

**A revision of the xanthid genus *Pilodius* Dana, 1851
(Crustacea: Brachyura: Xanthoidea)**

P. F. CLARK and B. S. GALIL†

*Department of Zoology, The Natural History Museum,
Cromwell Road, London SW7 5BD, UK*

† *Israel Oceanographic and Limnological Research Ltd,
Tel Shikmona, POB 8030, Haifa 31 080, Israel*

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Forty-three species have been assigned to *Pilodius*. This revision accepts 12 and, in addition, establishes three new species. These 15 species are described, figured, and their distributions mapped. A key to the genus is provided.

KEYWORDS: Crustacea, Xanthoidea, Brachyura, *Pilodius*, identification key, taxonomy, new species.

Introduction

Alphonse Milne Edwards (1873), Balss (1938a), Serène and Luom (1958, 1959), Forest and Guinot (1961) and Serène (1984) (Table 1) have all attempted revisionary studies of *Pilodius* Dana, 1851, but none of these authors completely unravelled the complex taxonomic problems associated with this taxon. The independent description of *Pilodius* under the name *Chlorodopsis* by A. Milne Edwards created chaos within the Chlorodiinae that was only resolved when Forest and Guinot (1961: 90) applied the rule of priority. In the period between Dana establishing *Pilodius* and Forest and Guinot finally imposing nominal stability, > 30 species were assigned to the *Pilodius/Chlorodopsis* complex. In fact, to date, a total of 43 (Table 2) species have been attributed to this group. This revision retains only 12 (Table 3), and in addition describes three new species.

Abbreviations

AM, Australian Museum, Sydney; AMNH, American Museum of Natural History, New York; BBM, Bernice Bishop Museum, Honolulu; IRSNB, Institut Royal des Sciences Naturelles de Belgique; MI, Mauritius Institute; MNHN, Muséum national d'Histoire naturelle, Paris; NHM, The Natural History Museum, London; NUS, National University of Singapore; OINT, Oceanographic Institute, Nha Trang, Vietnam; QM, Queensland Museum, Brisbane; SAM, South African Museum; SMF, Senckenberg Museum, Frankfurt-am-Main; SWU, Shikoku Women's University, Japan; USNM, United States National Museum, Smithsonian Institution; UMZC, University Museum of Zoology, Cambridge; UY, University of York; ZLKU, Zoological Laboratory, Kyushu University, Japan; ZSI, Zoological Survey of India.

The zones of the carapace are divided according to Serène (1984: 18) and all measurements refer to the width of the carapace.

Table 1. A list of major revisions to *Pilodius* since Dana (1852).

Dana (1852)	A. Milne Edwards (1873)	Balss (1938a)	
<i>Pilodius</i>	<i>Chlorodopsis</i>	<i>Pilodius</i>	<i>Chlorodopsis</i>
<i>P. pilumnoides</i>	<i>Ch. pilumnoides</i>	<i>P. pubescens</i>	<i>Ch. melanochira</i>
<i>P. pubescens</i>	<i>Ch. spinipes</i>	<i>P. flavus</i>	<i>Ch. pilumnoides</i>
<i>P. nitidus</i>	<i>Ch. areolatus</i>	<i>P. paumotensis</i>	<i>Ch. pugil</i>
<i>P. pugil</i>	<i>Ch. melanochirus</i>	<i>P. harmsi</i>	<i>Ch. melanospinis</i>
<i>P. scabriculus</i>	<i>Ch. melanodactylus</i>	<i>P. granulatus</i>	<i>Ch. areolata</i>
		<i>P. nigrocrinitus</i>	
Serène and Luom (1958)	Serène and Luom (1959)	Forest and Guinot (1961)	Serène (1984)
<i>Chlorodopsis</i>	<i>Chlorodopsis</i>	<i>Pilodius</i>	<i>Pilodius</i>
<i>Ch. areolata</i>	<i>Ch. areolatus</i>	<i>P. areolatus</i>	<i>P. areolatus</i>
<i>Ch. pilumnoides</i>	<i>Ch. pilumnoides</i>	<i>P. pilumnoides</i>	<i>P. pilumnoides</i>
<i>Ch. scabricula</i>	<i>Ch. palaoensis</i>	<i>P. pubescens</i>	<i>P. palaoensis</i>
<i>Ch. pugil</i>	<i>Ch. melanospinis</i>	<i>P. pugil</i>	<i>P. melanospinis</i>
<i>Ch. granulata</i>	<i>Ch. flava</i>	<i>P. scabriculus</i>	<i>P. flavus</i>
<i>Ch. nigrocrinita</i>	<i>Ch. paumotensis</i>	<i>P. granulatus</i>	<i>P. paumotensis</i>
<i>Ch. spinipes</i>	<i>Ch. nigrocrinita</i>	<i>P. nigrocrinitus</i>	<i>P. nigrocrinitus</i>
<i>Ch. melanochira</i>	<i>Ch. venusta</i>	<i>P. spinipes</i>	<i>P. maotieni</i>
<i>Ch. woodmasoni</i>	<i>Ch. harmsi</i>	<i>P. aberrans</i>	<i>P. scabriculus</i>
<i>Ch. aberrans</i>	<i>Ch. scabricula</i>	<i>P. flavus</i>	<i>P. granulatus</i>
<i>Ch. venusta</i>	<i>Ch. granulata</i>	<i>P. paumotensis</i>	<i>P. aff. spinipes</i>
<i>Ch. melanospinis</i>	<i>Ch. pubescens</i>	<i>P. melanospinis</i>	<i>P. pubescens</i>
<i>Ch. inoequalis</i>	<i>Ch. philippinensis</i>	<i>P. harmsi</i>	<i>P. philippinensis</i>
<i>Ch. paulsoni</i>	<i>Ch. pugil</i>	<i>P. miersi</i>	<i>P. pugil</i>
<i>Ch. palaoensis</i>	<i>Ch. spinipes</i>	<i>P. philippinensis</i>	<i>P. spinipes</i>
<i>Ch. miersi</i>	<i>Ch. aberrans</i>		<i>P. serenei</i>
<i>Ch. philippinensis</i>			<i>P. aberrans</i>
<i>Ch. melanodactyla</i>			<i>P. luomi</i>

Distribution maps: solid dots refer to specimens examined during the study and listed in material examined; circles refer to literature records which could not all be verified.

Systematic account

Pilodius Dana, 1851

Pilodius Dana, 1851: 126, 1852: 80, 1853: 216; Heller, 1861a: 11, 1861b: 340, A. Milne Edwards, 1863: 284; Heller, 1865: 19; De Man, 1902: 619; Nobili, 1906: 267, 1907: 393; Stimpson, 1907: 57; Stebbing, 1910: 300; Balss, 1934: 227, 1938a: 56; Serène and Luom, 1959: 333; Chen and Lan, 1978: 267; Forest and Guinot, 1961: 89; Sakai, 1965: 148; Guinot, 1967: 267; Derijard, 1968: 1244; McNeill, 1968: 72; Serène, 1984: 233; Dai *et al.*, 1986: 304; Dai and Yang, 1991: 327.

Chlorodopsis A. Milne Edwards, 1873: 227; Haswell, 1882: 54; De Man, 1887a: 35, 1887b: 281; Cano, 1889: 204; De Man, 1892: 278; Henderson, 1893: 361; Ortmann, 1893: 470; Zehntner, 1894: 151; De Man, 1895: 520; Alcock, 1898: 165; Lanchester, 1900: 737; Borradaile, 1900: 588; Lanchester, 1901: 539; Borradaile, 1902: 261; De Man, 1902: 624; Nobili, 1906: 269; Stebbing, 1910: 300; Klunzinger, 1913: 248; Bouvier, 1915: 279(99); Laurie, 1915: 450; Balss, 1922: 131; McNeill, 1926: 309; Urita, 1926: 11; Ward, 1932: 250; Gordon, 1934: 4; Ward, 1934: 21; Ramadan, 1936: 33; Ward, 1936: 4; Balss, 1938a: 58; Sakai, 1939: 502; Ward, 1939: 10, 1941: 11, 1942: 97; Barnard, 1950: 214; Serène and Luom, 1958: 88, 1959: 336.

Description

Carapace depressed, transversely oval, regions defined. Front, hardly projecting, more than one-third carapace width; margin divided into two large submedian lobes and two small lateral lobes. Anterolateral margins tri- or quadridentate, equal to or shorter than markedly convergent posterolateral margins. Posterior margin costate, short. Antennule fosset transverse. Basal antennal segment in adult butting into orbital hiatus, excluding short, slender antennal flagellum from orbit. Anterior margin of buccal cavity well defined, covered by third maxillipeds; exhalent channels faintly indicated on posterior region of palate only. Exopod of third maxilliped, shorter than endopod, columnar, distally notched, bearing triangular tooth distally on inner margin. Lateral margins of endopod ischium nearly parallel, proximal margin obliquely truncate, oblique shallow sulcus near setose internal margin; inner distal angle of merus excavate; carpus setose distally on dorsal surface and propodus with setal tuft, dactylus terminally setose. Chelipeds unequal, fingers massive, spoon-shaped. Superior margin of pereopods spinulate or tuberculate, external surface of pereopodal carpi furrowed. Modifications of dactylo-propodal articulation well defined, dactylus tip cornute. Genital openings coxal. Male with 5 abdominal segments.

Remarks

Dana (1851: 125) initially established *Pilodius* as a genus within the Chlorodinae and then (1852: 80) treated it as a subgenus of *Chlorodius* Leach. In the same publication he also assigned *Chlorodius pilumnoides* White to *Pilodius* and described four new species (see Table 1). Later, Dana (1853: 216) returned the taxon to generic status. Alphonse Milne Edwards (1873: 227) described *Chlorodopsis*, to which he attributed three species and described two new ones (Table 1). Bouvier (1915: 99) stated that *Chlorodopsis* was different from other 'chlorodiens' such as *Pilodius*, *Chlorodius*, *Phymodius* A. Milne Edwards and *Xanthodes* Dana, a view supported by Balss (1934: 227). Ward (1932: 250) also considered *Chlorodopsis* valid and subsequently named

Table 2. A list of the 43 species that have been assigned to the *Pilodius* complex.

Original name	Revised name	Revisor
<i>Chlorodopsis aberrans</i> Rathbun, 1906	<i>Garthiella aberrans</i> (Rathbun, 1906)	Titgen (1986: 57)
<i>Chlorodopsis arabica</i> Laurie, 1915	<i>Pilodius granulatus</i> (Targioni Tozzetti, 1877)	Gordon (1934: 41)
<i>Chlorodopsis areolatus</i> H. Milne Edwards, 1834	<i>Pilodius areolatus</i> (H. Milne Edwards, 1834)	Forest and Guinot (1961: 89)
<i>Pilodius armiger</i> Nobili, 1905	<i>Liocarpilodes armiger</i> (Nobili, 1905)	Balss (1938a: 45)
<i>Chlorodopsis (areolata)</i> var. <i>brandonensis</i> Ward, 1942	<i>Pilodius areolatus</i> (H. Milne Edwards, 1834)	Tweedie (1950b: 121)
<i>Chlorodopsis espinosus</i> Borradaile, 1902	<i>Etitus laevimanus</i> Randall, 1840	Odhner (1925: 83)
<i>Pilodius espinosus</i> McNeill, 1968	<i>Etitus laevimanus</i> Randall, 1840	This study
<i>Pilodius estivoides</i> Takeda and Miyake, 1968	Validity uncertain	
<i>Pilodius flavus</i> Rathbun, 1894	<i>sic</i>	
<i>Pilodius fragifer</i> Paulson, 1875	<i>Actaea fragifer</i> (White, 1847)	Odhner (1925: 54)
<i>Chlorodopsis frontalis</i> Borradaile, 1902: 261	<i>Etitus demani</i> Odhner, 1925	Balss (1938: 45)
<i>Pilodius granulatus</i> Stimpson, 1859	<i>sic</i>	
<i>Pilodius harmsi</i> Balss, 1934	<i>Liocarpilodes harmsi</i> (Balss, 1934)	Serène (1971: 914)
<i>Chlorodopsis hawaiiensis</i> Edmondson, 1962	<i>Pilodius flavus</i> Rathbun, 1906	This study
<i>Chlorodopsis inoequalis</i> Klunzinger, 1913	<i>Pilodius granulatus</i> (Targioni Tozzetti, 1877)	Balss (1938a: 55)
<i>Chlorodopsis kauaiensis</i> Edmondson, 1962	Type erroneously assigned to <i>Pilodius</i>	This study
<i>Pilodius luomi</i> Serène, 1971	<i>Pilodius miersi</i> (Ward, 1936)	This study
<i>Pilodius martensis</i> Nobili, 1906	<i>Chlorodiella cytherea</i> (Dana, 1852)	Forest and Guinot (1961: 95)
<i>Pilodius maotieni</i> Serène, 1971	<i>sic</i>	
<i>Chlorodopsis melanodactylus</i> A. Milne Edwards, 1873	<i>Pilodius pubescens</i> Dana, 1852	Serène and Luom (1959: 316)

<i>Chlorodopsis melanochirus</i> A. Milne Edwards, 1873	<i>Pilodius nigrocrinitus</i> Stimpson, 1859	Balss (1938a: 57)
<i>Chlorodopsis melanospinis</i> Rathbun, 1911	<i>Pilodius flavus</i> (Rathbun, 1906)	This study
<i>Chlorodopsis miersi</i> Ward, 1936	<i>Pilodius miersi</i> (Ward, 1936)	This study
<i>Chlorodopsis natalensis</i> Ward, 1934	<i>Liocarpilodes harmsi</i> (Balss, 1934)	Serène (1971: 914)
<i>Chlorodopsis natalis</i> Serène, 1984	<i>Pilodius scabriculus</i> Dana, 1852	Serène (1984: 233)
<i>Pilodius nigrocrinitus</i> Stimpson, 1859	<i>sic</i>	
<i>Pilodius nitidus</i> Dana, 1852	<i>Phymodius nitidus</i> (Dana, 1952)	Rathbun (1906: 858)
<i>Chlorodopsis oahuensis</i> Edmondson, 1962	<i>Pilodius paumotensis</i> Rathbun, 1907	Serène (1984: 241)
<i>Chlorodopsis (Cyclodius) ornatus</i> Alcock, 1898	<i>Phymodius monticulosus</i> (Dana, 1852)	Forest and Guinot (1961: 106)
<i>Chlorodopsis (Cyclodius) palaoensis</i> Sakai, 1936	<i>Pilodius pilumnooides</i> (White, 1848)	Balss (1938a: 60)
<i>Chlorodopsis paulsoni</i> Klunzinger, 1913	<i>Eisius patulsoni</i> (Klunzinger, 1913)	Serène (1984: 231)
<i>Chlorodopsis paumotensis</i> Rathbun, 1907	<i>sic</i>	
<i>Chlorodopsis philippinensis</i> Ward, 1936	<i>Pilodius granulatus</i> Stimpson, 1859	This study
<i>Chlorodius pilumnooides</i> White, 1848	<i>Pilodius pilumnooides</i> (White, 1848)	Forest and Guinot (1961: 89)
<i>Pilodius pubescens</i> Dana, 1852	<i>sic</i>	
<i>Pilodius pugil</i> Dana, 1852	<i>sic</i>	
<i>Pilodius saktensis</i> Serène (manuscript name)	<i>Pilodius granulatus</i> Stimpson, 1859	Thus study
<i>Pilodius scabriculus</i> Dana, 1852	<i>Pilodius granulatus</i> Stimpson, 1859	This study
<i>Pilodius serenei</i> Miyake and Takeda, 1968	<i>sic</i>	
<i>Pilodius spinipes</i> Heller, 1861	<i>Pilodius spinipes</i> Heller, 1861	Thus study
<i>Pilodius aff. spinipes</i> Serène, 1984	<i>Pilodius scabriculus</i> Dana, 1852	Forest and Guinot (1961: 89)
<i>Chlorodopsis venusta</i> Rathbun, 1907	<i>Pilodius spinipes</i> Heller, 1861	Nobili (1906: 270)
<i>Chlorodopsis woodmasoni</i> Alcock, 1898		

Table 3. List of valid species currently assigned to *Pilodius* Dana 1851. (Note that in addition to this list, three new species are described in this study.)

<i>Pilodius areolatus</i> (H. Milne Edwards, 1834)
<i>Pilodius flavus</i> Rathbun, 1894
<i>Pilodius granulatus</i> Stimpson, 1859
<i>Pilodius maotieni</i> Serène, 1971
<i>Pilodius miersi</i> (Ward, 1936)
<i>Pilodius nigrocrinitus</i> Stimpson, 1859
<i>Pilodius paumotensis</i> Rathbun, 1907
<i>Pilodius pilumnoides</i> (White, 1848)
<i>Pilodius pubescens</i> Dana, 1852
<i>Pilodius pugil</i> Dana, 1852
<i>Pilodius scabriculus</i> Dana, 1852
<i>Pilodius spinipes</i> Heller, 1861

C. melanochirus A. Milne Edwards as the type species. In an attempt to clarify the situation Balss (1938a: 56, 58) assigned six species to *Pilodius* and five to *Chlorodopsis* (Table 1). Serène and Luom (Table 1) extensively revised *Chlorodopsis*. In their generic discussion they considered (1959: 333) *Chlorodopsis* and *Pilodius* to be synonymous and recommended that the nomenclatorial confusion should be rectified by applying the rules of priority in favour of *Pilodius*. But in their concluding comments (p. 336) they ignored their own suggestion and adopted the junior synonym *Chlorodopsis*. They reasoned that the name *Pilodius* should be abandoned because its definition was insufficient and, therefore, the less ambiguous description of *Chlorodopsis* by A. Milne Edwards should be used. Forest and Guinot (1961: 90) opposed the decision made by Serène and Luom because, in their opinion, the definition of *Pilodius* by Dana was adequate, and it was incorrect to propose derogation of the law of priority by utilization of the name *Chlorodopsis*. Dana did not select a type species for *Pilodius*, so Forest and Guinot subsequently designated *Chlorodopsis pilumnoides* White, 1848 as the type species. Forest and Guinot (1961: 89) listed the species assigned to *Pilodius* Dana, 1852 under their original names (Table 1).

Of the 43 species listed (Table 2), eight were misidentified, and a further six were assigned to other genera within the subfamily Chlorodiinae because the original description of *Pilodius* by Dana 1852 was inadequate. On the basis of this description, Serène (1984: 233) suggested that the exclusion of the antennal flagellum from the orbital hiatus by the prolongation of the basal antennal segment is a character for separating *Pilodius* from other genera of the Chlorodiinae. However, Crosnier pointed out (footnote, Serène 1984: 233) that this prolongation develops with age and may not be useful for identifying juveniles. Furthermore, Crosnier noted that some species of *Pilodius*, i.e. *P. paumotensis* Rathbun, have only a very feeble prolongation, even in mature specimens, whereas species of other genera, such as *Phymodius ungulatus* H. Milne Edwards, can have a slight prolongation of the basal antennal segment. Despite this limitation the prolongation of the basal antennal segment remains the sole character for distinguishing *Pilodius* from other Chlorodiinae.

Type status

The type of the genus is *Pilodius pilumnoides*, and the specimens are extant in The Natural History Museum. Gender masculine.

Pilodius areolatus (H. Milne Edwards, 1834)

(Figs 1A–G, 31A, 40A, 44B)

- Chlorodius areolatus* H. Milne Edwards, 1834: 400; White, 1847: 18; Adams and White, 1849: 41; Hess, 1865: 135.
- Chlorodopsis areolatus*: A. Milne Edwards, 1873: 231, pl. VIII, fig. 8; Hilgendorf, 1879: 790; Richters, 1880: 140 (list), 148; Haswell, 1882: 54; Miers, 1884: 517, 532; Müller, 1887: 474 (list); Whitelegge, 1889: 227 (list); De Man, 1890: 54; Ortmann, 1893: 470; Alcock and Anderson, 1894: 200 (list); Bouvier, 1915: 278, figs 30, 31; Balss, 1922: 131; Ward, 1932: 251; Michel, 1964: 24.
- Chlorodopsis areolata*: Alcock, 1898: 166; Lenz, 1905: 354, pl. 47, fig. 8; Laurie, 1906: 405; Nobili, 1906: 269; Rathbun, 1906: 858; Nobili, 1907: 396, pl. 2, fig. 3; Calman, 1909: 705 (list); Lenz, 1910: 551; Stebbing, 1910: 300; Klunzinger, 1913: 250; Sandler, 1923: 38; Odhner, 1925: 36; Hale, 1929: 70; Montgomery, 1931: 443; Edmondson, 1933: 250, fig. 152b, 1946: 296, fig. 178f; Balss, 1935: 139, 1938a: 62; Miyake, 1939: 215, 237; Sakai, 1939: 502, pl. 97, fig. 3; Tweedie, 1947: 27 (list), 1950b: 121; Barnard, 1950: 214, figs 39d, e; Holthuis, 1953: 15; Sakai, 1956: 40 (Appendix); Guinot, 1958: 176, figs 21a, b; Serène and Luom, 1958: 96, fig. 2, pls IA, VIa, 1959, fig. 5a; Edmondson, 1962: 269, fig. 19a; Sankarankutty, 1962: 138, figs 24, 25; Garth, 1964: 140 (list); Ooishi, 1964: 199; Kensley, 1970: 104 (list).
- Pilodius areolatus*: Forest and Guinot, 1961: 90; Guinot, 1962: 237, 1964b: 66; Sankarankutty, 1966: 48, 50; Guinot, 1967: 267; Derijard, 1968: 1244; Serène, 1968: 80 (list); Ooishi, 1970: 93; Sakai, 1976: 460, pl. 164, fig. 1; Takeda and Miyake, 1976: 110 (list); Takeda and Nunomura, 1976: 62 (list), 72; Peyrot-Clausade, 1977a: 27 (list); Serène, 1977: 51 (list); Chen and Lan, 1978: 267, fig. 8:2, pl. 8, fig. 30; Takeda, 1978: 40; Kensley, 1981: 45; Serène, 1984: 241, figs 143c, 144, pl. 33C; Dai *et al.*, 1986: 305, pl. 43(2), fig. 165B(1); Takeda, 1989: 165, 178 (table); Dai and Yang, 1991: 328, pl. 43(2), fig. 165B(1).
- Chlorodius perlatus*: MacLeay, 1838: 59; Krauss, 1843: 31.
- Actea perlata*: Ward, 1942: 88.
- Xantho dehaanii* Krauss, 1843: 29, pl. I, fig. 2.
- Etisodes caelatus* Dana, 1852: 77; 1853: 188, 1855, pl. 9, fig. 4; Whitelegge, 1897: 131.
- Chlorodopsis areolata* var. *brandonensis* Ward, 1942: 97, pl. 6, fig. 3.
- Actaeodes affinis* Dana, 1852: 78; 1853: 197, 1855: pl. XI, fig. 3; Stimpson, 1907: 43.
- Actaeodes tomentosus*: Miers, 1886: 135 (part); Lanchester, 1900: 734 (part).
- Actaea affinis*: A. Milne Edwards, 1865: 263; Haswell, 1882: 45; Whitelegge, 1889: 226; Borradale, 1900: 583, 1902: 254; Grant and McCulloch, 1906: 11; Rathbun, 1906: 852; Stimpson, 1907: 43; Rathbun, 1907: 42; 1911: 219, 1914: 658; Balss, 1922: 121; Edmondson, 1923: 15.
- Phymodius ungulatus*: Boone, 1934: 143 (part); Serène and Luom, 1958: 96; Serène, 1984: 241. **non** H. Milne Edwards, 1834.

Description

Regions of carapace well defined, separated by deep grooves, 2M divided into two longitudinally, 3M tripartite, anterior lobe not reaching anterior margin of 2M, densely covered with minute setae, leaving free only pearliform granules. Submedian frontal lobes arched, minutely denticulate, separated by 'U'-shaped indentation, lateral lobes triangular, granulate. Anterolateral margin quadrilobate, lobes rounded, granulate. Anterior margin of cheliped merus granulate. External surface of cheliped carpus with clusters of pearliform granules, one furrow parallel with palmar joint. External surface of chela minutely setose, proximally set with large rounded granules, lower margin smooth. Pereiopods thickly fringed with plumose setae; merus, carpus with conical tubercles on superior margin; carpus, propodus with pearliform granules externally.

*Material examined**Indian Ocean*

Sta. B4, Kilifi; coll. W. Baumeister, 1984; 1♂ 15 mm (SMF no reg.). Near Watamu, South of Malindi—Sta. Ke-1; coll. H. G. Müller, 24/vii–7/viii/1989; 2♂ 12–8 mm

(SMF no reg.)—Sta. Ke-2; Kenya; coll. H. G. Müller, 24/vii-7/viii/1989; 2♂ 16.5–9 mm, 1♀ ovig. 11.5 mm, 2♀ 11.5–10 mm (SMF no reg.)—Sta. Ke-5; coll. H. G. Müller, 24/vii-7/viii/1989; 5♂ 23–17 mm, 1♀ ovig. 15 mm, 1♀ 11 mm (SMF no reg.).

Saline-les-Basins, Réunion; Sta. Re-1; coll. H. G. Müller, 20/i/1989, 0.5–1 m; 1♂ 12 mm, 1♀ 11 mm (SMF no reg.)—Sta. Re-7; Rifflagune; coll. H. G. Müller, 21–22.i.1989, 0.5–1.5 m; 2♂ 20.5–14 mm, 3♀ 13–9 mm (SMF no reg.)—Sta. Re-31; coll. H. G. Müller, 30/i-4/ii/1989; 4♂ 14–11 mm, 1♀ 15 mm, 5♀ ovig. 13.5–9 mm, 1♀ 15–9 mm (SMF no reg.)—Sta. Re-35; coll. H. G. Müller, 3–5/ii/1989, 0.5–1 m; 4♂ 14–9 mm, 1♀ ovig. 11 mm, 1♀ 14 mm (SMF no reg.)—Sta. Re-43; Riffdach; coll. H. G. Müller, 5/ii/1989, 0.5–1 m; 1♀ 11 mm (SMF no reg.).

Coetivy, Seychelles; coll. *Sealark*, 1905; 6♂ 20.5–10 mm, 2♀ ovig. 13–12.5 mm, 5♀ 16.5–10 mm; formerly *Actaea affinis* det. M. J. Rathbun (UMZC Aug. 7, 1910)—Peros, Coin, Chagos Archipelago; 1♂ 23.5 mm (UMZC Aug. 7, 1910)—Salomon Is.; 5♂ 18–11 mm, 2♀ ovig. 12 mm; redet. T. Odhner 1922 as *Chlorodopsis areolatus* (UMZC Aug. 7, 1910).

Maldive Is.; Fadiffolu Atoll; coll. J. S. Gardiner; 1♂ 14 mm, 1♀ 12 mm; formerly *Actaea affinis* det. L. A. Borradaile, redet. T. Odhner 1922 as *Chlorodopsis areolatus* (UMZC June 20, 1900)—Minijol Atoll; 1♀ 9.5 mm (UMZC June 20, 1900)—Goifur-fehendu Atoll; 1♀ 12 mm (UMZC June 20, 1900)—Hulule, Male; 8♂ 18–9.5 mm, 3♀ ovig. 13.5–12 mm, 2♀ 13.5–10 mm (UMZC June 20, 1900).

Weligama, Sri Lanka; coll. Low-Beer, 31/2/1912; 2♂ 18–13 mm, 1♀ ovig. 13 mm (SMF no reg.).

Cocos Keeling Is.; coll. C. A. Gibson-Hill, 1941; 2♂ 20.5–16 mm, 2♀ 15–13.5 mm (NUS 1965.11.11.28–32). Cocos Keeling Is.; coll. J. Covacevich, February 1986; 3♂ 14.5–10 mm, 10♀ 10 mm (QM W. 12385).

Christmas Is.; coll. C. A. Gibson-Hill, 1940; 1♂ 7 mm (NUS 1965.11.11.38).

Japan

Bise Village, Motobu-Cho, Okinawa; coll. P. Ng; 1♀ ovig. 18.5 mm, 3♀ 17–15 mm (NUS 1992:4986–4989)—Horikawa, Tamagusuka Village; 3♂ 17–13 mm, 1♀ 10 mm (NUS 1992:4990–4993)—Kunri-Hama Beach, Sesoko Is.; 1♀ ovig. 13 mm, 1♀ 11 mm (NUS 1992:4984–4985)—1♂ 8 mm (NUS 1992:4994).

Southeast Asia

Philippine Is.; coll. From H. Cuming's collection; 1♂ damaged, 1♀ 19 mm; formerly det. *Chlorodius areolatus* by Adams and White, redet. *Phymodius unguulatus* by A. Milne Edwards; reg. was 857a, b now (NHM 1843:6).

Australia

Masthead, Queensland; 1♂ 22.5 mm; formerly *Actaea affinis* det. F. E. Grant and A. R. McCulloch (AM G. 5845). Port Jackson, New South Wales; 1♂ 22 mm; formerly *Actaea affinis* det. W. A. Haswell (AM G. 5534). Heron Is., Queensland; coll. T. C. Marshall, 29 August 1939; 1♂ 21.5 mm (QM W. 983)—coll. A. A. Cameron, 21 July 1941; 1♂ 27 mm (QM W. 1406). Lady Elliot Is., Queensland; coll. P. Davie and D. Potter, 8 August 1985; 1♂ 17 mm (QM W. 15444)—13 August 1985; det. J. Short,

1♂ 18 mm, 1♀ 16.5 mm (QM W. 15439)—coll. B. Sanker, 13 August 1985; 1♂ 17 mm (QM W. 15448)—coll. P. Davie and D. Potter, 16 August 1985, 5 m; 1♂ 12 mm, 1♀ ovig. 17 mm, 1♀ 15 mm (QM W. 15449)—coll. P. Davie and J. Lowe, 17 August 1985; 1♂ 11 mm (QM W. 15442)—coll. P. Davie and D. Potter, 17 August 1985; 1♂ 18 mm, 1♀ 15 mm (QM W. 15447). South Is., Queensland; coll. P. Davie and J. Short, 25 May 1987; det. P. Davie, 30 May 1987, 1♂ 18 mm (QM W. 13133). Wreck Reef, nr Porpoise Cay, Queensland; coll. J. Short, 7 May 1988, 2 m; det. J. Short, 1♀ 13 mm (QM W. 15435)—coll. J. Short, 7 May 1988, 2 m; det. J. Short, 1♂ 12 mm (QM W. 15438)—coll. J. Short and S. Mullens, 10 May 1988, 0.5 m; 4♀ 19–10 mm (QM W. 15452)—coll. J. Short and S. Mullens, 14 May 1988; 5♂ 23–13 mm (QM W. 15453). Lady Elliot Is., Queensland Australia; coll. P. Davie and D. Potter, 16 August 1988, 5 m; 1♀ 14 mm (QM W. 15436). Middleton Reef, Tasman Sea; coll. J. Short and R. McKay, 9 May 1987; 1♂ 15 mm (QM W. 13022).

Pacific Ocean

Palau Is.; coll. C. Semper, 1862; 2♀ 14–10.5 mm (SMF 323a) (Ex. Museum Göttingen)—det. A. Sendler; 1♂ 22 mm (SMF 1712).

Sta. 20, Platier du Phare Amédeé, Nouvelle-Calédonie; coll. 17 September 1978; 2♂ 22–20 mm, 3♀ 17–15 mm (MNHN no reg.).

Oahu, Hawaiian Is.; 10♂ 17–10 mm, 5♀ ovig. 19–13.5 mm, 2♀ 13.5–11 mm (BBM 510403).

Sta. FPM-3, Maharepa, 2–6 km west of Flughafen, Moorea; coll. H. G. Müller, iii/1988, 0.5 m; 4♂ 17–10 mm, 3♀ ovig. 16.5–14 mm, 1♀ 15 mm (SMF no reg.).

Society Is., Polynesia; FPM-13, Afareaitu; coll. H. G. Müller, 29.iii.1988, 0–0.5 m; 3♂ 21–19 mm, 1♀ ovig. 13 mm, 4♀ 18–13 mm (SMF no reg.)—Bora Bora; coll. H. G. Müller, 27/ii–6/iii/1988, 0.5–1 m; 30 specimens (SMF no reg.).

Temae, 17°29'S, 149°46'W, Polynesia; coll. H. G. Müller, 31/iii/1988, 0–0.5 m; 5♂ 18–11 mm, 3♀ 16–12 mm, 2 juvs (SMF no reg.).

Viti Levu Is., Fiji; 1♂ 24 mm, 1♀ 20 mm (SMF 1711) (Ex. Museum Godeffroy). Rotuma Is., Fiji; coll. J. S. Gardiner; 1♂ 14 mm, 1♀ ovig. 11 mm, 4♀ 15.5–11 mm; formerly *Actaea affinis* det. L. A. Borradaile, redet. T. Odhner 1922 as *Chlorodopsis areolatus* (UMZC Sept. 15, 1897).

Remarks

Crabs identified by Borradaile (1900) and Rathbun (1907, 1911, 1914) as *Actaea affinis* and deposited in the University Museum of Zoology, Cambridge were redetermined as *Pilodius areolatus* by T. Odhner. Miers (1886: 135) erroneously synonymized the *Actaeodes affinis* Dana (1853: 197) with *Actaeodes tomentosus* (H. Milne Edwards), see Montgomery (1931). A number of species are considered junior synonyms of *Pilodius areolatus*, *Xantho dehaanii* Krauss by Miers (1884), *Chlorodius perlatus* MacLeay by A. Milne Edwards (1873), *Etisodes caelatus* Dana by Haswell (1882), *Actaeodes affinis* Dana (assigned to *Actea* by A. Milne Edwards) by Montgomery (1931) and *Actea perlatus* and *Chlorodopsis areolatus brandonensis* both of Ward by Barnard (1950). The *Chlorodius areolatus* material of Adams and White (1849) was assigned by A. Milne Edwards (1873: 232) to *Phymodius ungulatus*, however, this material was examined during this revision and the identification of Adams and White was confirmed.

Distribution

Reported from the Red Sea and east coast of Africa to Mangareva, Polynesia, Pacific Ocean (Fig. 16).

Type status

The Type from Nouvelle-Hollande (Australia) is no longer extant.

Pilodius cephalalgicus sp. n.

(Figs 2A–G, 31B, 40B)

Description

HOLOTYPE male. Regions of carapace well defined, 2M divided into two longitudinally, areoles granular, granules acuminate, apically cornute on 1L–5L, set with short, coarse, dark setae. Transverse row of adjoining pearliform granules medially on 1P; two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes arched, prominently denticulate, separated by deep 'U'-shaped indentation, lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth multispinose, apically cornute, terminal spine accompanied by ancillary spines. Anterior margin of cheliped merus prominently spinose. External surface of cheliped carpus with cornute, conical tubercles, coarsely setose, ill-defined furrow parallel with palmar joint. External surface of chela set with short, coarse, dark setae; cornute, conical tubercles on upper margin, rounder inferiorly; lower margin granulate and dark coloration restricted to fixed finger. Pereiopods with coarse dark setae, merus, carpus prominently spinose on superior margin.

*Material examined**Malayan Peninsula*

Sta. 20, 6°55'N, 102°45'E; coll. Serène, 24 July 1965; 1♂ 20 mm, HOLOTYPE (MNHN MP B.20935)—4♂ 14–10 mm, 1♀ 11 mm, PARATYPES (MNHN MP B.24030)—Sta. 15, Tilok Kekhe, Perhentian Besar, 6°55'N, 102°45'E; 21 July 1965, 1♂ 8 mm, PARATYPE (MNHN MP B.24031)—1♂ 10 mm, 1 juv., PARATYPES (MNHN MP B.24029)—1 juv., PARATYPE (MNHN MP B.24034)—Sta. 18, 6°55'N, 102°45'E; 23 July 1965; 1♂ 8 mm, PARATYPE (MNHN MP B.24032)—Sta. 31, Poulo Babi Nyong, 2°30'N, 103°57'E; 21 August 1965; 1♂ 16 mm, PARATYPE (MNHN MP B.20936).

Remarks

Pilodius cephalalgicus sp. n. is morphologically similar to *P. pilumnoides*, because the anterior margin of the cheliped merus is spinose, but it differs from the latter by the dark coloration on the cheliped being restricted to the fixed finger. The pleopods of these two species are distinct.

Distribution

Restricted to the east coast of the Malayan Peninsula (Fig. 17).

Type status

Type series extant and deposited in the Muséum national d'Histoire naturelle, Paris. Holotype from 6°55'N, 102°55'E, Malayan Peninsula.

Etymology

Cephalalgicus from the Greek *Kephalalgikos*, meaning causing a headache, referring to the severe taxonomic problems the authors encountered while revising *Pilodius*. Gender masculine.

Pilodius concors sp. n.

(Figs 3A–G, 32A, 40C)

Chlorodopsis pilumnoides: Balss, 1938b: 56; Tweedie, 1950a: 92; Guinot, 1958: 179, fig. 25a, b. **non** White, 1848.

Pilodius nigrocrinitus: McNeill, 1968: 73 (part). **non** Stimpson, 1859.

Description

HOLOTYPE male. Regions of carapace well defined, 2M divided into two longitudinally. Areoles prominently granular, set with short coarse setae; on 1L–5L granules larger, apically cornute. Transverse row of adjoining pearliform granules on 1P; two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes arched, prominently denticulate, separated by deep 'U'-shaped indentation, lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth multispinose, apically cornute, terminal spine accompanied by ancillary spines. Anterior margin of cheliped merus prominently spinose. External surface of cheliped carpus with large cornute tubercles, coarsely setose, furrow parallel with palmar joint. Upper margin of chela with cornute tubercles, external surface smooth. Pereiopods with coarse dark setae, merus, carpus, propodus prominently spinose on superior margin.

*Material examined**Australia*

Hock Reef, East of Hayman Is., Queensland; coll. F. A. McNeill and J. K. Howard, May 1953; 1 ♂ 37 mm, PARATYPE (AM P. 12306). Great Barrier Reef, Queensland; coll. Great Barrier Reef Expedition 1928–29; 1 ♂ 18 mm, PARATYPE; formerly det. F. A. McNeill *Pilodius nigrocrinitus* (NHM 1937.9.21.104–123). Cape York, Queensland; 1 ♂ 25.5 mm, PARATYPE; was reg. 319.68 (MNHN MP B.2394). Coconut Beach, west side of Lindeman Is.; Queensland; coll. P. Davie and J. Short, 26 March 1987, 16 m; 1 ♂ 22.5 mm, PARATYPE (QM W.12914) (part).

Southeast Asia

Poulo Condore; coll. Mr Germain (410–68); 1 ♂ 19 mm, PARATYPE; formerly det. D. Guinot *Pilodius pilumnoides* (MNHN MP B.13755). Horsburgh Lighthouse, Singapore, South China Sea; coll. A. Monteiro, April 1938; 1 ♂ 62 mm, HOLOTYPE; formerly det. Tweedie *Chlorodopsis pilumnoides* (NUS 1965.11.11.147)—Sultan Shoal; coll. M. W. F. Tweedie, December 1933; 1 ♀ 61 mm, PARATYPE (NUS 1965.11.11.149)—Sentosa Reef; coll. P. K. L. Ng, 13 December 1989; 2 ♂ 44–37.5 mm, 1 ♀ 32.5 mm, PARATYPES (NUS 1989.3428–3430). Tekek Bay, Pulau Tioman, Malaysia; coll. P. K. L. Ng, June 1983; 1 ♂ 58 mm, PARATYPE (NUS 1985.1506).

Edam Is. (Damar Besar), Djakarta, Java, Indonesia; coll. J. Brock; 2 ♂ 23–21 mm, PARATYPES; formerly det. De Man as *Ch. melanochira*; Ex. Museum Göttingen (SMF 592a) (part).

Remarks

Specimens referred to by Balss (1938b), Tweedie (1950a) and Guinot (1958) as *P. pilumnoides*, and by McNeill (1968) as *P. nigrocrinitus* (part) pertain to *P. concors* sp. n. *Pilodius concors* sp. n. is morphologically similar to *P. maotieni*, *P. cephalalgicus* sp. n. and *P. pilumnoides* in having 1L–5L with conical tubercles, but it differs from these species by having the lower external surface of the cheliped smooth. The pleopods can also be used to separate these species.

Etymology

From the Latin *concors*, to be of one mind, for the authors' decade of scientific cooperation. Gender masculine.

Distribution

Off the southern coast of Vietnam (South China Sea) to the northwest coast of Queensland, Australia (Fig. 18).

Type status

Type series extant and the holotype is deposited in the National University of Singapore. Type locality is Horsburgh Lighthouse, Singapore, South China Sea.

***Pilodius flavus* Rathbun, 1894**
(Figs 4A–G, 32B, 40D, 41A)

Pilodius flavus Rathbun, 1894: 239, 1906: 860, fig. 21; Edmondson, 1925: 43; Balss, 1938a: 57; Miyake, 1939: 215.

Chlorodopsis flava: Serène and Luom, 1959: 330, fig. 2C, 5F, pl. IB, pl. IIIB.

Chlorodopsis melanospinis Rathbun, 1911: 226, pl. 18 fig. 11; Balss, 1938a: 62; Serène and Luom, 1958: 108, pl. I, fig. D, pl. III, fig. b, pl. IV, fig. c, 1959, fig. 2M.

Pilodius melanospinis: Guinot, 1964b: 67, 1967: 268; Serène, 1968: 80 (list), 1984: 242, figs 143e, 146, pl. XXXIII E; Dai and Yang, 1991: 329, pl. 43(4), fig. 166(1).

Pilodius pubescens: De Man, 1902: 619. **non** Dana, 1852.

?*Pilodius pubescens*: Nobili, 1907: 395. **non** Dana, 1852.

Chlorodopsis melanodactylus: Miers, 1884: 531 (part).

Chlorodopsis pilumnoides: Laurie, 1906: 406. **non** White, 1848.

Chlorodopsis hawaiiensis Edmondson, 1962: 273, fig. 21a–e.

Description

Regions of carapace well defined, 2M partly divided into two longitudinally, granulose, granules conical, prominent laterally, dorsal surface covered with long bristly setae. Two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes broad, denticulate, separated by 'U'-shaped emargination, lateral lobes small, bluntly triangular. Extraorbital angle prominently spinose. Anterolateral margin quadridentate, teeth distinct, spinose, second and third teeth often with ancillary spines. Anterior margin of cheliped merus spinose. External surface of cheliped carpus with long conical tubercles, setose. External surface of chela with large tubercles, conical near upper margin, rounder medially, lower margin smooth. Pereiopods with long bristly setae, merus, carpus, propodus with produced slender spines on superior margin.

*Material examined**Indian Ocean*

Aldabra; coll. *Calypso* 1954; 1♂ 8 mm; formerly *Pilodius melanospinis* det. D. Guinot, 1964 (MNHN MP B.13733)—1♀ 9 mm; formerly *Pilodius melanospinis* det. D. Guinot, 1964 (MNHN MP B.13734). coll. A. J. Bruce; 1♀ 8.5 mm; formerly *Pilodius melanospinis* det. R. Serène (MNHN MP B.8015).

Sta. 191, Etoile Is., Amirante Group; coll. P. R. W. Coppinger, HMS *Alert*, April 1882, 13 fms; 2♂ 14–8.5 mm, 1♀ ovig. 9 mm, 1♀ 10 mm; formerly *Chlorodopsis melanodactylus* det. Miers (NHM 1882: 24).

Saya de Malha Bank, (c. 10°30'S, 61°30'E), Western Indian Ocean; coll. J. S. Gardiner, *Sealark*, 1905, 26–29 fms; 1♂ 13 mm, 1♀ 13 mm, 3 juv.; formerly *Chlorodopsis melanospinis* det. Rathbun, types; pres. Gardiner (NHM 1912.2.10.53–57). Sta. C.19, Saya de Malha Bank (c. 10°30'S, 61°30'E), Western Indian Ocean; coll. J. S. Gardiner, *Sealark*, 7 September 1905, 29 fms; 1♂ 17 mm, 1♀ 12 mm, 3 juv.; formerly *Chlorodopsis melanospinis* det. M. J. Rathbun, types (USNM 41268). Sta. C.16, Saya de Malha Bank, (c. 10°30'S, 61°30'E), Western Indian Ocean; coll. J. S. Gardiner, *Sealark*, 6 September 1905, 26 fms; 1♀ 15 mm, 6 juv.; formerly *Chlorodopsis melanospinis* det. M. J. Rathbun; types; (UMZC Aug. 7, 1910).

Mauritius; coll. Peyrot-Clausade 1974; 3♂ 9–7.5 mm, 3♀ ovig. 10–8.5 mm, 1♀ 9.5–9 mm; formerly *Pilodius melanospinis* det. R. Serène; (MNHN MP B.6696).

Ceylon (Sri Lanka); coll. W. A. Herdman; 7♂ 15–7 mm, 4♀ ovig. 14–11 mm, 6♀ 11–7 mm; formerly *Chlorodopsis pilumnoides* det. R. D. Laurie; pres. W. A. Herdman (NHM 1907.5.22.241–45). Colombo, Sri Lanka; Ex. Colombo Museum; 1♂ 12 mm (NUS 1970.1.20.2.).

Southeast Asia

Macclesfield Bank (c. 15°50'N, 114°20'E), South China Sea; coll. P. Bassett-Smith, HMS *Egeria*, 44 fms; 1♂ 12 mm; pres. Lords of the Admiralty (NHM 1893.11.3.45)—32–44 fms; 1♂ 8.5 mm; det. H. Balss June 1932 (NHM 1893.11.3.102)—HMS *Penguin*; 3♂ 10–8 mm, 1♀ 11 mm, 2 juv. (NHM 1932.7.7.29).

Pearl Bank, 2 mls and 349° from Zal Is., Sulu Archipelago; coll. B. R. Wilson, *Pele*, 10 fms, 22/2/1964; 1♂ 13 mm, 1♀ 13 mm ovig., 1♀ 8 mm (MNHN MP B. 10485).

Ternate, Moluccas, Indonesia; coll. W. Kükenthal, 1894; 1♂ 11.5 mm, 1♀ 11 mm ovig. (SMF 19984).

Arafura Sea; coll. P. Bassett-Smith; HMS *Penguin*; 1♂ 14 mm; pres. Lords of the Admiralty (NHM 1932.7.7.29).

Australia

Wreck Reef, nr Porpoise Cay, Queensland; coll. J. Short and S. Mullens, 11 May 1988, 12 m; 1♂ 12 mm (QM W. 15157).

Pacific Ocean

Nouvelle Calédonie; Lagon, Sta. 67, Baie de Prony, Ile Ouen, 22°26'S, 166°29'E; coll. B. Richer de Forges, ORSTOM, 21 m; 1 ♂ 11 mm (MNHN no reg.)—Sta. 343, Grand Récif Sud, 22°49'S, 166°48'E; 32 m; 1 ♂ 24 mm (MNHN no reg.)—Sta. 480, Lagune Nord, 18°56'S, 163°29'E; 2 March 1985, 31 m; 1 ♂ 13 mm (MNHN no reg.)—Sta. 554, Grand Récif Sud, 22°50'S, 166°55'E; 16 July 1985, 27 m; 1 ♂ 13 mm (MNHN no reg.).

Hawaiian Is.; Sta. 189, 1.5 miles off Pokai Bay, Oahu; coll. Pele Exp., 30 August 1959; 1 ♂ 10 mm; formerly *Chlorodopsis hawaiiensis* det. Edmondson (BBM S 7043)—Anahole, Kauai; coll. Pele Exp., September 1959; 1 ♀ 10.5 mm; formerly *Chlorodopsis hawaiiensis* det. Edmondson (BBM S 6878). NW Hawaiian Is.; Pearl and Hermes Reef; coll. Pietschmann, February 1928; 1 ♂ 14 mm (BBM S 3047)—French Frigate Shoals; coll. Thaanum, June 1923; 1 ♂ 11 mm, 1 ♀ 12 mm (BBM S 1287). Hawaiian Is.; Sta. 3469, Kaiwi Channel, 21°14'51"N, 157°43'30"W; coll. *Albatross*, 1891, 14 fms; 1 ♀ 9 mm; det. M. J. Rathbun, HOLOTYPE (USNM 17317)—Sta. 3970, French Frigate Shoal; coll. *Albatross* Hawaiian Exploration, 1902, 29 May 1902; 1 ♀ 10.5 mm; det. M. J. Rathbun (USNM 29536)—Sta. 3968, French Frigate Shoal; 1 ♀ 10.5 mm (USNM 29535)—Sta. 4150; Modu, Manu Is. 5 August 1902; 1 ♀ 9 mm (USNM 29539)—Sta. 4148; 1 ♀ 13 mm, 1 juv. (USNM 29538)—Sta. 4158; 1 ♀ 13 mm, 1 juv. (USNM 29540)—Sta. 4159; 7 August 1902; 1 ♀ 10 mm (USNM 29541)—Sta. 4162; 8 August 1902; 1 ♀ 13 mm (USNM 29542).

Remarks

Rathbun (1911) noted that *Chlorodopsis melanospinis* resembled *Pilodius flavus*, but its carapace was not as deeply areolated and devoid of spines on the dorsum and upper margin of the orbit. In contrast, Serène (1984) regarded the differences in areolation as difficult to appreciate, but the presence or absence of spines on the orbital margin as providing a good character for differentiation. He further commented that for the males of these two species the pleopods were of the same type (Serène and Luom, 1959: fig. 2c, m). A study of the male chelipeds by Serène led him to conclude that the black coloration extends further back on to the propodus in the case of *P. flavus*, but not all in the case of *Ch. melanospinis*. After examination of *Pilodius flavus* and *Chlorodopsis melanospinis* specimens, we regard them as one species. We agree with some of the observations made by Serène, i.e. that differences in areolation are not significant and that pleopod morphology is identical, but after examination of a large number of specimens the difference in the spinulation of the orbital margin as originally described by Rathbun appears to be just variation. Furthermore, the coloration of the male chelipeds is the same in both species, with the larger cheliped of the male appearing to develop in specimens > 12 mm carapace width. The *P. pubescens* of De Man (1902) were deposited in Senckenberg Museum and were examined by Balss (1938a), who redetermined them as *P. flavus*. Balss (1938a) also considered the material that Nobili (1907) tentatively identified as ?*P. pubescens* as *P. flavus*. During this study, material identified by Edmondson (1962) as *Chlorodopsis hawaiiensis* was examined and proved to be *P. flavus*.

Distribution

From Aldabra Is., Indian Ocean to Hawaiian Is., Pacific Ocean (Fig. 19). Not recorded from the coast of east Africa or the Red Sea.

Type status

Holotype is extant, see material examined, United States National Museum, Smithsonian Institution. Type locality, off Sandwich Is. (Hawaii), 21°14'51"N, 157°43'30"W.

Pilodius granulatus Stimpson, 1859

(Figs 5A–G, 33A, 41B)

Pilodius granulatus Stimpson, 1859: 34, 1907: 58, pl. VII, fig. 2.*Chlorodopsis granulatus*: Miers, 1884: 216 (part), plate XXI, fig. a'.*Chlorodopsis philippinensis* Ward, 1941: 11.*Pilodius serenei* Miyake and Takeda, 1968: 393, figs 3, 4; Takeda and Nunomura, 1976: 62 (list), 73.non *Chlorodopsis granulatus*: Miers, 1884: 216, pl. XXI, fig. A (part); Sakai, 1936a: 164, pl. 49, fig. 1, 1939: 503, fig. 41, pl. 62, fig. 1, 98, fig. 6; Serène and Luom, 1959: 307, fig. 1A, fig. 2E, F, pl. I, fig. D, pl. III, fig. c, F = *Pilodius miersi* Ward, 1936.non *Chlorodopsis granulatus*: Nobili, 1907: 46 = *Pilodius paumotensis* Rathbun, 1907.non *Pilodius granulatus*: Sakai, 1965: 148, pl. 73, fig. 6, 1976: 460, pl. 164, fig. 3; Serène, 1984: 240; Dai *et al.*, 1986: 306, pl. 43(3), fig. 165B(2); Dai and Yang, 1991: 329, pl. 43(3), fig. 165B = *Pilodius miersi* Ward, 1936.*Description*

Regions of carapace well defined, separated by wide, smooth grooves, areoles granular, set with tufts of setae. 2M divided into two longitudinally. 1P uniformly granulate; two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes rounded, denticulate, separated by 'V'-shaped emargination, lateral lobes triangular, denticulate. Anterolateral margin quadrispinose, teeth multispinose. Anterior margin of cheliped merus tuberculate. External surface of cheliped carpus with large tubercles, minutely setose, wide furrow parallel with palmar joint. External surface of chela with large tubercles, conical near upper margin, rounder medially, lower margin smooth. Pereiopods setose, merus, carpus distinctly spinose on superior margin.

*Material examined**Southeast Asia*

Tolo Harbour, Hong Kong, South China Sea; coll. *Albatross*, Philippine Expedition 1907–8, 2–6 fms; 1 ♀ 10 mm; det. F. A. Chace (USNM 152640).

No. 201, Singapore; coll. R. W. Coppinger, HMS *Alert*; pres. Lords of the Admiralty; 1 ♂ 11 mm; formerly *Chlorodopsis granulatus* det. E. J. Miers, *Chlorodopsis melanochirus* det. H. Balss, 1934 (NHM 1882.24). No locality; coll. D. S. Johnson; 9 ♂ 12–7 mm, 1 ♀ 8 mm (NUS 1985:1142–1151)—1 ♂ 11 mm (NUS 1985:1152). Reef flat at Baran Darat, Singapore; coll. D. S. Johnson, 2 December 1952; 2 ♂ 8–7.5 mm, 2 ♀ ovig. 9–7 mm, 2 ♀ 7–6 mm (NUS 1985:1125–11300)—Lower Beach, Labrador; 7 December 1953; 1 ♂ 5 mm (NUS 1985:13110)—Lower Beach, Labrador; 7/12/53; 1 ♂ 5 mm (NUS 1985:1311)—Pulau Hartu; 21 November 1953; 1 ♀ ovig. 7 mm, 3 ♀ 10–5.5 mm (NUS 1985:1138–1141)—Pulau Pawai; 2 ♂ 7.5–7 mm, 1 ♀ 6 mm ovig. (NUS 1985:1135–1137)—Raffles Lighthouse; 12 November 1958; 2 ♂ 13–9.5 mm, 1 ♀ 10.5 mm (NUS 1970.3.13.1153–1155)—6 March 1985; 1 ♂ 10 mm, 1 ♀ ovig. 6 mm, 1 ♀ 6.5 mm (NUS 1985.1122–1124). Sultan Shoal, Singapore; coll. 1933; 3 ♂ 11–7.5 mm, 3 ♀ 10–7 mm (NUS 1977.7.5.26–310). Pulau Senang, Singapore; coll. M. W. F. Tweedie, November 1934; 5 ♂ 11–9.5 mm, 5 ♀ 10–8 mm (NUS

1965.11.11.80–89)—Raffles Lighthouse; July 1937; 6♂ 14–9 mm, 1♀ 9 mm (NUS 1965.11.11.119–125)—Horsburg Lighthouse; 1936; 1♂ 10 mm; formerly *Pilodius sakitensis* (manuscript name) det. R. Serène (NUS 1969.11.24.12)—1♀ 9 mm (NUS 1969.11.24.13). Pulau Hartu, Singapore; coll. P. Ng, March 1984; 1♂ 10 mm, 1♀ ovig. 9 mm, 1♀ 9 mm (NUS 1987:2525–2527)—Pulau Kukor; 30/12/86; 2♂ 10–9.5 mm, 3♀ 9–8 mm (NUS 1987:2533–2537)—Pulau Kukor; 1♂ 9 mm, 1♀ ovig. 8 mm, 2♀ 9–6 mm (NUS 1987:2538–2541)—1♂ 8 mm, 1 juv. (NUS 1987:2542–2543)—Sentosa Reef; June 1983; 1♀ ovig. 7.5 mm (NUS 1985:1875)—1♂ 10 mm; (NUS 1985:1786)—December 1985; 1♀ 9 mm (NUS 1987:2531)—Labrador; 1980; 1♂ 9.5 mm (NUS 1985:1502)—Labrador Beach; February 1987; 2♂ 10–6 mm, 2♀ 8–7 mm, 4 juv. (NUS 1987:2544–2551). Pulau Jong, Singapore; coll. Beverly Goh, 26 August 1986; 1♀ 6 mm (NUS 1987:2529)—24 October 1986; 1♂ 8 mm (NUS 1987:2530).

Gulf of Davao, Mindanao, Philippines; coll. Mr Godfred R. Oesch, 8 March 1936; 1♂ 9.5 mm, 1♀ ovig. 7 mm; formerly *Chlorodopsis philippinensis* det. Ward; Types (AMNH 8376)—28 June 1936; 1♂ 9.5 mm, 1♀ ovig. 7 mm (AMNH 8319)—6 July 1936; 1♀ ovig. 9 mm; 1♀ 9 mm (AMNH 8298)—coll. Dr William G. van Name, 14 November 1937; 1♂ 8 mm (AMNH 8581)—1♂ 10 mm (AMNH 8340). Palawan; coll. R. Serène, June 1963; 1♂ 10 mm (MNHN MP B.6781).

Ngadarak reef, Palau Is. (7°17'30"N, 134°28'30"E); coll. 22–31 May 1939; 1♂ 11 mm; formerly *Pilodius serenei* det. Miyake and Takeda; HOLOTYPE (ZLKU 2979)—1♂ 9 mm; formerly *Pilodius serenei* paratype (ZLKU 2980).

Pulau Soegi, nr Sumatra, Indonesia; coll. M. W. F. Tweedie, 1936; 5♂ 11–9 mm, 6♀ 8.5–7 mm; formerly *Pilodius sakitensis* (manuscript name) det. Serène (NUS 1969.11.24.1–11). Indonesia; 5♂ 10–8.5 mm (NUS 1969.11.22.7–11). Pulau Sakit, Indonesia; coll. R. Serène, 1963; 1♂ 11 mm; formerly *Pilodius sakitensis* (manuscript name) det. Serène (NUS 1969.11.24.17)—1♂ 11.5 mm; formerly *Pilodius sakitensis* (manuscript name, type) (NUS 1969.11.24.16).

Arafura Sea; coll. P. Bassett Smith, HMS *Penguin*; pres. Lords of the Admiralty; 1♀ 9 mm (NHM 1932.7.7.30).

Australia

Lizard Is., Queensland; coll. P. Davie and J. Short, 24 May 1987, 1.5 m; 1♂ 13 mm (QM W. 15469). No. 176, Port Darwin, Northern Territory; coll. R. W. Coppinger, HMS *Alert*, May 1881; pres. Lords of the Admiralty; 1♂ 10 mm (NHM 1882.7).

No locality; 1♂ 11 mm (SMF 7131).

Remarks

Stimpson (1859: 34) described this species only briefly, without reference to a figure. Miers (1884: 216) identified Stimpson's species as *Chlorodopsis granulatus* from material collected in Singapore and Australia, and gave a full description of the male specimen from Port Molle (no. 95), Australia, which was figured (plate XXI fig. A, a). After the death of Stimpson in 1872, his report on the Crustacea (Brachyura and Anomura) collected by the North Pacific Exploring Expedition 1853–56, was discovered and Rathbun, realizing the importance of the historical document,

published the manuscript (Stimpson, 1907). In this paper Stimpson gave an extended description of *P. granulatus* and figured (plate VII, fig. 2) the type from Hong Kong Is. The male cheliped coloration figured and described by Stimpson differs from that of Miers, and this has caused much confusion. Stimpson (1907: 59) described the male cheliped of *P. granulatus* as possessing a broad encircling band of brown near the bases of the fingers. His figure does not show this brown band present on the dorsal margin of the propodus, i.e. the coloration does not circumvent the palm of the cheliped. Miers described cheliped colour variation in the HMS *Alert* material collected by R. W. Coppinger from Australia. The cheliped of the male from Port Molle (no. 95) had fingers coloured deep brown, and this coloration extended over the greater part of the inner and outer surfaces of the palm (see Miers, plate XXI, fig. a). The coloration encompasses the palm of the male cheliped. This type of cheliped was exhibited by another male from Port Molle (no. 103). Miers further described a male from Port Darwin as a variety (see plate XXI, fig. a'). Re-examination of this specimen revealed that the faded coloration pattern of the cheliped propodus was identical to that of *P. granulatus* Stimpson, 1859. The HMS *Alert* material from Australia consists of two species, *P. granulatus* Stimpson and a new species, subsequently described by Ward (1936: 4) as *P. miersi*. In the reference collection of the National University of Singapore are type specimens attributed to *Pilodius sakitensis* by Serène. However, this name appears only in a manuscript found by Crosnier, Paris Museum, and the type material is here ascribed to *P. granulatus*. Specimens of *Chlorodopsis philippinensis* Ward (1941), *Pilodius philippinensis* Serène (1971) and *P. serenei* Miyake and Takeda (1968) were examined during this present study and all are identified as *P. granulatus*.

Distribution

From Hong Kong and Singapore to the east coast of Queensland, Australia (Fig. 20).

Type status

The Type of *Pilodius granulatus* Stimpson is no longer extant (Manning, personal communication), it was destroyed in the Chicago fire of 1871. Type locality Hong Kong.

Pilodius maotieni Serène, 1971

(Figs 6A–G, 33B, 41C)

Chlorodopsis pilumnoides: Serène and Luom, 1958: 102 (part), pl. IC, IIIa, IVB; 1959: 302 (part), fig. 2A, 5G, pl. 3A. **non** White, 1848.

Pilodius maotieni Serène, 1971: 913; 1984: 238, fig. 152.

Description

Regions of carapace well defined, separated by wide, smooth grooves. 2M divided into two longitudinally. Areoles granular, set with short, dark, coarse setae interspaced with longer, finer ones. On 1L–5L granules larger, conical, apically cornute. Transverse row of adjoining pearliform granules on 1P; two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes rounded, denticulate, separated by 'V'-shaped emargination, lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth multispinose. Anterior margin of cheliped merus tuberculate. External surface of cheliped carpus with dark conical tubercles, setose. External surface of chela with dark tubercles, large,

conical, well spaced near upper margin, smaller, rounder and closer set inferiorly. Lower margin smooth. Pereiopods setose, merus, carpus distinctly spinose on superior margin.

Material examined

Southeast Asia

Vietnam; 1 ♂ 20 mm; formerly *Chlorodopsis pilumnoides* det. Serène and Luom (OINT E.41.911, Rte 1850)—coll. Nguyen Van Luom, 5 May 1958; 1 ♀ 16 mm (OINT E.41.912, Rte 1850)—1 ♀ 16.5 mm; reg. E.41.913, Rte 1850—1 ♀ ovig. 16 mm (OINT E.41.914, Rte 1850). 1 ♂ 14 mm (OINT E.42.210, Rte 1863). coll. Serène; 1 ♂ 17 mm; formerly *Chlorodopsis pilumnoides* det. Serène and Luom (MNHN E.34.581, MP B.9312)—1 ♂ 5 mm (MNHN E.42.161, MP B.9388)—1 ♂ 7 mm (MNHN E.42.763)—Baie de Nhatrang; 1 ♂ 17 mm. HOLOTYPE; coll. Serène and Luom, 1959 (MNHN E.41.915, MP B.9313).

Indochine; 1 ♀ 10 mm (MNHN E.1573, MP B.9411).

Macclesfield Bank; coll. P. Bassett-Smith, HMS *Penguin*, 25–28 fms; 1 ♂ 18 mm, 1 ♀ ovig. 16 mm (NHM 1892.8.28.238–40); HMS *Egeria*, 44 fms; 1 ♂ 20 mm (NHM 1893.11.3.45–6).

Pearl Bank, 2 mls and 349° from Zal Is., Sulu Archipelago; coll. B. R. Wilson, *Pele*, 10 fms, 22/2/1964; 1 ♂ 16 mm (MNHN MP B.10485).

Pacific Ocean

Sta. 483, Lagon Nord, 19°01'S, 163°32'E, Nouvelle-Calédonie; coll. B. Richer de Forges, ORSTOM, 2 March 1985, 33 m; 1 ♂ 21 mm (MNHN no reg.).

Remarks

Serène (1971: 913) described *P. maotieni* from a specimen originally determined by Serène and Luom (1958, 1959) as *C. pilumnoides*. The pleopod of *P. maotieni* was illustrated by these authors (1958, pl. IVb, 1959, fig. 2A) and Serène (1948: 238, fig. 152).

Distribution

Eastwards from Nhatrang, Vietnam to New Caledonia (Fig. 21). Not recorded from the Indian Ocean.

Type status

Holotype is extant, see material examined Muséum national d'Histoire naturelle, Paris. Type locality, Nhatrang, Vietnam.

Pilodius miersi (Ward, 1936)

(Figs 7A–G, 34A, 41D)

Chlorodopsis miersi Ward, 1936: 4, pl. II, figs 1–3.

Chlorodopsis granulatus: Miers, 1884: 216 (part), pl. XXI, fig. A, a; Sakai, 1956: 40 (Appendix). **non** Stimpson, 1859.

Chlorodopsis granulata: Sakai, 1936a: 164, pl. 49, fig. 1, 1939: 503, Text-fig. 41, pl. LXII, fig. 1, pl. XCVII, fig. 6; Serène and Luom, 1959: 307, fig. 1A, fig. 2E, F, pl. I fig. D, pl. III fig. C, F. **non** Stimpson, 1859.

Pilodius granulatus: Sakai, 1965: 148, pl. 73, fig. 6, 1976: 460, pl. 164, fig. 3; Dai *et al.*, 1986: 306, pl. 43(3), fig. 165(B); Dai and Yang, 1991: 329, pl. 43(3), fig. 165B(2). **non** Stimpson, 1859.

Pilodius luomi Serène, 1971: 913, 1984: 240.

Description

Regions of carapace well defined, 2M divided into two longitudinally, 3M tripartite, anterior lobe surpassing anterior margin of 2M. Areoles with rounded granules, minutely setose. 1P uniformly granulate; two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes arched, denticulate, denticles diminishing in size laterally, separated by 'U'-shaped emargination, lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth basally tuberculate, apical spine curved. Anterior margin of cheliped merus tuberculate. External surface of cheliped carpus with clustered granules, furrow parallel with palmar joint. External surface of chela with conical tubercles on upper margin, diminishing in size inferiorly, lower margin smooth. Pereiopods setose, merus, carpus with conical tubercles on superior margin.

Material examined

Japan

Kushimoto, Japan; coll. Kono, 23 February 1970; 1♂ 13 mm, 1♀ 9.5 mm; det. *Pilodius pilumnoides* by T. Sakai (SWU TS. 00006). Magari-Zaki, Japan; coll. 13 August 1956; 4♂ 10–7 mm, 1♀ 8 mm; det. *Pilodius granulatus* (SWU TS. 00025).

Southeast Asia

Vietnam; coll. R. Serène; 1♂ 10 mm; formerly *Chlorodopsis granulatus* det. R. Serène; reg. (MNHN MP B.9391; formerly E.42.206).

Horsburgh Lighthouse, off Singapore, South China Sea; coll. April 1934; 3♂ 8 mm, 3♀ 9–8 mm; formerly *Pilodius luomi*, det. R. Serène; paratypes (NUS 1965.11.11.39–44). Pulau Kukor, Singapore; coll. P. Ng, 30 December 1986; 2♂ 10–9.5 mm, 3♀ 9.5–9 mm (NUS 1987:2533–2537)—Pulau Kukor; 1♂ 9 mm, 3♀ 9–6 mm (NUS 1987:2538–2541)—1♂ 8 mm, 1 juv. (NUS 1987:2542–2543)—Pulau Hantu; March 1984; 1♂ 10 mm, 1♀ ovig. 9 mm, 1♀ 9 mm (NUS 1987:2525–2527)—Sentosa; 1♂ 10 mm (NUS 1985:1786)—Sentosa; December 1985; 1♀ 9 mm (NUS 1987:2531)—Labrador Beach; February 1987; 2♂ 10–6 mm, 2♀ 8–7 mm, 4 juv. (NUS 1987:2544–2551). Pulau Jong, Singapore; coll. Beverly Goh, 24 August 1986; 1♂ 8 mm (NUS 1987:2530)—26 August 1986; 1♀ 6 mm (NUS 1987:2529).

Grande Is., off Southern Luzon, Philippines; coll. *Albatross*, Philippine Expedition 1907–8, 8 January 1908; 1♀ 10–8.5 mm; formerly *Chlorodopsis granulatus*, det. M. Ward (USNM 65288)—Jolo Lt., Jolo; 29 fms, 15 January 1908; 2♀ 11–9.5 mm (USNM 65291)—Sta. 5159, Tinakta Is., Sulu Archipelago; 10 fms, 21 February 1908; 1♂ 9 mm, 2♀ 8 mm (USNM 65290)—Sta. 5559, Cabalian Point, Jolo Is.; 13 fms, 18 September 1909; 1♀ 13 mm; det. M. Ward (USNM 65287).

Australia

Geoffrey Bay, Magnetic Is., Queensland; coll. D. R. Fielder, 20 June 1963; 1 ♂ 10 mm (AM P 16505). Hayman Is., Whitsunday Group, Queensland; coll. F. A. McNeill, May 1933; 1 ♂ 13.3 mm (AM P 10411). Lindeman Is., Queensland; M. Ward exchange; 1 ♂ 12.5 mm; formerly *Chlorodopsis miersi* det. M. Ward; types (NHM 1940.2.23.4)—2 ♂ 17–15 mm, 2 ♀ 15 mm types (NHM 1937.7.15.21–23). No. 95, Porto Molle, Queensland; coll. R. W. Coppinger, HMS *Alert*, May 1881; 1 ♂ 14 mm, 1 ♀ 12 mm; formerly *Chlorodopsis granulatus* det. E. J. Miers, *Chlorodopsis melanochirus* det. H. Balss 1934, *Chlorodopsis miersi* det. M. Ward (NHM 1881:31)—no. 103; 3 ♂ 12–7 mm (NHM 1881:31). Southern side of Seaforth Is., near Lindeman Is., Queensland; coll. P. Davie and J. Short, 24 March 1987; 1 ♂ 13 mm (QM W. 14404); 2 ♀ 12–9 mm (QM W. 14405)—Home Beach; 25 March 1987; 3 ♂ 10.5–10 mm; det. J. Short (QM W. 14417)—Coconut Beach; 26 March 1987; 1 ♂ 12 mm (QM W. 14512)—2 ♂ 12–10 mm, 4 ♀ 10.5–8 mm, 5 juv. (QM W. 12934)—1 ♀ 12 mm (QM W. 14466).

Remarks

Miers (1884: 216) identified material from Australia, collected by HMS *Alert*, as *Chlorodopsis granulatus* (Stimpson). Examination of the specimens revealed the presence of two species, *Pilodius granulatus* Stimpson (plate XXI, fig. a') and a new species (plate XXI, fig. A, a), later described by Ward (1936: 4) as *P. miersi*. The cheliped figured by Miers (plate XXI, fig. A, a) features pigmentation that encompasses the propodus, and corresponds exactly with the type material of Ward (NHM reg. 1937.7.15.21–23, 1940.2.23.4) from Lindeman Is., Queensland, Australia. Figures by Sakai and by Serène and Luom under the name of *P. granulatus* are of *P. miersi*. *P. luomi* paratypes of Serène (1971: 913, 1984: 240) deposited in the National University of Singapore (reg. 1965.11.11.30–44) were examined and the pigmentation pattern of the male chelipeds matches the *P. miersi* of Ward. Further, Dai and Yang's illustration (1991: 328, pl. 43(3), fig. 165B.2) of the first pleopod and their description of the cheliped manus with a black circular band, pertain to *P. miersi* not to *P. granulatus*.

Distribution

Singapore eastwards to Queensland, Australia and Japan (Fig. 22). Not recorded from the Indian Ocean.

Type status

Type series is extant, see material examined in the Natural History Museum. Type specimens in the Australian Museum, Sydney were not examined. Type localities are cited as Singapore and Lindeman Is., Queensland, Australia.

***Pilodius moranti* sp. n.**
(Figs 8A–D; 34B, 42A)

Description

HOLOTYPE male. Regions of carapace well defined, 2M divided into two longitudinally, smooth furrows dividing setose granulate areoles, granules more prominent laterally. 1P uniformly granulate; sinuous transverse row of adjoining pearliform granules on 2P. Submedian frontal lobes arched, minutely denticulate, medially produced, separated by narrow sinus, lateral lobes triangular, granulate. Anterolateral

margin quadridentate, teeth multispinose, two median teeth wider, more prominent. Anterior margin of cheliped merus proximally tuberculate. External surface of cheliped carpus with two setae-fringed furrows parallel with palmar joint. External surface of chela closely set with conical tubercles, smaller, obsolescent inferiorly, lower margin smooth, longitudinal furrow proximally near upper margin. Pereiopods thickly fringed with long setae; merus, carpus prominently spinose on superior margin. Posterior surface of pereopodal carpus medially with deep setae-fringed furrow, its borders granulate.

Etymology

This species is named for Harry Morant, Australian bushman, poet and soldier, who, in spite of being innocent, was executed during the Boer War in Pietersburg on 27 February 1902. Gender masculine.

Material examined

Australia

Wreck Reef, nr Porpoise Cay, Queensland; coll. J. Short and S. Mullens, 10 May 1988, 0.5 m; 1♂ 21 mm; PARATYPE (QM W. 15454)—14 May 1988; 4♂ 16.5–9 mm; PARATYPES (QM W. 15456)—2♀ 19–14 mm; PARATYPES (QM W. 15142)—1♂ 24 mm; PARATYPE (QM W. 15143)—0.5 m; 1♀ 22 mm; PARATYPE (QM W. 15455).

NE coast of Australia?; coll. Mr Rayner, Surgeon, HMS *Herald*; 1♂ 12.5 mm, 1♀ 13 mm; PARATYPES; purch. Mr Warwick (NHM 1862.53). Lord Howe Is., New South Wales; coll. P. R. Redley, April 1910; 1♂ 24 mm; HOLOTYPE (AM P. 2371)—coll. Icely, 1889; 1♂ 27.5 mm; PARATYPE (AM P. 366).

Middleton Reef, Tasman Sea; coll. J. Short and R. McKay, 9 May 1987; 1♀ 20 mm; PARATYPE (QM W. 13025)—1♀ 9 mm. PARATYPE (QM W. 13026).

Remarks

Pilodius moranti keys out as close to *P. granulatus* and *P. spinipes* in having 1L–5L lacking conical tubercles, but it differs from these two species because the carpus of the cheliped has two anterior furrows. These three species have distinct pleopods.

Distribution

Only recorded from the east coast of Queensland, Australia and the Tasman Sea. (Fig. 23).

Type status

Type series is extant and deposited in the Queensland Museum, Australia.

Pilodius nigrocrinitus Stimpson, 1859

(Figs 9A–G, 35A, 42B–C)

Pilodius nigrocrinitus Stimpson, 1859: 34, 1907: 58, pl. 7, fig. 1a, b; Balss, 1938a: 57; Forest and Guinot, 1961: 89; Sakai, 1965: 148, pl. 73, fig. 5; McNeill, 1968: 73 (part); Sakai, 1976: 461, text-fig. 248a, b, pl. 164, fig. 2; Takeda and Nunomura, 1976: 73; Serène, 1984: 239; Dai *et al.*, 1986: 307, pl. 43(5), fig. 166(2); Dai and Yang, 1991: 330, pl. 43(5), fig. 166(2). *Chlorodopsis nigrocrinitus*: Urita, 1926: 11.

Chlorodopsis nigrocrinita: Sakai, 1936a: 163, pl. 49, fig. 2, 1939: 504, text-fig. 42, pl. LXII, fig. 2, XCVII, fig. 2; Tweedie, 1950a: 92; Sakai, 1956: 40 (Appendix); Guinot, 1958: 179, fig. 24a, b; Serène and Luom, 1958: 112, pls IIA, IIIe, IVe, 1959: 304, figs 2B, 5B, pl. IA; Sakai, 1960: 70, pl. 35, 2.

Chlorodopsis melanochirus A. Milne Edwards, 1873: 228, pl. VIII, fig. 5; Haswell, 1882: 55; Ortmann, 1893: 471; Nobili, 1899: 30; Stephenson *et al.*, 1931: 59; Ward, 1932: 251.

Chlorodopsis melanochira: De Man, 1887b: 281, 1892: 278, 1895: 520; Alcock, 1898: 168; De Man, 1902: 624, 1929: 1 (list); Serène and Luom, 1958: 117, pls IIB, IIIId, IVd; Forest and Guinot, 1961: 89.

Chlorodopsis pilumnoides: Sankarankutty, 1962: 138, figs 38, 39. **non** White, 1848.

Pilodius spinipes: McNeill, 1968: 74. **non** Heller, 1861.

non *Pilodius nigrocrinitus*: McNeill, 1968: 73 (part)=*P. concors* sp. n.

Description

Regions of carapace well defined, covered with coarse dark setae. 2M partly divided into two longitudinally, minutely granulate, granules more prominent laterally. 1P uniformly granulate; sinuous transverse row of adjoining pearliform granules on 2P. Submedian frontal lobes arched, minutely denticulate, separated by 'U'-shaped indentation; lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth multispinose, spines subequal, cornute. Anterior margin of cheliped merus tuberculate, tubercles diminishing in size distally. External surface of cheliped carpus coarsely setose, with cornute conical tubercles, lacking longitudinal furrow parallel with palmar joint. External surface of chela coarsely setose proximally, with conical tubercles proximally, smaller, obsolescent inferiorly, lower margin smooth. Pereiopods thickly fringed both with plumose setae and dark coarse setae, merus, carpus prominently tuberculate on superior margin.

Material examined

Indian Ocean

Goh Phuket, Thailand, Andaman Sea; coll. Gallardo, 4 February 1966; pres. R. Serène; 1♂ 10 mm (USNM 184261).

Great Cocos Is.; coll. *Investigator*; 1♂ 13.5 mm; pres. Indian Museum (UMZC Oct. 17, 1900, 28).

Southeast Asia

Sta. 15, Tilok Kehe, Perhentian Besar, 6°55'N, 102°45'E, Malaysian Peninsula; coll. R. Serène, 21/7/65; 1♀ 8 mm (MNHN MP B.24033). Aor Is. (Pulau Aur), Malaysia, South China Sea; coll. M. W. F. Tweedie, 1938; 2♂ 12–11 mm, 1♀ 11 mm, 1♀ ovig. 10.5 mm, 1♀ 10.5 mm; det. M. W. F. Tweedie as *Chlorodopsis nigrocrinita*, 1949 (NUS 1950: 92). Pangkor Laut, Perak, Malaysia; coll. D. S. Johnson, 29 October 1953; 1♂ 9 mm, 1♀ ovig. 9 mm, 1♀ 8 mm (NUS 1985.1357–1359)—Tg. Dalan, Tioman; coll. P. Ng, 22 June 1983; 1♂ 7.5 mm (NUS 1985.1877)—Buru Dalam, Telok, Pulau Tioman; 23 June 1983; 1♂ 11 mm, 1♀ 10 mm (NUS 1985.1507–1508). Kelantan, Malaysian Peninsula; coll. Skeat Expedition; 4♂ 11–10 mm, 4♀ ovig. 11–8.5 mm, 1♀ 8 mm (UMZC Nov. 30, 1899).

Damar Besar (=Edam Is.), Djakarta, Java, Indonesia; coll. J. Brock; 3♂ 16–15 mm; formerly det. J. G. De Man as *Chlorodopsis melanochira* (SMF 592a) (Ex. Museum Göttingen). Ternate, Molluccas, Indonesia; coll. W. Kükenthal; formerly det. J. D. De Man as *Chlorodopsis melanochirus* (SMF 1716). Indopacific; coll. J. Brock; 3♂

16–15.5 mm; formerly det. J. D. De Man as *Chlorodopsis melanochira* (SMF 592a) (Ex. Museum Göttingen).

Aor Is.; coll. R. Serène, 1934; 4♂ 14–10 mm, 1♀ ovig. 10 mm, 2♀ 10 mm (SMF 7137).

Australia

Murray Is., Queensland; coll. C. Headley and A. R. McCulloch, August–October 1907; 3♂ 13–7 mm; 2♀ 10–8 mm (AM P.7538)—Cape York; coll. A. R. McCulloch, November 1920; 1♀ ovig. 17 mm (AM P.4983)—Masthead Is.; coll. D. B. Fry, January 1911; 4♂ 16–12 mm, 3♀ 13.5–12 mm (AM P.2585)—Holborn Is., Port Denisen; coll. E. H. Rainsford, June 1921; 4♂ 15–10.5 mm (AM P.5321)—July 1918; 5♂ 19–11 mm, 2♀ 14–11 mm (AM P.4176)—Holborn Is., Port Denisen; November 1921; 4♂ 17–11 mm, 1♀ ovig. 13.5 mm, 2♀ 14–12.5 mm (AM P.5556)—1♀ 14 mm (AM P.5557)—St Crispin Reef, Port Douglas; coll. A. R. McCulloch, 1918; 1♂ 9 mm (AM P.4308)—Lady Elliot Is.; coll. Mrs C. Wright, 1964; 7♂ 16.5–12 mm, 2♀ 14–12 mm (AM P.17259)—Swain Reef; coll. Swain's Reef Expedition 1962; 3♂ 15.5–11.5 mm, 4♀ 11–8 mm (AM P.17208)—One Tree Is., Capricorn Group; coll. D. J. G. Griffin and A. Wellington, 14 October 1968; 1♂ 11.5 mm, 1♀ 11 mm (AM P.17260)—Beach Rock; coll. D. J. G. Griffin, 11 October 1972; 3♂ 15–10 mm (AM P.18913)—One Tree Is.; 2 October 1972; 1♂ 14.5 mm (AM P.18914)—coll. D. J. G. Griffin, 6 November 1972; 2♂ 14–13 mm (AM P.18915)—coll. H. F. and P. Recher, 15 October 1972; 2♂ 17.5–13 mm (AM P.17265)—Townsville; 1♂ 18.5 mm, 1♀ 14 mm; pres. D. R. Fielder (AM P.17277). The Boulder Tract, Low Isles, Queensland; coll. Great Barrier Reef Expedition 1928–29; 1♂ damaged, 1♀ ovig. 8 mm; formerly *Pilodius spinipes* det. F. A. McNeill (NHM no reg.); Queensland—1♂ 10 mm, 1♀ 8 mm (NHM 1937.9.21.104–123)—1♂ 13.5 mm, 1♀ 11 mm; McNeill (NHM 1937.9.21.104–123)—Low Isles; 20 March 1929; 2♂ 14 mm (NHM 1937.9.21.104–123)—12♂ 14.5–8 mm, 12♀ 12–8 mm (NHM 1937.9.21.104–123)—4 April 1929; 1♀ ovig. 9 mm; det. F. A. McNeill (NHM 1937.9.21.104–123)—Batt Reef; 1♂ 14 mm, 2♂ 13.5–11 mm (NHM 1937.9.21.104–123)—Three Isles; 5 May 1929; 1♀ 13 mm (NHM 1937.9.21.104–123)—6 May 1929; 1♂ 11 mm (NHM 1937.9.21.104–123)—8 May 1929; 1♂ 8 mm, 1♀ ovig. 9 mm (NHM 1937.9.21.104–123)—2♂ 11.5–11 mm (NHM 1937.9.21.104–123)—1♂ 14 mm (NHM 1937.9.21.104–123)—Asterina Spit; 19 November 1928; 1♂ 11.5 mm (NHM 1937.9.21.104–123)—Shingle Rampart; 1♂ 11 mm (NHM 1937.9.21.104–123)—22 March 1929; 1♀ ovig. 14 mm, 1 juv.; (NHM 1937.9.21.104–123)—8 March 1929; 1♂ 13 mm (NHM 1937.9.21.104–123). Murray Is., Torres Straits, Queensland; coll. F. W. Moorhouse, 10/11/1930; 1♀ 14 mm (QM W.310)—Lindeman Is.; coll. 14 July 1934; 2♀ 13–12 mm (QM W.513)—Orpheus Is.; coll. A. A. Cameron, 27 June 1940; 1♀ 13 mm (QM W.1097). Mt Adolphus Is., Queensland; coll. 16 July 1974; 1♂ 14 mm (QM W.12482); Dugon Is.; coll. 17 July 1974; 2♂ 19–15 mm (QM W.12487)—Lizard Is.; coll. P. Davie and J. Short, 7 June 1987; 2♂ 12–10 mm, 2 juv. (QM W.15467)—Lizard Is., 30 June 1987; 1♂ 10 mm, 4♀ 10–9 mm (QM W.13137)—Lady Elliot Is.; coll. P. Davie and D. Potter, 11 August 1985; 1♂ 12 mm, 1♀ 8 mm (QM W.15441)—coll. P. Davie and J. Lowe, 17 August 1985; 3♂ 10–8 mm, 1 juv. (QM W.15440)—Palfrey Is., P. Davie and J. Short, 24 May 1987; 2♂ 12–11 mm, 1♀ ovig. 10 mm, 3♀ 9–6 mm; det. P. Davie, 30 May 1987 (QM W.13132). Cape York, Queensland; coll. R. Schütte 1876; 2♀

16 mm, 1 ♀ 13 mm (SMF 403a) (Ex. Museum Göttingen). Australia; coll. R. Schütte; 1 ♂ 13 mm (SMF no reg.) (Ex. Museum Göttingen).

Pacific Ocean

Solomon Is.; coll. Capt. Farrel; 2 ♂ 12–11 mm (AM P.1755)—Peu, Vanikoro, Santa Cruz Group; coll. Traughton and Livingstone; 1 ♂ 11 mm (AM P.9096).

Noumea Harbour, New Caledonia; coll. A. R. McCulloch, September 1924; 4 ♂ 16–9 mm, 3 ♀ 11.5 mm, 2 ♀ 10–9 mm (AM P.7497)—Anse Vata, Noumea; coll. A. F. Bassett-Hull, August 1925; 3 ♂ 12–10 mm (AM P.8268)—coll. 1926; 1 ♂ 14.5 mm, 3 ♀ 12.5–9 mm (AM P.8880). Sta. 2, Platier Ricaudy, Nouvelle-Calédonie; coll. 31 August 1978, ORSTOM; 2 ♂ 16 mm (MNHN no reg.)—Sta. 6, Platier de Namié; coll. 3 September 1978; 1 ♂ 12 mm, 2 ♀ 8 mm (MNHN no reg.)—Sta. 20, Platier du Phare Amédée; coll. 17 September 1978; 1 ♀ 15 mm (MNHN no reg.)—Sta. 28, Platier Rocher à la voile; coll. 29 September 1978; 2 ♂ 14 mm (MNHN no reg.)—Sta. 31, Platier de l'ilot Maitre; coll. 3 October 1978, 1 ♂ 16 mm (MNHN no reg.)—Sta. 33, coll. 5 October 1978, 1 ♂ 15 mm (MNHN no reg.)—Mangrove d'Arama; coll. September 1984; 1 ♂ 15 mm (MNHN no reg.).

Samoa; 2 ♂ 13–12 mm (SMF 1714) (Ex. Museum Göttingen).

No locality; 1 ♂ 12.5 mm (SMF no reg.) (Ex. Museum Göttingen). 1 ♂ 9 mm (ZSI 8100/6)—1 ♂ 12 mm, 1 ♀ 11.5 mm (ZSI 1958/7).

Remarks

Stimpson (1859: 34) based his description of *P. nigrocrinitus* on a female, but this species was subsequently described and figured by A. Milne Edwards (1873: 117, pl. VIII, fig. 5) under the name *Chlorodopsis melanochirus*. A report written by Stimpson (1907) and published posthumously by Rathbun, included a figure (pl. VIIIA, b) of the female holotype. This figure was used by Balss (1938: 57) to establish that *C. melanochirus* is a junior synonym of *P. nigrocrinitus*. Sakai (1939: 504, Text-fig. 42) illustrated the left pleopod of *P. nigrocrinitus* from its ventral aspect. The accuracy of this drawing was confirmed by Serène and Luom (1958, pl. IVe, 1959: 314, fig. 2B) who figured the ventral view of the right pleopod. The left pleopod of *C. melanochira* is figured in ventral aspect by Serène and Luom (1958, pl. IVd) and corresponds to that presented by Sakai (1939: 504, Text-fig. 42).

Distribution

Ranging from the eastern Indian Ocean (Andaman and Nicobar Is.) to Japan, the Society and Hawaiian Is. in the Pacific Ocean (Fig. 24). Not recorded west of longitude 90°E.

Type status

Stimpson based his description of *P. nigrocrinitus* on a female which is no longer extant because it was destroyed in the great fire of Chicago 1871. Type locality was Simoda, Japan.

Pilodius paumotensis Rathbun, 1907

(Figs 10A–G, 35B, 43A)

Pilodius paumotensis Rathbun, 1907: 52, pl. 8, fig. 2, 2a, 2b; 1911: 227; Balss, 1938a: 58; Holthuis, 1953: 25; Guinot, 1962: 237, fig. 14a, b; Takeda and Miyake, 1968: 7, pl. 1, fig. f; Serène, 1968: 80 (list); Peyrot-Clausade and Serène, 1976: 1357, pl. 4D; Takeda and Miyake, 1976: 110 (list); Peyrot-Clausade, 1977a: 27; Ribes, 1978: 127; Serène, 1984: 241, figs 143d, 145, pl. 33d.

Chlorodopsis granulatus: Nobili, 1907: 46. **non** Stimpson, 1859.

Chlorodopsis oahuensis: Edmondson, 1962: 270.

Chlorodopsis pilumnoides: Barnard, 1955: 3 (part); Michel, 1964: 24; Guinot, 1967: 268 (part). **non** White, 1848.

Description

Regions of carapace nearly indistinct, dorsal surface shagreened, with short pubescence interspaced with long setae. 2M entire. 1P uniformly granulate; two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes arched, minutely denticulate, separated by 'U'-shaped emargination; lateral lobes triangular, denticulate. Anterolateral quadridentate, two median teeth largest. Anterior margin of cheliped merus proximally tuberculate. External surface of cheliped carpus with furrow parallel with palmar joint. External surface of chela with short pubescence interspaced with long setae, tuberculate. Pereiopods setose, merus, carpus with conical tubercles on superior margin.

*Material examined**Indian Ocean*

Delagoa Bay (Baia de Lourenco Marques), Moçambique; 1♂ 9 mm formerly *Chlorodopsis pilumnoides* det. K. H. Barnard (SAM A.10855).

Réunion; coll. M. Peyrot-Clausade; 5♂ 9–5 mm, 3♀ ovig. 7.5–5 mm, 2♀ 5.5–4.5 mm; det. R. Serène (MNHN MP B.6697).

Tuléar, Madagascar; coll. M. Peyrot-Clausade; 10♂ 9.5–4 mm, 3♀ ovig. 6.5–6 mm; det. R. Serène (MNHN MP B.19260)—Itampolo, 3♂ 7.5–5 mm, 3♀ 8–5 mm, 3 juv. (MNHN MP B.6780).

Mauritius; 1♂ 7 mm; formerly *Chlorodopsis pilumnoides*; (MI no reg.).

Re-35, Saline-les-Bains, Réunion; coll. H. G. Müller, 3–5/ii/1989; 1♂ 9.5 mm (SMF no reg.).

Addu Atoll, Maldives; coll. S. Gerlach, 2 January 1958, *Xarife* Expedition 1957–58; 1♂ 8 mm; det. D. Guinot (MNHN MP B.13751).

Peros, Coin, Chagos Archipelago; coll. J. S. Gardiner, *Sealark* 1905; 1♀ 8.5 mm; formerly *Chlorodopsis spinipes* det. M. J. Rathbun (UMZC Aug. 7 1910).

South Pacific

Guam Is., Mariana Is.; coll. 1945; 2♂ 9.5–9 mm; det. J. S. Garth; (USNH 134593)—1 juv. (USNM 134594).

Likiep Atoll, Nado Is., Marshall Is.; coll. S. F. MacNeil, 1951–52; 3♂ 6–5 mm, 1♀ ovig. 7.5 mm, 3 juv.; det. L. B. Holthuis (USNM 93999).

Tamana, Gilbert Is.; coll. L. Bock, 16 September 1917; 1♀ 9 mm (MNHN MP B.13753).

Waianae, Oahu, Hawaiian Is.; coll. Edmondson, 1920; 3♀ 7.5–5 mm, 1 juv.; formerly *Chlorodopsis oahuensis* det. Edmondson (BBM S.923)—1♂ 8 mm (BBM S.5287).

Marutea, Tuamotu Archipelago; coll. G. Seurat, 1905; 1♂ 5 mm; det. D. Guinot, 1962; formerly *Chlorodopsis granulatus* det. G. Nobili, 1906 (MNHN MP B.13754).

Fakarava Is., Tuamotu Archipelago; coll. *Albatross*, 12 October 1899; 1♂ 5 mm; det. M. J. Rathbun; Smithsonian Exchange, reg. 33323 (MNHN MP B.13752).

Bora Bora, Society Is.; coll. Bredin Expedition, 25 April 1957; 2♂ 7–5.5 mm, 1♀ 6 mm; det. J. S. Garth (USNM 156070).

Eua Is., Tonga; coll. *Albatross*, 28 November 1899; 1♂ 8 mm; J. S. Garth (USNM 134591).

Makemo, Tuamotu Archipelago; coll. *Albatross*, 21 October 1899; 1♂ 8 mm, 1♀ 7 mm; det. M. J. Rathbun, Types (USNM 32852)—Outer Reef, Fakarava Is.; 12 October 1899; 1 juv.; det. J. S. Garth (USNM 134592).

Remarks

Examination of *Chlorodopsis oahuensis* Edmondson (1962) and *Ch. pilumnoides* Barnard (1955, part) and Michel (1964) proved the specimens to be *P. paumotensis*. Guinot (1962) examined a juvenile male identified by Nobili (1907) as *Chlorodopsis granulata*, but she considered it to be *Pilodius paumotensis*.

Distribution

Ranging from the coast of Moçambique, Indian Ocean to Makemo Is. in the Pacific Ocean (Fig. 25).

Type status

Type series is extant, see material examined United States National Museum, Smithsonian Institution. Type locality Fakarava Id. and Makemo, Pautmotus.

Pilodius pilumnoides (White, 1848)

(Figs 11A–G, 36A, 42D)

Chlorodius pilumnoides White, 1847: 18 (*nom. nud.*); White, 1848a: 226, 1848b: 286; Adams and White, 1849: 41, tab. IX, fig. 3.

Pilodius pilumnoides?: Dana, 1853: 221, 1855, pl. XII, fig. 10a–c.

Pilodius pilumnoides: Sakai, 1976: 461, text-fig. 249 a–b–b'; Garth and Kim, 1983: 686; Serène, 1984, figs 143j, 150, pl. 34E; Takeda, 1989: 166, 178 (table).

Chlorodopsis pilumnoides: De Man, 1887a: 35, 1887b: 281; Cano, 1889: 204; Alcock, 1898: 167; Lanchester, 1900: 737; Rathbun, 1923: 108; McNeill, 1926: 309; Gordon, 1934: 47, fig. 26a; Miyake, 1936: 509 (list); Balss, 1938a: 59, pl. 1, fig. 4, 1938b: 56; Sakai, 1939: 505, Text-fig. 43; Holthuis, 1953: 16; Sakai, 1956: 40 (Appendix); Serène and Luom, 1958: 102 (part), 1959: 302 (part), 5G, pls IA, IIIA; Sakai, 1976: 461, Text-fig. 249.

Chlorodopsis (Cyclodius) palaoensis Sakai, 1936b: 167, pls XIII, fig. 2, XIV fig. 1; Miyake, 1939: 215.

non *Chlorodopsis pilumnoides*: Laurie, 1906: 406=*Pilodius flavus* Rathbun, 1894.

- non *Chlorodopsis pilumnoides*: Serène and Luom, 1958: 102 (part), pls IC, IIIa, IVb, 1959: 314 (part), figs 2A=*Pilodius maotieni* Serène, 1971.
 non *Chlorodopsis pilumnoides*: Sankarankutty, 1962: 138, figs 38, 39=*Pilodius nigrocrinitus* Stimpson, 1859.
 non *Chlorodopsis pilumnoides*: Barnard, 1955: 3; Guinot, 1967: 268=*Pilodius spinipes* Heller, 1861 and *P. paumotensis* Rathbun, 1907.
 non *Chlorodopsis pilumnoides*: Balss, 1938b: 56; Tweedie, 1950a: 92, Guinot, 1958: 179, fig. 25a, b=*Pilodius concors* sp. n.
 non *Chlorodopsis pilumnoides*: Garth, 1964: 140=*Pilodius scabriculus* Dana, 1852.
 non *Chlorodopsis pilumnoides*: Michel, 1964: 24=*Pilodius paumotensis* Rathbun 1907.

Description

Regions of carapace well defined, 2M divided into two longitudinally, areoles prominently granular, granules acuminate, apically cornute on 1L–5L, set with short, coarse, dark setae. Transverse row of adjoining pearliform granules medially on 1P; two parallel transverse rows of adjoining pearliform granules on 2P, anterior row medially disjunct. Submedian frontal lobes arched, prominently denticulate, separated by deep 'U'-shaped indentation, lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth multispinose, apically cornute, terminal spine accompanied by ancillary spines. Anterior margin of cheliped merus prominently spinose. External surface of cheliped carpus with cornute, conical tubercles, coarsely setose, ill-defined furrow parallel with palmar joint. External surface of chela set with short, coarse, dark setae; cornute, conical tubercles on upper margin, rounder inferiorly; lower margin smooth and dark coloration expands on to palm. Pereiopods with coarse dark setae, merus, carpus prominently spinose on superior margin.

Material examined

Southeast Asia

Singapore; coll. From H. Cuming's collection; 1 ♂ 33 mm; Type, det. A. White (NHM 1843.6).

Bohol (*sphalm.* Rohol), Philippine Is.; coll. From H. Cuming's collection; 1 ♀ 15 mm; Type; det. A. White (NHM 1843.6). West-end Little Sta., Cruz Is., Zamboanga, Mindanao, Philippines; coll. *Albatross*, 26 May 1908; 1 ♀ damaged; det. J. S. Garth and H. S. Kim.

Pulau Aor, South China Sea; coll. M. W. F. Tweedie, June 1938; 1 ♂ 34 mm, *Chlorodopsis pilumnoides*, det. Tweedie (NUS 1965.11.11.148).

Banda-Neira, Dutch East Indies (Indonesia); coll. 5 m, 24 February 1929; 1 ♂ 16 mm; formerly *Chlorodopsis pilumnoides* det. I. Gordon, 1934 (IRSNB 9223).

Australia

Cape York, Queensland; 2 ♂ 23–20 mm (MNHN MP B.2393) (319.68). Bowen, Queensland; 1 ♂ 23 mm; det. M. Ward, June 1931 (QM W.151)—Lindeman Is.; 2 ♂ 23–17 mm; formerly *Chlorodopsis pilumnoides*, det. M. Ward, 14 July 1934 (QM W.518) (part). Lizard Is., Queensland; coll. P. Davie and J. Short, 16 m; 2 ♂ 14–13 mm, 1 ♀ 15 mm (QM W.13142)—Coconut Beach, west side of Lindeman Is.; 26 March 1987; 4 ♂ 24–15 mm, 1 ♀ 14 mm (QM W.12914) (part)—Blue Lagoon, Lizard Is.; 5 June 1987, 5–7 m; 2 ♂ 14–7 mm (QM W.15462)—Research Pt.; 24 May 1987;

1 ♂ 15.5 mm; det. P. Davie (QM W.13143)—First Beach, Lizard Is.; South of Osprey; 30 May 1987; 1 ♂ 17 mm (QM W.15468). Dugong Is., Queensland; 17 July 1974; 1 ♂ 23 mm (QM W.12487)—Orpheus Is.; coll. A. A. Cameron, 27 July 1940; 1 ♂ 22 mm, 1 ♀ 23 mm (QM W.1096). Lindeman Is., Queensland; coll. M. Ward; 1 ♂ 35 mm, det. Ward (NUS 1965.11.11.150).

Ohne Fundort; 1 ♂ 20 mm (Ex. Museum Göttingen) (SMF no reg.)—3 ♂ 14–17.5 mm; 592a (part).

Remarks

Balss (1938) wrongly synonymized *P. pubescens* Dana, 1852 and *Chlorodopsis melanodactylus* A. Milne Edwards, 1873 with *P. pilumnoides*. In the same paragraph he also synonymized *Chlorodopsis palaoensis* Sakai, 1936. Since the description of Sakai is based on two females, this synonymy of Balss is difficult to confirm because the black coloration on the cheliped of females is not diagnostic (see discussion). Further, the types of *Ch. palaoensis* could not be located. The specimen of *P. pilumnoides* identified by Gordon lacked (originally) chelipeds, making certain determination difficult. Material assigned to *P. pilumnoides* by Balss (1938b), Tweedie (1950a) and Guinot (1958) all belongs to *P. concors* sp. n. A specimen of *Ch. pilumnoides* identified by Serène and Luom was later redescribed by Serène (1971) as *P. maotieni*. All specimens identified by Garth (1964) were reidentified as *Pilodius scabriculus* and the *P. pilumnoides* of Takeda (1989) cannot be confirmed.

Distribution

From Singapore to the Ryukyu Islands, Japan and Fiji (Fig. 26). Records from the Indian Ocean are dubious; specimens of *P. pilumnoides* identified by Barnard (1955) were redetermined as *P. spinipes* and *P. paumotensis*, and those of Laurie (1906) pertain to *P. flavus*. The Andaman Islands and Mergui Archipelago material of Alcock (1898) were not made available for study.

Type status

Type series extant, see material examined The Natural History Museum, London. Type locality Singapore and Philippines.

Pilodius pubescens Dana, 1852

(Figs 12A–G, 36B, 43B)

Pilodius pubescens Dana, 1852: 80; 1853: 217, 1855, pl. 12, fig. 6a–d; Takeda and Nunomura, 1976: 62 (list), 73; Dai *et al.*, 1986: 307, pl. 43(6), fig. 166(3); Dai and Yang, 1991: 331, pl. 43(6), Fig. 166(3).

Chlorodopsis pubescens: Serène and Luom, 1959: 316, fig. 1B, 2D, 5C.

Chlorodopsis melanodactylus: A. Milne Edwards, 1873: 229, pl. 7, fig. 7, 7a; Miers, 1884: 531 (part); Nobili, 1899: 258, 1900: 498; Calman, 1900: 12; Ward, 1932: 251; Tweedie, 1950b: 121; Holthuis, 1953: 16; Guinot, 1958, fig. 23a, b.

Chlorodopsis melanodactyla: De Man, 1902: 624; Gordon, 1934: 47; Serène and Luom, 1958: 125, pl. ID, IIIf, IVg.

Chlorodopsis pilumnoides: Balss, 1938a: 60 (part). **non** White, 1848.

non *Pilodius pubescens*: De Man, 1902: 619=*P. flavus* Rathbun, 1894.

non ?*Pilodius pubescens*: Nobili, 1907: 395=*P. flavus* Rathbun, 1894.

non *Pilodius pubescens*: Serène, 1977: 51 (list)=*P. spinipes* Heller, 1861.

non *Chlorodopsis melanodactylus*: Miers, 1884: 531 (part)=*P. spinipes* Heller, 1861.

non *Chlorodopsis melanodactyla*: Lenz, 1905: 255=*P. spinipes* Heller, 1861.

Description

Regions of carapace nearly indistinct, surface granulate, evenly covered with short fine setae. 2M entire. 1P uniformly granulate; sinuous transverse row of adjoining pearliform granules posteriorly on 2P. Submedian frontal lobes arched, denticulate, separated by 'U'-shaped emargination; lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth well defined, curved, terminating in chitinized spine. Anterior margin of cheliped merus spinose. External surface of cheliped carpus tuberculate, with furrow parallel with palmar joint. External surface of chela with well-spaced, large rounded tubercles on upper margin, diminishing in size inferiorly. Pereiopods setose, merus, carpus distinctly spinose on superior margin.

*Material examined**Southeast Asia*

Vietnam; 1♂ 11.5 mm; formerly *Chlorodopsis melanodactylus* and *Chlorodopsis pubescens* det. Serène and Luom (MNHN E 41.925 MP B.9387).

Moluccas, Indonesia; coll. Rumphius Exp., 27 January 1975; 1♀ 10 mm; det. Th. Monod and R. Serène (MNHN MP B.9921). Ternate, Moluccas; coll. W. Kükenthal; 1♂ 8 mm (SMF 1715). Banda Neira; 24 November 1929; 1♂ 6.5 mm formerly *Chlorodopsis melanodactyla*, det. I. Gordon, 1934 (IRSNB 9223). Indonesia; coll. R. Serène, 4 April 1963; 1♂ 10.5 mm; det. R. Serène, 10 April 1963 (NUS 1969.11.24.31).

Australia

Murray Is., Queensland; coll. A. C. Haddon, 1888; 1♂ 16.5 mm; formerly *Chlorodopsis melanodactylus*, det. W. T. Calman; pres. University College of Dundee (NHM 1954.9.14.74)—Torres Straits; 1♂ 12 mm (NHM 1954.9.14.73). Site 30, Elizabeth Reef; coll. 10 December 1987; 1♀ 10 mm (AM P.38260)—Site 37; 12 December 1987; 1♀ 13 mm (AM P.38256). North West Island, Capricorn Group, Queensland; coll. M. Ward, December 1929; 1♂ 11.5–13 mm; formerly *Chlorodopsis melanodactylus* det. M. Ward (NHM 1931.4.14.19–20). Lizard Is., Queensland; coll. P. Davie and J. Short, 3 June 1987, 1–2 m; 1♂ 13 mm, 1♀ 10 mm (QM W.15464)—Wreck Reef, Coral Sea, nr Porpoise Cay; coll. J. Short and S. Mullens, 11 May 1988, 12 m; 1♂ 13 mm, 1♀ 10–9 mm, 1 juv. (QM W.15451)—coll. J. Short and B. Batley, 2–3 m; 1♂ 9 mm, 1♀ 10 mm (QM W.15450).

Pacific Ocean

Eastern Seas; coll. F. M. Rayner, HMS *Herald*; 1♂ 13 mm; formerly *Chlorodopsis melanodactylus* det. E. J. Miers; (NHM 1862.53). Nouvelle-Calédonie; coll. M. Balansa; 1♂ 15 mm; formerly *Chlorodopsis melanodactylus* det. A. Milne Edwards, Type and *Chlorodopsis pubescens* det. Serène and Luom (MNHN MP B.13758)—7♂ 15–10 mm, 3♀ ovig. 12–9.5 mm, 6♀ 14–9.5 mm (MNHN MP B.13757). Langon, Sta. 3, Touaouroo, Nouvelle-Calédonie; coll. 2 September 1978; 1♀ 13 mm (MNHN no reg.)—Sta. 20, Ile Amédée; coll. 17 September 1978, 1♂ 10.5 mm, 4♀ 9–8 mm (MNHN no reg.)—Sta. 79, Baie du Prony, Ile Ouen, 22°29'S, 166°29'E; coll. B. Richer de Forges, ORSTOM, 16 m, 14 January 1987; 1♂ 10 mm, 1♀ 13 mm (MNHN no reg.)—Sta. 82; 10 m; 1♀ 11 mm (MNHN no reg.)—Sta. 159; 17 m; 1♂ 12 mm, 2♀ ovig. 12–10 mm, 1♀ 7 mm (MNHN no reg.)—Sta. 160; 10 m; 2♂ 14–11 mm, 5♀ ovig. 12–10 mm (MNHN no reg.)—Sta. 283; Secteur de Nouméa, 22°27'S, 166°24'E; 13 m; 1♂ 12–10 mm (MNHN no reg.)—Sta. 480, Lagune Nord,

18°56'S, 163°29'E; 31 m, 2 March 1985, 1♂ 11 mm, 1♀ 10 mm ovig., 1♀ 8 mm (MNHN no reg.)—Sta. 483; 33 m, 2 March 1985; 1♂ 21 mm (MNHN no reg.)—Sta. 554, Grand Récif Sud, 22°50'S, 166°55'E; 16 July 1985, 27 m; 1♂ 13–8 mm, 1♀ 11 mm (MNHN no reg.)—Sta. 899, Lagune Est, 20°14.2'S, 164°25.15'E; 16 m, 14 January 1987; 1♂ 9.5 mm, 1♀ 11 mm (MNHN no reg.).

Ovalua Is., Viti Levu, Fiji; coll. F. M. Rayner, HMS *Herald*; 2♂ 6 mm (NHM 1858.172). Namuba, Viti Levu, Fiji; coll. S. Bock; 1♂ 9.5 mm; Formerly *Chlorodopsis pilumnoides* det. H. Balss; Munich Museum Exchange (NHM 1934.6.27.5). Viti, Fiji; 1♀ 12–10 mm (SMF 1713) (Ex. Göttingen).

Samoa; coll. Mus. Godeffroy; 2♂ 11–9.5 mm, 1♀ 10 mm; pres. University College Dundee (NHM 1955.1.5.9–10).

Ohura, Polynesia; coll. G. Seurat, 1905; 1♂ 5 mm; det. G. Nobili, 1906 (MNHN MP B.13756). Sta. FPH-8a, Ternae, Society Is., Polynesia; coll. H. G. Müller, 30.iii.1988; 1♂ 11 mm (SMF no reg.).

Remarks

Chlorodopsis melanodactylus was described and figured by A. Milne Edwards (1873) from New Caledonia, and it was this name that became widely used in the literature. Miers (1884: 531) identified *Chlorodopsis melanodactylus* from Africa or Eagle Island (now *P. spinipes*), Seychelles (now *P. spinipes*), Etoile Island (now *P. flavus*) and Oriental Seas (now *P. pubescens*). The *Chlorodopsis melanodactyla* of Lenz (1905) from Zanzibar pertains to *P. spinipes*. Balss (1938a: 59) synonymized both *P. pubescens* Dana and ?*Chlorodopsis melanodactylus* A. Milne Edwards with *C. pilumnoides* (White, 1848), a decision not supported by Tweedie (1950: 12) who claimed (as did Miers, 1884: 531) that the pigmentation found on the male cheliped of *P. pubescens* extended only very slightly on to the palm (propodus), a character that separated the species from *P. pilumnoides*. Although this character is adequate for separating these two species, part of Miers' material and Tweedie's (Serène, 1984: 244) was not *Pilodius pubescens*. A male syntype of *C. melanodactylus* was examined by Serène and Luom (1959: 316), and they concluded that the species of A. Milne Edwards agreed perfectly with the description and plates of *P. pubescens* Dana, 1852. S. Bock collected a single male from Namuba, Viti Levu, Fiji, which was identified by Balss (1938a: 60) as *C. pilumnoides* and subsequently formed part of an exchange by the Munich Museum with the NHM. This male was redetermined as *P. pubescens*. Balss (1938a: 57) also synonymized the ?*Pilodius pubescens* of Nobili 1907: 395 with *Pilodius flavus*.

Distribution

From Nhatrang Bay, Vietnam to Samoa (Fig. 27). Not recorded from the Indian Ocean. Specimens recorded as *Pilodius pubescens* from Seychelles (Serène, 1977) and *P. spinipes* and the record of Tweedie (1950b) from the Cocos Keeling Is. must be considered dubious.

Type status

The type material was destroyed at the time of the Chicago fire, because Stimpson had on loan from the Smithsonian Institution a large collection of Crustacea including many type specimens of James D. Dana. Sooloo (Sulu) Sea, or Balabac Passage, were quoted by Dana as the type locality.

Pilodius pugil Dana, 1852

(Figs 13A–G, 37A, 43C)

- Pilodius pugil* Dana, 1852: 80; 1853: 219, 1855, pl. 12, fig. 8a–i; Heller, 1865: 19; Laurie, 1906: 406; Forest and Guinot, 1961: 91; Guinot, 1964b: 67, 1967: 268; Serène, 1968: 80 (list); Peyrot-Clausade, 1977a: 27, 1977b: 213; Chen and Lan, 1978: 267 pl. 4, fig. 14; Serène, 1984: 242, figs 143f, 147, pl. XXXIIIF; George and George, 1987: 238 (list), Table 5; Dai *et al.*, 1986: 308, pl. 44(1), fig. 166(4); Dai and Yang, 1991: 332, pl. 44(1), Fig. 166(4).
- Chlorodopsis pugil*: Nobili, 1907: 395; Gordon, 1934: 48; Ramadan, 1936: 33 (part); Balss, 1938a: 61; Sakai, 1939: 506; Ward, 1939: 10; Miyake, 1939: 216; Holthuis, 1953: 17; Sakai, 1956: 40 (Appendix); Guinot, 1958: 180; Serène and Luom, 1959: 319, figs 2K, 3A, 5D, pl. II, fig. c, pl. III, figs D, D'.
- Chlorodopsis spinipes*: A. Milne Edwards, 1873: 230 pl. 8, fig. b; De Man, 1887b: 282, 1892: 278; Ortmann, 1893: 471; Henderson, 1893: 361; Zehntner, 1894: 151; Alcock, 1898: 169; Calman, 1900: 12; Borradaile, 1900: 588, 1902: 261; De Man, 1902: 626; Rathbun, 1907: 50, pl. 2, fig. 5; Lenz, 1910: 551; Rathbun, 1911: 226; Ward, 1932: 251; Miyake, 1936: 509; Serène and Luom, 1958: 135; pl. 1, fig. 13, pl. 4, fig. h; Sankarankutty, 1961: 121 (list), 129; Michel, 1964: 24. **non** Heller, 1861.
- Pilumnus globosus* Boone, 1934: 152, pl. 78.
non *Chlorodopsis pugil*: Klunzinger, 1913, pl. 6, fig. 18; Ramadan, 1936: 33 (part)=*Pilodius spinipes* Heller, 1861.

Description

Regions of carapace well defined by broad smooth deep-cut grooves, 1L–4L conical shaped, 2M entire, dorsal surface shagreened, with few scattered setae. 1P uniformly granulate; sinuous transverse row of adjoining pearliform granules posteriorly on 2P. Submedian frontal lobes trapezoid, crenulate, separated by distinct 'U'-shaped groove, lateral lobes acuminate tubercles. Anterolateral margin tridentate, three equally prominent, large hook-shaped teeth lacking ancillary spines or granules. Anterior margin of cheliped merus prominently spinose. External surface of cheliped carpus and propodus studded with large, conic tubercles, smaller and obsolescent ventrally on propodus. Pereiopods fringed with long setae, superior margin of carpus, merus, propodus prominently spinose.

*Material examined**Indian Ocean*

Abu Latt Is., Saudia Arabi; Red Sea; coll. *Calypso*, 1952; 1 ♀ 7 mm, 1 juv.; det. D. Guinot, 1962 (MNHN MP B.16483)—Red Sea; 1 ♀ 6.5 mm (MNHN MP B.16487).

Aldabra; coll. Norman Sloan, 3 March 1978; 3 ♀ 13–10.5 mm; det. R. Serène 1980 (NHM 1986: 211)—Passe Femme; coll. J. D. Taylor, 29 November 1967, 1 ♂ 10.5–8 mm; det. R. Serène 1980; pres. Royal Society Expedition, Aldabra 1967–68 (NHM 1986: 206)—Main Channel; coll. J. D. Taylor, 10 December 1967; 1 juv. (NHM 1986: 208)—1 ♂ 12.5–9.5 mm (NHM 1986: 210)—North side, Main Channel; 11 December 1967; 1 ♀ 12 mm (NHM 1986: 212)—West side, East Channel; 30 September 1967; 1 ♂ 13–12 mm, 4 ♀ 14–9 mm (NHM 1986: 213). Aldabra; coll. A. J. Bruce; 1 ♂ 14 mm, 1 ♀ 17 mm; det. R. Serène, 9 March 1980 (MNHN MP B.8014).

Ile Mayotte, Archipel des Comores; coll. M. Marie, 1903; 3 ♂, 5 ♀; det. R. Serène (MNHN MP B.6782).

Tamatave, Madagascar; coll. J. Millot; 2 ♀ ovig. 9–7 mm, 3 ♀ 6–10 mm; formerly *Chlorodopsis spinipes*, det. H. Balss, redet. A. Crosnier; (MNHN MP B.8016).

Mauritius; 1 ♂ 13 mm; formerly *Chlorodopsis spinipes* (NHM 1986: 420). Mauritius; 1 ♂ 10 mm (MI no reg.), formerly *Chlorodopsis spinipes*, det. C. Michel. Mauritius; coll. P. Carié, 1910; 1 ♂ 11 mm; formerly *Chlorodopsis spinipes*, det. E. Bouvier; redet. J. Forest and D. Guinot 1960 (MNHN MP B.16480)—Port Louis; 2 ♂ 11 mm, 2 ♀ 10–8.5 mm; redet. D. Guinot, 1960 (MNHN MP B.16482). Mauritius, coll. M. Peyrot-Clausade; 5 ♀ 11–6 mm, 3 juv. (MNHN MP B.6698).

Sta. Re-1, Riffdach, Saline-les-Bains, Réunion; coll. H. G. Müller, 0.5–1 m, 20 January 1989; 1 ♂ 14 mm (SMF no reg.)—Sta. Re-11, Saline-les-Bains; 0.5–1 m, 25 January 1989; 1 ♂ 14 mm, 1 ♀ 10 mm, 1 juv. (SMF no reg.)—Sta. Re-35; 3–5 February 1989; 1 ♂ 10 mm, 5 ♀ 13–8 mm (SMF no reg.)—Sta. Re-31; 30 January–4 February 1989; 3 ♂ 13–10 mm, 1 ♀ 10.5 mm (SMF no reg.)—Sta. Re-35; 0.5–1 m, 3–5 February 1989; 1 ♂ 10 mm, 5 ♀ 13–8 mm (SMF no reg.).

Egmont Reef, Chagos Archipelago; coll. J. S. Gardiner, *Sealark* 1905; 1 ♀ 10–9 mm; formerly *Chlorodopsis spinipes* det. M. J. Rathbun (UMZC Aug. 7 1910)—Salomon; 2 ♀ 11.5–9 mm (UMZC Aug. 7 1910)—Hulule, Male Atoll, Maldive Is.; coll. J. S. Gardiner; 3 ♂ 11.5–9 mm, 2 ♀ ovig. 8–7 mm, 1 ♀ 9.5 mm; formerly *Chlorodopsis spinipes*, det. L. A. Borradaile (UMZC no reg.)—Minikoi, Laccadive Is.; 1 ♀ 11 mm (UMZC June 20 1900)—Funafuti, Ellice Is.; 15–25 fms; 2 ♂ 11–6 mm (UMZC Jan. 11 1897).

Gulf of Mannar; coll. W. A. Herdman, 1902; 1 ♂ 14 mm; det. R. D. Laurie; pres. Miss Herdman (NHM 1934.1.16.85).

Japan

Ishigaki Is., Japan; 1 ♀ 10–7 mm (SMF reg. 7733).

Southeast Asia

Phuket, Thailand; coll. R. Serène, 4 February 1966; 5 ♀ 13.5–8 mm (NUS 1970.3.13.8–12).

Pulau Mantabuan West, Sabah, Borneo; coll. J. D. and J. George, 30 August 1980; 1 juv.; pres. Semporna Marine Park Survey, World Wildlife Fund, Malaysia (NHM 1985: 325).

Philippines; coll. 1859–1864; 1 ♀ 11 mm (SMF 324a) (Ex. Museum Göttingen).

Ternate, Mollucas, Indonesia; coll. W. Kükenthal; 1 ♂ 12 mm; formerly *Chlorodopsis spinipes* det. J. D. De Man (SMF 1717).

Amboina; coll. Strubell, 1891; 1 ♂ 10 mm (SMF 1651). Ambon, Moluccas, Indonesia; coll. R. Serène, 1975; 1 ♂ 8.5 mm, 1 ♀ 7 mm, 1 juv. 4.5 mm; det. R. Serène (MNHN MP B.8026).

Australia

Murray Is., Torres Straits, Queensland; coll. A. C. Haddon, 1888; 1 ♀ 11.5 mm; redet. R. Serène; formerly *Chlorodopsis spinipes*, det. W. T. Calman; pres. University College Dundee (NHM 1954.9.14.75). North West Islet, Capricorn Group, Queensland; coll. F. A. McNeill, 1933; 1 ♀ 9 mm (AM P.10375)—One Tree Is.; coll. J. C. Yaldwyn, November–December 1966; 1 ♀ ovig. 9.5 mm (AM P.15967). Capri Cay, Swain Reef, Queensland; coll. October 1962, Swain Reefs Expedition; 1 ♂ 9.5 mm (AM P.16961). North West Is., Capricorn Group, Queensland; coll. M. Ward, December 1929; 1 ♀ 9 mm; formerly *Chlorodopsis spinipes*; pres. M. Ward (NHM 1931.4.14.21).

Pacific Ocean

New Caledonia; coll. 1903; 2 ♀ ovig. 7 mm, 1 ♀ 10 mm (MNHN) formerly *Chlorodopsis spinipes*, det. A. Milne Edwards. Sta. 551, Grand Récif Sud, 23°00'S, 166°59'E, 9 m; coll. B. Richer de Forges, ORSTOM, 15 July 1985; 3 ♂ 12–6.5 mm, 1 ♀ 9 mm, 1 ♀ 7 mm (MNHN no reg.).

Gilbert Is.; 1 ♂ 13 mm; formerly *Chlorodopsis pugil*, det. H. Balss; Munich Museum Exchange (NHM 1934.6.27.1).

Samoa; Pres. S. J. Whitmee; 1 ♂ 10 mm (AM P.3171), exchange with NHM 1912 original reg. 1877:35. Samoa Is.; 3 ♂ 11–10.5 mm, 1 ♀ 12.5–10 mm; Pres. S. J. Whitmee (NHM 1877:35).

French Polynesia; coll. G. Seurat, 1905; 1 ♂ 6.5 mm, 1 ♀ 6 mm; formerly *Chlorodopsis pugil*, det. G. Nobili, 1906 (MNHN MP B.16486); Lagoon de Has; 1 ♂ 8 mm (MNHN MP B.16477)—1 ♂ 8 mm; det. J. Forest and D. Guinot, 1960 (MNHN MP B.16479)—2 ♂ 9–7 mm, 8 ♀ 12–7 mm; det. G. Nobili, 1906 (MNHN MP B.16487)—Moorea, Tahiti; coll. M. Peyrot-Clausade; 2 ♂ 11–8 mm, 1 ♀ 10 mm; det. R. Serène (MNHN MP B.6699)—coll. O. Odinetz; 1 ♂ 8 mm, 4 ♀ 11–7.5 mm (MNHN MP B.13598)—Taka Poto; 2 ♂ 9–7 mm, 2 ♀ 9 mm, 5 juv.; det. D. Guinot, 1982 (MNHN MP B.17067). Hikueru, Archipel des Tuamotu; coll. G. Rouson; 1 ♀ ovig. 9 mm; det. J. Forest and D. Guinot (MNHN MP B.16478). Upolu; 1 ♂ 11 mm, 1 ♀ 11 mm (SMF 1694) (Ex. Museum Göttingen). Temae, 17°29'S, 149°46'W, Society Is., Polynesia; coll. H. G. Müller, 0–0.5 m; 31 March 1988; 21 specimens (SMF no reg.)—FPM-8a, 2 m, 30 March 1988; 1 ♂ 11 mm, 2 ♂ 9 mm, 8 juv. (SMF no reg.)—FPM 11b, Tiahura Reef, Mooréa; 1 m, 30 March 1988; 2 ♂ 9–7 mm (SMF no reg.)—FPM-13, Afareaita; 0–0.5 m, 29 March 1988; 1 ♂ 10 mm (SMF no reg.).

Remarks

The confusion between *Pilodius pugil* and *P. spinipes* was first noted by Nobili (1906, 1907). He stated that the description of *Chlorodopsis spinipes* given by Alcock (1898) was similar to the figure of *P. pugil* by Dana (1855: pl. 12, fig. 8a). Ramadan (1936) erroneously synonymized the *Chlorodopsis spinipes* of Nobili (1906), Laurie (1915) and Balss (1924) and the *Chlorodopsis woodmasoni* of Alcock (1898) with *Ch. pugil*. All this material belongs to *P. spinipes*. Serène and Luom (1959: 320) assigned the *Pilumnus globosus* of Boone (1934) to *P. pugil*.

Distribution

Balss (1938a: 62) remarked that only *P. spinipes* occurred in the Red Sea, and he considered *P. pugil* to be an oriental species. However, Guinot (1964: 68) identified three small *Pilodius* specimens collected in the Red Sea as *P. pugil* and showed that while *P. spinipes* was indeed restricted to the Indian Ocean, *P. pugil* had a wider distribution which extended from the Red Sea to the Tuamotu Archipelago (Fig. 28).

Type status

Dana's type specimen is no longer extant; it was destroyed in the great fire of Chicago while on loan to Stimpson. Type locality Upolu, Samoa, Pacific and Balabac Passage, north of Borneo.

Pilodius scabriculus Dana, 1852

(Figs 14A–G, 37B, 43D)

Pilodius scabriculus Dana, 1852: 80, 1853: 220, 1855, pl. 12, fig. 9; Nobili, 1907: 394; Forest and Guinot, 1961: 91, fig. 83a, b, fig. 84, 86; Guinot, 1967: 268; Serène, 1968: 80 (list); Peyrot-Clausade, 1977a: 27, 1977b: 213 (list); Thomassin, 1978: 64 (Appendix 3); Serène, 1984: 244; Dai *et al.*, 1986: 309, pl. 44(2), fig. 166(5); Dai and Yang, 1991: 332, pl. 44(2), fig. 166(5).

Chlorodopsis scabriculus: Edmondson, 1923: 17, 1925: 43.

Chlorodopsis melanodactylus: Tweedie, 1950b: 121, pl. XVII d, e.

Chlorodopsis spinipes: Sankarankutty, 1962: 139, fig. 40, 41. **non** Heller, 1861.

Chlorodopsis venusta Rathbun, 1907: 49, pl. 1, fig. 5, 1911: 226; Calman, 1909: 705 (list); Ward, 1941: 11; Tweedie, 1947: 27 (list); Serène and Luom, 1958: 131, pl. II, fig. C, pl. III fig. e, pl. IV, fig. f.

Chlorodopsis venusta: Balss, 1938a: 53 (part).

Pilodius etisoides Takeda and Miyake, 1968b: 186, fig. 2, pl. 8 C, D.

Chlorodopsis pilumnoides: Garth, 1964: 140 (list). **non** White, 1848.

non *Chlorodiella venusta*: Balss, 1938a: 53 (part) = *Liocarpilodes integerrimus* (Dana, 1852).

non *Chlorodopsis scabricula*: Rathbun, 1906: 859, 1907: 50, pl. 1, fig. 3, pl. 9, fig. 5 = *Phymodius nitidus* (Dana, 1852).

Description

Regions of carapace nearly indistinct, better defined laterally, dorsal surface shagreened, sparsely setose. 2M entire. 1P uniformly granulate; sinuous transverse row of adjoining pearliform granules posteriorly on 2P. Submedian frontal lobes rounded, minutely denticulate, separated by shallow notch; lateral lobes triangular, denticulate. Anterolateral margin quadridentate, teeth granulate, anteriormost smallest, lacking curved apical spine. Anterior margin of cheliped merus distinctly spinose. External surface of cheliped carpus tuberculate, with furrow parallel with palmar joint. External surface of chela with conical tubercles on upper margin, smaller and obsolescent inferiorly, lower margin shagreened. Pereiopods sparsely setose, merus, carpus with conical tubercles on superior margin.

*Material examined**Indian Ocean*

Iles Glorieuses; coll. J. Millot, September 1958; 1♂ 10 mm, 1♀ 9 mm; det. R. Serène (MNHM MP B.6733).

Ile Europa; coll. P. Fourmanoir; 1♀ 11.5 mm; det. R. Serène (MNHN MP B.6732).

Nosy Famy, Madagascar; coll. A. Crosnier, February 1962; 2♂ 11.5–11 mm; det. R. Serène (MNHN MP B.6734).

Coin Peros, Chagos Archipelago; coll. J. S. Gardiner, *Sealark*, 1905; 1♂ 12 mm; formerly *Chlorodopsis venusta* det. M. J. Rathbun; (UMZC Aug. 7 1910)—Salomon Is.; 1♀ 8.5 mm, 1 juv. (UMZC Aug. 7 1910)—Coetivy; 2♂ 9.5–5.5 mm, 2♀ 8 mm, 1 juv. (UMZC Aug. 7 1910).

Cocos Keeling Island, Indian Ocean; coll. C. A. Gibson-Hill; 3♂ 10.5–9.5 mm, 2♀ 11–9 mm; formerly *Pilodius melanodactyla* det. M. W. F. Tweedie, redet. R. Serène 20/11/69 (NUS 1969.11.11.126–130).

Christmas Island, Indian Ocean; coll. C. A. Gibson-Hill 1940; 1♀ 8.5 mm; det. R. Serène 20/11/69 (NUS 1969.11.24.30). Christmas Island; coll. C. W. Andrews,

1908; 4♂ 10–7.5 mm, 5♀ 9.5–6 mm; formerly *Chlorodopsis venusta* det. W. T. Calman, redet. J. Forest and D. Guinot (NHM 1909.5.19.54–58).

Australia

Thirteen miles SE of Cape Capricorn, Queensland; coll. *Endeavour*; 1♂ 5 mm (AM E.3146). Wreck Reef, nr Porpoise Cay, Queensland; coll. J. Short and B. Matheson, 9 May 1988, 0.5 m; 3♂ 12–8 mm, 5♀ 10–7 mm, 2 juv. (QM W.15443)—coll. J. Short and S. Mullens, 14 May 1988; 1♂ 8 mm; det. P. Davie, 3 June 1988 (QM W.15149)—15 May 1988; 1♂ 13 mm (QM W.15446). Green Is.; coll. Wm. A. Bartes; 1♂ 8 mm; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM 156078).

Pacific Ocean

Yap Is., Caroline Is., coll. R. W. Hyatt; 1♂ 6 mm; formerly *Pilodius pilumnoides* det. J. S. Garth; (USNM 156077)—1♂ 15 mm; (USNM 156080)—1♂ 7 mm (USNM 156081).

8-13-3, Ifaluk Atoll, Caroline Is.; coll. D. Abbott and F. M. Bayer 1953; 1♂ 4 mm; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.)—39-C, Ifaluk Atoll; fragments (USNM no reg.)—74-B; 1♂ 5.5 mm (USNM no reg.)—73-G-3; 1♂ 3.5 mm (USNM no reg.).

Teffaao, Huahine Is., 16°43'S, 151°00'W; coll. 2 May 1957; 7♂ 9.5–6 mm, 6♀ ovig. 8–7 mm ovig., 2♀ 7–6 mm, 13 juv., formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.).

Saipan Id., Mariana Is.; coll. A. H. Banner 1945; 2♂ 8 mm, 1♀ 8 mm, 2♀ damaged, 20 juv.; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.)—1♀ 6.5 mm (USNM 156079); 3♂ 8–6 mm, 6♀ ovig. 7.5–5 mm; 1♀ 5 mm (USNM no reg.)—2♂ 8–7 mm, 1♀ 8 mm, 1♀ 7 mm, 3 juv. (USNM no reg.)—1♂ 7 mm, 2 juv. (USNM no reg.); 1♂ 8 mm; (USNM no reg.)—1♂ 7 mm, 2 juv. (USNM no reg.).

Arno Atoll, Marshall Is., Micronesia; coll. R. W. Hyatt, June 1950; 1♀ 8 mm, 2 juv.; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM 134597)—2♂ 10–9 mm, 3♀ 9–7 mm (USNM no reg.)—Rigili Is., Eniwetok Atoll; coll. H. S. Ladd, May 1952; 1♂ damaged, 1♀ 8 mm, 1♀ damaged (USNM no reg.)—East Rigili Is.; coll. J. P. E. Morrison 30 May 1952; 1♂ 10 mm (USNM no reg.).

Canton Id., Phoenix Is., Polynesia; coll. C. A. Ely, January 1942; 1♀ 7 mm; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM 134595).

Enyu Id., Bikini Atoll; coll. F. M. Bayer, 1 August 1947; 1♂ 9 mm; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.)—Namu Id.; coll. M. W. Johnson, 3 April 1946; 3♂ 9–6 mm, 6♀ 8 mm, 3 juv. (USNM no reg.)—coll. M. W. Johnson, 3 April 1946; 1♂ 8 mm, 1♀ 9 mm (USNM no reg.)—Enürükku Is.; 1♂ 8 mm (USNM no reg.). Namu Id.; 1♂ 8 mm (USNM no reg.)—1♂ 7.5 mm, 1♀ 7 mm (USNM no reg.).

West of Point Hauru, Moorea, Society Is., Polynesia; coll. 8 May 1957; 2♀ ovig. 7–6 mm, 12 juv.; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.)—Moorea; coll. Bredin Exp., 8 May 1957; 16 juv. (USNM no reg.).

West of Motu Tapee, Bora Bora; coll. 25 April 1957; 2♂ 7 mm, 1♂ damaged, 1♀ 8 mm; formerly *Pilodius pilumnoides* det. J. S. Garth; (USNM no reg.)—1 juv.

(USNM no reg.)—Bora Bora; 1 ♂ 10 mm, 1 ♀ ovig. 8 mm, 6 juv. (USNM no reg.)—1 ♀ 9 mm, 1 ♀ 8 mm; 6 juv. (USNM no reg.).

Raiatea, Tetaro Id.; coll. 29 April 1957; 1 ♀ 9.5 mm, 1 juv.; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.). Vaiorea Is.; coll. 1 May 1957; 1 ♀ 7 mm, 2 juv.; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.).

Palmyra Is.; 1 ♀ 8 mm (MNHN MP B.16490).

Temoe, Tuamotu; coll. L. G. Seurat, 22 April 1903; 1 ♂ 7.5 mm, 1 ♀ 9 mm; det. G. Nobili, 1906 (MNHN MP B.16494).

Hao; coll. L. G. Seurat, 1905; 1 ♀ 10 mm; det. G. Nobili, 1906; (MNHN MP B.16489). Tahiti; coll. G. Ranson; 1 ♀ 6 mm; det. Forest and Guinot 1960 (MNHN MP B.16495). Hikueru; coll. G. Ranson; 1 ♂ 7 mm; 2 ♀ 9–8 mm; det. Forest and Guinot 1960 (MNHN MP B.16496).

Fakahina, Tuamotu; coll. L. G. Seurat, 1905; 1 ♂ 10 mm; det. G. Nobili, 1906 (MNHN MP B.16497)—1 juv. (MNHN MP B.16492)—Marutea, 1 ♂ 10.5 mm, 2 ♀ 11–8 mm (MNHN MP B.16491)—Marutea; 1 ♀ 6.5 mm ovig., 1 juv. (MNHN MP B.16493). Tickahau Atoll, Tuamotu Is., Polynesia; coll. Bredin Exp., 11 April 1957; 1 ♂ 7 mm, 2 ♀ 7 mm, 15 juv.; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.)—1 ♀ ovig. 6 mm (USNM no reg.)—12 April 1957; 1 ♀ ovig. 9 mm, 1 ♀ 8 mm (USNM no reg.)—11 April 1957; 1 juv. (USNM 156082)—13 April 1957; 1 ♀ 5 mm (USNM 156083)—Maiai Is.; 14 April 1957; 1 ♂ 10.5 mm 1 ♀ 8 mm ovig., 1 juv. (USNM no reg.).

No data; 1 ♂ 8 mm, 2 juv.; formerly *Pilodius pilumnoides* det. J. S. Garth (USNM no reg.).

Remarks

Material identified by Rathbun from Honolulu (1906) and Tahiti (1907) as *Chlorodopsis scabricula* was assigned to *Phymodius nitidus* by Forest and Guinot (1961). Balss (1938) synonymized *Chlorodiella asper* Edmondson, 1925 with *Chlorodiella venusta*; however, Serène 1984: 263 assigned this material of Edmondson to *Liocarpilodes integerrimus* (Dana, 1852). Forest and Guinot (1971) considered *Chlorodopsis venusta* and *Chlorodiella venusta* as junior synonyms of *Pilodius scabriculus*. Specimens identified by Garth (1964) as *P. pilumnoides* belong to *P. scabriculus*. The *Chlorodopsis spinipes* of Sankarankutty (1962) and the *Pilodius etisoides* of Takeda and Miyake (1968) were assigned by Serène (1984: 245) to *Pilodius scabriculus*.

Distribution

Recorded from the Island of Europa, west of Madagascar, to Polynesia (Fig. 29). Not recorded from mainland east Africa, Red Sea or India.

Type status

Type specimen destroyed in the great fire of Chicago while on loan to Stimpson. Type locality Balabac Passage, South China Sea.

Pilodius spinipes Heller, 1861

(Figs 15A–G, 38A, B, 39A, 44A, C)

- Pilodius spinipes* Heller, 1861a: 11–12, 1861b: 340–341, pl. III, fig. 22; Guinot, 1964a: 12, 1964b: 68, 1967: 268; Derijard, 1968: 1244; Peyrot-Clausade, 1977a: 27; Serène, 1984: 243 (part), figs 143g, 148, pl. XXXIV A, B.
- Pilodius* aff. *spinipes* Serène, 1984: 244, fig. 143h, pl. XXXIV C.
- Chlorodopsis spinipes*: De Man, 1881: 98; Alcock, 1898: 169; Nobili, 1901b: 14, 1906: 270; Laurie, 1915: 455 pl. XLIII, fig. 3a–d; Balss, 1924: 11; Monod, 1938: 132; Serène and Luom, 1959: 321–323, 338, figs 2E, 3B, 4B, 5E, pl. 11B, IIIH; Guinot, 1958: 178 fig. 22a, b.
- Chlorodopsis pilumnoides*: Barnard, 1955: 3 (part); Guinot, 1967: 268 (part). **non** White, 1848.
- Chlorodopsis pugil*: Klunzinger, 1913: 248 (152) pl. VI(X), figs 18a–c; Ramadan, 1936: 33 (part). **non** Dana, 1852.
- Chlorodopsis melanodactylus*: Miers, 1884: 531 (part).
- Chlorodopsis melanodactyla*: Lenz, 1905: 355.
- Chlorodopsis woodmasoni* Alcock, 1898: 170, 1899, pl. 37, fig. 7; Borradaile, 1902: 261; Lenz, 1910: 551; Rathbun, 1911: 226; Bouvier, 1915: 280(103), fig. 29; Michel 1964: 24.
- Chlorodopsis pubescens*: Serène, 1977: 51 (list). **non** Dana, 1852.
- Etisus spinipes*: Paul'son, 1875: 39, pl. VI, fig. I.
- Chlorodius niger*: Rüppell, 1830: 20 (part).
- Chlorodiella nigra*: Serène, 1984: 285 (part).
- non** *Chlorodopsis spinipes*: A. Milne Edwards, 1873: 230 pl. VIII, fig. 6; De Man, 1887a: 282, 1892: 278; Ortmann, 1893: 471; Henderson, 1893: 361; Zehntner, 1894: 151; Alcock, 1898: 169; Calman, 1900: 12; Borradaile, 1900: 588, 1902: 261; De Man, 1902: 626; Rathbun, 1907: 50, pl. II, fig. 5; Lenz, 1910: 551; Rathbun, 1911: 226; Ward, 1932: 251; Miyake, 1936: 509; Serène and Luom, 1958: 135 pl. IB, IVh; Sankarankutty, 1961: 121 (list), 129; Michel, 1964: 24 = *Pilodius pugil* Dana, 1852.
- non** *Chlorodopsis spinipes*: Sankarankutty, 1962, fig. 40, 41 = *Pilodius scabriculus* Dana, 1852.
- non** *Pilodius spinipes*: Serène, 1984: 243 (part) = *Phymodius granulatus* (Targioni Tozzetti, 1877).
- non** *Pilodius spinipes*: McNeill, 1968: 74 = *Pilodius nigrocrinitus* Stimpson, 1859.

Description

Regions of carapace well defined, deep cervical groove in mesogastric region, surface unevenly granular, sparsely setose. 2M partly divided into two longitudinally. 1P uniformly granulate; sinuous transverse row of adjoining pearliform granules posteriorly on 2P. Submedian frontal lobes rounded, denticulate, separated by 'U'-shaped notch, external lobes small, spine-like. Anterolateral margin quadridentate, teeth well defined, clearly separated, curved, furnished with ancillary spines distally, this being most pronounced in 2nd tooth. Anterior margin of cheliped merus spinose. External surface of cheliped carpus with large, conic tubercles, furrow parallel with palmar joint. External surface of chela closely set with long conical tubercles, smaller inferiorly, lower margin granulate. Pereiopods sparsely setose, superior margin of carpus, merus, propodus spinose.

*Material examined**Indian Ocean*

Gulf of Suez, Red Sea; 1♂ 13 mm, 1♀ 9 mm, pres. R. MacAndrews (NHM 1869: 49).

Dahab, Egypt; Gulf of Aqaba, Red Sea; coll. *Manihine* 14 February 1949; 1♂ 14 mm (NHM 1951.1.17.34)—Sharm el Sheik; 2 February 1949; 1♂ 13 mm, 1♀ ovig. 13.5 mm (NHM 1951.1.17.35).

Biological Station, Ghardaqa, Egypt; Red Sea; coll. R. Gurney; 1♀ 16 mm; pres. R. Gurney (NHM 1986: 419).

Red Sea; 1♂ 12 mm; formerly *Chlorodius niger* det. Rüppell (SMF 1724).

Sharm Yenbo (Jambo), Saudi Arabia; Red Sea; coll. S.M.S. *Pola*, December 1895; 1♀ ovig. 10 mm; formerly *Chlorodopsis spinipes* det. Balss; Munich Museum Exchange (NHM 1934.6.27.2).

Abu Latt Is., Saudi Arabia; Red Sea; coll. *Calypso*, 1952; 1♂ 7.5 mm, 2♀ ovig. 12–10 mm; det. D. Guinot (MNHN MP B.16507)—0.5–1 m; 1♂ 14 mm, 1♀ ovig. 11 mm, 1♀ 10.5 mm (MNHN MP B.16508).

Ras Zeili, Red Sea; coll. R. Ph. Dollfus; 1♀ 9 mm, 1 juv.; det. Th. Monod 1932 (MNHN PM B.13718).

Sta. Vc, off Beacon Is., Khor Dongonab, Sudan; Red Sea; coll. Cyril Crossland, 26 April 1905; 1♂ 7.5 mm, 2♀ 7.5–7 mm; formerly *Chlorodopsis spinipes* det. R. D. Laurie; pres. Miss Herdman (NHM 1934.1.17.78)—Sta. VIII D, Suakin Harbour; 1905; 1♀ 10 mm (NHM 1934.1.17.79). Sta. 33, Sudan; Red Sea; coll. R. G. Hartnoll; 1♂ 11 mm; pres. R. G. Hartnoll; det. A. C. Edwards (NHM 1962.9.12.38).

Perim and Obock, Djibouti, Red Sea; coll. F. P. Jousseume, 1897; 1♂ 14 mm, 1♀ ovig. 15 mm, 1♀ 13 mm; det. E. L. Bouvier (AM P.5402), exchange with Paris Museum September 1921, original reg. MP B.8057. Perim and Obock, Djibouti; Red Sea; coll. F. P. Jousseume, 1897; 24♂ 18–7.5 mm, 1♀ ovig. 12.5 mm, 21♀ 17–8 mm, 2 damaged specimens; formerly *Chlorodopsis spinipes* det. Bouvier, verif. G. Nobili 1905; 7 specimens *Phymodius granulatus* det. P. F. Clark (MNHN MP B.8057). Djibouti; coll. M. Maindron; 1♂ 15.5 mm; det. G. Nobili 1905 (MNHN MP B.13715). Djibouti; 1♂ 16.5–11 mm (MNHN MP B.13713)—coll. H. Coutière; 1♀ 10 mm; det. G. Nobili 1905 (MNHN MP B.13717)—Iles Musha, Djibouti; coll. Mission Ch. Gravier, 1904; 1♂ 10 mm; det. G. Nobili 1905 (MNHN MP B.13716).

Aden; 4♂ 12–7.5 mm, 3♀ 12–7.5 mm; pres. Capt. J. W. Yerbury; (NHM 1884: 25)—2♂ 12.5–12 mm, 5♀ 12–8 mm (NHM 1885.14). Sapper Bay, Aden; coll. Capt. K. England, October 1966; 1♂ 11 mm, 2♀ 10–9.5 mm; pres. Capt. K. England (NHM 1974: 101)—Ras Tarshyne; 1♂ 15 mm, 1♀ 10–9.5 mm (NHM 1974: 112).

Khasab Bay, Oman; coll. P. F. S. Cornelius 4 December 1971; 2♀ 7–6.5 mm (NHM 1974: 142)—Khor Ghubb Ali, North Oman; 18 December 1971, 10 fms; 1♂ 12 mm, 1♀ ovig. 8 mm, 3♀ 8.5–7 mm; 1 juv. 5 mm (NHM 1974: 89)—off Bukha; 26 November 1971, 10 fms; 1♂ 14 mm, 2♀ 10.5–9 mm (NHM 1974: 90)—Khasab Bay, off Ras Ghyyh Masud; 24 November 1971; 1♂ 9 mm (NHM 1974: 143). Mirbat, Oman; 1♂ 15–14 mm (UY)—det. P. Hogarth; 1 juv. (UY)—Muscat al Bustan; 1♀ 10 mm (UY)—Sadh; 2♂ 11–10 mm, 2♀ 9.5–6.5 mm (UY)—1♂ 10.5 mm, 1♀ 11.5 mm (UY)—1♀ ovig. 9.5 mm; 1♀ 10 mm, 1 juv. (UY)—4♂ 11–5.5 mm, 3 juv. (UY)—Raysat; 1♂ 8.5 mm (UY)—3♂ 10.5–9 mm; 1♀ 10.5 mm, 1 juv. 6 mm (UY)—1♂ 7 mm (UY).

Island off Entre-Dent, Aldabra; coll. J. D. Taylor 19 April 1967; 1♂ 16 mm; pres. Royal Society Expedition, Aldabra 1967–68 (NHM 1986: 201). Aldabra; coll. A. J. Bruce; 1♂ 16–14 mm; formerly *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.6779).

Iles Glorieuses; coll. A. Crosnier, 29 January 1973; 1♂ 16 mm; formerly *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.8024).

African or Eagle Is., Amirante Group; coll. R. W. Coppinger March 1882, HMS *Alert* 10 fms; 1♂ 16 mm; formerly *Chlorodopsis melanodactylus* det. E. J. Miers; pres. Lords of the Admiralty; (NHM 1882: 24)—no. 194; 4–12 fms; 4♂ 12–9 mm, 2♀ 13–9 mm (NHM 1882: 24).

Seychelles; 1♀ 9 mm; pres. N. Polunin (?) (NHM 1974: 583). Gan, Maldives; coll. P. S. Davies, 20 August 1964; 1♂ 14 mm (NHM 1966:2:1:30). Mahé, Seychelles; 1♂ 12 mm; det. Balss (MNHN MP B.16506). Praslin Reef, Seychelles, coll. J. S. Gardiner, *Sealark* 1905; 1♀ ovig. 14 mm; formerly *Chlorodopsis woodmasoni* det. M. J. Rathbun; (UMZC Aug. 7, 1910)—Coetivy; 2♂ 19–12 mm, 1♀ 14 mm; (UMZC Aug. 7, 1910)—Lagoon, Salomon, Chagos Archipelago; 12 fms; 1♂ 10.5–9 mm (UMZC Aug. 7, 1910)—Diamant, Peros; 16 fms; 1♂ 10 mm (UMZC Aug. 7, 1910)—Hulule, Male Atoll, Maldives; 3♂ 16–10 mm, 1♀ 14.5 mm; formerly *Chlorodopsis woodmasoni* det. L. A. Borradaile (UMZC June 20, 1900)—1♂ 7 mm, 1♀ 9.5 mm, 1 juv. (UMZC June 20, 1900)—Goïdu, Gorfurfehendu Atoll; 4♂ 15–7.5 mm, 1♀ ovig. 12 mm (UMZC June 20, 1900).

Mayotte, Archipel des Comores; coll. M. Marie; 1♂ 14 mm, 1♀ 13.5 mm; det. D. Guinot (MNHN MP B.16505)—coll. A. Crosnier, September 1959; 2♂ 15.5–14.5 mm, 4♀ 14–10 mm; formerly *Pilodius* aff. *spinipes* det. Serène (MNHN MP B.8025).

Delagoa Bay (Baia de Lourenco Marques), Moçambique; 1♀ ovig. 15 mm; formerly *Chlorodopsis pilumnoides* det. K. H. Barnard (SAM A 10855).

Madagascar; 1♀ ovig. 14 mm, 1♀ 14 mm; det. H. Balss (MNHN MP B.16499) and (MNHN MP B.19261)—coll. 1903; 3♂ 16.5–15 mm, 5♀ ovig. 14.5–10 mm; det. H. Balss (MNHN MP B.16504)—3♂ 15–16.5 mm, 5♀ ovig. 14.5–10 mm; det. H. Balss (MNHN MP B.16504)—Nosy Be; coll. A. Crosnier, January 1958; 5♂ 18–11 mm, 1♀ ovig. 16 mm, 2♀ 13–12 mm; formerly *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.8017)—Tamatave; 1♂ 14–10.5 mm; det. H. Balss (MNHN MP B.16498)—Tuléar; coll. G. Petit; 1♂ 18 mm; det. H. Balss; formerly *Pilodius* aff. *spinipes* det. Serène (MNHN MP B.8018)—Tuléar; coll. M. Peyrot-Clausade; 3♂ 18–7.5 mm, 1♀ 13 mm; formerly *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.8019)—Tuléar; Madagascar; coll. 17 May 1898; 1♀ 14 mm; det. Balss (MNHN MP B.16500)—Tuléar; coll. A. Grandidier 1903; 1♂ 10 mm, 2♀ 12 mm (MNHN MP B.19263)—Tuléar; coll. P. Fourmanoir; 1♂ 14.5 mm; formerly *Actea depressa* det. K. H. Barnard, *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.8020)—Fort Dauphin; coll. R. Decary 1931; 1♂ 11.5 mm; formerly *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.8021)—Fort Dauphin; coll. A. Crosnier, 5 March 1973; 2♂ 13.5–9.5 mm, 2♀ 14–11 mm; formerly *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.8022).

Mauritius; coll. P. Carié, 1913; 1♀ 10 mm; formerly *Chlorodopsis woodmasoni* det. E. L. Bouvier (MNHN MP B.13721)—Grand Port; 2♂ 11–9 mm (MNHN MP B.16503)—5♂ 16–6 mm, 4♀ 14–11 mm; formerly *Chlorodopsis woodmasoni* det. E. L. Bouvier, *Pilodius* aff. *spinipes* det. R. Serène (MNHN MP B.8023)—2♂ 12–11.5 mm; formerly *Chlorodopsis woodmasoni* det. E. L. Bouvier (MNHN no reg.)—1♂ 10 mm; formerly *Chlorodopsis woodmasoni* (MI no reg.).

Andamans; coll. *Investigator*; 1♂ 13 mm; formerly *Chlorodopsis woodmasoni* det. A. Alcock, Type (ZSI 2032).

Remarks

Nobili (1906: 270, 1907: 395) commented on the confusion that had existed over the descriptions of three species *Pilodius pugil* Dana, 1852, *P. spinipes* Heller, 1861 and *Chlorodopsis woodmasoni* Alcock, 1898. The *Ch. spinipes* description by Alcock agreed with Dana's figure (1855: pl. 12, fig. 8a) of *Pilodius pugil* and fitted perfectly with Nobili's examples. After examining numerous specimens of *P. spinipes* from the Red Sea, the type locality of Heller's species, Nobili concluded that they accorded well with *Ch. woodmasoni* of Alcock, but Nobili was unable to confirm this statement as Heller's types were no longer extant in the Vienna Museum. However, Serène (1984: 243), after examining Alcock's syntypes of *Ch. woodmasoni*, supported Nobili by saying that this species was identical to *P. spinipes*. The extreme variation found in *P. spinipes* (pl. 2A, B) was shown by Serène (pls XXXIVa, b), from specimens collected in Djibouti (MP B.8057). Further, the material assigned by Serène (1984: 243) to *Pilodius* aff. *spinipes* (pl. 9A) was examined and it was found to be within the morphological variation exhibited by *P. spinipes* Heller. Serène suggested that *Chlorodopsis melanodactyla* (now as *Pilodius spinipes*) of Miers (1884: 531) from Seychelles, Barnard's (1955: 3) *Pilodius pilumnoides* (ovigerous ♀ now *P. spinipes*) from Delagoa Bay (Baia de Lourenco Marques) Moçambique and McNeill's *P. spinipes* from Queensland (1968: 74), Australia (now *P. nigrocrinitus*) should be re-examined. Michel's *Chlorodopsis spinipes* and *C. woodmasoni* from Mauritius (1964: 24) were redetermined as *Pilodius pugil* Dana, 1852 and *Phymodius drachi* Guinot, 1964 respectively.

Distribution

Pilodius spinipes is restricted to the Red Sea and Indian Ocean (Fig. 30). The redetermination of McNeill's material leaves Alcock's Mergui Archipelago recording (*Chlorodopsis woodmasoni*) (1898: 171) as eastern-most Indian Ocean record.

Type status

A recent inquiry (Pitkin, personal communication) confirms that the type specimen is not extant in the Vienna Museum. Type Locality: Red Sea.

Discussion

Previous revisors of *Pilodius* Dana, 1851 were unsuccessful in resolving the complex taxonomic problems associated with this taxon. Many factors have contributed to the situation where 43 species (Table 2) have been described and referred to *Pilodius*. A major part of the problem is that only male specimens can be positively identified to species. Male pleopod morphology had great value as an effective differentiating character between the many old and new species established and male cheliped coloration pattern provide further stable identification features. Other characters are more variable; for example the difference in cheliped morphology between mature and immature specimens of the same species is marked, (Figs 40D, 41A, 42B, C), also variation of exoskeleton spinature in males can be extreme (Figs 38A, B, 39A).

Females of *Pilodius* are almost impossible to identify to species because their cheliped coloration patterns are different from those of the male counterpart (Figs 40A ♂, 44A ♂, 44B ♀, 44C ♀), but are almost uniform between species (Figs 44B ♀, 44C ♀). Takeda and Miyake (1968b) based their description of *P. etisoides* on a single ovigerous female and, although this specimen was examined during the present study, the validity of the species cannot be confirmed in the absence of a male. Rathbun based

the description of *Pilodius flavus* on an immature female holotype measuring 9 mm in carapace width. She later described the same species under a different name, *Chlorodopsis melanospinis*, from a mature male specimen (Fig. 40D) and a number of paratypes. Examination of available *P. flavus* and *Ch. melanospinis* material enabled the present authors to synonymize the two species. This decision, although correct under the rules of nomenclature, makes the type worthless as a morphological representative of the species *P. flavus*. The ovigerous cotype of *Ch. kauaiensis* described by Edmondson from Kauai, Waimea, Hawaii (Bernice P. Bishop Museum reg. S 6876), was examined and the prolongation of the basal antennal segment was absent. Consequently, the antennal flagellum was not excluded from the orbital hiatus and therefore this species has been assigned to *Pilodius* erroneously.

In Table 2, 14 species are junior synonyms. The creation of some of these could have been avoided if the available type material of other species had been examined first. For example, *Chlorodopsis (Cyclodius) palaoensis* Sakai 1938 is *Pilodius pilumnoides* (White, 1847), the types of which are extant and available for study. Unavailability of material may have caused many problems; the type specimens *P. pubescens*, *P. pugil* and *P. scabriculus*, *P. granulatus* and *P. nigrocrinitus*, were destroyed in the great fire in Chicago, 1871. This caused confusion between the identifications of *P. spinipes* and *P. pugil* and precluded the precise identity of *P. granulatus*. Two brachyuran collections are not available for study, the material of Sakai and Alcock, both are extant. The examination of *Ch. melanochira*, *Ch. pilumnoides*, *Ch. spinipes* and ?*Ch. nigrocrinata* as determined by Alcock (1898) would have solved many distribution and taxonomic problems, however the Zoological Survey of India did not make this valuable material available to the authors of this current study.

Key to species of *Pilodius*

1a	2M entire	2
1b	2M partly divided into 2 longitudinally	5
1c	2M divided into 2 longitudinally	6
2a(1a)	Anterolateral margin of carapace 3-dentate	<i>P. pugil</i>
2b(1a)	Anterolateral margin of carapace 4-dentate	3
3a(2b)	2P with two parallel transverse rows of adjoining pearliform granules, anterior row medially disjunct.	<i>P. paumotensis</i>
3b(2b)	2P with single sinuous transverse row of adjoining pearliform granules	4
4a(3b)	Carapace densely covered with short setae	<i>P. pubescens</i>
4b(3b)	Carapace sparsely covered with setae	<i>P. scabriculus</i>
5a(1b)	Carapace and pereiopods profusely furnished with dark bristly setae; upper margin of pereiopodal merus, carpus and propodus set with conical tubercles	<i>P. nigrocrinitus</i>
5b(1b)	Carapace and pereiopods covered with long, light-coloured setae; upper margin of pereiopodal merus, carpus and propodus set with long slender spines	<i>P. flavus</i>
6a(1c)	3M tripartite.	7
6b(1c)	3M entire	8
7a(6a)	Anterior lobe of 3M not reaching anterior margin of 2M	<i>P. areolatus</i>
7b(6a)	Anterior lobe of 3M surpassing anterior margin of 2M	<i>P. miersi</i>
8a(6b)	1L-5L with cornute conical tubercles	9
8b(6b)	1L-5L lacking cornute conical tubercles.	12
9a(8a)	Lower external surface of cheliped smooth	<i>P. concors</i> sp. n. (Fig. 40C)

9b (8b) Lower external surface of cheliped granulate 10
(Figs 40B, 41C, 42D)

10a (9b) Anterior margin of cheliped merus spinose 11

10b (9b) Anterior margin of cheliped merus granulate *P. maotieni*

11a (9b) Dark coloration restricted to fixed finger only of chela. *P. cephalalgicus* sp. n.
(Fig. 40B)

11b (9b) Dark coloration extends on to manus of chela *P. pilumnoides*
(Fig. 42D)

12a (8b) Cheliped carpus with two furrows anteriorly *P. moranti* sp. n.

12b (8b) Cheliped carpus with a single furrow anteriorly 13

13a (12b) 2P with two parallel transverse rows of adjoining pearliform granules, anterior
row medially disjunct. *P. granulatus*

13b (12b) 2P with single sinuous transverse row of adjoining pearliform granules
P. spinipes

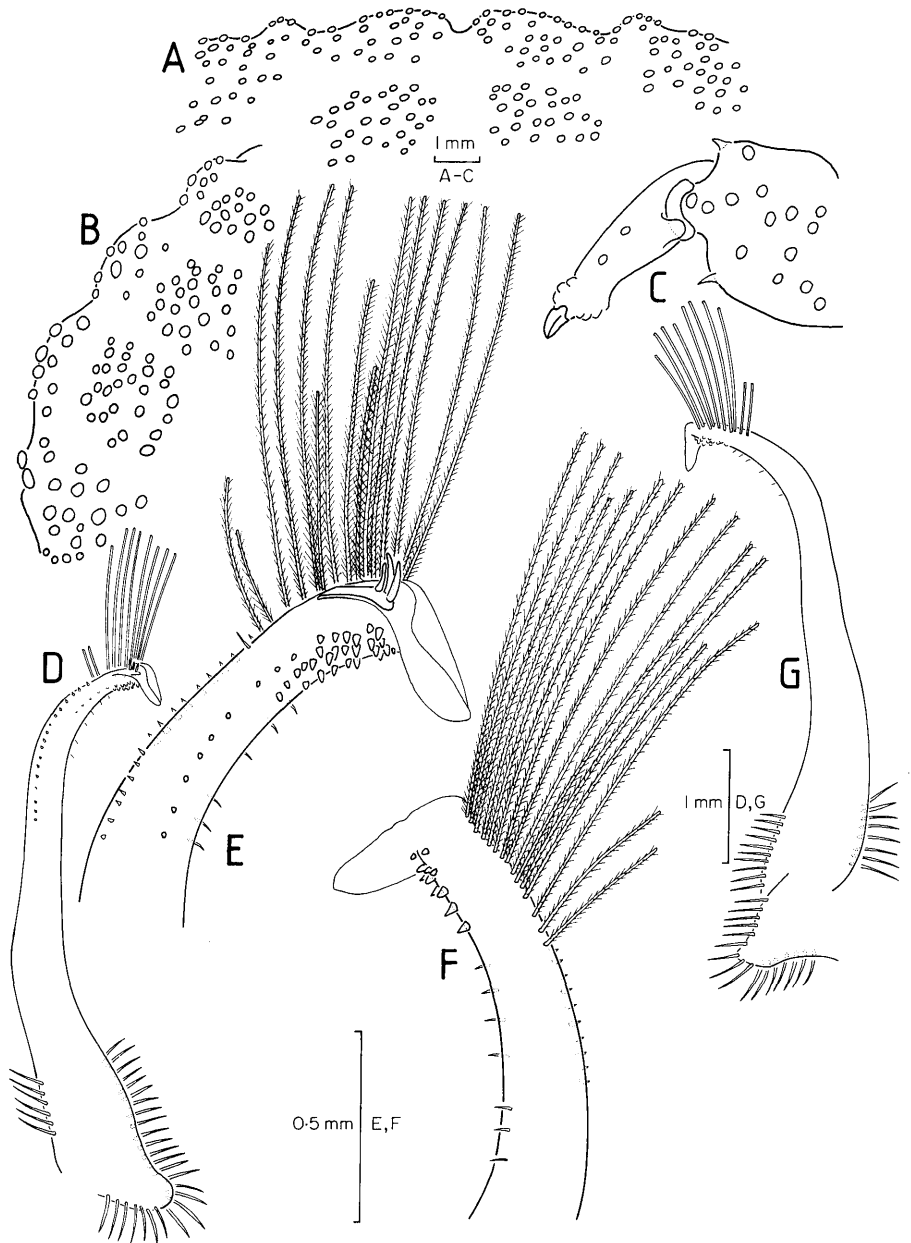


FIG. 1. *Pilodius areolatus* (H. Milne Edwards, 1834); NHM reg. 1931.7.24.95-100; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

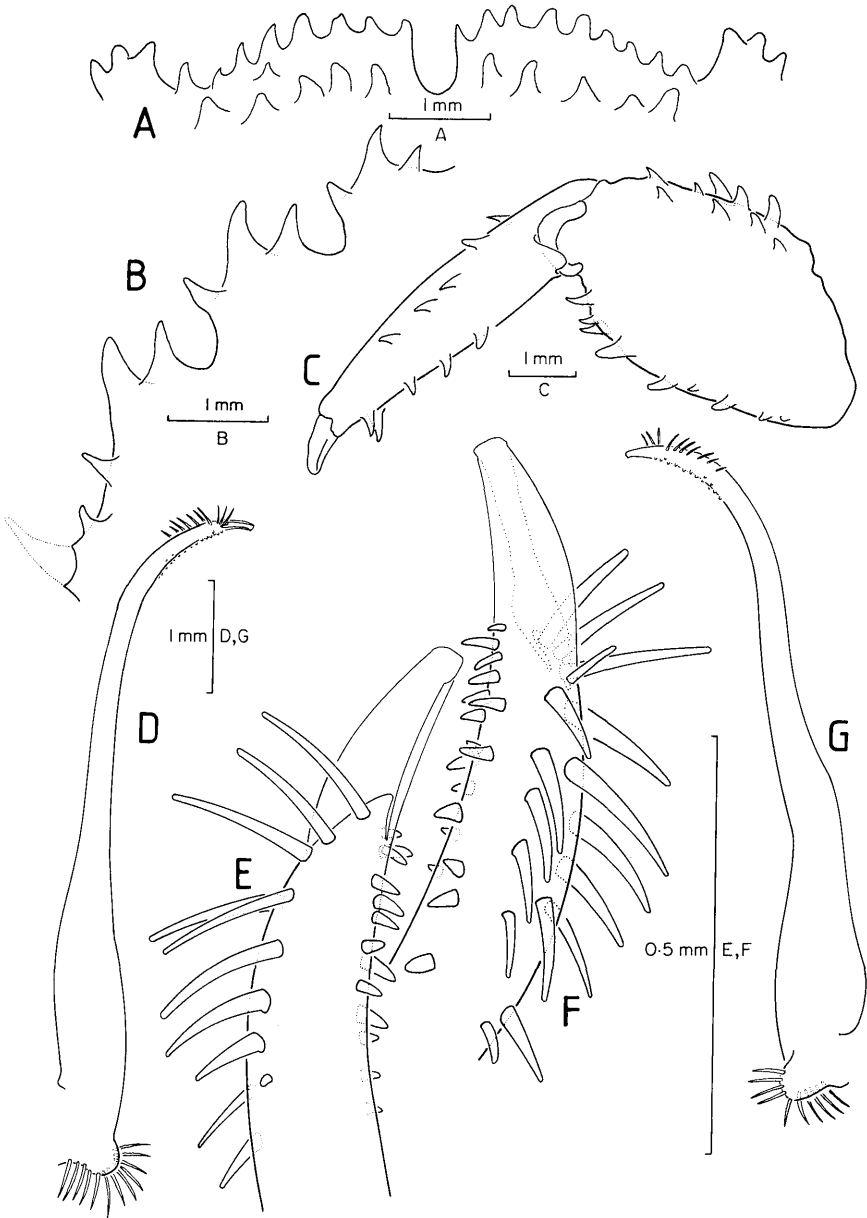


FIG. 2. *Pilodius cephalalgicus* sp. n.; MNHN reg. MP B 20935; Holotype; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

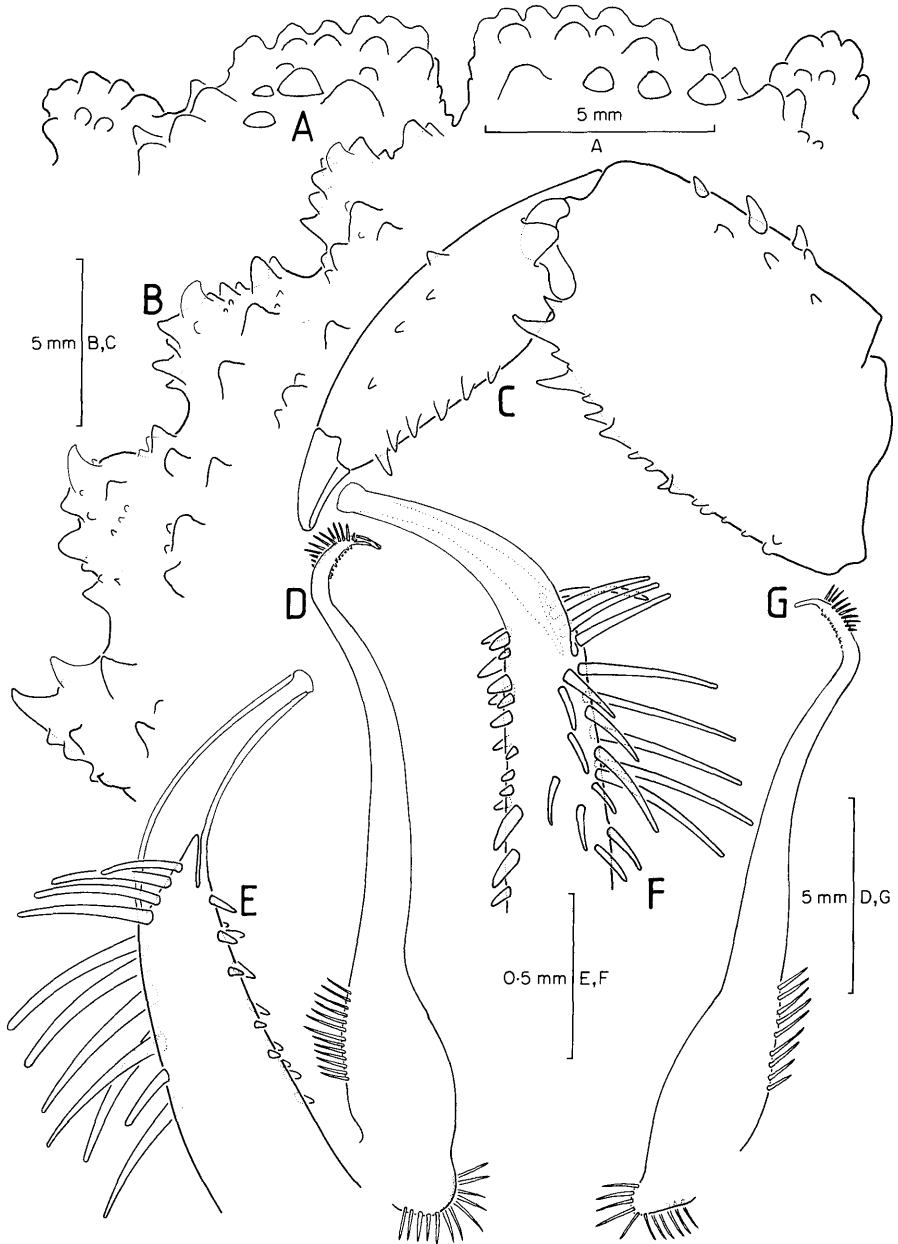


FIG. 3. *Pilodius concors* sp. n.; NUS reg. 1965.11.11.147; Holotype; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

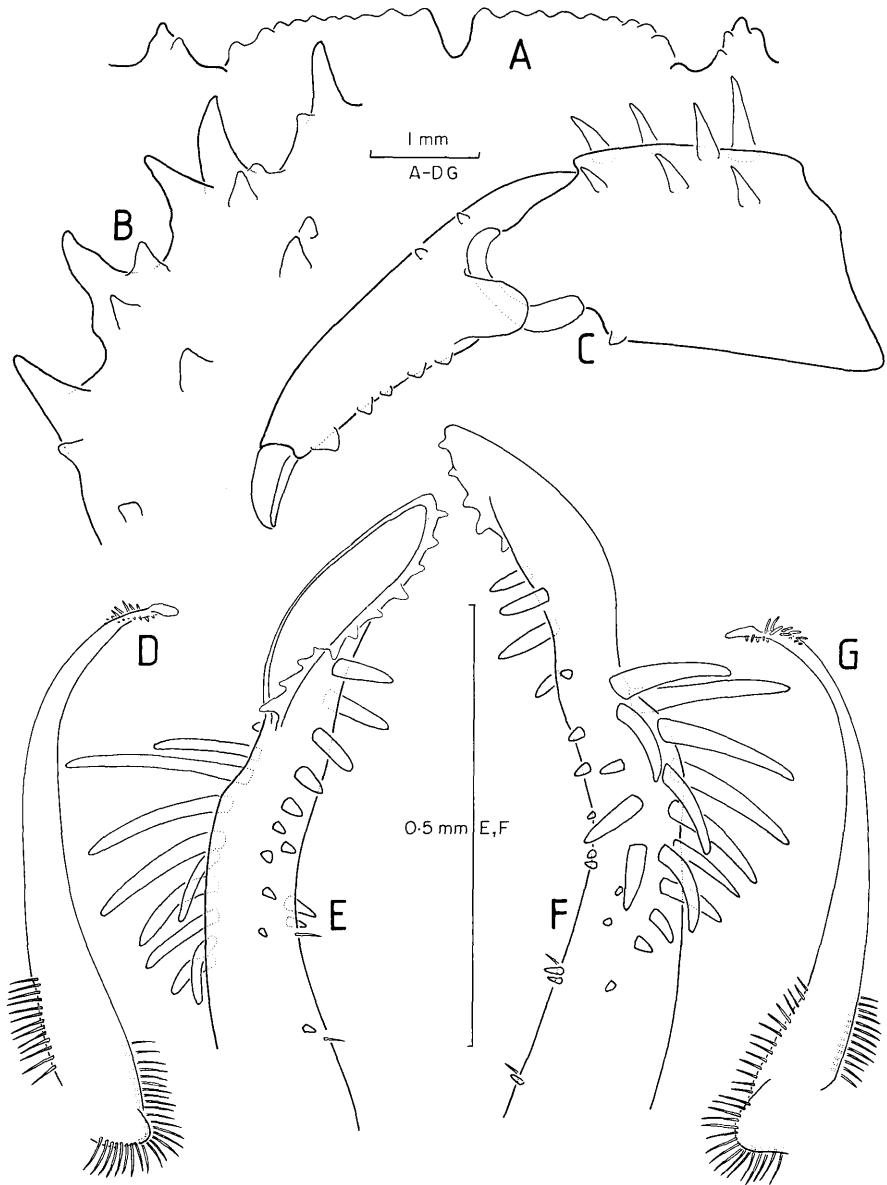


FIG. 4. *Pilodius flavus* Rathbun, 1894; USNM reg. 41268; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

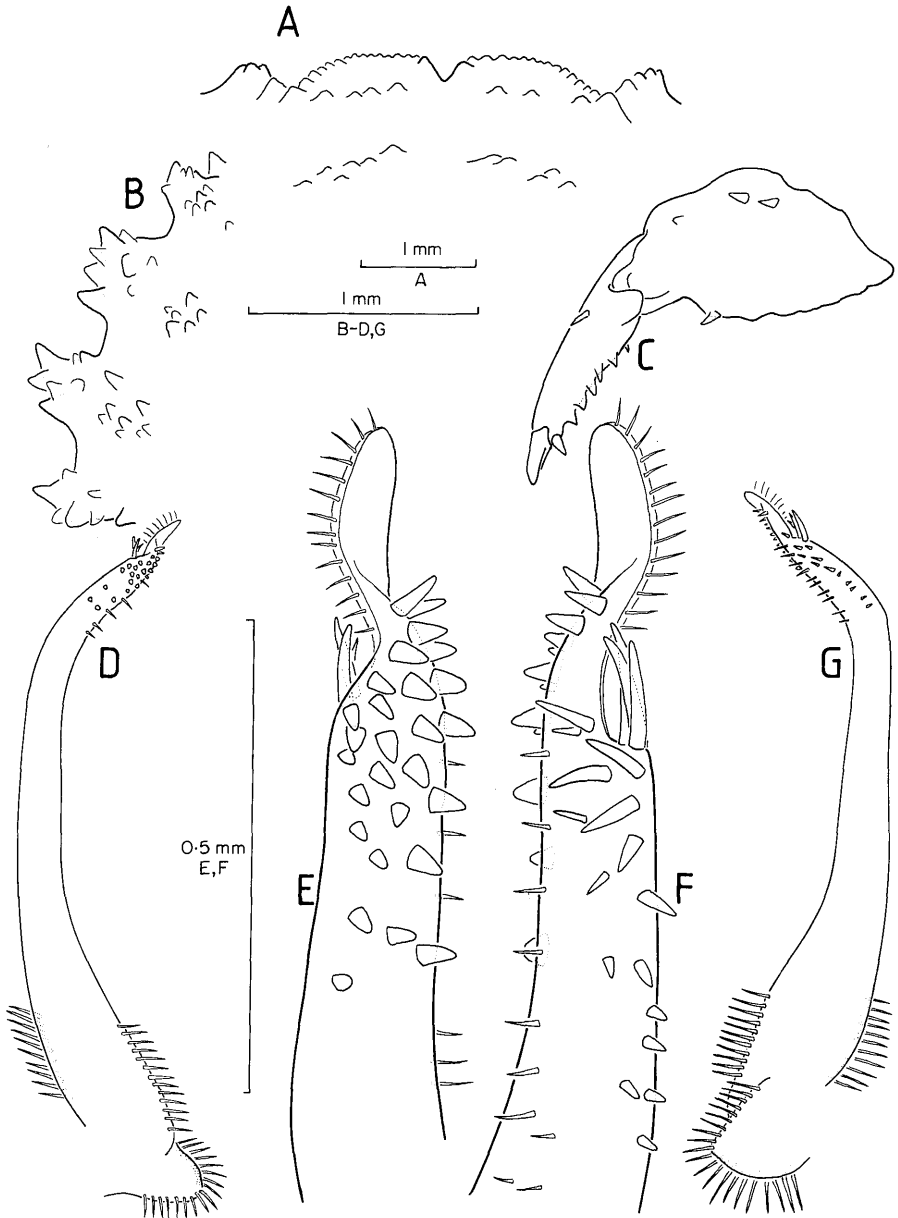


FIG. 5. *Pilodius granulatus* Stimpson, 1859; figs (A–C) reg. NUS reg. 1985.1142–1151, figs (D, E) NUS reg. 1969.11.22.7–11; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

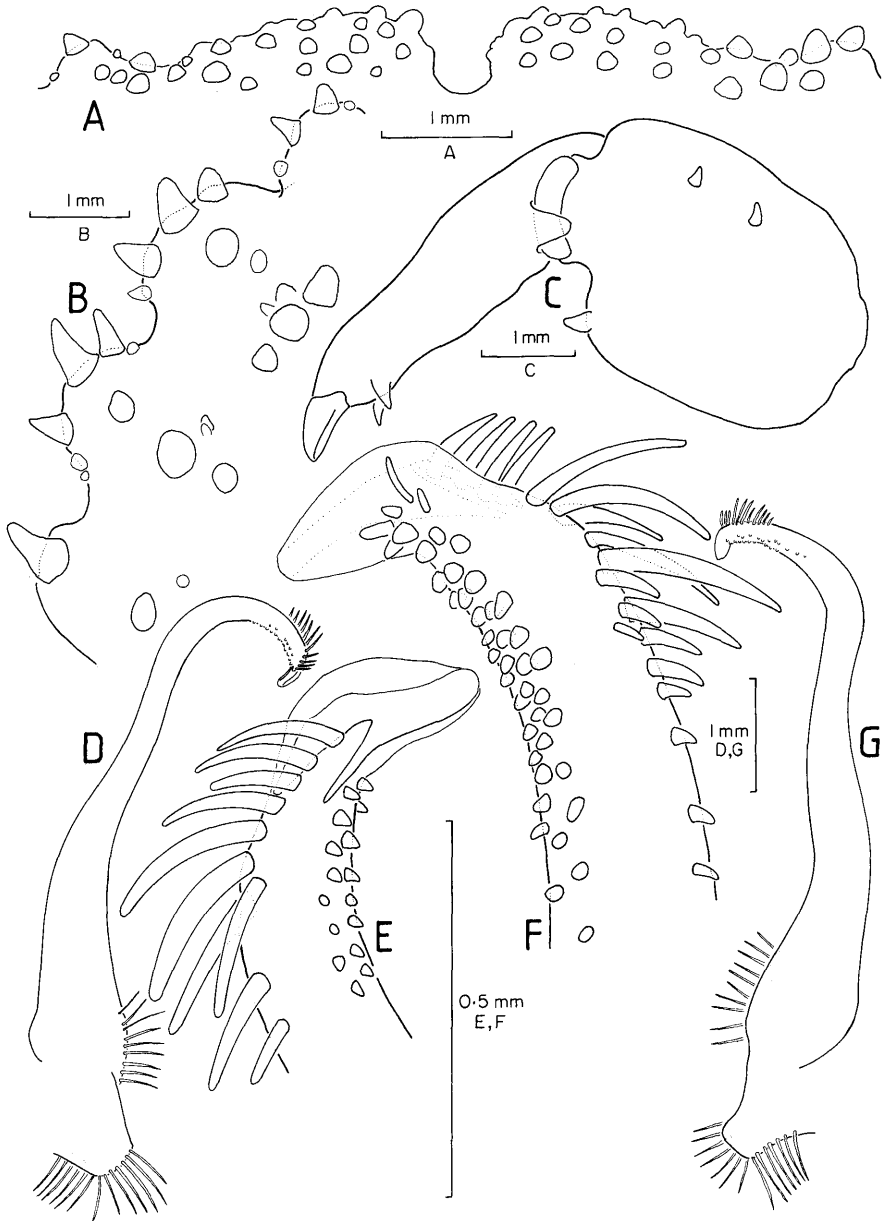


FIG. 6. *Pilodius maotieni* Serène, 1971; MNHN no reg.; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

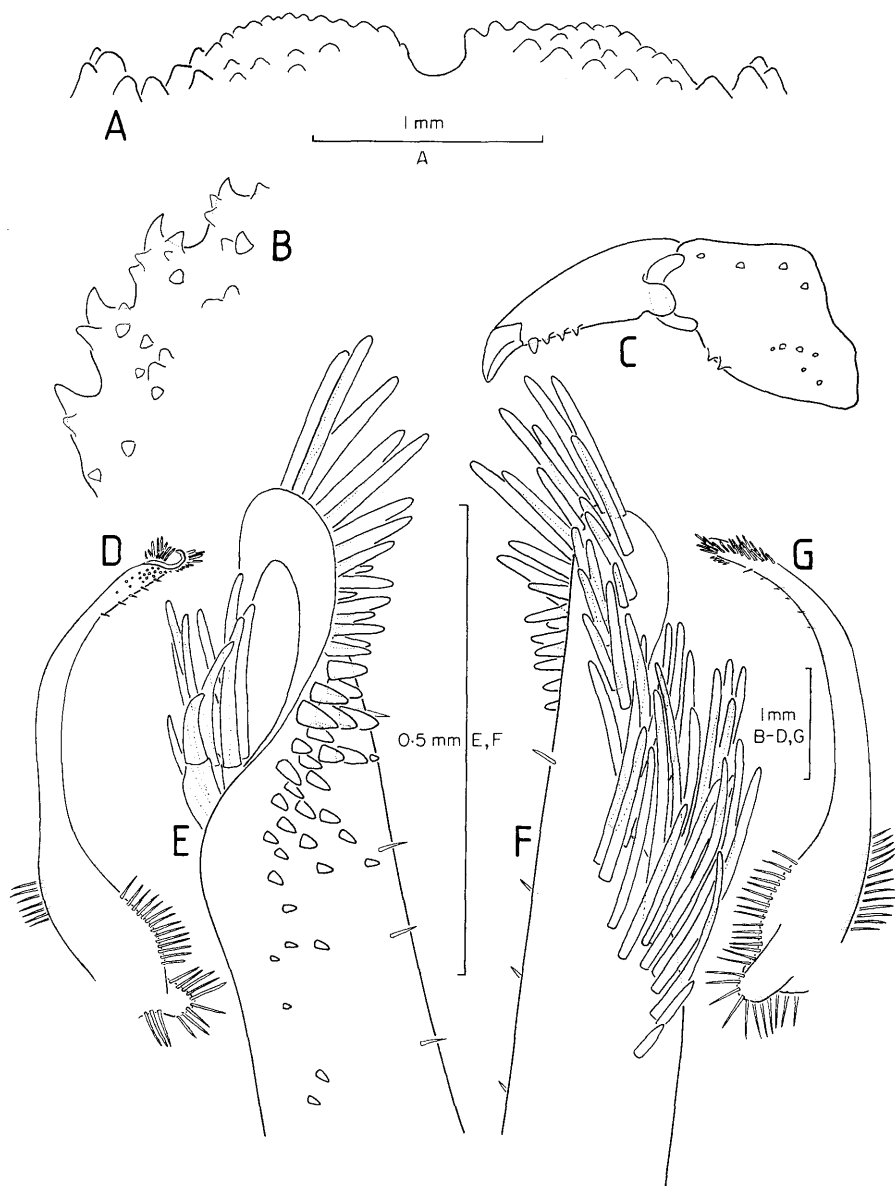


FIG. 7. *Pilodius miersi* (Ward, 1936); figs (A–C) MNHN reg. MP B.9391, figs (D–G) NHM reg. no. 1937.7.15.21–23, Type; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

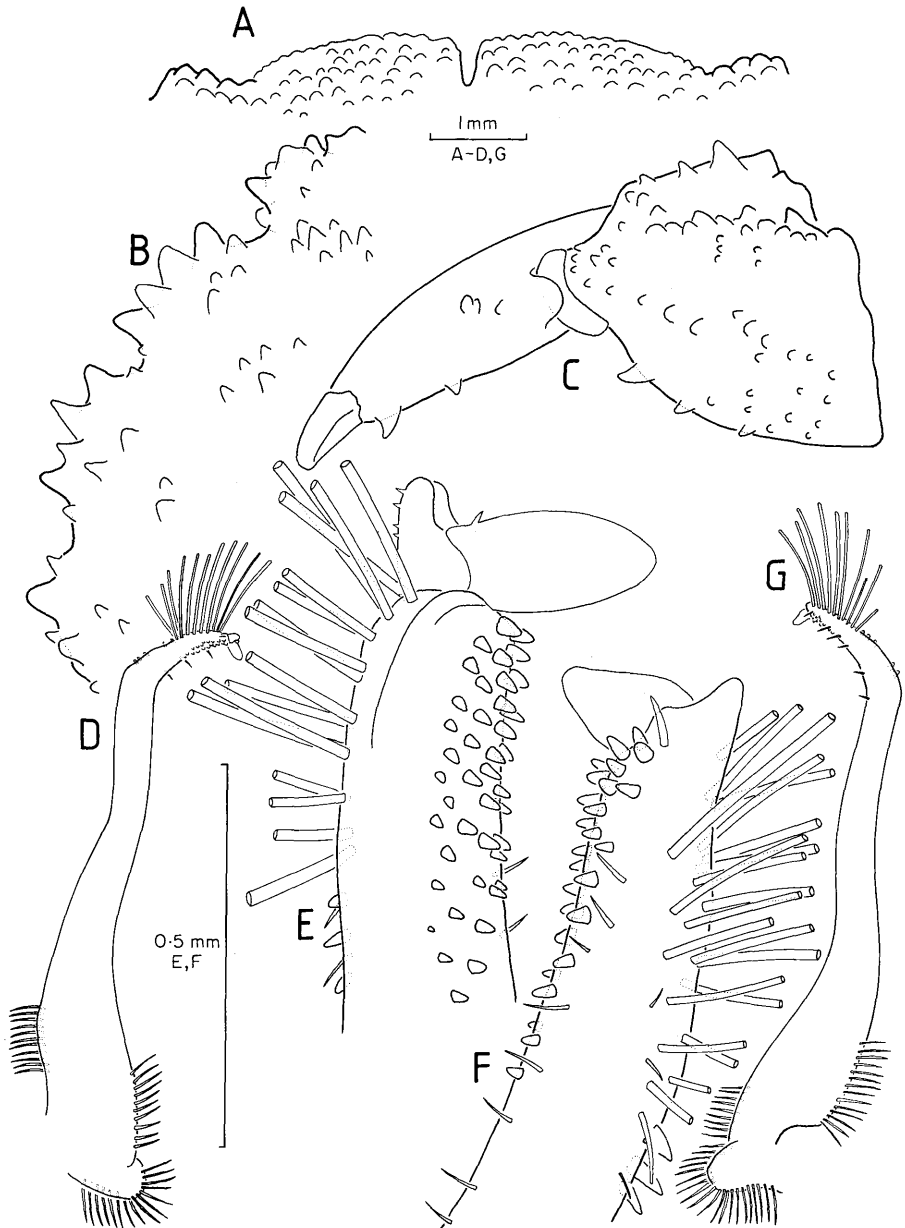


FIG. 8. *Pilodius moranti* sp. n.; figs (A–C) AM reg. P.2372; figs (D–G) AM reg. P.2371 Holotype; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

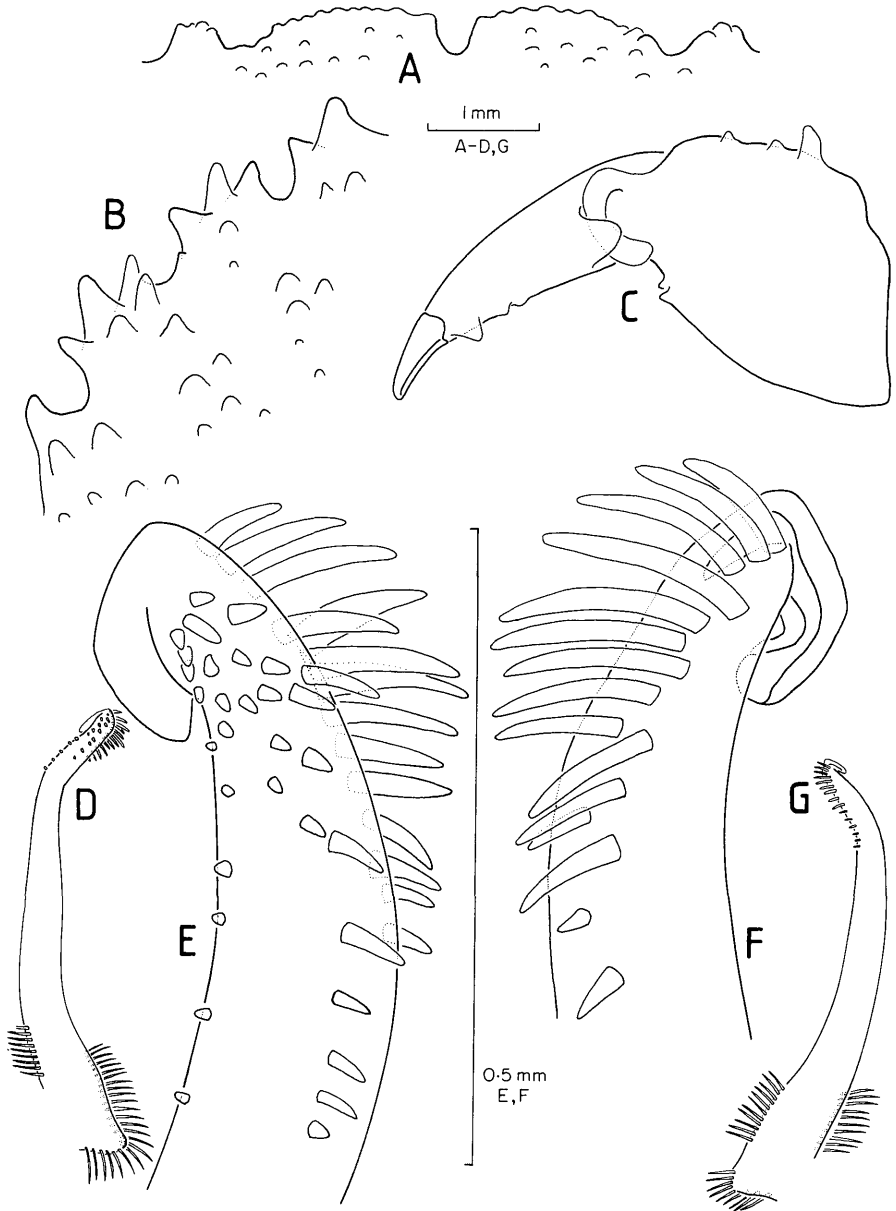


FIG. 9. *Pilodius nigrocrinitus* Stimpson, 1859; figs (A–C) AM reg. P.17208, figs (D–G) NHM reg. 1937.9.21.104–123; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

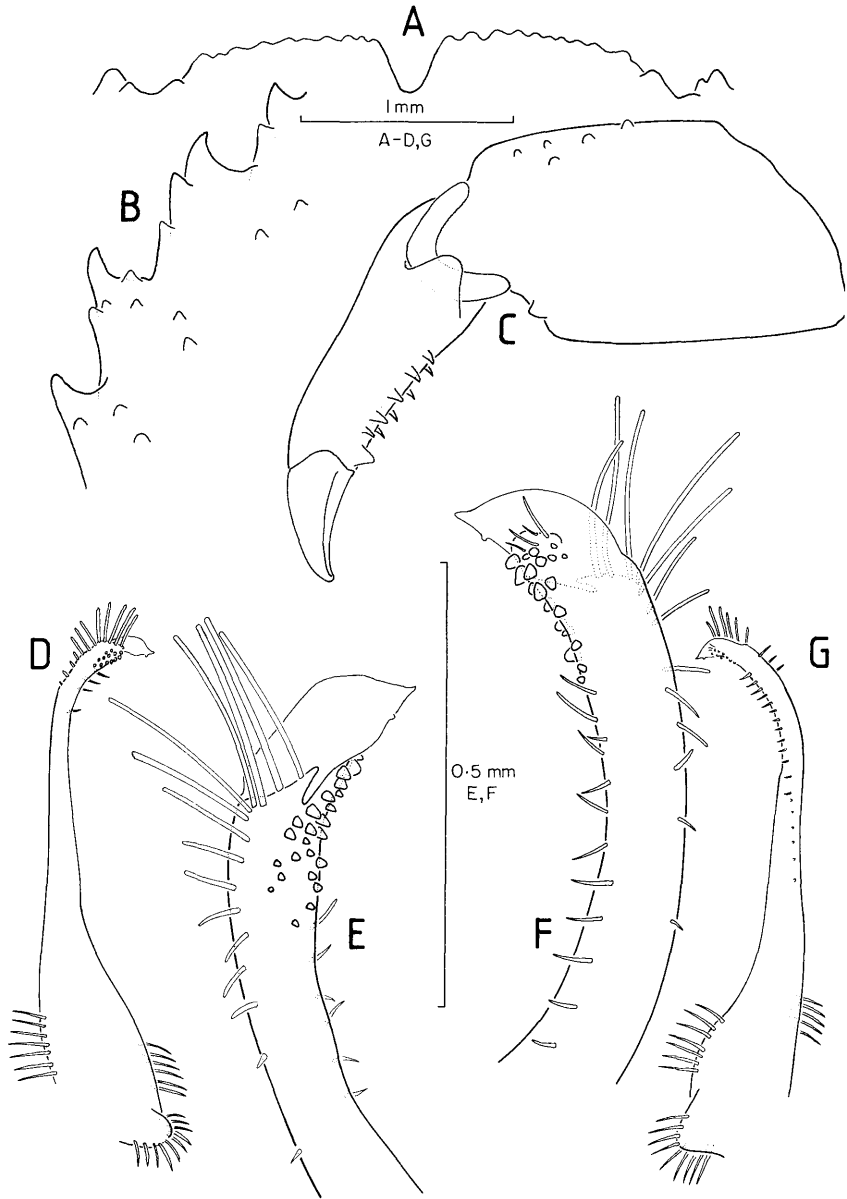


FIG. 10. *Pilodius paumotensis* Rathbun, 1907; USNM reg. 32852; Type; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

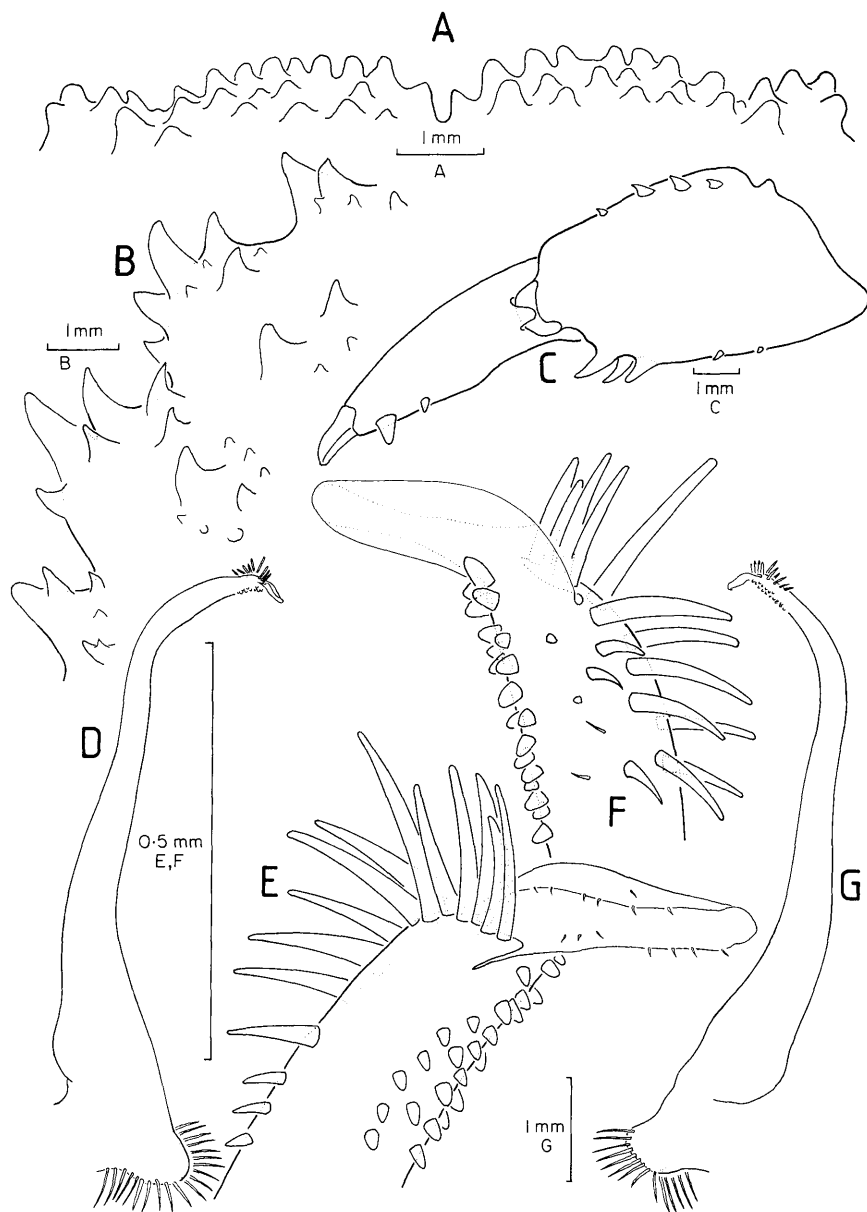


FIG. 11. *Pilodius pilumnoides* (White, 1848); figs (A–C) NHM reg. 1843.6, figs (D–G) NUS reg. 1965.11.11.148; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

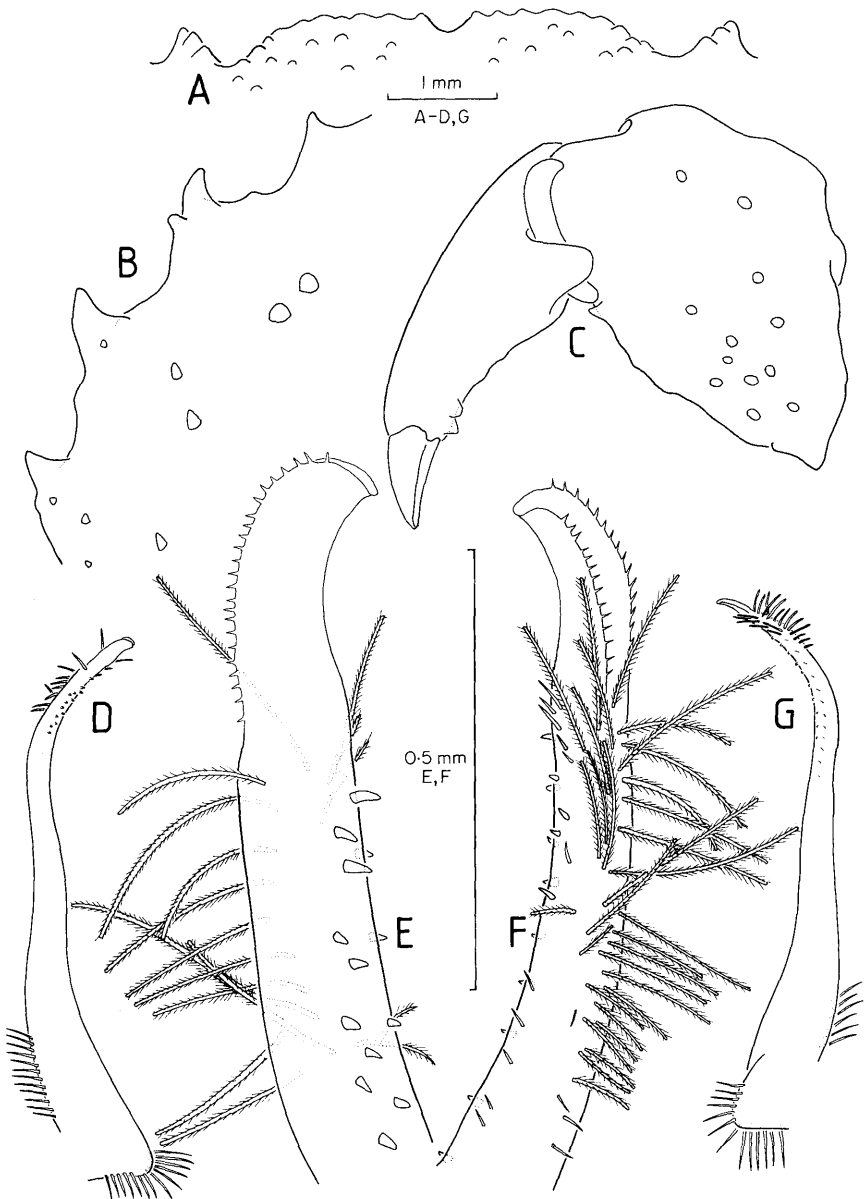


FIG. 12. *Pilodius pubescens* Dana, 1852; NHM reg. 1954.9.14.74; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

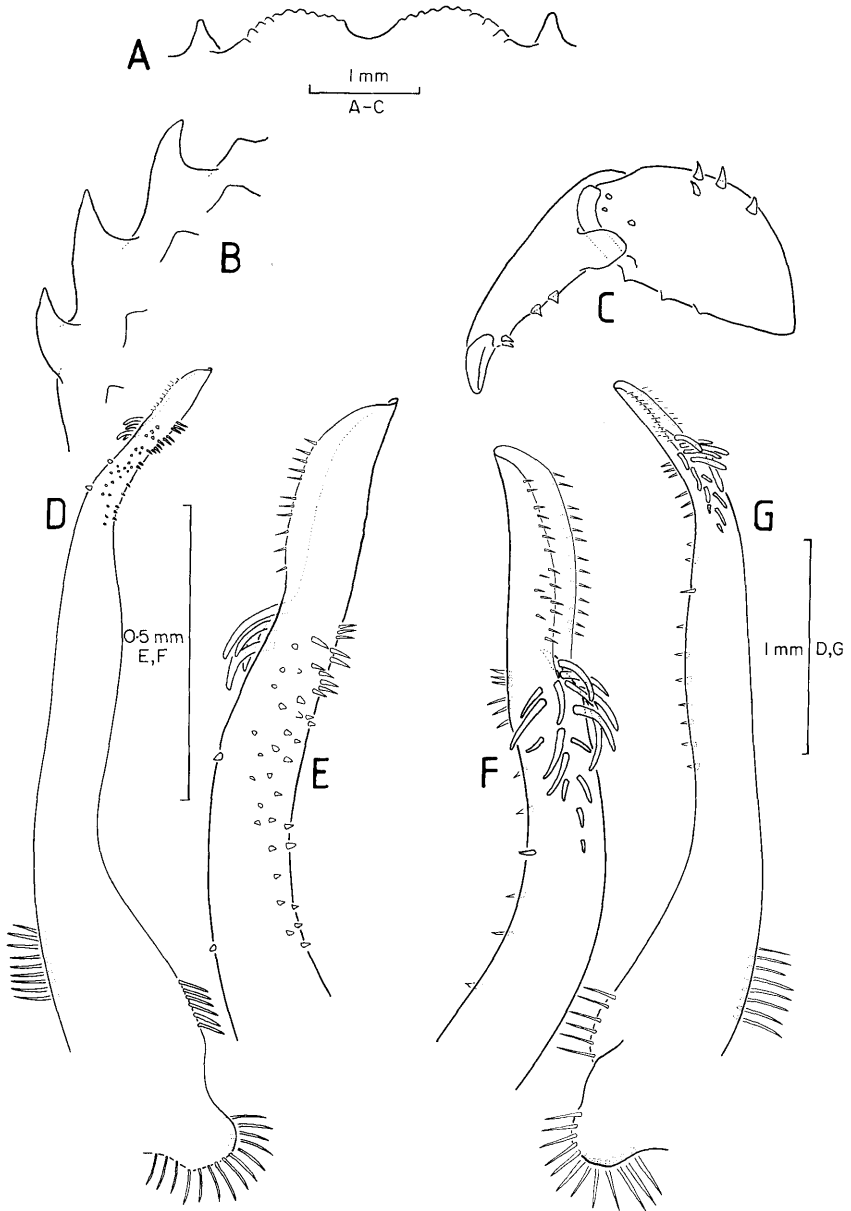


FIG. 13. *Pilodius pugil* Dana, 1852; NHM reg. figs (A-C) 1877.35, figs (D-E) NHM reg. 1986:213; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

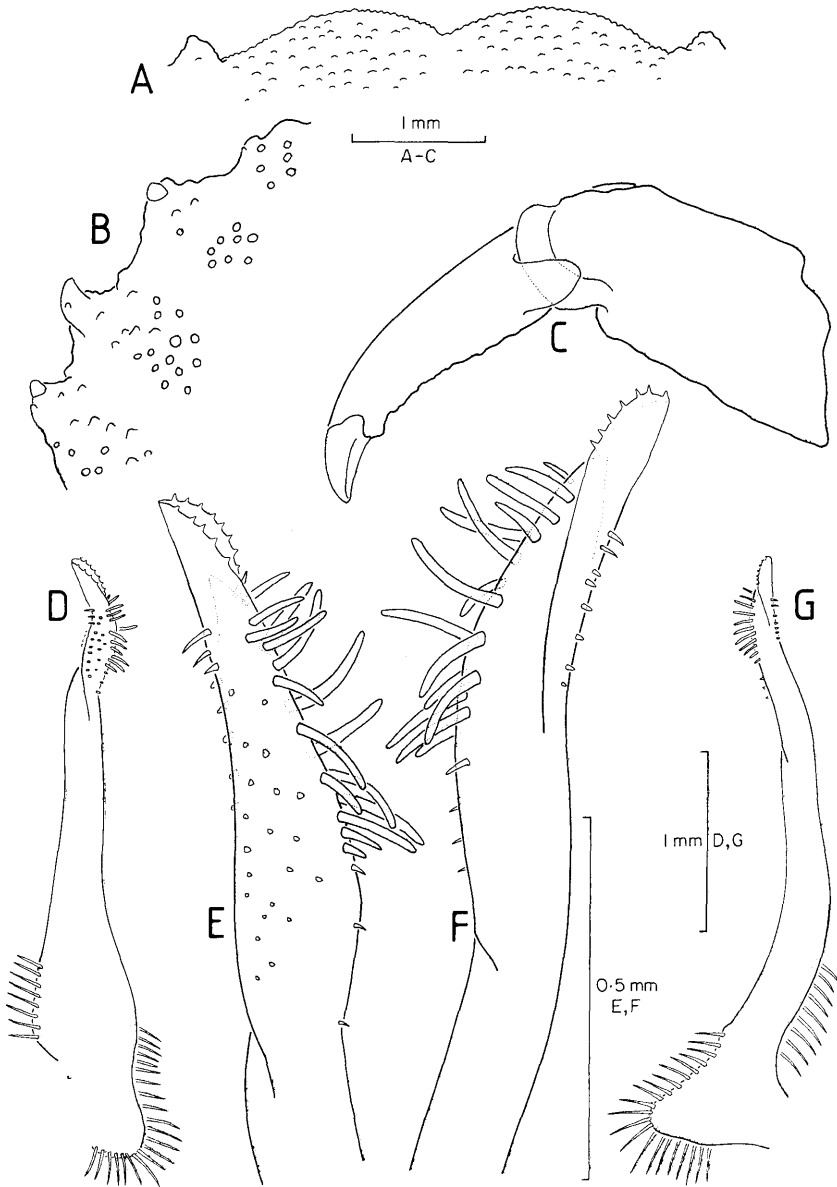


FIG. 14. *Pilodius scabriculus* Dana, 1852; fig. (A) MNHN reg. MP B.6732, figs (B–G) MNHN reg. MP B.6734; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

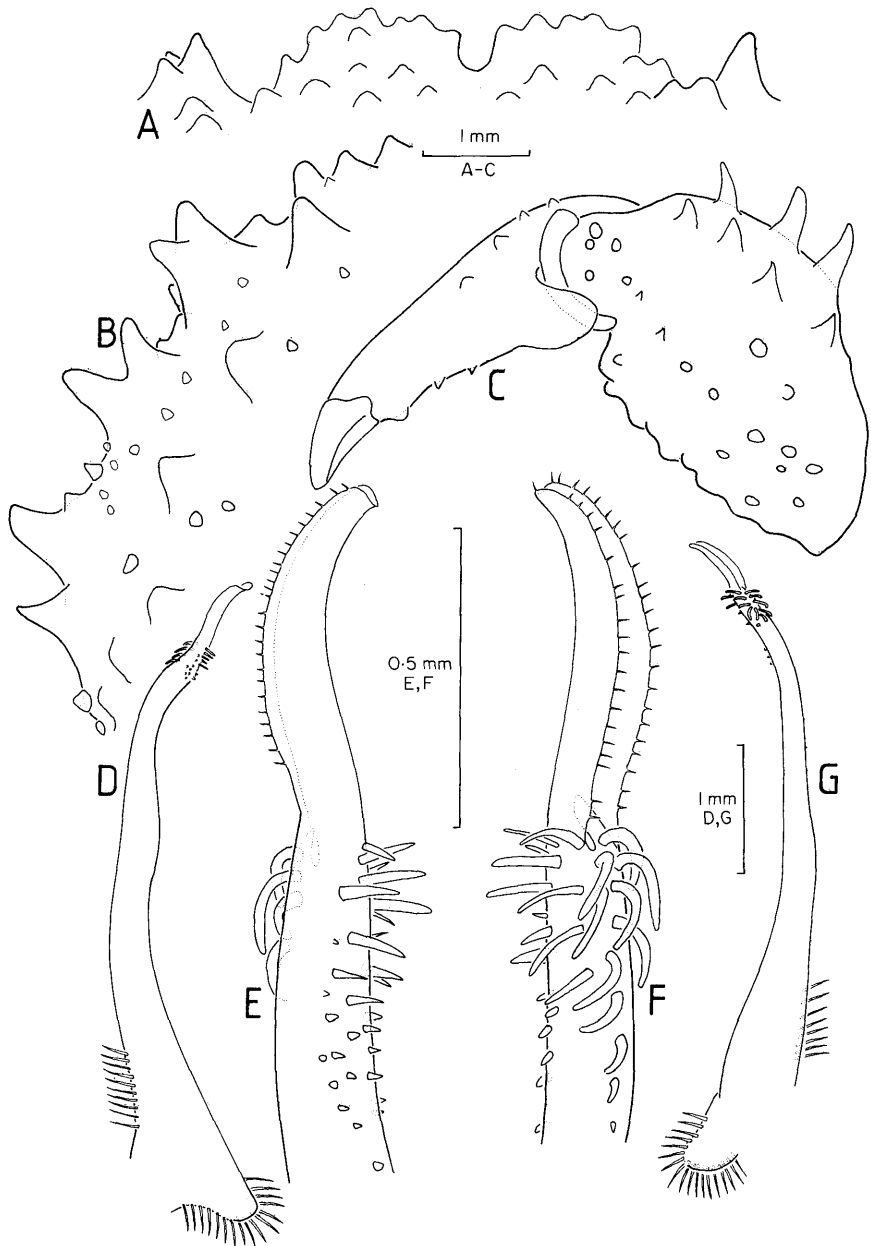


FIG. 15. *Pilodius spinipes* Heller, 1861; NHM reg. 1986:201; (A) frontal margin, (B) left anterolateral margin, (C) propodus and dactylus of left 5th pereiopod, (D, E) ventral view of left pleopod, (F, G) dorsal view of left pleopod.

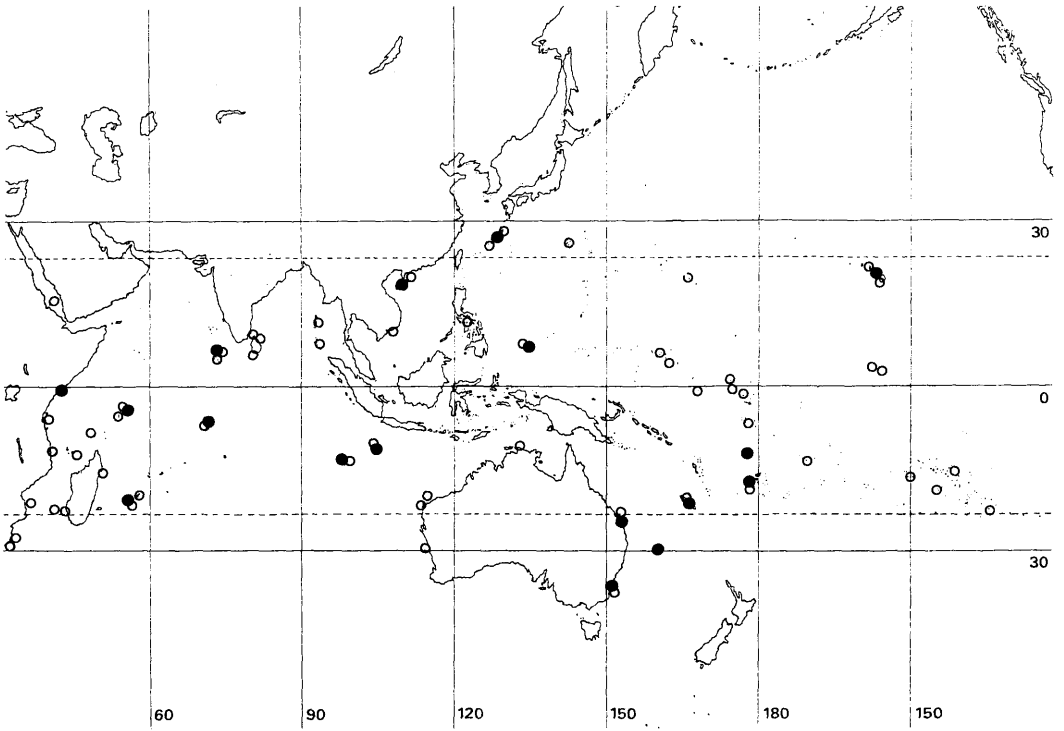


FIG. 16. Distribution of *Pilodius areolatus* (H. Milne Edwards, 1834).

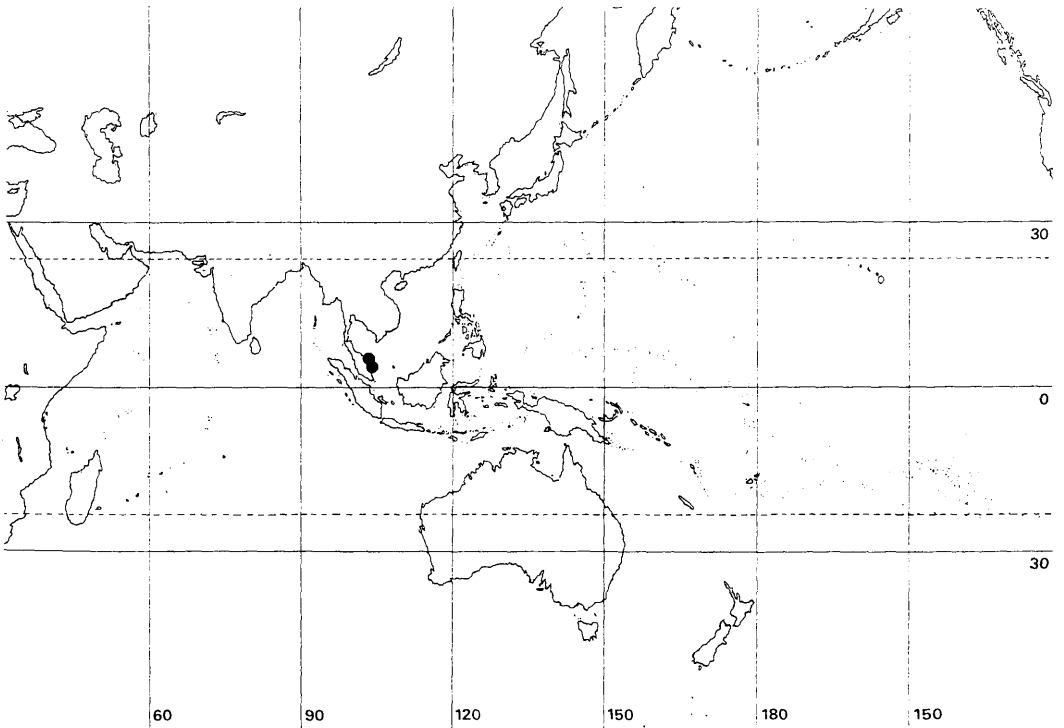


FIG. 17. Distribution of *Pilodius cephalalgicus* sp. n.

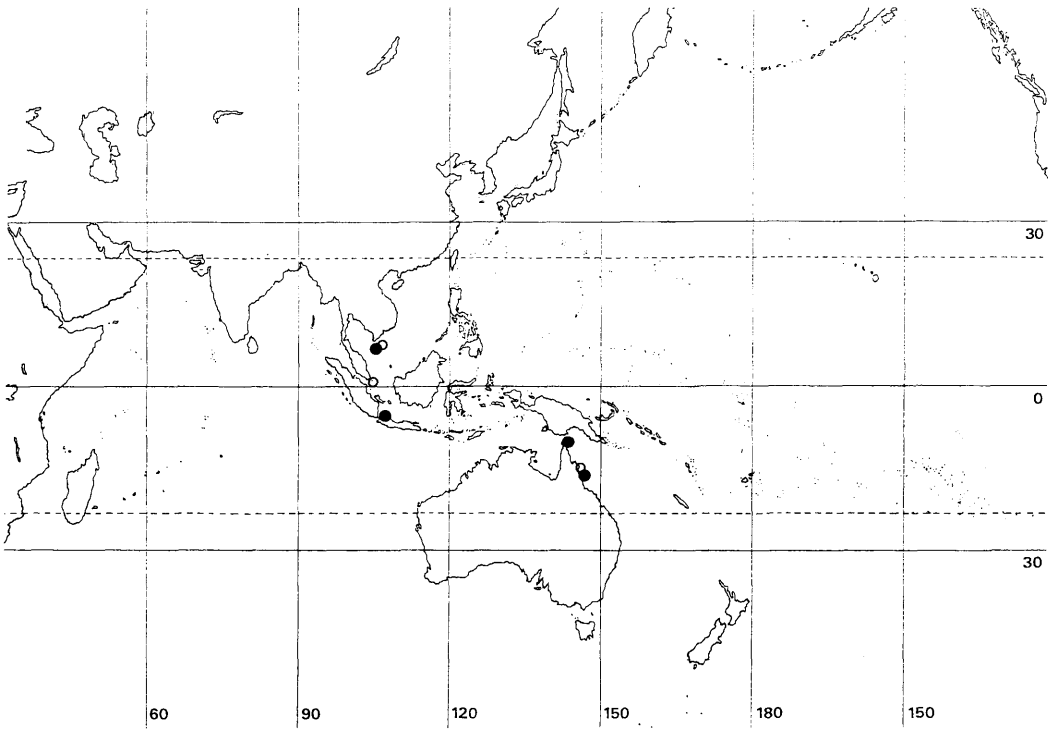


FIG. 18. Distribution of *Pilodius concors* sp. n.

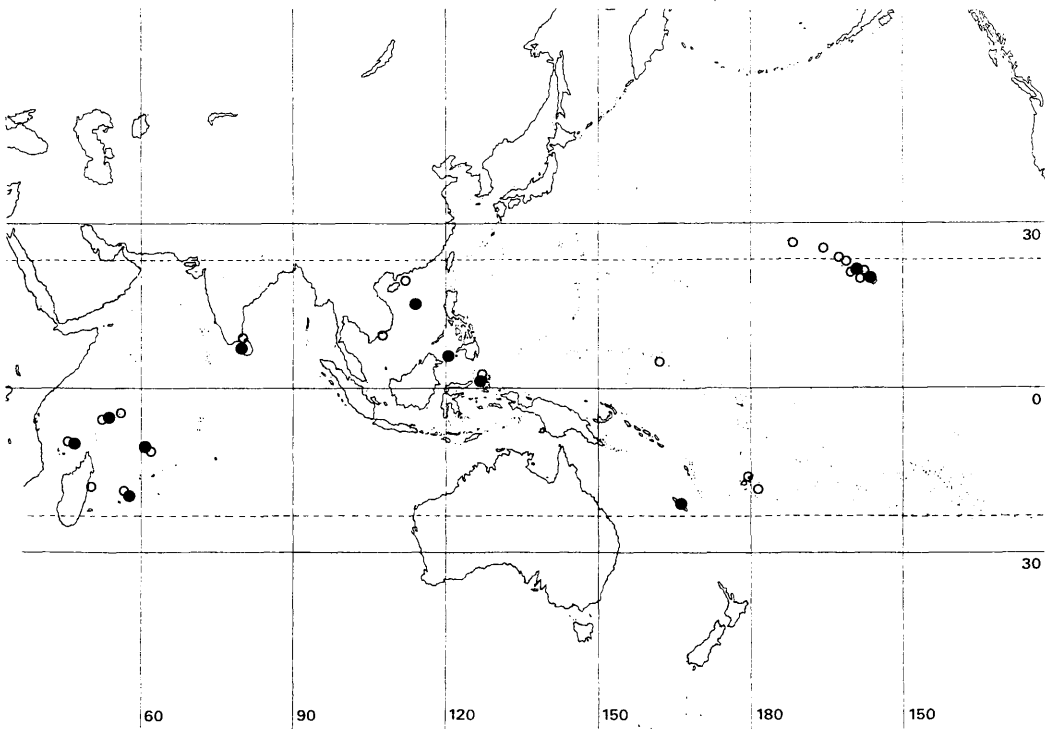
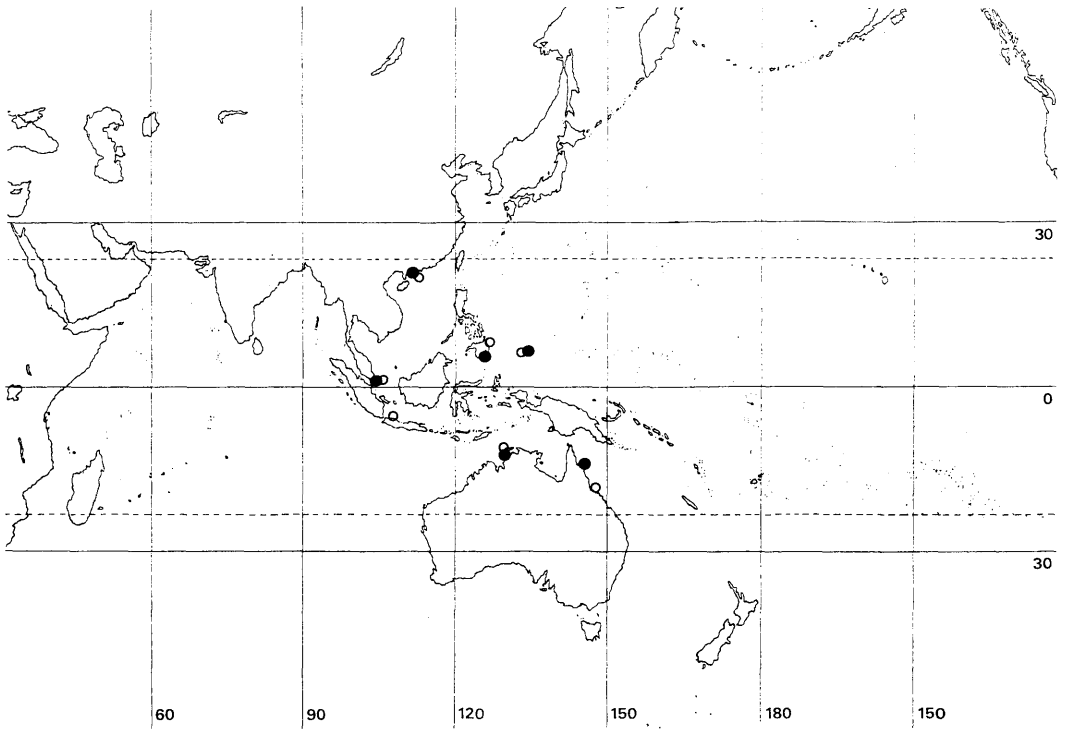
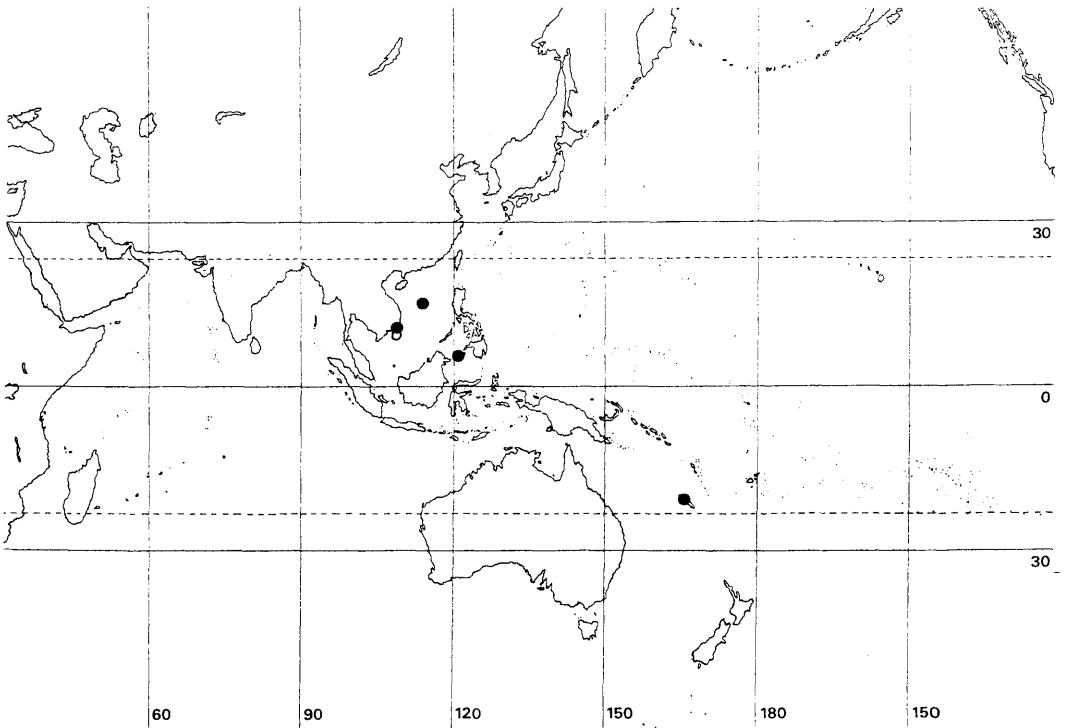


FIG. 19. Distribution of *Pilodius flavus* Rathbun, 1894.

FIG. 20. Distribution of *Pilodius granulatus* Stimpson, 1859.FIG. 21. Distribution of *Pilodius maotieni* Serène, 1971.

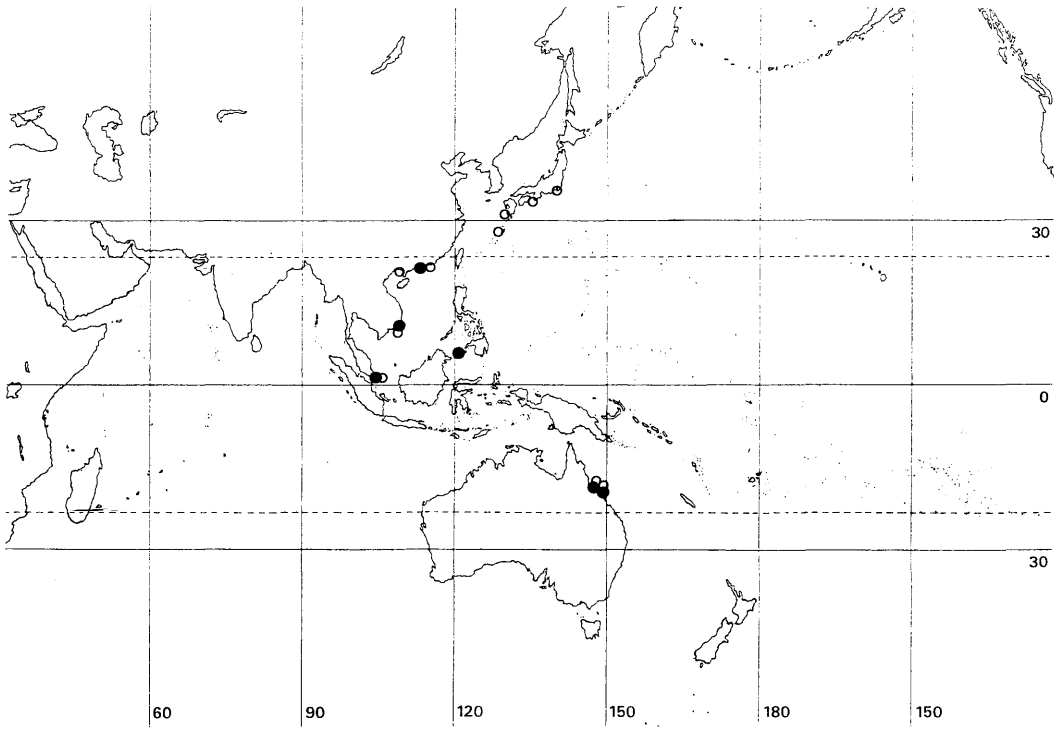


FIG. 22. Distribution of *Pilodius miersi* (Ward, 1936).

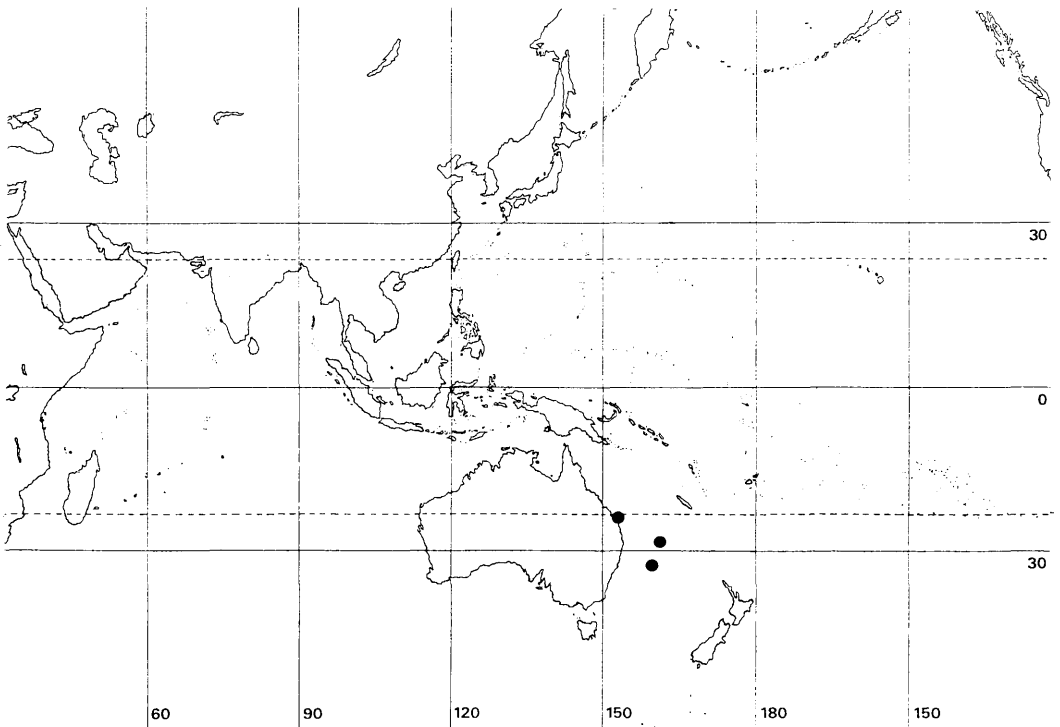


FIG. 23. Distribution of *Pilodius moranti* sp. n.

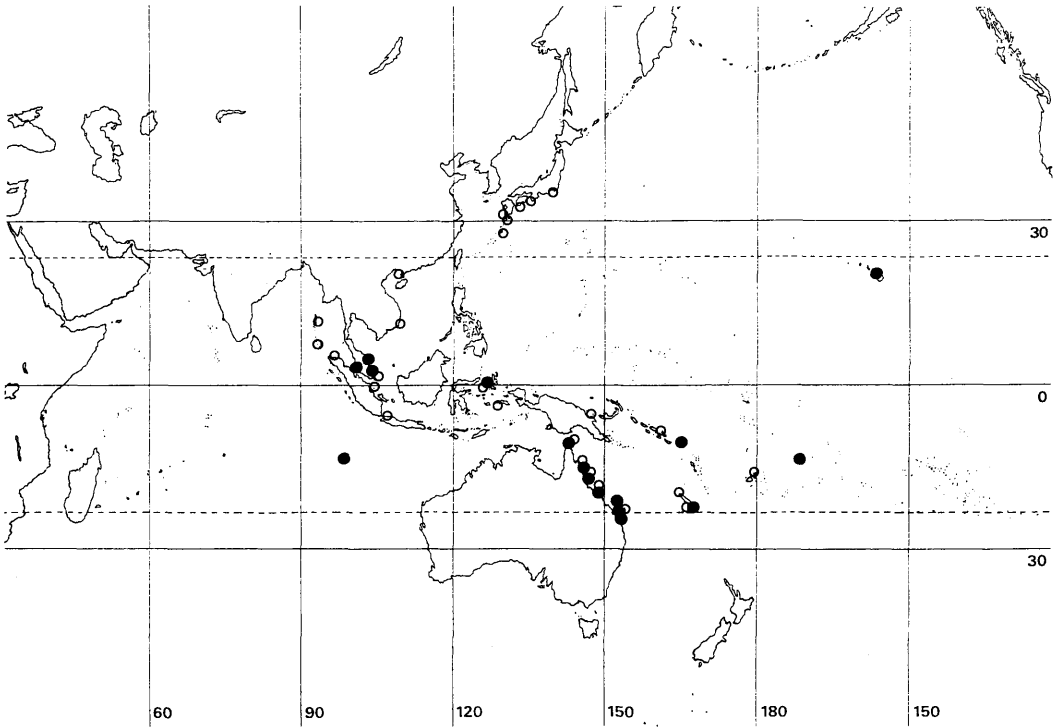


FIG. 24. Distribution of *Pilodius nigrocrinitus* Stimpson, 1859.

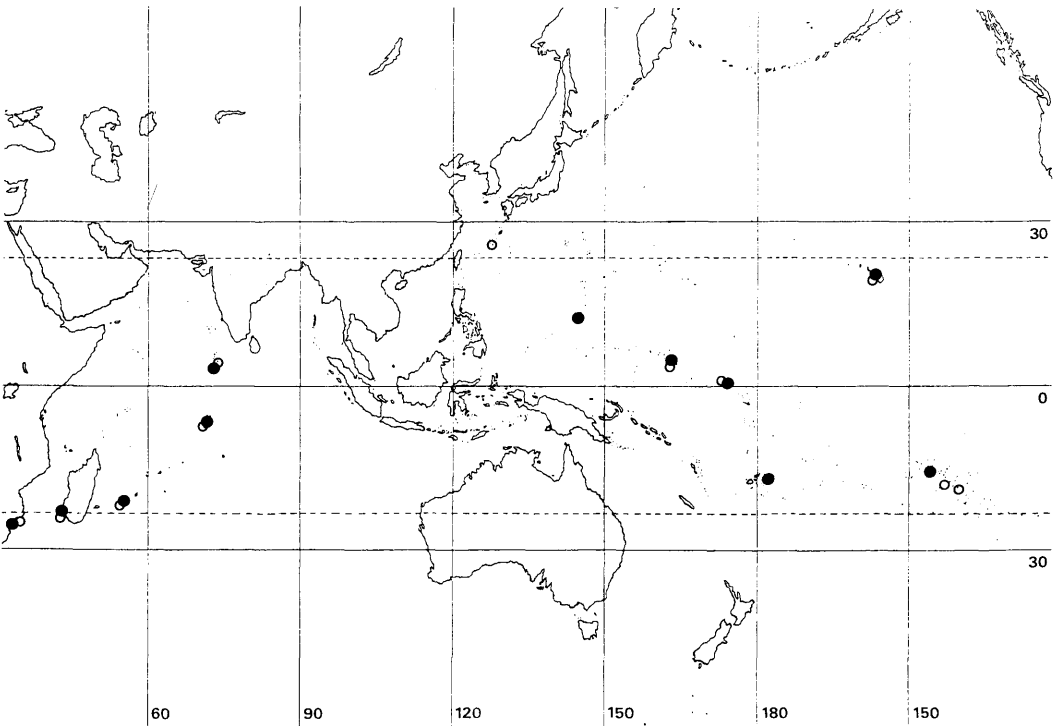


FIG. 25. Distribution of *Pilodius paumotensis* Rathbun, 1907.

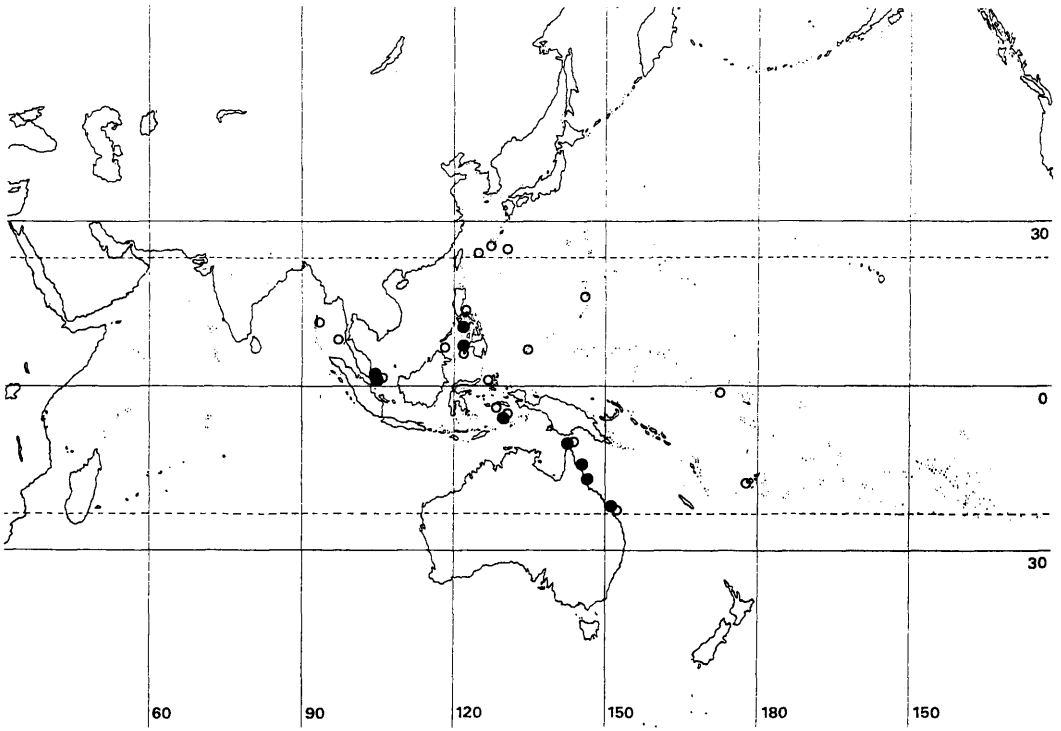


FIG. 26. Distribution of *Pilodius pilumnoides* (White, 1848).

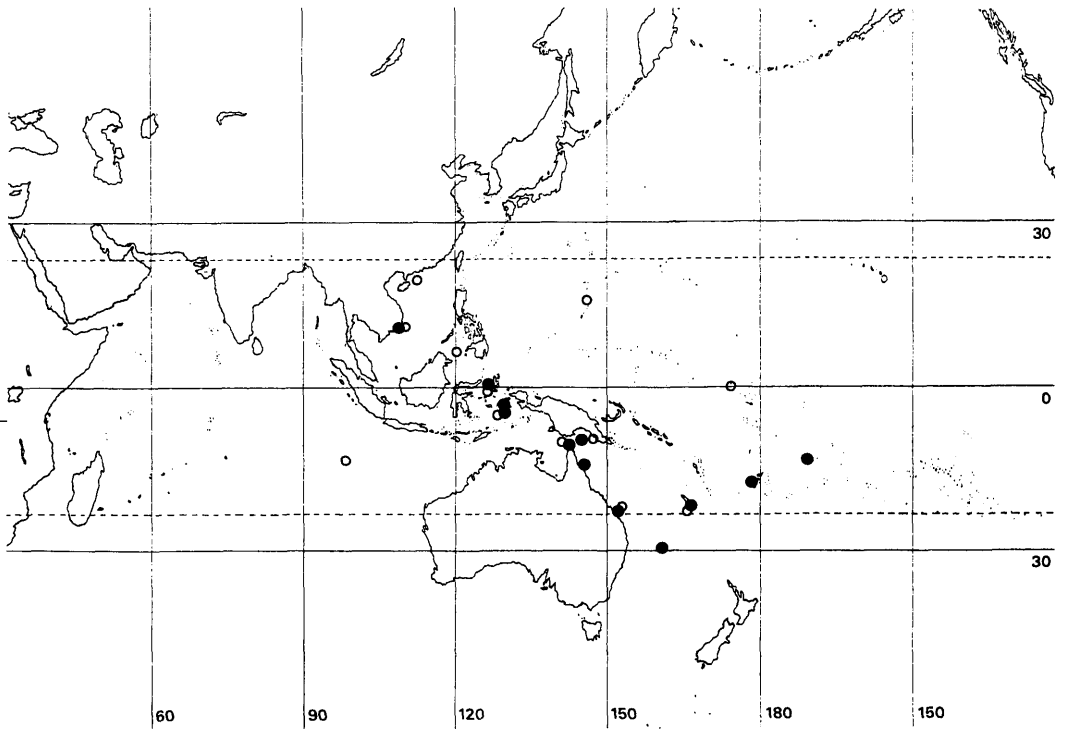


FIG. 27. Distribution of *Pilodius pubescens* Dana, 1852.

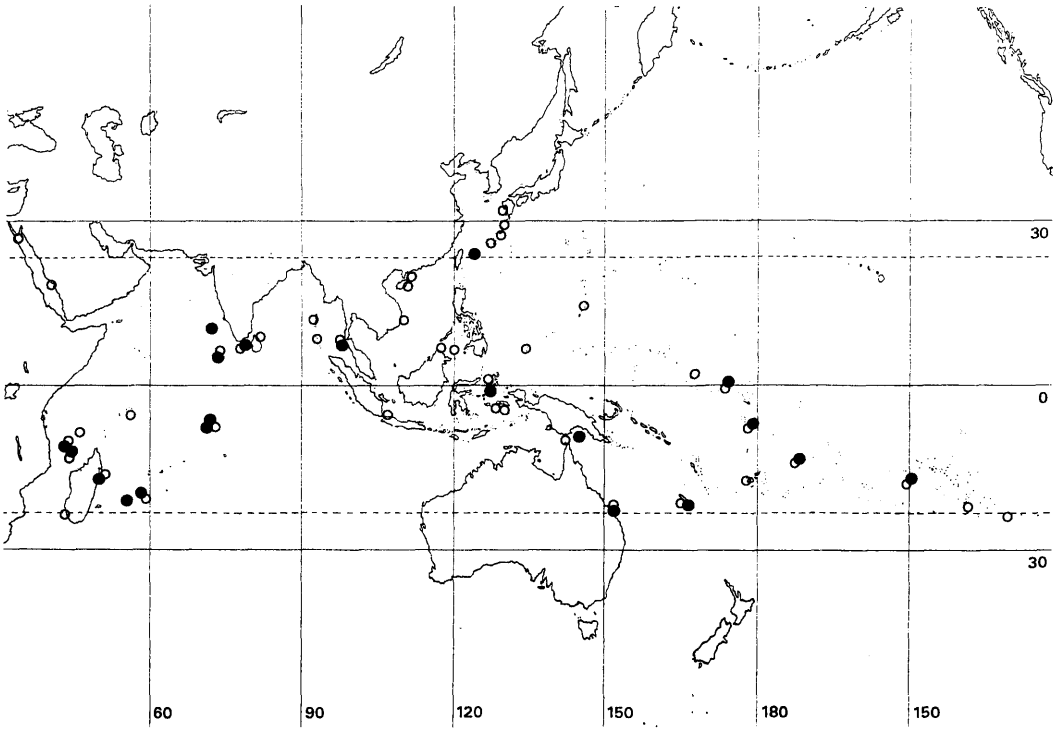


FIG. 28. Distribution of *Pilodius pugil* Dana, 1852.

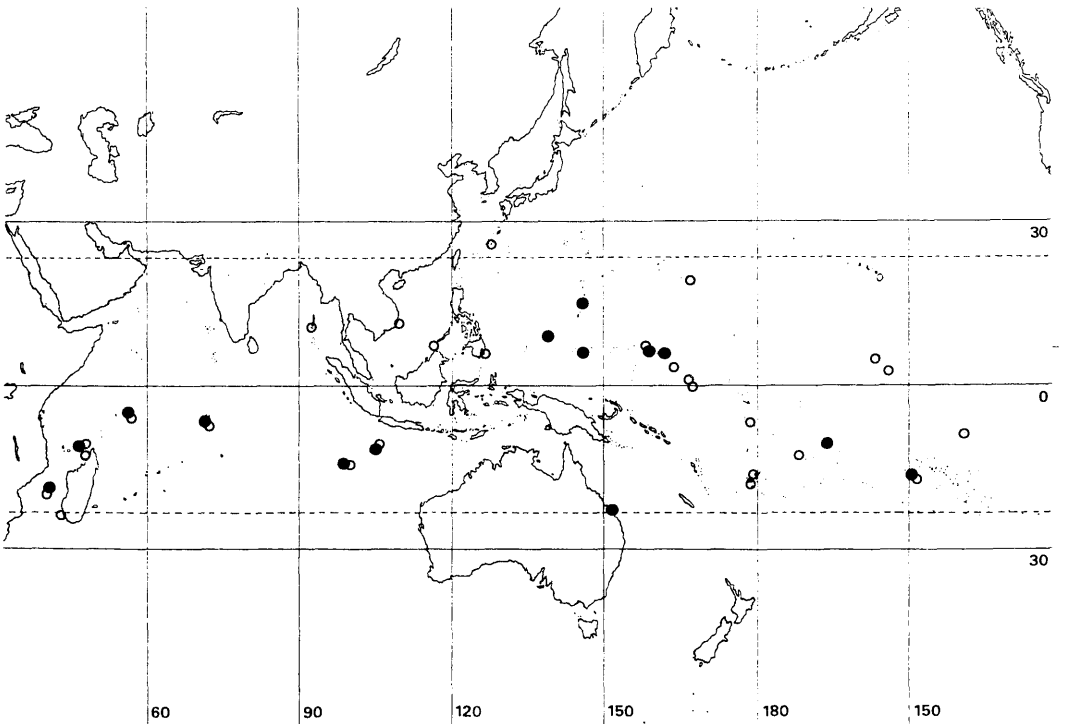


FIG. 29. Distribution of *Pilodius scabriculus* Dana, 1852.

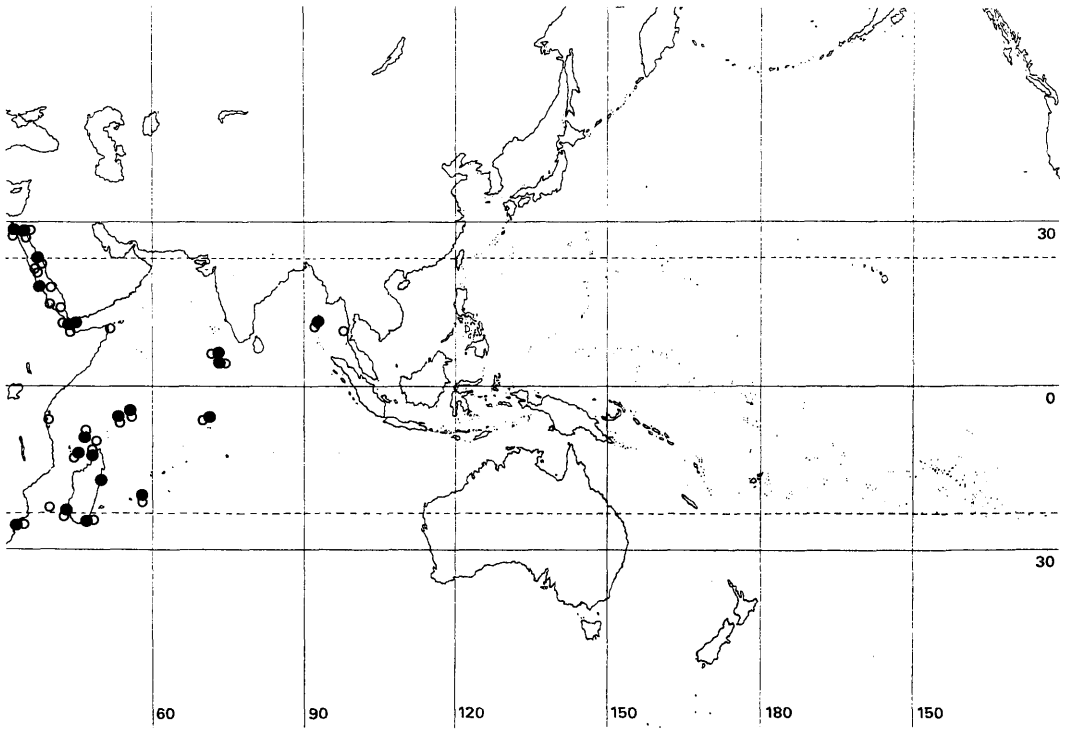


FIG. 30. Distribution of *Pilodius spinipes* Heller, 1861.

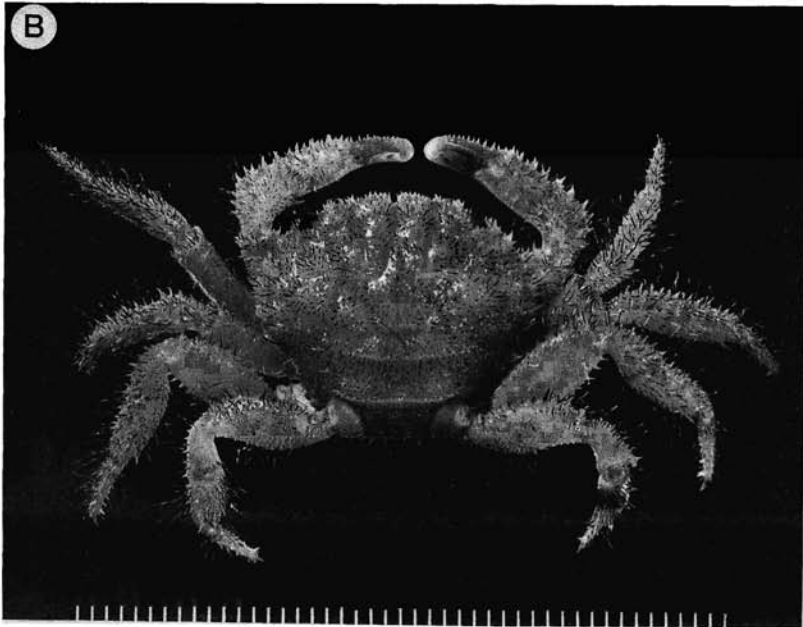
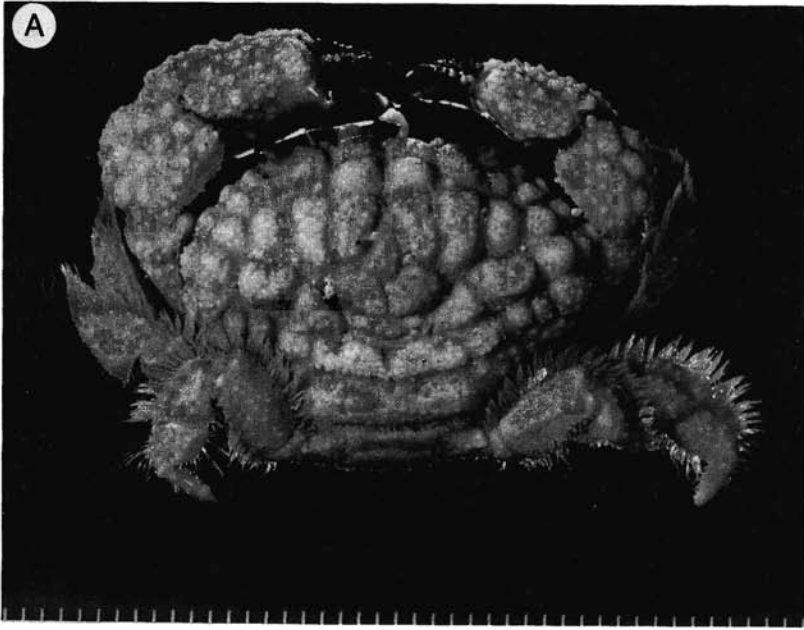


FIG. 31. Dorsal view; (A) *Pilodius areolatus* (H. Milne Edwards, 1834), NHM reg. 1931.7.24.95-100; (B) *Pilodius cephalalgicus* sp. n., MNHN reg. MP B.20935, Holotype.

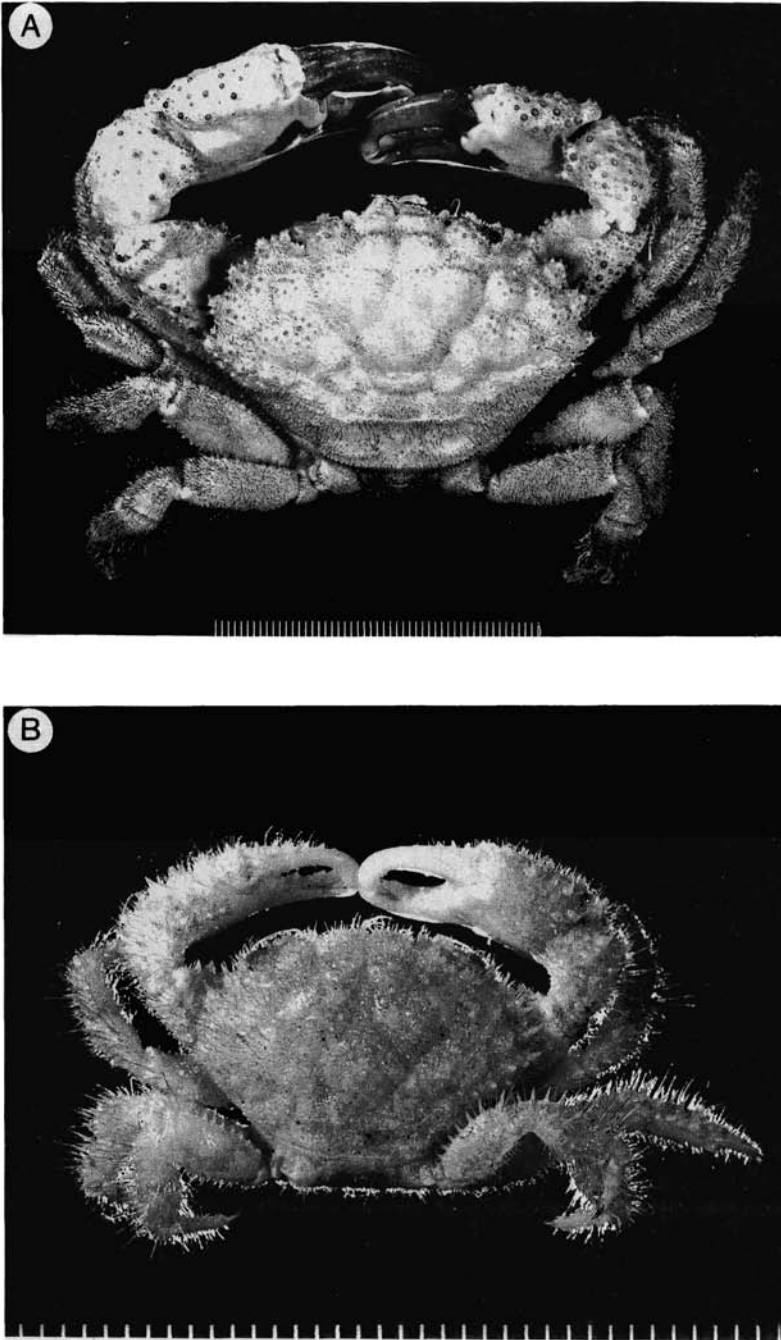


FIG. 32. Dorsal view; (A) *Pilodius concors* sp. n., NUS reg. 1965.11.11.147, Holotype; (B) *Pilodius flavus* Rathbun, 1894, USNM reg. 41268.

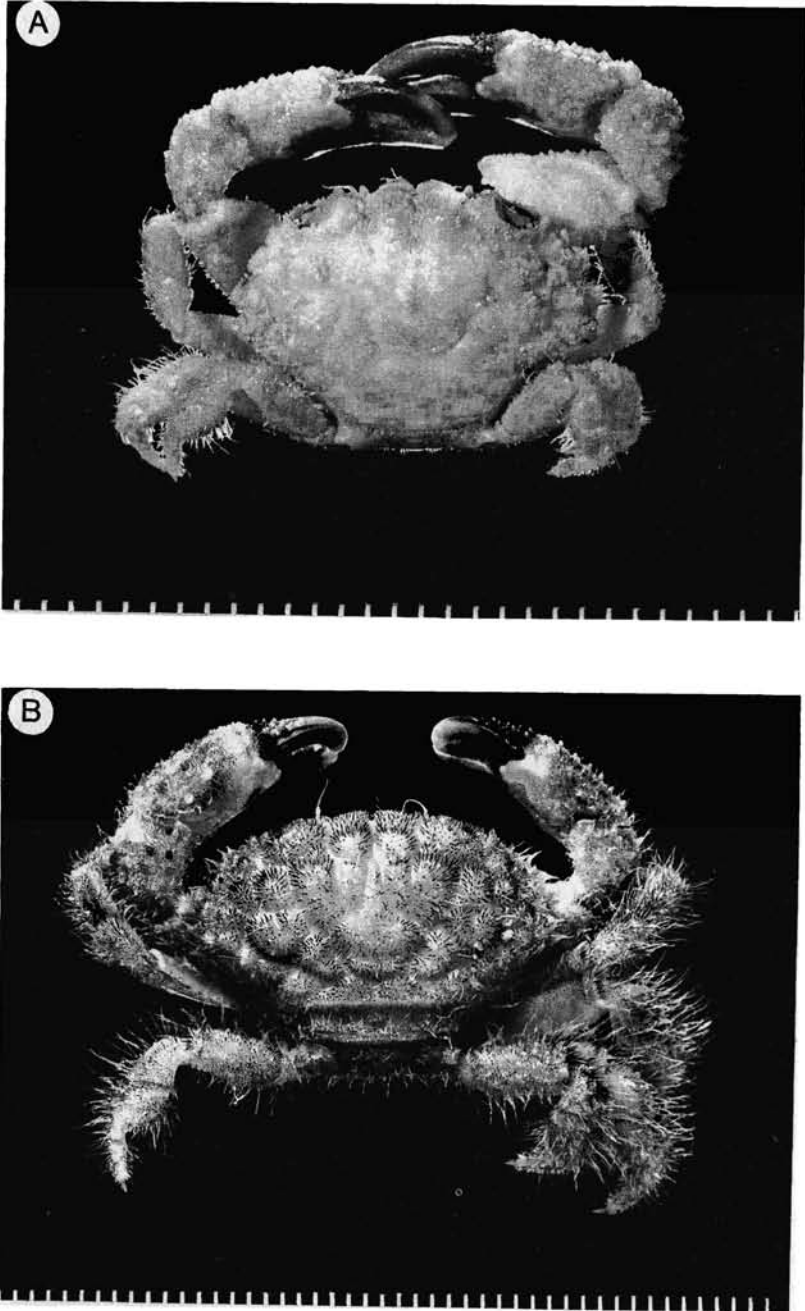


FIG. 33. Dorsal view; (A) *Pilodius granulatus* Stimpson, 1859, NUS 1965.11.11.119-125; (B) *Pilodius maotieni* Serène, 1971, MNHN no reg. Sta. 483.

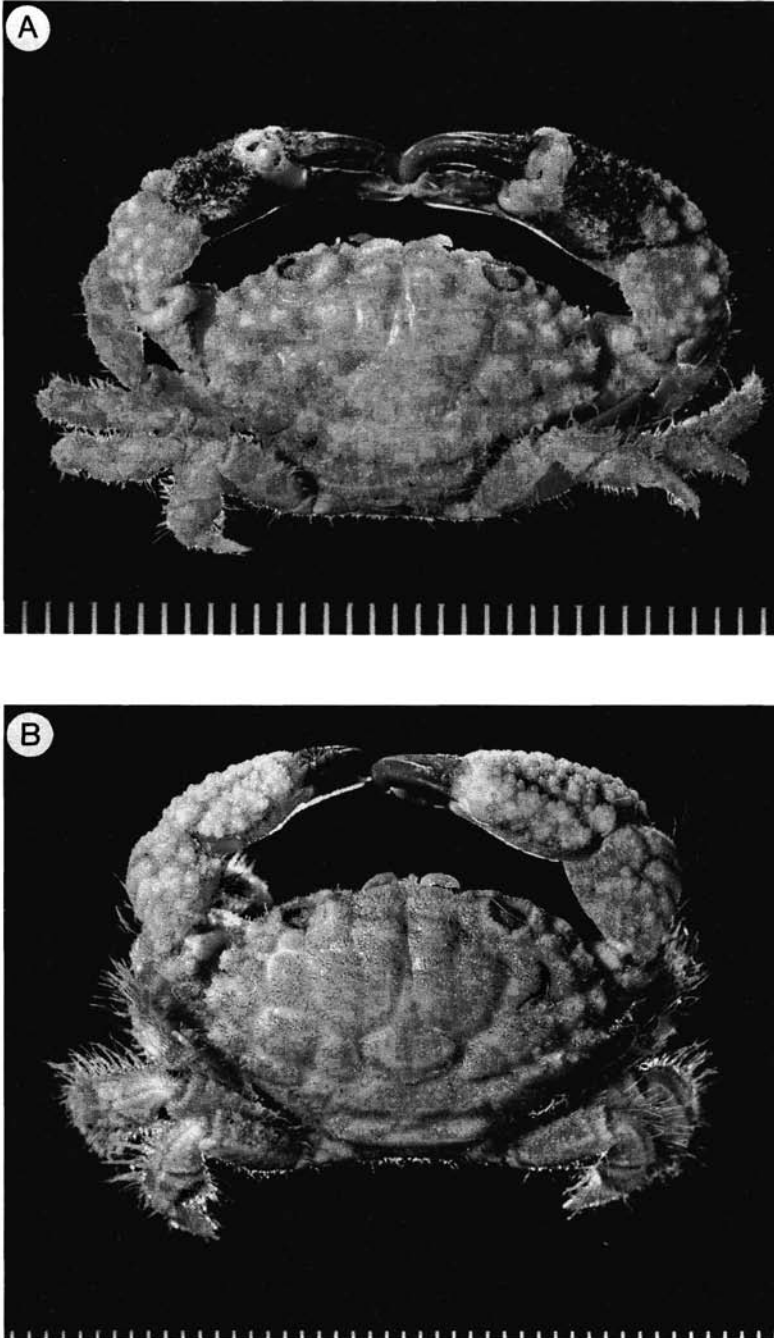


FIG. 34. Dorsal view; (A) *Pilodius miersi* (Ward, 1936), NHM reg. 1937.7.15.21–23; (B) *Pilodius moranti* sp. n., AM reg. P.2371, Holotype.

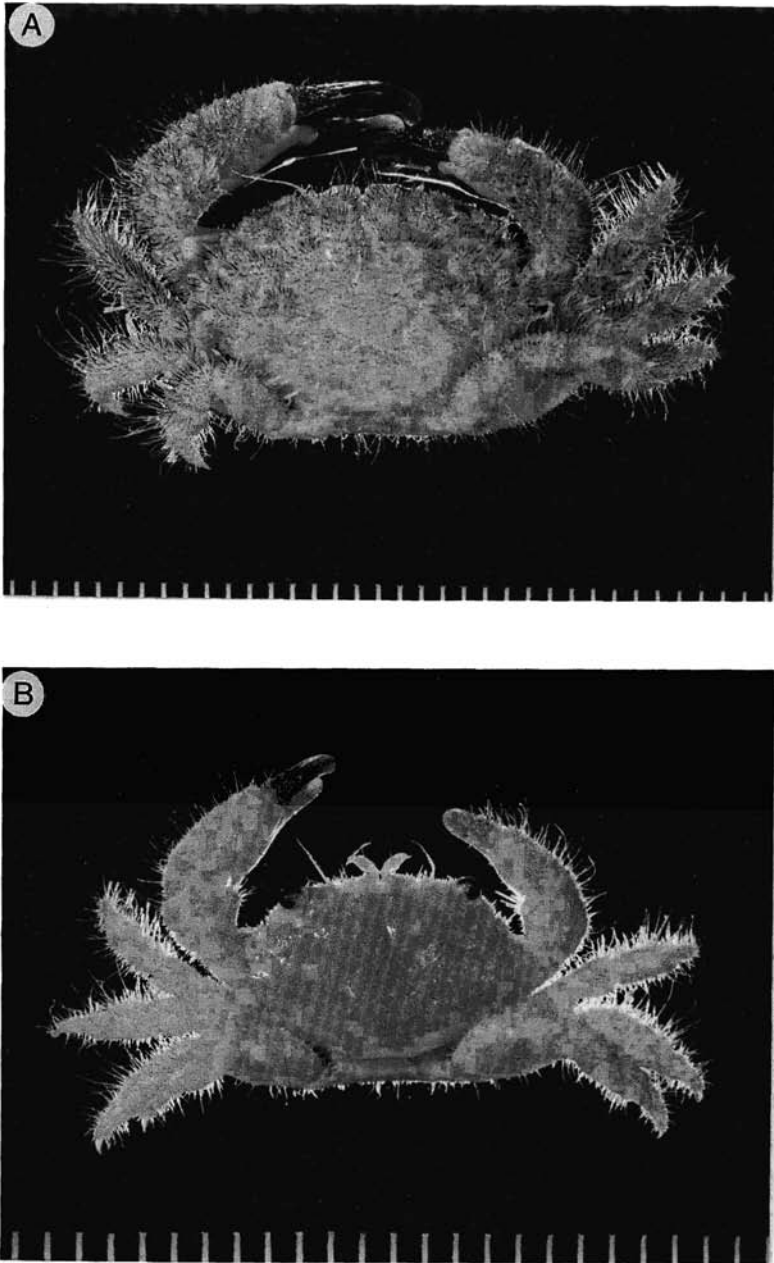


FIG. 35. Dorsal view; (A) *Pilodius nigrocrinitus* Stimpson, 1859, AM reg. P.17259; (B) *Pilodius paumotensis* Rathbun, 1907, MNHN reg. MP B.6697.

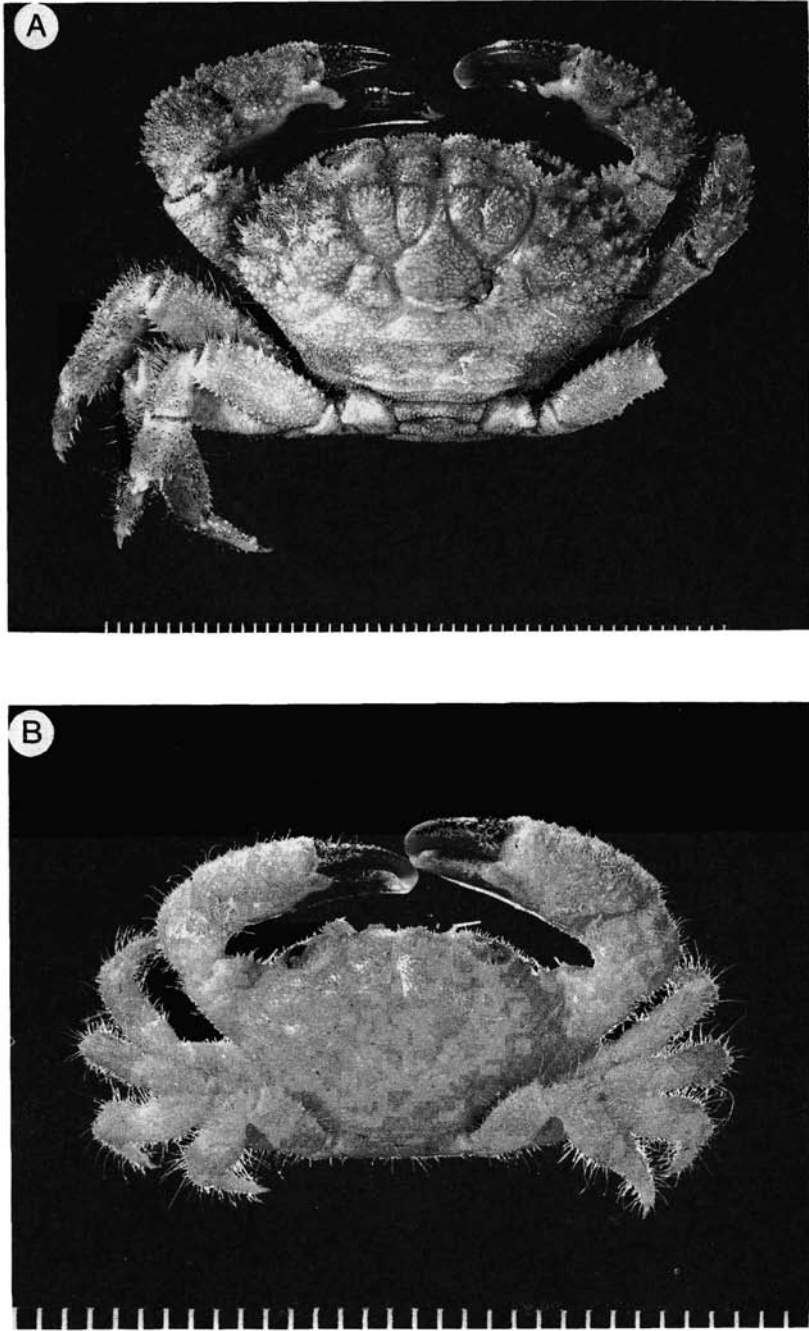


FIG. 36. Dorsal view; (A) *Pilodius pilumnoides* (White, 1848), NHM reg. 1843.6, Type; (B) *Pilodius pubescens* Dana, 1852, NHM reg.1931.4.14.19–20.

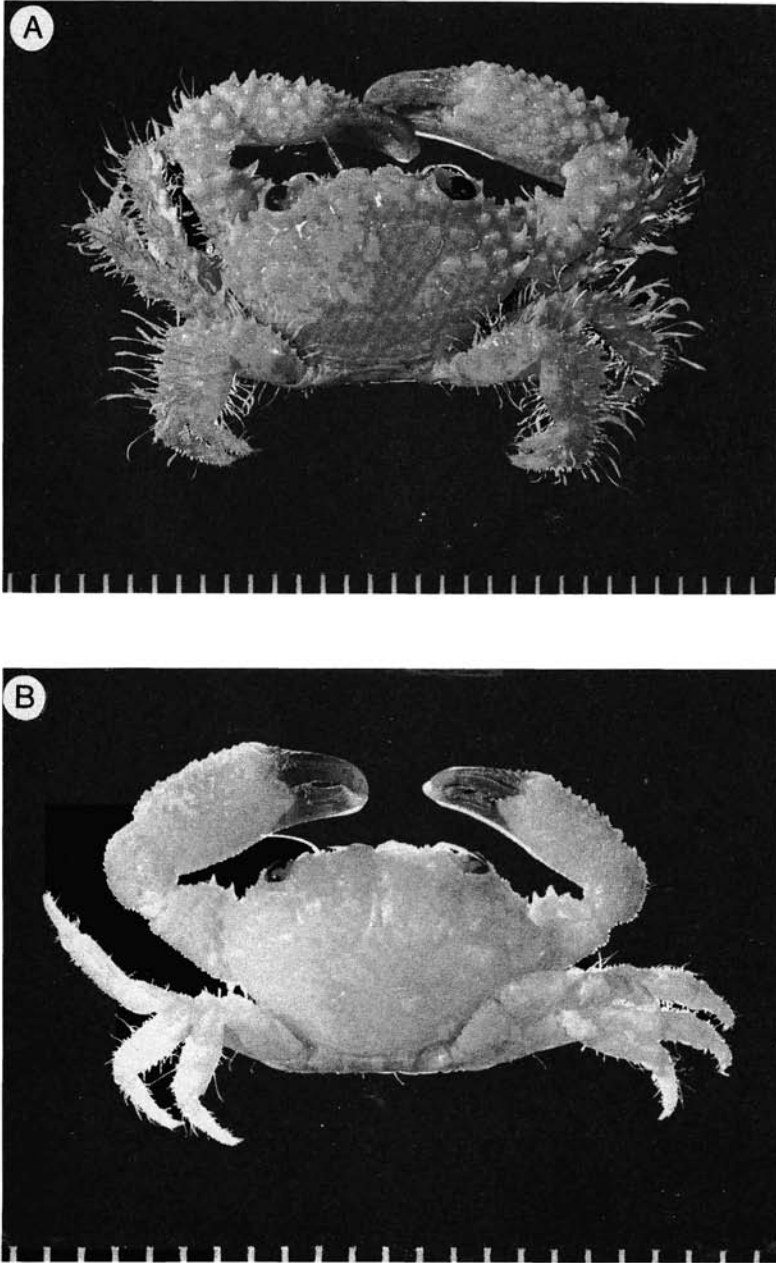


FIG. 37. Dorsal view; (A) *Pilodius pugil* Dana, 1852, NHM reg. 1934.6.27.1; (B) *Pilodius scabriculus* Dana, 1852, MNHN reg. MP B.9383.

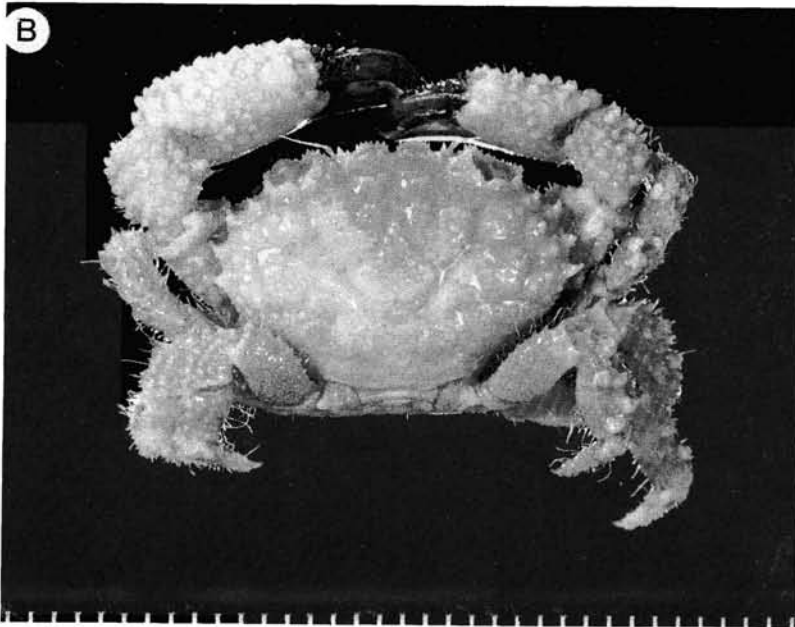
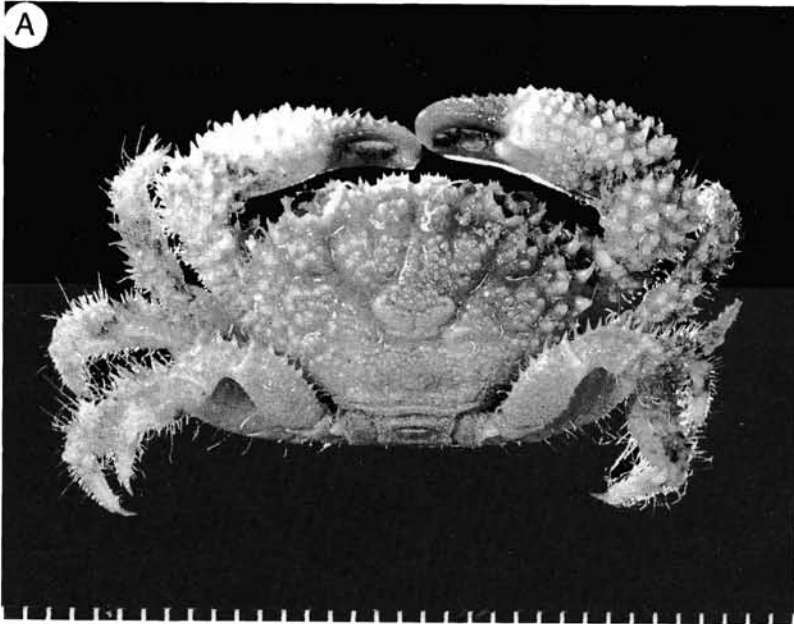


FIG. 38. Dorsal view; (A, B) *Pilodius spinipes* Heller, 1861, MNHN reg. MP B.8057.

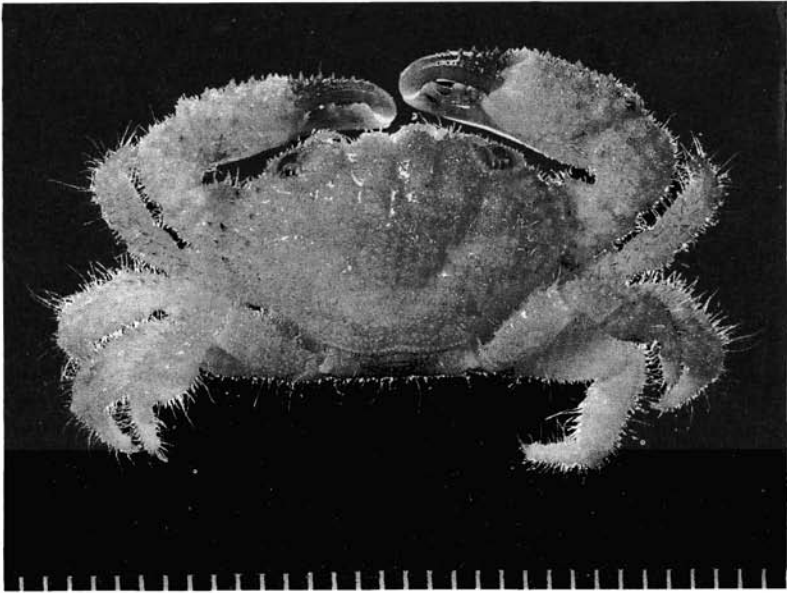


FIG. 39. Dorsal view; (A) *Pilodius* aff. *spinipes* Serène, 1984, MNHN reg. MP B.8017.

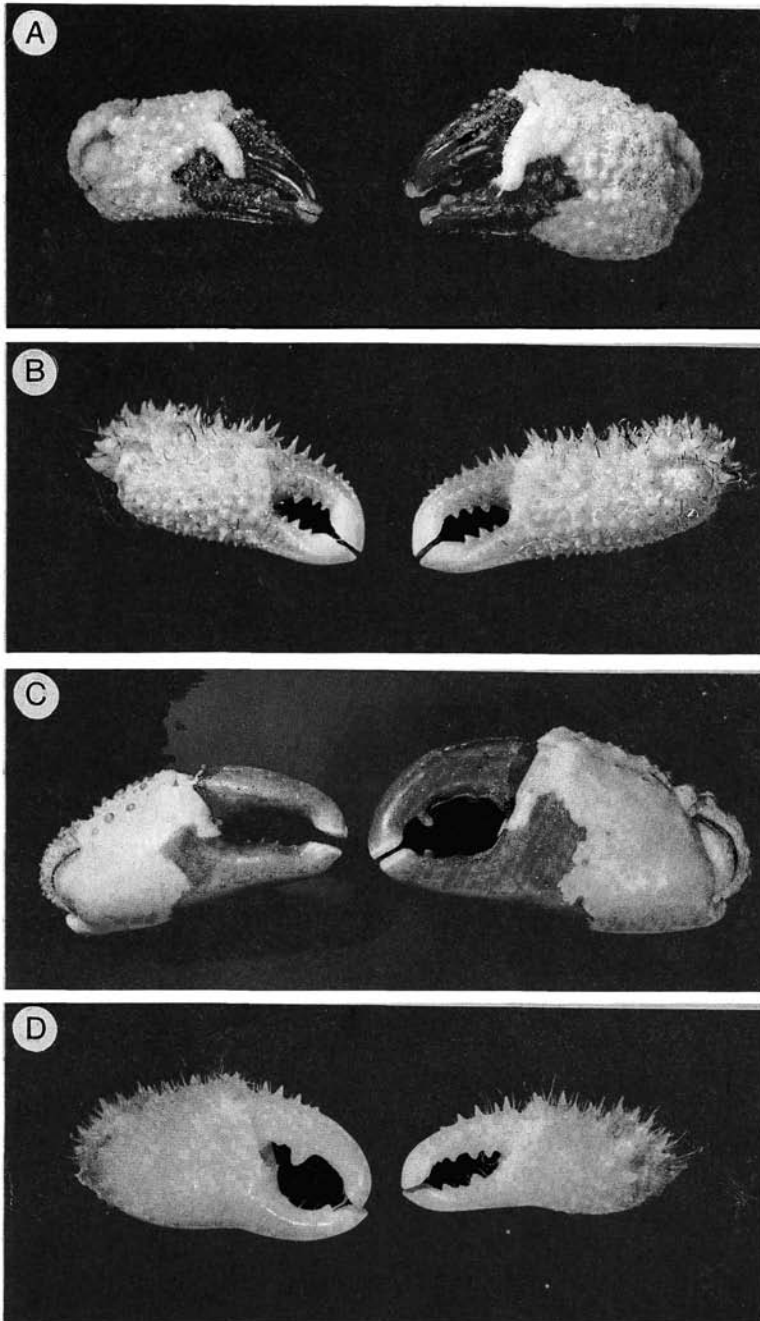


FIG. 40. External surface of ♂ chelipeds; (A) *Pilodius areolatus* (H. Milne Edwards, 1834), NHM reg. 1931.7.24.95–100; (B) *Pilodius cephalalgicus* sp. n., MNHN reg. MP B.20935, Holotype; (C) *Pilodius concors* sp. n., NUS reg. 1965.11.11.147, Holotype; (D) *Pilodius flavus* Rathbun, 1894, USNM reg. 41268 (mature ♂).

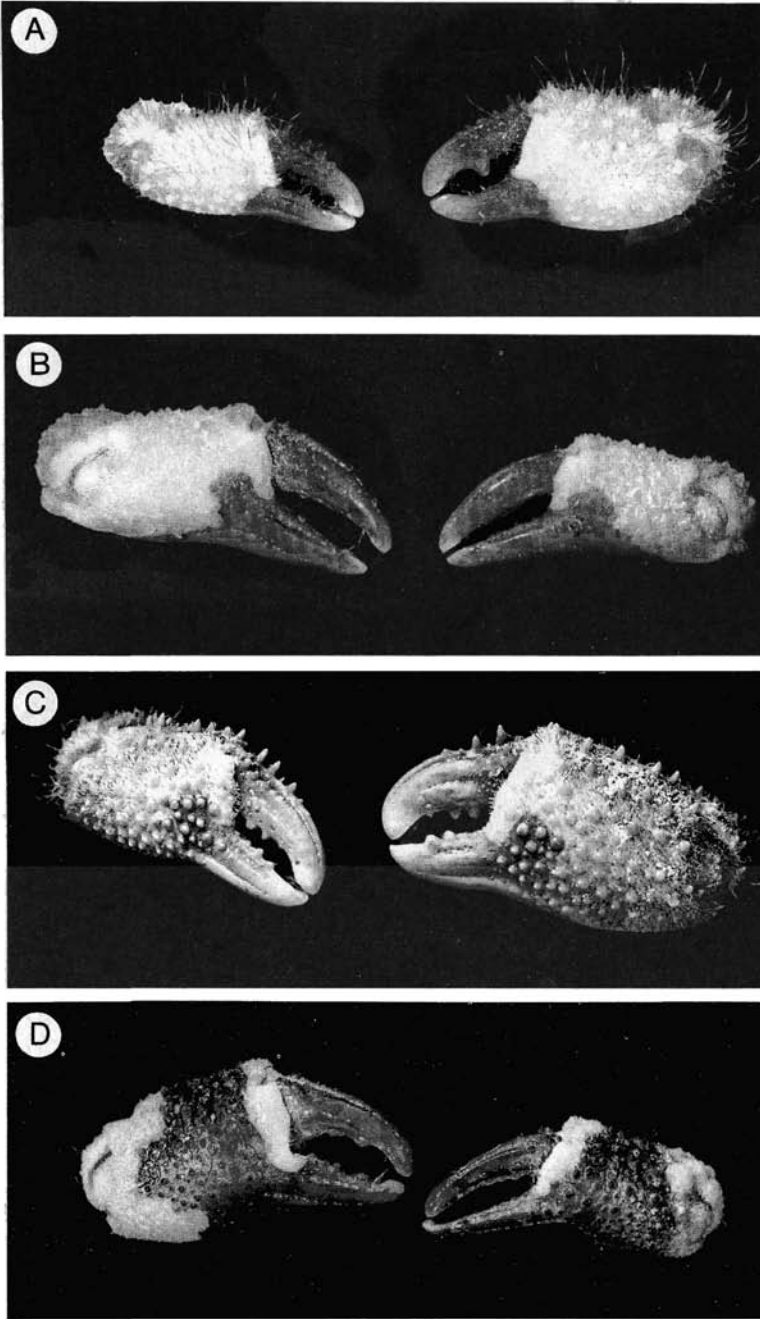


FIG. 41. External surface of δ chelipeds; (A) *Pilodius flavus* Rathbun, 1894, NHM reg. 1907.5.22.241–45 (immature δ); (B) *Pilodius granulatus* Stimpson, 1859, NUS reg. 1965.11.11.119–125; (C) *Pilodius maotieni* Serène, 1971, MNHN no reg. Sta. 483; (D) *Pilodius miersi* (Ward, 1936), NHM reg. 1937.7.15.21–23, Type.

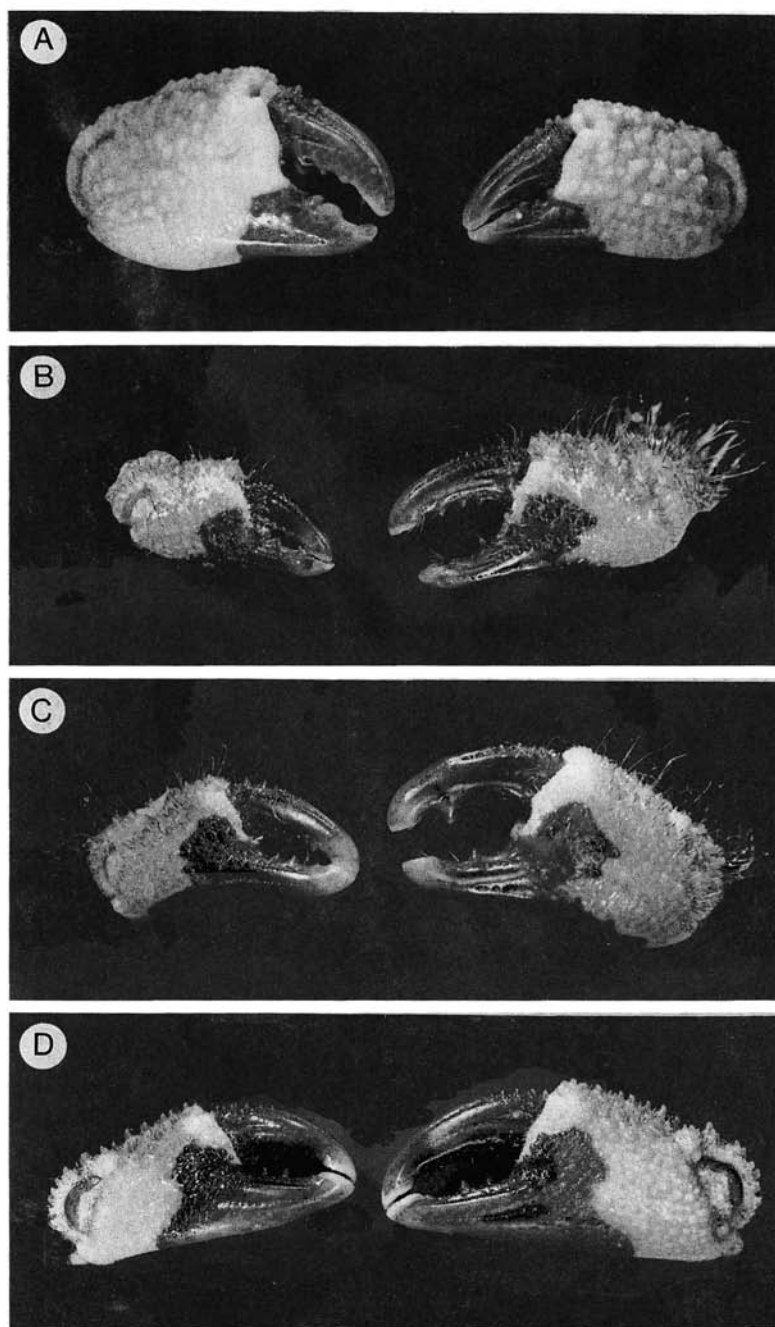


FIG. 42. External surface of δ chelipeds; (A) *Pilodius moranti* sp. n., AM reg. P.2371, Holotype; (B) *Pilodius nigrocrinitus* Stimpson, 1859, AM reg. P.17259, (immature δ); (C) *Pilodius nigrocrinitus* Stimpson, 1859, AM reg. P.17259, (mature δ); (D) *Pilodius pilumnoides* (White, 1848), NHM reg. 1843.6, Type.

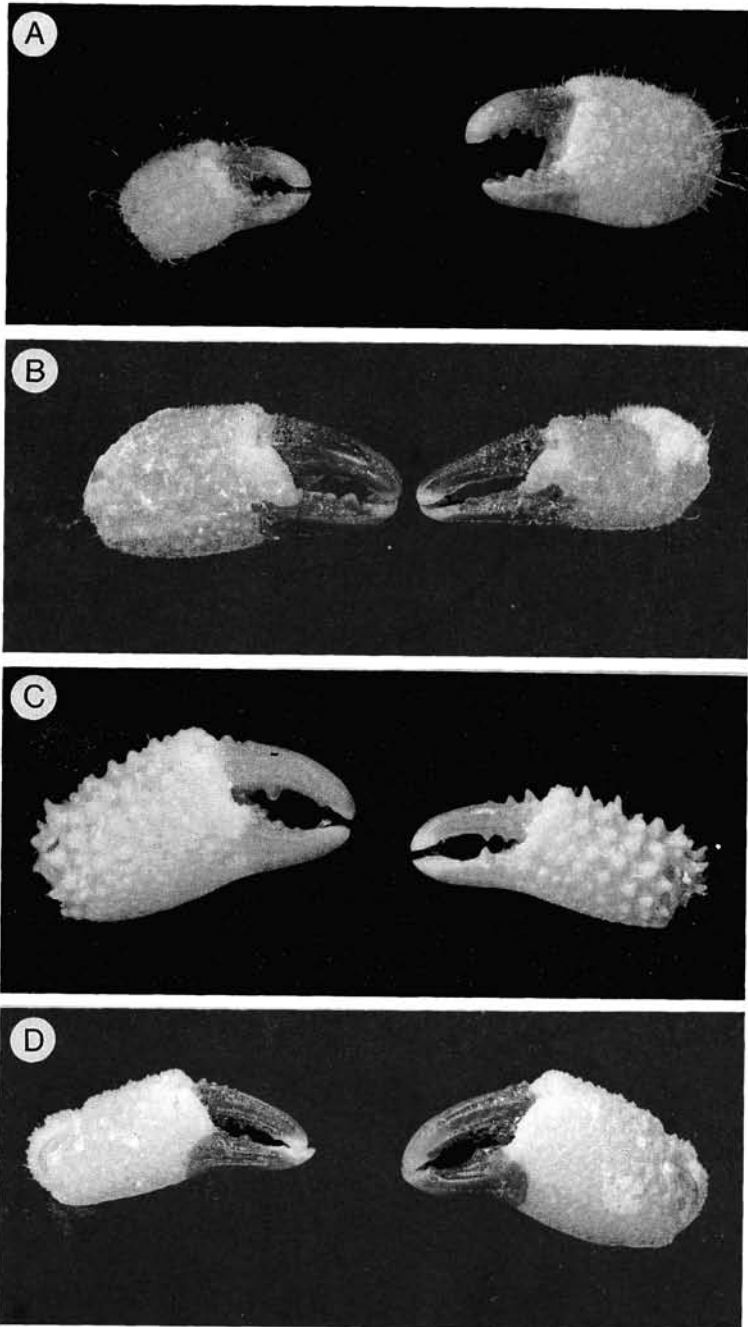


FIG. 43. External surface of ♂ chelipeds; (A) *Pilodius paumotensis* Rathbun, 1907, MNHN reg. MP B.6697; (B) *Pilodius pubescens* Dana, 1852; (C) *Pilodius pugil* Dana, 1852, NHM reg. 1934.6.27.1; (D) *Pilodius scabriculus* Dana, 1852, MNHN reg. MP B.9383.

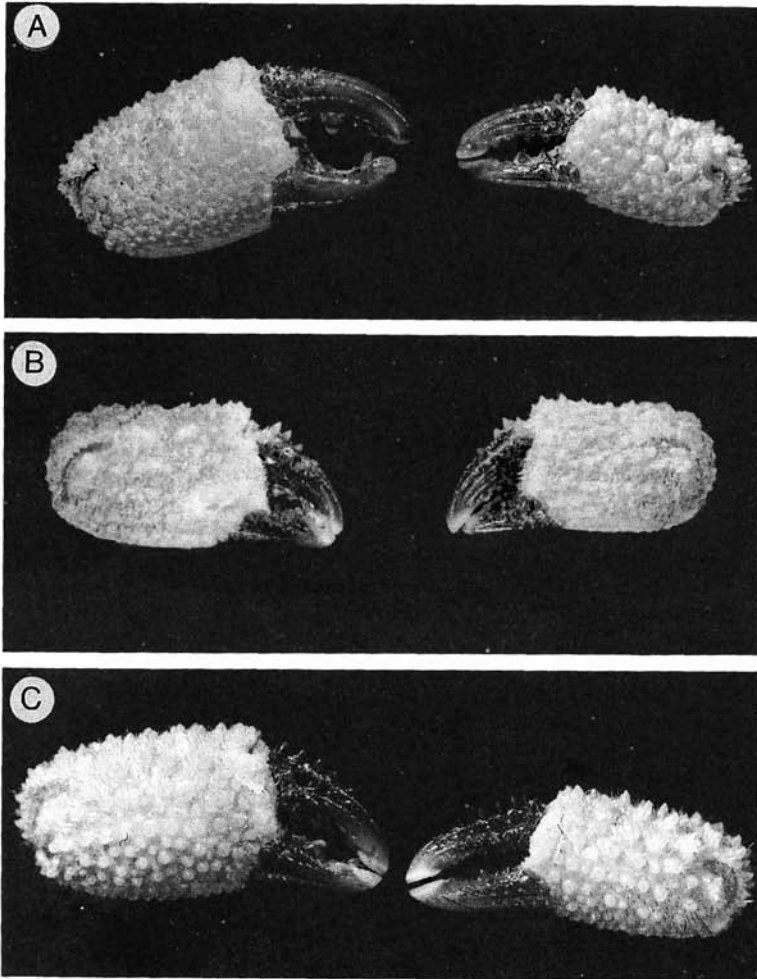


FIG. 44. External surface of ♂ chelipeds; (A) *Pilodius spinipes* Heller, 1861, MNHN reg. MP B.8057; external surface of ♀ chelipeds; (B) *Pilodius areolatus* (H. Milne Edwards, 1834), NHM reg. 1931.7.24.95–100; (C) *Pilodius spinipes* Heller, 1861, MNHN reg. MP B.8017.

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