	1 + 0 + 8	0 + 0 + 6	1 + 0 + 7	1 + 0 + 7
Leg 3 dactyl spines	0 + 0 + 3	3 + 0 + 2	3 + 0 + 3	3 + 0 + 3	3 + 0 + 3
Leg 4 dactyl spines	1 + 0 + 0	4 + 0 + 4	3 + 0 + 3	5 + 0 + 0	4 + 0 + 3
Legs 1 & 2 coxal ridges	none + none	serr. + serr.	?	serr. + serr.	serr. + serr.
Legs 1 & 2 propod' dactyl	1.0	1.3	1.3	1.6	1.3

PL = pleopod; sm = small; abs. = absent; serr. = serrated; the formula for dactyl spine on legs 1-4 (i + j + k), where i = number of propodal spines opposing the dactyl, j = number of spines on the outer propodal margin, and k = number of spines on the inner margin of the dactyl, i.e. accessory spines.

Secondly, there is some variation in the construction of the orbit, especially in *S. brizops*, in the dactyl spines of the first two pairs of legs and in the development of the podobranchs. *S. kendalli* has no distal propodal spine at the base of the dactyl of the first two pairs of legs which must be regarded as an advanced feature. It seems that a key feature of crabs of the family Dromiidae is the presence of spines opposed to the dactyl and which can be used to form a sub-chelate mechanism on the last two pairs of legs for grasping pieces of camouflage. Although the propodal spines on the first two pairs of legs are still present, they are not, for obvious reasons, functional, and have been lost in *S. kendalli.* Also we can see in any one species of *Sphaerodromia* the gradual reduction of spines on the inner margin of the dactyl from the first to the last leg (see fig, 2b-h). This is accompanied by shortening of the propodus, curving of the dactylus, and increase in the number of spines opposing the dactyl. In more advanced dromiids there are no propodal spines on the first two pairs of legs (spines on the inner margins of the dactyls are retained) and there are only rarely any spines on the inner margins of the dactyls of the last two pairs of legs. Thus the hypothesis that I am presenting is that the ancestral dromiid had four legs, used for walking, each similar to the first or second leg of *S. ducoussoi* (see fig. 2b) with strong dactyls carrying numerous spines on the inner margin and with one or more distal propodal spines overlapping the base of the dactyl. From this one can derive any of the spine arrangements seen in other dromiids whether they are used for grasping sponges, ascidians or shells. Since many of these characters are seen in the Homolodromiidae [see for e.g. *Dicranodromia baffini* (Alcock and Anderson, 1899), *Homolodromia robertsi* Garth, 1973, also BAEZ and MARTIN, 1989] the dromiid to which I am referring may have been ancestral to the homolodromiids as well. In both of these families the last two pairs of legs are similarly modified for carrying camouflage. GUINOT (1978) has suggested that an important difference between the homolodromiids and dromiids is that the former are facultative carriers of camouflage whereas the latter are obligatory carriers (see also BAEZ and MARTIN, 1989). The homolodromiids appear to have all the necessary morphological equipment for carrying, but perhaps they do not have the behaviour well established. In this way, the homolodromiids would represent an intermediate stage in the evolution of camouflage-carrying.

The podobranchs of *Sphaerodromia* also show a gradual reduction : in *S. brizops* and *S. kendalli* the cheliped podobranch is large, while those on the legs are progressively smaller, and further stages are seen in *S. ducoussoi* where the podobranch on the second leg is absent and again in *S. nux* where the first two pairs of legs have no podobranchs at all. Despite this variation, these species form a natural generic group and they mark an early stage in the evolution of the Dromiidae. Podobranchs are absent from all other known species in this family : cheliped epipods are found in *Hemisphaerodromia, Dromia* and *Dromidiopsis* for e.g. but pereiopodal epipods are absent in *Pseudodromia, Dromidia*, and *Cryptodromia.*

It is useful to compare the *Sphaerodromia* spp. with a species of the Dynomenidae e.g. *Dynomene devaneyi.* There are some remarkable similarities : in *D. devaneyi* the front of the carapace is rounded, the second segment of the antenna and exopod are very similar to *Sphaerodromia*, a supraorbital ridge is present, the male pleopods are identical with *Sphaerodromia* and the female sternal grooves are also the same. But epipods are present on chelipeds and the first two legs and the podobranchs are well developed on all these pereiopods, suggesting a more primitive stage than in *Sphaerodromia.* A major point of difference is that *D. devaneyi* has what appear superficially to be trichobranchiate gills, rather

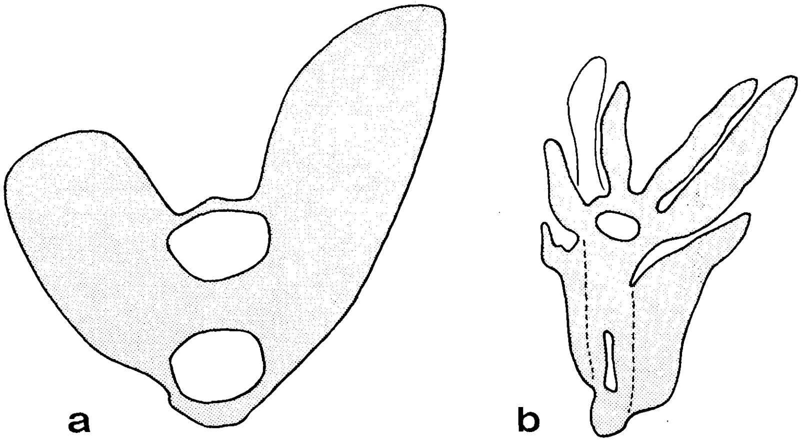

FIG. 4. — Section through arthrobranch of left second leg : a, *Sphaerodromia nux* Alcock, 1899*b*; b, *Dynomene devaneyi* Takeda, 1977. In both drawings the gill plate is filled and blood channels are open. In 4b the filaments are arranged in rows except that the open gill plate indicates that its position alternates with the plate to the right. The scale for fig. 4b is 1.4 × scale for 4a.

than phyllobranchs (see fig. 4a, b), but it is unclear whether this should be regarded as a primitive feature. The dichotomy between trichobranchiate and phyllobranchiate gills is extremely arbitrary and it does not recognise the existence of a great variety of structure among so-called " trichobranchiate " gills (M. DE SAINT LAURENT, pers. comm.). The gills of *D. devaneyi* are best described as transitional and it should be noted that even within the Dynomenidae there are phyllobranchiate-like gills in *D. filholi* and essentially phyllobranchiate gills in *Acanthodromia erinacea* (see BOUVIER, 1894). This further reduces any real differences between dynomenids and dromiids.

The abdominal locking mechanism in *D. devaneyi* is different from all the *Sphaerodromia* spp. Although the male uropods in *D. devaneyi* are a large, they are not used in locking the abdomen : this is achieved by the abdominal flap fitting loosely under blunt teeth on the posterior coxal margins of the first two legs. In *S. ducoussoi*, for e.g., the abdomen is grasped laterally by small, angled, serrated ridges on the coxae of these legs. In neither of these crabs do the uropods play any part in locking the abdomen but the mechanism for retaining the abdomen is quite different, being a simple catch mechanism in *D. devaneyi* and a more elaborate grasping mechanism in *S. ducoussoi* and other species of this genus.

However, *D. devaneyi* does have distinct anterolateral teeth and no distal propodal spines on any of its legs; the " spine " opposing the dactyl on the last legs is really an extension of the border of the propodus (like the fixed finger of the cheliped) and probably not homologous with the spines on *Sphaerodromia*, and besides, the dactyl on this limb is very reduced so that the grasping mechanism is obsolete. Thus there are some features of *D. devaneyi* which would suggest that the dynomenids may be ancestral to the dromiids, but they perhaps have some advanced features as well. The whole question of the origin of the dromiids and whether the dynomenids should really be a separate family must await a more detailed study of the other species of the Dynomenidae because they are a poorly known group. Particular attention should be paid to the details of the structure of the gills.

Cryptodromiopsis tridens Borradaile, 1903*b*
(Fig. 5a-d)

Cryptodromiopsis tridens Borradaile, 1903*a* : 229; 1903*b* : 578, pl. 33, fig. 4. — IHLE, 1913 : 91 (list). — EDMONDSON, 1922 : 39, pl. 2A, B, C; 1946 : 268. — WARD, 1934 : 6. — BUITENDIJK, 1950 : 62. — TWEEDIE, 1950 : 106. — ELDREDGE, 1977 : 249, fig. 1. — LEWINSOHN, 1984 : 113.
Dromidia fenestrata Lewinsohn, 1979 : 3, fig. 1a-j.

MATERIAL. — French Polynesia, Society Islands, Moorea, 17°30′ S, 149°50′ W (approx. locality), slope of outer reef, on side of a fissure in *Distichopora* sp. (Hydrozoa, Milleporina), 3-5 m, 28 August 1979 : 1 ♂ CW = 7.5, CL = 6.2 mm.

ADDITIONAL MATERIAL EXAMINED. — Society Islands, Tahiti, no locality or date known, coll. A. GARRET, Museum Godeffroy, 2 ♂♂, 1 ♀, with a compound ascidian (*Distaplia*? *taylori*), catalogue no. K-05000. Kindly loaned by Dr. G. HARTMANN, Zoologisches Museum, Universitat Hamburg.

DESCRIPTION

Carapace wider than long, smooth, convex, covered in a short tomentum except for two sharply circumscribed naked areas near the posterolateral corners which are marked by deep grooves; faint cardiac grooves extend forward medially from these areas, branchial grooves not evident. Rostrum tridentate all three teeth relatively slender and acute with the median tooth on a slightly lower level and extending further forward. A shallow frontal groove extends back between a pair of low protuberances. Eroded orbital margin extends back from the lateral rostral tooth, not concealing antennal base and point of insertion of flagella, to a distinct supraorbital tooth, followed by a longer but less acute postorbital tooth which has a small tubercle at its base. No fissure at the postorbital corner, infraorbital margin is eroded laterally and has a single acute tooth. The first segment of the antenna is very reduced, inner margin only slightly beak-like, second segment is large and flattened with the distolateral corner produced as a spine and the distomedial corner produced as a longer spine on which the third antennal segment is inserted at an angle. The antennal exopod is curved to accommodate the laterally directed antennae and rests against the base of the eyestalk and the under-surface of the orbital margin (thereby dividing the orbit into two compartments) when closed. Ratio of length/width of basis = 2.14; ratio of antennal flagella to CW = 0.52; ratio of exopod/(basis + exopod) = 0.33. The subhepatic area is convex and bears one acute tooth which is visible dorsally; also a distinct buccal tooth. Collectively the two tubercles on the second antennal segment and the infraorbital and subhepatic teeth give appearence of a row of four teeth sloping laterally. The anterolateral margin begins at the level of the orbit, rounded and has two acute teeth, the first of which longer is than the second and is just above the subhepatic tooth. There is no posterolateral tooth and the posterolateral carapace borders are convergent. Posterior margin of carapace is slightly sinuous.

Chelipeds and legs covered in a short soft tomentum. Chelipeds moderately developed, fingers strongly down-curved and white, carpus with two strong distal tubercles and central area of outer face inflated. Superior propodal margin has 3-4 small rounded granules. Fingers

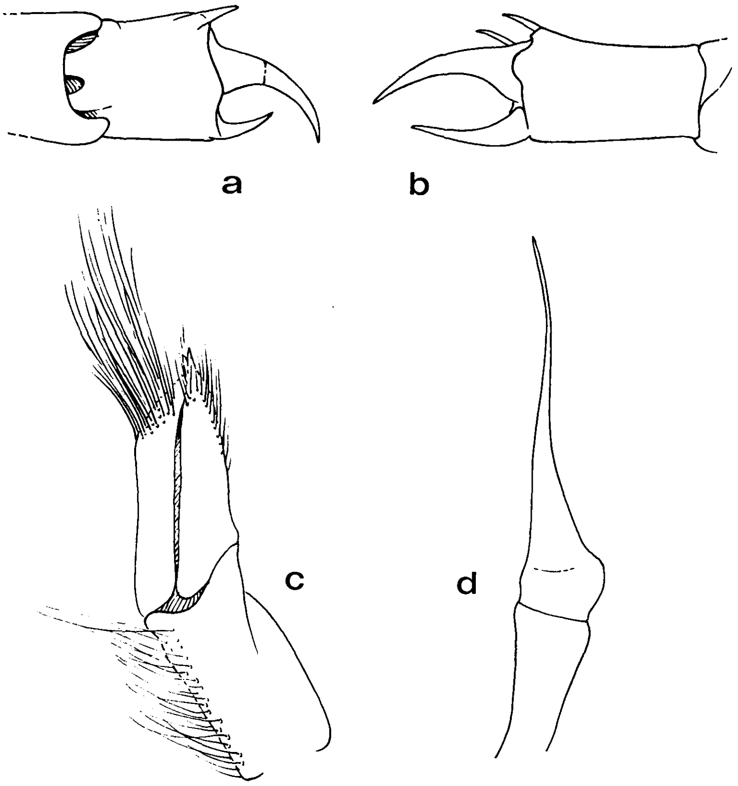

FIG. 5. — *Cryptodromiopsis tridens* Borradaile, 1903*b*, Society Islands, Moorea, ♂ 7.5 × 6.2 mm : a, propodus and dactyl of right 3rd leg, posterior view; b, propodus and dactyl of right 4th leg, posterior view; c, left first male pleopod, dorsal view; d, left second male pleopod, dorsal view.
The scale for figs. 5a, b is the same; figs. 5c, d are at a higher magnification.

in male gaping; one or two interlocking distal teeth and 4-5 smaller proximal teeth; in the female the fingers are regularly toothed and close over their entire length. First two pairs of legs shorter than chelipeds, upper margin of carpi strongly produced, as acute tubercles, dactyli short and stout, with 4-5 small spines along the inner margin, propodi of similar length. Last two pairs of legs shorter than the first two pairs, the third pair shortest, dactyl opposed by a single propodal spine with another stout spine on the outer margin. Dactyl of last leg also opposed by a single spine with another spine on the outer margin of the propodus and an additional spine on the outer margin of the dactyl itself.

Telson wider than long and rounded; uropod plates visible externally, and the abdomen has a strong median ridge. Abdominal locking mechanism involves uropod plates sitting in front of serrated ridge on the base of the first leg. Female sternal grooves end close together in a median tubercle between the chelipeds. Male first pleopod a simple folded tube with a setose apex armed with a sharp tubercle; second pleopod needle-like.

DISCUSSION

These new records of *Cryptodromiopsis tridens* from Moorea in the Society Islands extend the range further westward from Hawaii (EDMONDSON, 1922). The species was originally described from Male and Minitoki atolls in the Maldives (BORRADAILE, 1903*b*) and subsequently reported from Christmas Island (WARD, 1934), Gesira, Somalia (LEWINSOHN, 1979) and Madagascar (LEWINSOHN, 1984) in the Indian Ocean. Further records from Cocos Keeling and Singapore (TWEEDIE, 1950; BUITENDIJK, 1950) and from Ifalik atoll (Caroline Islands), Midway Island and various Hawaiian Islands were summarized by ELDREDGE (1977). *C. tridens* is clearly a very widespread Indo-Pacific species restricted to tropical waters. The very distinctive circumscribed, naked areas on the posterolateral corners of the carapace make it unlikely that misidentification could have occurred.

Three of the French Polynesia specimens were accompanied by pieces of camouflage, two with sponges and one with a compound ascidian. ELDREDGE (1977) found that the majority (70 %) of the specimens which he examined carried didemnid ascidians, primarily species of *Didemnum*, while the others carried various species of sponge. EDMONDSON (1946) found that *C. tridens* was common near shore, under stones and in rock crevices, and usually carried light brown sponges. This predominant use of ascidians is the reverse of *Cryptodromia hilgendorfi*, which in Moreton Bay, Queensland, Australia, carries mainly sponges (MCLAY, 1983). Therefore there may be some specialisation amongst dromiids in their use of different kinds of camouflage. *C. tridens* is amongst the smallest dromiid crabs with the maximum recorded sizes being ♂ CW = 9.2, CL = 8.0, ♀ CW = 8.0, CL = 6.0 mm, smallest ovigerous ♀ CW = 6.4, CL = 5.2 mm.

BORRADAILE (1903*a*) erected the genus *Cryptodromiopsis* for *C. tridens* and he gave the following definition for the genus : " Dromiidae with no epipodite on the cheliped, the walking legs knobbed or ridged, the carapace broader than long, especially broad in the forepart, and with the furrows between the regions almost completely lost, the ridges of the efferent branchial channels well made, the sternal grooves of the female ending together on the cheliped segment, the fifth leg shorter than the third, and a spine on the outer side of its last joint ". It should be noted that while the female sternal grooves extend to the level of the bases of the chelipeds, they are not in fact associated with the cheliped segment : the end of these grooves mark the suture between segments 7/8 of the thorax (see HARTNOLL, 1975). The aim was to separate from *Cryptodromia*, a species with convergent sternal grooves, but there is nothing especially distinctive about these characters or their combination and BORRADAILE clearly did not regard the unusual carapace features as being worthy of generic status. Subsequently, three other species have been added to *Cryptodromiopsis* : *C. bituberculatus* (Stebbing, 1920) (originally placed in *Eudromia* by STEBBING and later in *Cryptodromiopsis* by BARNARD, 1947), *C. lepidota* Barnard, 1947, and *C. mortenseni* Kensley, 1978. BARNARD also included *Dromidia spongiosa* Stimpson, 1858 in *Cryptodromiopsis* but it is quite different.

These species do not make a natural group, having very little in common with each other. *C. tridens* shows some similarities (no epipod on cheliped, well developed uropods, relatively long last legs, spines on outer propodal margins of last two pairs of legs and sometimes accessory spines as well, sternal grooves end together between chelipeds) to some species of

Cryptodromia (*C. bullifera* Alcock, 1899*b*, *C. mariae* Ihle, 1913) and also to species of *Dromidia* [*D. antillensis* Stimpson, 1858, *D. larraburei* Rathbun, 1910, *D. plumosa* (Lewinsohn, 1984)]. [It should be explained that *Dromidiopsis plumosa* Lewinsohn, 1984 does not belong in this genus; an examination of the type specimen shows that Lewinsohn was mistaken in stating that there is an epipodite on the cheliped. Thus the species should be *Dromidia plumosa* (Lewinsohn, 1984)]. However, moving *C. tridens* to either of these genera would remove the type species from *Cryptodromiopsis* and leave three species with little in common with the original concept of the genus. For the present it seems preferable to leave *C. tridens* where it currently is and to relocate the other species : *C. bituberculatus* should probably be returned to a re-defined *Eudromidia* and a new genus created for *C. lepidota* and *C. mortenseni* which are reasonably similar to each other. This will be undertaken in a later paper with the result that the genus *Cryptodromiopsis* will no longer be necessary. The need for generic revision of the Dromiidae has been noted by several authors (e.g. Lewinshon, 1984) and the need is nowhere more glaringly obvious than in *Cryptodromiopsis*.

Lewinsohn (1979) illustrated the last two pairs of legs of specimens from Somalia but the text description does not agree with his figure 1. Later, Lewinsohn (1984) stated that the illustrations were in fact correct and the text in error, but close examination of specimens of *C. tridens* shows that on neither occasion was Lewinsohn correct : the third leg has one propodal spine opposing the dactyl and another on the outer margin at the base of the dactyl, and the fourth leg has, in addition to these spines, a small accessory spine on the outer margin of the dactyl itself.

Petalomera wilsoni (Fulton and Grant, 1902)

(Pl. IB; figs 6a-d, 7a-c, 8a-c)

Cryptodromia lateralis : Heller, 1865 : 71. — Miers, 1876 : 57. — Thomson, 1899 : 170, pl. 20, figs. 1, 2. — Chilton, 1911 : 49. Not Gray, 1831.

Cryptodromia wilsoni Fulton and Grant, 1902 : 61, pl. 9. — Ihle, 1913 : 91 (list).

Dromia pseudogibbosa : Parisi, 1915 : 102, pl. 2, figs. 1, 2. — Balss, 1922 : 106. — Yokoya, 1933 : 97.

Petalomera lateralis : Richardson, 1949 : 60, fig. 51. Not Gray, 1831.

Petalomera wilsoni : Rathbun, 1923 : 154, pl. 42, fig. 1. — Hale, 1927 : 113, fig. 111. — Sakai, 1936*a* : 33, pl. 1, fig. 1; 1936*b* : 34, pl. 1, fig. 4, text fig. 9; 1965 : 9, pl. 4, fig.2; 1976 : 24, pl. 6, fig. 1. — Barnard, 1947 : 368; 1950 : 313, fig. 59e. — Guiler, 1952 : 37. — Dell, 1963 : 22. — Bennett, 1964 : 27, fig. 141. — Suzuki and Kurata, 1967 : 95 (list). — Dell, 1968 : 14, pl. 2. — Kim, 1970 : 9 pl. 1, fig. 3; 1973 : 608. — Wear, 1979 : 1; 1977 : 572. — Griffin, 1972 : 56. — Kensley, 1978 : 251; 1981 : 37 (list). — Kim and Kim, 1982 : 136. — Miyake, 1983 : 6, pl. 3, fig. 1. — Baba, *in* Baba, Hayashi and Toriyama, 1986 : 309, pl. 162

Material. — French Polynesia, SMCB coll. : Tuamotu Archipelago, Takapoto, 14°40,0′S, 145°15,2′W, trap, 250 m, 07 June 1989 : 1 ♂ CW = 61, CL = 41.6 mm. [*Poecilasma* sp. (Cirripedia : Poecilasmatidae) on carapace and merus of one walking leg.]; Makemo, stn 308, 16°34,5′S, 143°39,9′W, trap, 280 m, 07 October, 1990 : 1 ♂ CW = 61.0, CL = 45.4 mm. — Tubuai Islands, Raevavae, 23°51,4′S, 147°44,5′W, trap, 350 m, 01 March 1989 : 5 ♂♂ CW = 44.0, 50.6, 45.8, 48.9, 48.5, CL = 32.0, 36.2, 34.0 34.2, 34.8 mm resp. ; 3 ♀♀ CW = 42.8, 36.5, 38.6, CL = 33.8, 26.9, 29.4 mm resp. — Marquesas Islands, Tahuata, stn 300, 9°54,5′S, 139°07,9′W, trap, 190 m, 01 September 1990 : 2 ♀♀ ovig. CW = 46.5, 44.6, CL = 32.9, 33.7 mm resp.

DESCRIPTION

Carapace distinctly wider than long, moderately convex, surface smooth, gently undulating, under a thick cover of soft, long hairs which give the surface an areolate appearance. Cardiac and branchial grooves well marked by depressions, a pair of medial cardiac pits and another single one further back. Median rostral tooth small, blunt and on a lower level, projecting as far forward as lateral rostral teeth which are separated by a U-shaped sinus, from which extends a distinct frontal groove separating two rounded protuberances. Lateral rostral teeth continuous with the supraorbital margin, which has a broad, blunt

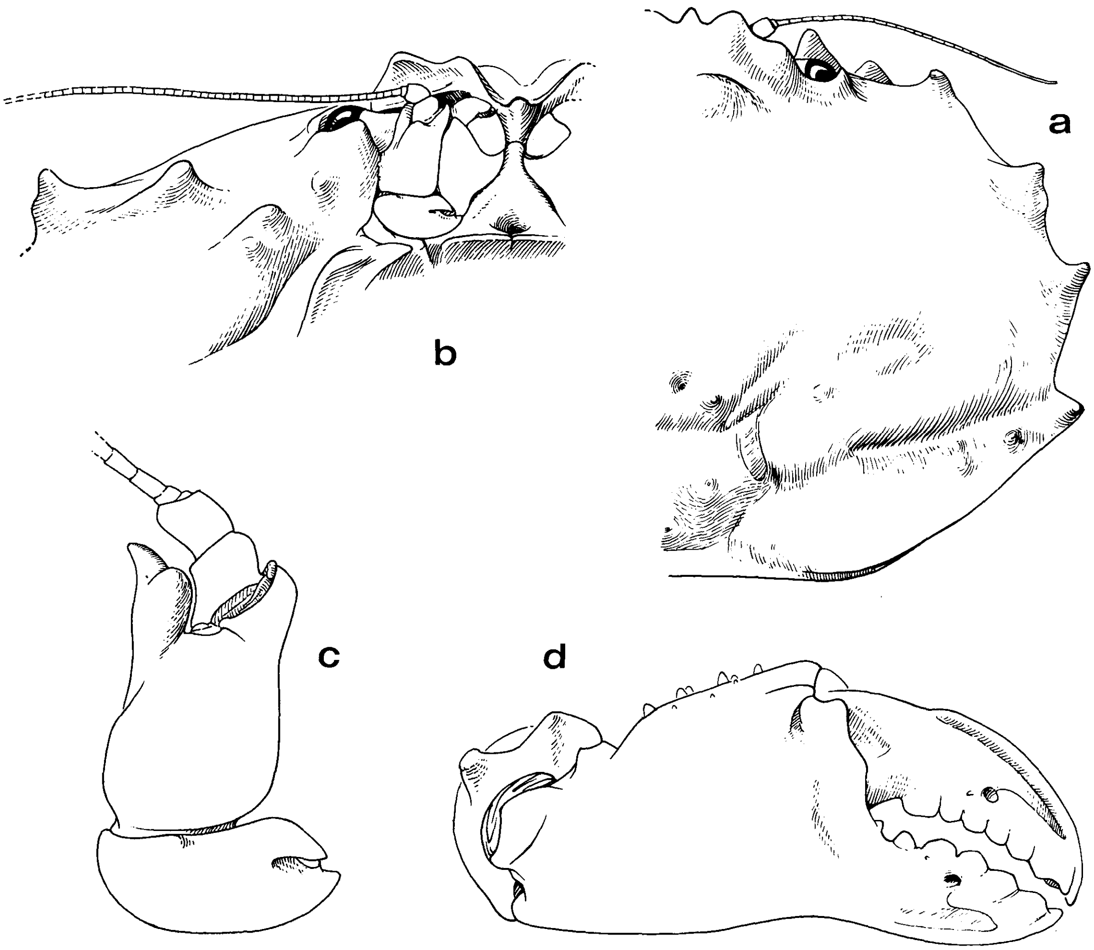

FIG. 6. — *Petalomera wilsoni* (Fulton and Grant, 1902), Tubuai Islands, Raevavae, ♂ 48.5 × 34.8 mm : a, right half of carapace, dorsal view; b, right orbit and anterolateral margin, ventral view; c, basal segments of right antennae, ventrolateral view; d, right cheliped, outer face.

The scale for figs. 6a, d is the same; fig. 6b is 1.25 times 6a and 6c is at a higher magnification.

supraorbital tooth. External orbital corner not produced and with a small fissure separating it from the strong infraorbital tooth, which is visible dorsally. First segment of antenna medially beak-like, gaping, and twisted, second segment convex, with flange-like lateral margin, rounded tubercle at base of third segment, distomedial corner produced, curved; exopod fused to second segment, produced beyond third segment, tip bilobed, inner lobe acute and curved over base of eyestalk; ratio of length to width of second segment = 1.3, ratio of antennal flagella to CW = 0.43. In the dorsal part of the orbit, beneath the supraorbital margin, there is the vestige of a parallel ridge and at the lateral end of the ridge it meets a weak vertical ridge (an extension of the supraorbital tooth), which tends to divide off a corneal region of the orbit. Subhepatic area of carapace convex with a small, blunt tubercle beneath the infraorbital tooth and another, larger tubercle lower and between it and the first anterolateral tooth. A well marked groove, beginning below the orbit, curves under the larger subhepatic tubercle and anterolateral margin and terminates near the posterolateral tooth. Three strong anterolateral teeth extend back from the level of the infraorbital tooth; first tooth directed forward and the last two upwardly directed. [Both FULTON and GRANT, 1902 and RATHBUN, 1923, stated that there are 4 anterolateral teeth, but the first tooth is clearly subhepatic in position.] Posterolateral tooth, large, also projects upward; on the ridge behind the branchial groove there is a small tubercle close to the base of the posterolateral tooth; posterolateral margins convergent and posterior margin of carapace is concave.

Chelipeds bearing an epipodite, large, especially in male, merus triangular in section, all three borders have small rounded granules, carpus has 2 large distal nodules, inner angle has a sharp tooth; propodus smooth, upper border in male sparsely covered in rounded nodules, in female these nodules are rudimentary. Inner and outer surfaces of fingers longitudinally grooved and covered with tomentum, distal surface alone is naked and glabrous. Fingers pink, hollowed internally, armed with 7 well developed teeth and gaping when closed, long silky hairs on inner surface of propodus and fingers. First two pairs of legs shorter than chelipeds,

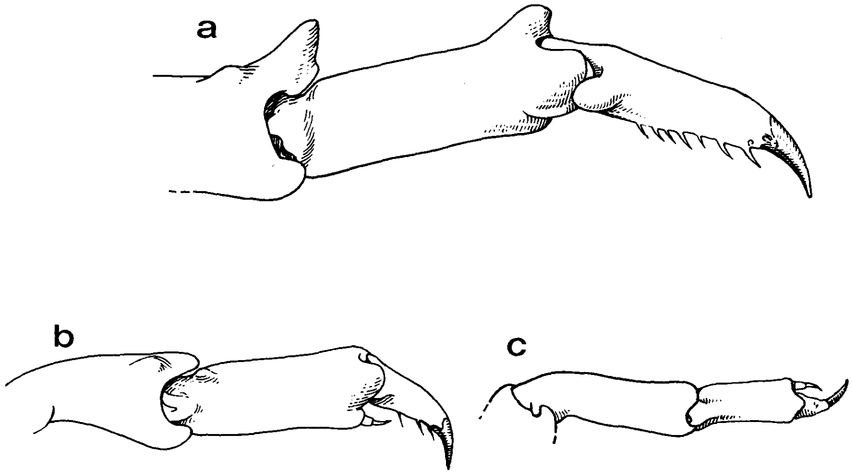

FIG. 7. — *Petalomera wilsoni* (Fulton and Grant, 1902), Tubuai Islands, Raevavae, ♂ 48.5 × 34.8 mm : a, propodus and dactyl of right second leg, posterior view; b, propodus and dactyl of right third leg, posterior view; c, propodus and dactyl of right fourth leg, posterior view.
All drawings are all at the same scale.

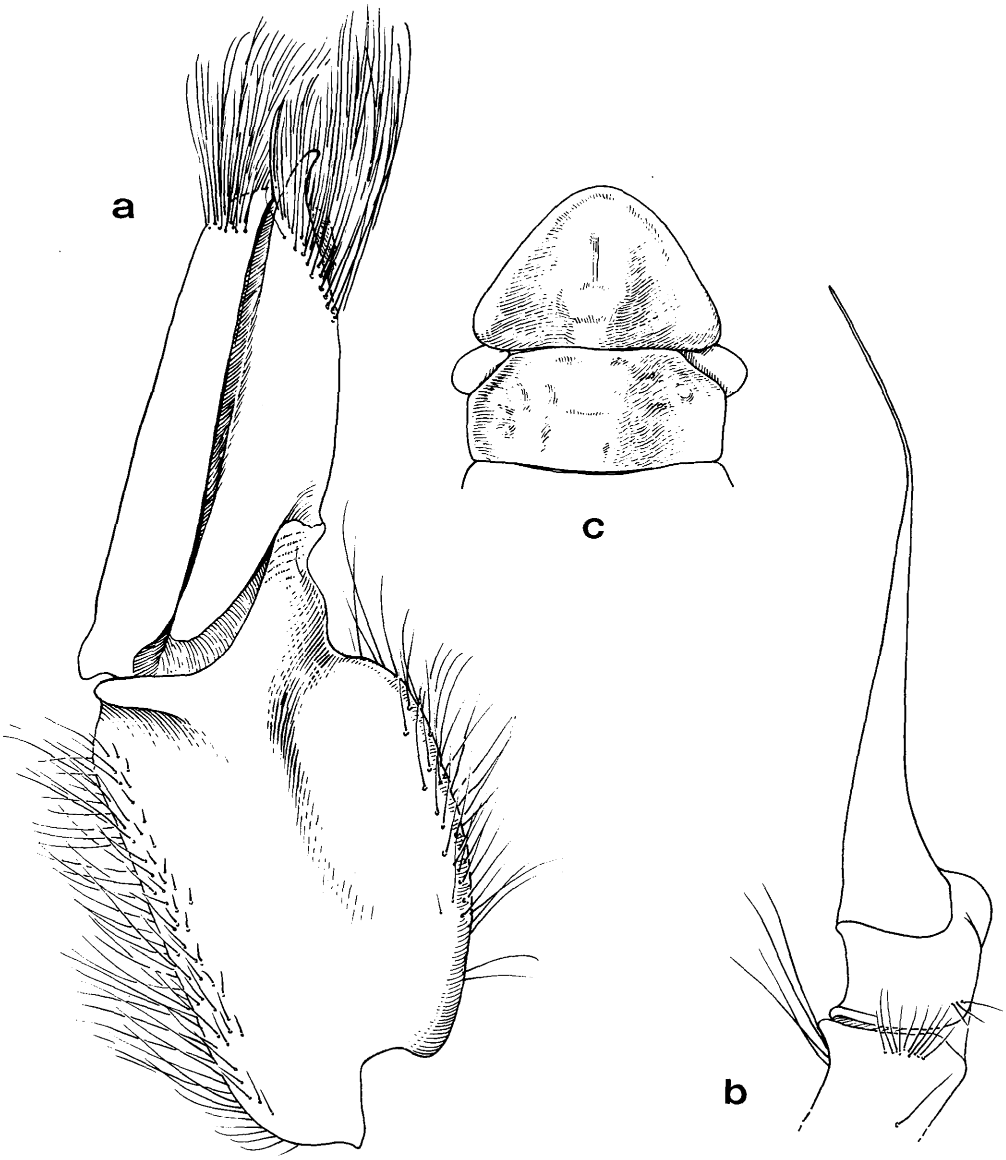

FIG. 8. — *Petalomera wilsoni* (Fulton and Grant, 1902), Tubuai Islands, Raevavae, ♂ 48.5 × 34.8 mm : a, left first pleopod, dorsal view; b, left second pleopod, dorsal view; c, telson and penultimate segment of abdomen with uropods.

The scale for figs. 8a, b is the same; fig. 8c is at a lower magnification.

first slightly longer than second, carpi and propodi have tuberculiform nodules at distal ends of anterior borders, dactyli approximately as long as propodi, inner margins of dactyls have 5-7 small spines which increase in size distally. Last two pairs of legs much reduced and of similar size, with a single propodal spine opposing the curved dactyl on each leg, but inner margin of dactyl of third leg has 3-4 small accessory spines.

Abdomen of six free segments, telson much wider than long, male telson trigonal (ratio = 1.5), female telson subtruncate (ratio = 1.7). Uropod plates well developed and visible externally; abdominal locking mechanism involves uropods fitting in front of well developed serrated flanges on the base of the first legs. Male first pleopod is a partially rolled tube with a densely setose, broadly rounded tip armed with a sharp horny tubercle, second pleopod simple and needle-like. Female sternal grooves end wide apart on small raised tubercles between bases of first and second legs.

DISCUSSION

At present there are some 17 species in the genus *Petalomera* Stimpson, 1858 and the definition of the genus is currently as follows : " Dromiidae with an epipodite on the chelipeds, the walking legs bearing sharp ridges, the carapace varying in the relation of its length to its breath, but usually broader than long, the regions clearly or indistinctly marked, the efferent branchial channels well made, the sternal grooves of the female ending apart behind the cheliped segment, the fifth leg shorter than the third, and without a thorn on the outer side of its last joint. " (BORRADAILE, 1903*b*). (The same remarks should be made here in relation to BORRADAILE's use of the term 'cheliped segment' as were made about the definition of the genus *Cryptodromiopsis*, see earlier.) The type species of *Petalomera* is *P. granulata* Stimpson, 1858 which has as its most distinctive feature, the petaloid meri on the chelipeds and first two pairs of legs. The only other species which fits this generic concept is *P. pulchra* Miers, 1884 (and its synonym *P. longipes* Ihle, 1913). The problem with this genus is that while the petaloid meri of the type species are not included in the generic definition, these are in fact the only distinctive features and all the other characters mentioned are so vague that almost anything could be put in *Petalomera*, as long as a cheliped epipodite was present and the female sternal grooves were in accordance. Both ALCOCK (1899*b*) and BARNARD (1950) included the petaloid meri character in the definition of the genus, but did not allow the absence of such meri to exclude some species. ALCOCK also included a granular carapace as being a feature of *Petalomera*, a character which the type species possesses. It seems to me that species in this genus should have at least these three characters : petaloid meri, sternal grooves ending apart behind chelipeds, and a granular carapace (as well as the cheliped epipodite). This means that all the other 15 or so species, not already mentioned (including *P. wilsoni*), should be placed in several new genera.

P. wilsoni has a superficial resemblance to some species of the Dynomenidae, e.g. *Dynomene devaneyi* Takeda, 1977, but differs in several major characters; it has a closer resemblance to *Platydromia depressa* Brocchi, 1875, in terms of its size, shape and shaggy tomentum but differs in having an epipodite on the cheliped and having well-developed uropods; therefore it cannot be placed in *Platydromia*. Many of the important characters of these species of *Petalomera* have not been accurately recorded and so it would be premature to attempt a generic reorganization at this time. For the present the name of *P. wilsoni* should remain unchanged. It is interesting to note that the two unusual features of the orbit (horizontal and vertical ridges) are found together in *P. wilsoni*, where they are weakly developed or perhaps vestigial. Such features are found separately in species of *Sphaerodromia* and *D. devaneyi* (see table 1) but, as yet, not together. I do not think that this indicates a close relationship.

P. wilsoni was first described from Port Phillip Heads, Melbourne, Australia but it has perhaps the widest distribution of any dromiid crab, including the coasts of Australia from southern Western Australia round to New South Wales, as well as Tasmania. Its southernmost limit is off the Kaikoura coast, South Island, New Zealand (42°24′ S, McLay, 1988). In the Indian Ocean *P. wilsoni* is known from the east coast of South Africa and even extending to St. Helena (15°58′ S, 5°43′ W) in the Atlantic Ocean (Forest, 1974). Within the Pacific it is known as far north as Sagami Bay, Japan. The present records from French Polynesia are important because they extend the distribution of *P. wilsoni* westward to the Tubuai Islands, 147°44,5′ W. Therefore the distribution includes all three of the world's major oceans as well as both sides of equator in the Pacific.

In the present collection two females, taken at the same time from the Marquesas Islands (Tahuata) were ovigerous : CW = 46.5 mm, approx. 3300 eggs, diam. = 0.7 mm, CW = 44.6 mm, approx. 3500 eggs, diam. = 0.65 mm, both broods had small eyespots. Ovigerous *P. wilsoni* females from other localities have been collected from December to June (McLay, 1988) so the occurrence of females with eggs at an advanced stage of development in September indicates a different reproductive schedule in Polynesian waters. Also the eggs are somewhat smaller than reported for New Zealand examples (0.75-1.0 mm). *P. wilsoni* has 3 or possibly 4 zoeal stages (Wear, 1970, 1977; Wear and Fielder, 1985), and although the reproductive strategy does not appear to be directed at producing large numbers of offspring (compared to other crabs of similar size) it is evidently successful in achieving an extraordinarily wide distribution.

None of the *P. wilsoni* specimens from French Polynesia were carrying pieces of camouflage; all were fairly large specimens who entered baited traps and the absence of sponge caps supports the hypothesis of Dell (1968) that larger *P. wilsoni* do not usually carry camouflage materials. Small (CW < approx. 15 mm) specimens which I have examined certainly do carry a tightly fitting cap of sponge or an ascidan but this habit may be lost by older crabs. The very shaggy tomentum may be sufficient concealment for these animals. One specimen from Takapoto had *Poecilasma* sp. stalked barnacles on its carapace and one leg and these would be unlikely to occur if the crab had been carrying a sponge cap. Baba *in* Baba, Hayashi and Toriyama (1986) provide a photograph of a large female *P. wilsoni* from the Kyushu-Palau Ridge (520 m) very heavily covered with stalked barnacles and it was not recorded as having a sponge cap.

The specimens from Polynesia are the largest known for *P. wilsoni*, especially the ♂ CW = 61.0 mm and ♀ CW = 42.8 mm (although this crab is smaller than the CW = 49.1 mm recorded by Baba *in* Baba, Hayashi and Toriyama, 1986), Also the depths at which the specimens were taken, 190-350 m are amongst the deepest known for this species (maximum 520 m) which has usually been collected from depths less than 100 m. It appears that the use of traps to capture crabs from deeper waters may well cause us to revise many of the estimates that we have for the vertical distribution of crabs.

GENERAL DISCUSSION

The only dromiid crabs known from French Polynesia are *Cryptodromia canaliculata* Stimpson, 1858 and *C. coronata* Stimpson, 1858. HOLTHUIS (1953) recorded *C. canaliculata* from Homohomo Island, Raroia Atoll, under rocks near the shore and NOBILI (1907) recorded *C. coronata* from Rikitea on *Halimeda* (Chlorophyta, Codiacene). All three species reported in this paper are therefore new records and they bring the total to 5 species. The fauna may be compared with that of Hawaii where EDMONDSON (1922) recorded *Cryptodromiopsis tridens, Dromidia unidentata* (Ruppel, 1830), taken from blocks of dead coral in shallow water on Waikiki reef, *D. hirsutissima* (Lamarck, 1818) and *Dromidiopsis dormia* (Linnaeus, 1763), reported as *Dromia rumphii* Fabricius, 1798 by LENZ (1901) and EDMONDSON. The record of *D. hirsutissima* should be ignored because it was based only on DANA (1852) who mis-identified *D. dormia* (see RATHBUN, 1923*b*; LEWINSOHN, 1984). EDMONDSON (1946) stated that *D. dormia* occurred sub-tidally and sometimes carried unusual pieces of camouflage : in one case a hollowed out block of wood, and in another case, an old shoe sole! Thus there is a similar small number of species (3 compared to 5) but only one species in common with French Polynesia. Given the wide distribution of *D. unidentata* and *D. dormia* it is likely that they also will be found in French Polynesia.

In their biogeographic analysis of the French Polynesia Brachyura from shallow water (mostly coral-inhabiting) FOREST and GUINOT (1962) recognized an Indo-West Pacific group which included some very widespread species. Amongst these species were three groups : 1) species endemic to the Pacific; 2) species which extend westward as far as the Indo-Malaysian region (as far as the north-east Indian Ocean), and most importantly; 3) species which extend further west to the coast of Africa and the Red Sea (many of which were absent from the coast of India). Of the dromiids now known from French Polynesia *S. ducoussoi* belongs in the first group, only one species (*C. coronata*) belongs in the second group and the other three (*C. canaliculata, P. wilsoni* and *C. tridens*) all belong to the third group. Thus the small number of dromiids mirrors the general characteristics of the brachyuran fauna as a whole. Species of the genus *Sphaerodromia* live in deeper water than species of the other genera and so have not been sampled as extensively, but it is likely that this genus will also prove to have a similar wide distribution though the individual species may be more restricted.

Acknowledgements

I would like to thank Maurice GAILLARD who prepared the illustrations and Jacques REBIÈRE who made the photographs. The barnacles on *P. wilsoni* were identified by Mark GRYGIER. I am especially grateful to Michelle DE SAINT LAURENT for her assistance and valuable comments on a draft of this paper which led to many improvements. Marcos TAVARES helped with translations of some French papers and provided the opportunity to compare notes with a different group of crabs. Above all I would like to thank Alain CROSNIER who made this project possible and who ensured the completion of the work in so many ways.

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PLATE I

A — *Sphaerodromia ducoussoi* sp. nov., ♂ holotype 43 × 43.2 mm, Tuamotu Archipelago (MNHN-B 22172) : dorsal view of whole crab.

B — *Petalomera wilsoni* (Fulton and Grant, 1902), ♂ 48.5 × 34.8 mm, Tubuai Islands, Raevavae : dorsal view of whole crab, right half of carapace cleared of hairs.

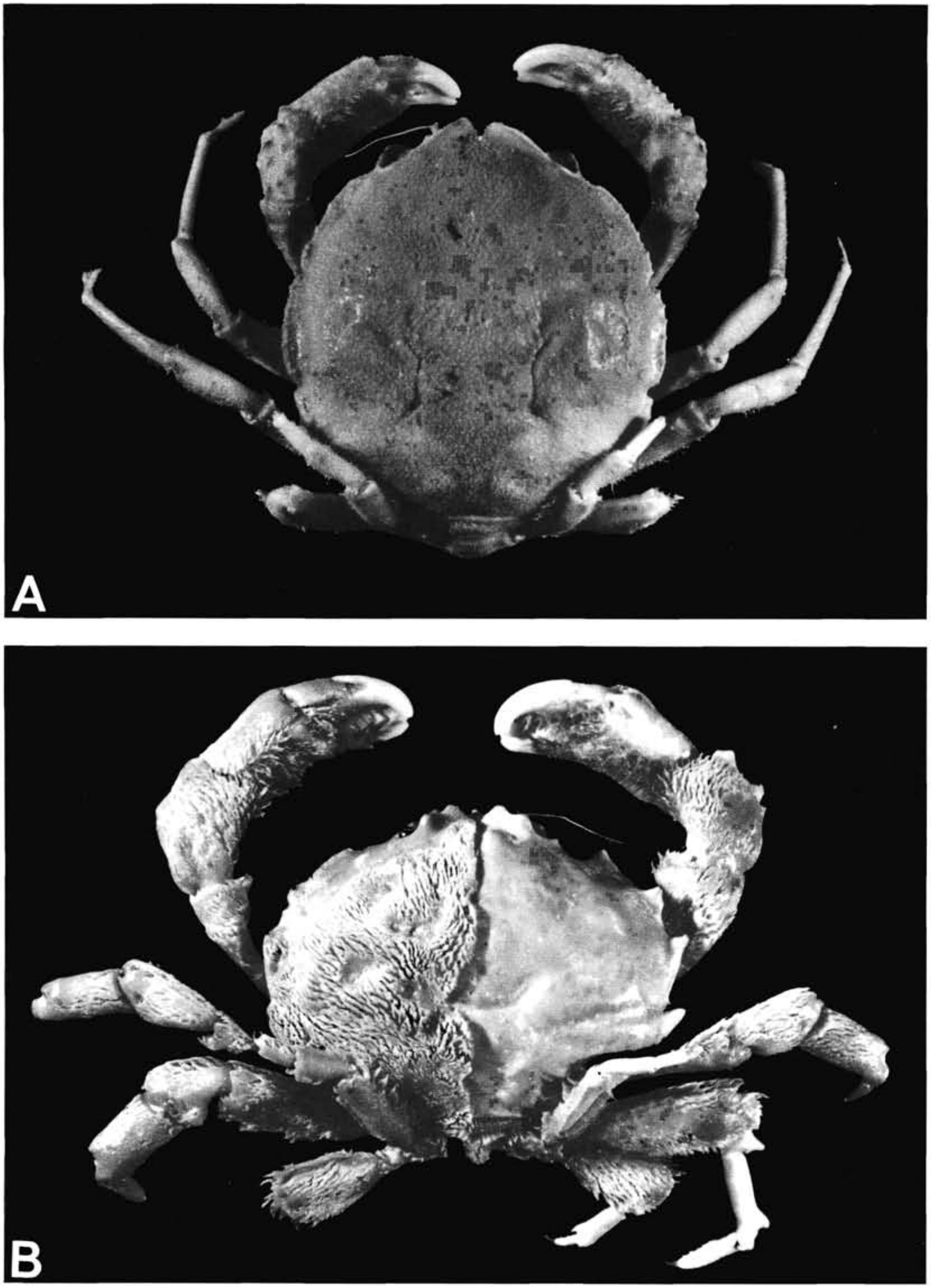

PLATE I