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Round the World 1950-52



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DEEP-SEA CHIROSTYLID AND GALATHEID CRUSTACEANS (DECAPODA: ANOMURA) FROM THE INDO-PACIFIC, WITH A LIST OF SPECIES

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ABSTRACT

Deep-sea chirostylid and galatheid crustaceans collected during the "Galathea" Expedition 1950–52, Kei Islands Expedition 1922, and by Th. Mortensen, and others now in the collection of the Zoological Museum, Copenhagen constitute the basis of this paper. They comprise 864 specimens, 105 of which are distributed among 38 species in five genera of Chirostylidae (one in *Chirostylus* Ortmann, 1982; five in *Eumunida* Smith, 1883; three in *Gastroptychus* Caullery, 1896; one in *Pseudomunida* Haig, 1979; three in *Uroptychodes* Baba, 2004; and 25 in *Uroptychus* Henderson, 1888).

The remaining 759 specimens belong to Galatheidae, with 94 species in 13 genera, including two new genera (three in *Agononida* Baba & de Saint Laurent, 1996; two in *Bathymunida* Balss, 1914; one in *Enriquea* n. gen.; eight in *Galathea* Fabricius, 1793; one in *Heteronida* Baba & de Saint Laurent, 1996; one in *Leiogalathea* Baba, 1969; 29 in *Munida* Leach, 1820; 38 in *Munidopsis* Whiteaves, 1874; six in *Paramunida* Baba, 1988; two in *Phylladorhynchus* Baba, 1969; one in *Raymunida* Macpherson & Machordom, 2000; one in *Sadayoshia* Baba, 1969; and one in *Torbenia* n. gen.).

Twenty-nine new species are described: one of *Gastroptychus*, nine of *Uroptychus*, three of *Galathea*, five of *Munida*, 10 of *Munidopsis*, and one of *Torbenia*.

Three species (two of *Munida* and one of *Raymunida*) that have depth records exceeding 200 m,

but which in the present collection are available from the continental shelf, are incorporated in this report.

Chirostylus ciliatus van Dam, 1933 and *Gastroptychus chacei* Baba, 1986, are transferred to *Uroptychus*, *Munida leviantennata* Baba, 1988 is transferred to *Enriquea*, as also is *Agononida insolita* Macpherson, 2004 to *Torbenia*. Examination of the type material of *Munida quinquespinosa* Balss, 1913 reveals that it belongs to *Galathea*.

All species are diagnosed and if new, the holotype is described. In order to clarify the identity of some species, type material and/or comparative material from repositories other than the Copenhagen Museum is included in the report (for *Uroptychus latirostris*, *U. tridentatus*, and *Munidopsis subsquamosa*). Color notes are given when available, and geographic and depth distributions are summarized for the species included in the collection.

A list of 580 deep-sea species (161 species in six genera of Chirostylidae and 419 species in 26 genera of Galatheidae) known or supposed to occur at depths exceeding 200 m in the Indo-Pacific, including the Southern Ocean, is provided, along with a key to species of each genus where necessary. For each species, synonymy including reference(s), locality and depth records, and the repository and registration number of the type material are given where possible. Brief comments on vertical and horizontal distributions of species are given for multi-species genera.

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INTRODUCTION

The crustacean families Chirostylidae and Galatheidae are grouped together with Aeglidae Dana, 1852 and Porcellanidae Haworth, 1825 in the superfamily Galatheoidea (Balss, 1957; Martin & Davis, 2001). These two families are most diverse among decapod crustaceans, the first often associated with soft corals such as antipatharians, alcyonaceans and gorgonaceans, and the second represented by lobster krill, craylets and squat lobsters, occurring in the surface of the sea to depths of more than 5,000 m. Through the courtesy of Torben Wolff I have been given the privilege of conducting a study of the chirostylids and galatheids collected by the "Galathea" Expedition 1950–52, the names of the crustacean group and the expedition coinciding with each other.

The aim of this paper was primarily to provide systematic accounts of deep-sea chirostylid and galatheid crustaceans occurring below 200 m now in the collection of the Zoological Museum, Copenhagen. In order to have this paper match the purpose of the Galathea Report, I intended to give a list of all the known deep-sea species. However, due to lack of sufficient material and knowledge of Atlantic species, this paper is limited to Indo-Pacific species. In this introductory note, brief historical overviews of the studies on both the Atlantic and the Indo-Pacific deep-sea species are given.

The present collection has been assembled largely by the "Galathea" Deep-Sea Expedition 1950–52, the Kei Islands Expedition 1922 and Th. Mortensen's collecting trips during 1899–1930. Station data may be consulted in Bruun (1959) and Wolff (1964) for the "Galathea" Expedition, and Mortensen (1923) for the Kei Islands Expedition. A mimeographed list of stations worked by Mortensen has also been very useful (Wolff, T., Dr. Th. Mortensen's Expeditions 1899–1930, List of Stations, 30 pp., 4 maps, unpublished).

During the "Galathea" Expedition, a total of 779 stations from the surface to a depth of about 10,000 m were worked (Wolff, 1964 for station data for 0–400 m; Bruun, 1959 for 400–10,000 m). The deep-sea material (>200 m) studied came from 31 stations from East Africa between Natal and Kenya, SW of Sri Lanka, Bay of Bengal, Andaman Sea, Indonesia and Philippines, Tasman Sea, Kermadec Deep, and eastern Pacific off Costa Rica and Panama, comprising 509 specimens in 76 lots, distributed among 48 species (six chirostylids and 42 galatheids). Another seven lots containing five species (one chirostylid and four

galatheids) were taken from West Africa, two of which are incorporated in the present paper because of worldwide occurrence of the species identified. Some of the deep-sea galatheids in the "Galathea" collection have been incorporated in previous reports; *Munida speciosa* from Station 92 off River Congo (Miyake & Baba, 1970) and *Munidopsis albatrossae* from Station 716 off the Pacific coast of Central America (Pequegnat & Pequegnat, 1973). Two hundred and two specimens, in 83 lots, collected by the Kei Islands Expedition, included 49 species (15 chirostylids and 34 galatheids). Four species of chirostylids obtained by the expedition have been reported by van Dam (1939). The collections made by Th. Mortensen, during his trips to Pacific islands, South Africa, and the Kei Islands, include 227 specimens in 92 lots, and contained 50 species (11 chirostylids and 39 galatheids). The other material accumulated in the collection of the Zoological Museum was largely donated by a Danish telegraph company and comprises 45 specimens in 13 lots, distributed among 10 species (eight chirostylids and two galatheids). Also available are two lots containing two species of galatheids collected from New Caledonia by the Danish "Dana" Expedition 1928–30.

Shallow water benthic stations were also worked by the "Galathea" Expedition (Wolff, 1964). The collections, in depths less than 100 m in the Philippines and Indonesia, Singapore, Gulf of Siam, New Guinea, Coral Sea, Tonga, Samoa, Mozambique and Great Australian Bight includes 44 specimens in 20 lots that are identified in 11 species (exclusive of one unidentifiable specimen without carapace). These will also be published elsewhere in a report now in preparation on other collections of the Museum at Copenhagen.

Available in the present collection are a number of species that were taken only on the continental shelf but have depth records exceeding 200 m. These species are incorporated in this report as deep-sea species.

The present material has been gathered widely from various localities, but an analysis of the geographical distribution is still not practical, because the number of species is still increasing, especially thanks to extensive works by Enrique Macpherson (see below). In addition, more than 50 new species of *Uroptychus* Henderson, 1888 (Chirostylidae) are being described from New Caledonia and vicinity (Baba, unpublished). A brief comment on the zoogeography of the Indo-Pacific species can be found in Baba (1988).

In order to establish the systematic status of some

problematic species, type and comparative materials in the collections of the National Museum of Natural History, Smithsonian Institution, the Natural History Museum, London, the Muséum national d'Histoire naturelle, Paris, and the Museum für Naturkunde an der Humboldt-Universität zu Berlin, are included in this report.

Historical overview

Atlantic deep-sea species

From the western Atlantic, 17 species of chirostylids are now known and 72 species of galatheids (exclusive of five shallow-water species occurring in depths <200 m). Most of these were largely made known by the "Blake" (A. Milne Edwards, 1880; Milne Edwards & Bouvier, 1897), the "Albatross" (Smith, 1883, 1885; Benedict, 1902), and the "Challenger" (Henderson, 1885, 1888) cruises. A comprehensive study by Chace (1942) on the collection made by the "Atlantis" Expeditions to the West Indies listed all the species known at that time from the western Atlantic, and provided keys to species of known genera. This was complemented by Williams (1965, 1984) with his monographs of decapod crustaceans from the eastern United States. Türkay (1968) recorded a species of *Munida* from Venezuela. Pequegnat & Pequegnat (1970, 1971) reported chirostylids and galatheids from the Gulf of Mexico and the Caribbean Sea, describing eight species of *Munidopsis*. Mayo (1972) described three new species of galatheids (one of *Phylladiorhynchus*, one of *Munida*, one of *Munidopsis*) from the Caribbean Sea, one of which was from shallow waters (*P. caribbensis* was later transferred to *Anomoeomunida* (see Baba, 1993)). Laird *et al.* (1976) reported two species (one of *Munida*, and one of *Munidopsis*) taken in the Chesapeake Bight. Wenner (1982) reported the distribution and biology of one species of Chirostylidae and 12 species of Galatheidae in the Middle Atlantic Bight. Gore (1983) made a systematic analysis of four species of *Munidopsis* taken in bathyal and abyssal depths in the Venezuela Basin. Takeda (1983) provided color photographs, along with descriptive remarks, of five species of *Munida* and five species of *Munidopsis* taken by trawling off Suriname and French Guiana. Baba & Camp (1988) noted two species of Galatheidae new to Florida, including a new species of *Munidopsis*. De Saint Laurent & Macpherson (1988) described a new species of *Munida* from South Africa, and also two new species of *Eumunida* from South Africa (de Saint Laurent &

Macpherson, 1990b). Rice & Miller (1991) reported four species (two chirostylids and two *Munidopsis*, including a new species of *Gastroptychus*) from deep-waters off Bahamas, all associated with echinoderms. De Melo-Filho & de Melo (1992a) studied the "Blake" material from Brazil and described a new species of *Munida*, also they examined the "Challenger" material from Brazil (de Melo-Filho & de Melo (1992b) and in 1994 they described three new species of *Munida* from Brazil. Pequegnat & Williams (1995) described two new species of *Munidopsis*, one from the northwestern Gulf of Mexico and the other from both the northwestern Gulf of Mexico and off Georgia. De Melo-Filho (1996) described a new species of *Munida* from Brazil. Tavares & Campinho (1998a) recorded two species of *Munidopsis* new to Brazil, and in another paper they re-described a species of *Munidopsis* from the Caribbean Sea (Tavares & Campinho, 1998b). De Melo (1999) provided keys to Brazilian species of *Uroptychus*, *Munida* and *Munidopsis*, and diagnoses, geographic distributions and habitats, along with illustrations for each species. De Melo-Filho & de Melo (2001) studied 16 species of *Munida* occurring on the Brazilian coast, discussing their distribution, and providing a key to the species.

The number of eastern Atlantic deep-sea species now known is estimated to be nine of Chirostylidae and 47 of Galatheidae. Many species were described based upon the collections made by the "Talisman" and "Travailleur" Expeditions (Milne Edwards, 1881, 1882; Milne Edwards & Bouvier, 1900). Prior to these only one species, *Galathea* [= now *Munidopsis*] *serricornis* had been described by Lovén (1852) from Swedish coast. Barrois (1888) described *Galathea machadoi* from an unknown depth off the Azores, which later was found in deeper waters (A. Milne Edwards & Bouvier, 1899; de Saint Laurent, 1971). Milne Edwards & Bouvier (1899) reported 10 species (one chirostylid and nine galatheids) occurring in transitional-bathyal depths in the northeastern Atlantic and the Mediterranean. Hansen (1908) reported two chirostylids and nine galatheids from the North Atlantic Ocean including the Davis Strait based on the collection largely made by the "Ingolf" Expedition and partly by the "Thor" Expedition. Selbie (1914) reported two species of *Uroptychus*, two species of *Munida* and two species of *Munidopsis* collected from the coast of Ireland mostly by the "Helga." Zariquiey Alvarez (1952) revised five species (including three subspecies) of *Munida* from the eastern Atlantic and the Mediterranean, and in his 1968 monograph of the

Iberian Decapoda he reported three species of Chirostylidae and 17 species (seven of which are shallow-water forms) of Galatheidae. Sivertsen & Holthuis (1956) reported four species of *Munidopsis* (including a new species) in their report on decapod Crustacea collected by the “Michael Sars” North Atlantic Deep-Sea Expedition 1910. Miyake & Baba (1970) reported galatheids including seven deep-sea species collected by the Danish “Atlantide” Expedition, providing a list of species of the West African Galatheidae. Türkay (1975, 1976) provided records of deep-sea species including two new species (one *Uroptychus* and one *Munidopsis*) collected by the “Meteor” from NW Africa. De Saint Laurent (1985) gave distribution records for deep-sea species occurring in the Gulf of Gascogne. Rice & de Saint Laurent (1986) revised four northeastern Atlantic species of *Munida* that had been confused in nomenclature. Abello & Valladares (1988) reported one *Munidopsis* and one *Munida* in bathyal depths in the northwest Mediterranean. Khodkina & Duris (1989) described a new species of *Munidopsis* from the northeast Atlantic. De Saint Laurent & Macpherson (1990b) described a new species of *Eumunida* from the west coast of Africa and a new species of *Munida* from western South Africa. Galil & Goren (1994) recorded a species of *Munidopsis* in the Mediterranean off Israel. Pohle & Macpherson (1995) provided a range extension of a species of *Gastroptychus* to the northern Atlantic off southern Greenland. Tiefenbacher (2001) reported two rare species of *Munidopsis* from the southern West Europe Basin. Recently Froglija *et al.* (2002) recorded a species of *Munidopsis* new to the Mediterranean, which had been known from off Cape Bojador and off Azores.

Indo-Pacific deep-sea species

As in the Atlantic Ocean, the knowledge of deep-sea species in the Indo-Pacific is largely based on the great expeditions: “Challenger” for worldwide (Henderson, 1885, 1888), “Investigator” for the Indian Ocean, particularly around the Andaman Islands (Alcock, 1894, 1901; Wood-Mason in Wood-Mason & Alcock, 1891; Alcock & Anderson, 1894, 1895, 1896, 1899a, 1899b; Anderson, 1896; McArdle, 1901; Alcock & McArdle, 1901, 1902; MacGilchrist, 1905; Alcock & MacGilchrist, 1905), “Albatross” for the eastern and western Pacific (Benedict, 1902; Baba, 1977b, 1988; Baba & Tirmizi, 1979) and for the eastern Pacific around the Gulf of Panama (Faxon, 1893, 1895), “Valdivia” for the eastern and western Indian Ocean

(Balss, 1913a; Doflein & Balss, 1913), and “John Murray” for the Indian Ocean (Tirmizi, 1964, 1966). Deep-sea species were listed by Doflein & Balss (1913), and the Indo-West Pacific species were summarized in Baba (1988).

With recent surveys conducted under French MUSORSTOM projects around Indonesia, New Caledonia and vicinity, Vanuatu, the SW Pacific, the Marquesas Islands, Fiji Islands and Tonga, an enormous number of new taxa have been described (de Saint Laurent & Macpherson, 1990a; Baba, 1991a, 1991b; Macpherson, 1991, 1993a, 1993b, 1994, 1996a, 1996b, 1997, 1998, 1999a, 2000, 2004; Macpherson & Baba, 1993; de Saint Laurent & Poupin, 1996; Baba & de Saint Laurent, 1996; Macpherson & Machordom, 2001; Macpherson, 2004). Nine new genera of the Galatheidae were established (*Agononida* Baba & de Saint Laurent, 1996; *Alainius* Baba, 1991; *Anoplonida* Baba & de Saint Laurent, 1996; *Crosnierita* Macpherson, 1998; *Heteronida* Baba & de Saint Laurent, 1996; *Neonida* Baba & de Saint Laurent, 1996; *Onconida* Baba & de Saint Laurent, 1996; *Plesionida* Baba & de Saint Laurent, 1996; *Raymunida* Macpherson & Machordom, 2000). Thanks to the works by Macpherson and his collaborators in particular (see above), considerable numbers of new species were described: nine in Chirostylidae (one in *Chirostylus*, six in *Eumunida*, two in *Gastroptychus*) and 113 in Galatheidae (12 in *Agononida*, one in *Alainius*, one in *Anoplonida*, seven in *Bathymunida*, four in *Crosnierita*, one in *Heteronida*, 91 in *Munida*, one in *Neonida*, five in *Onconida*, 15 in *Paramunida*, one in *Plesionida*, and four in *Raymunida*).

In addition to the above-mentioned works, the galatheidean fauna (exclusive of Porcellanidae) of the western Pacific including the Hawaiian Islands and Tuamotu Archipelago has been enhanced by the following: Khodkina (1981), Haig (1973, 1974, 1979), Baba (1977a, 1977b, 1977c, 1978, 1981a, 1981b, 1982a, 1994, 1995, 2000, 2001), Zarenkov & Khodkina (1981), Williams & Van Dover (1983), Baba in Baba *et al.* (1986), Baba & Yu (1987), Williams (1988b), Williams and Baba (1990), Baba & Macpherson, 1991; Macpherson & de Saint Laurent (1991), Baba & Türkay (1992), Baba & de Saint Laurent (1992), Wu *et al.* (1997), Baba & Williams (1998), Wu & Chan (2000), Chan *et al.* (2000), Osawa & Okuno (2002), Baba & Poore (2002), and Lin *et al.* (2004). Very recently Ahyong & Poore (2004a, 2004b) described 34 new species from southern and southeastern Australia: one of *Gastroptychus*, 20 of *Uroptychus*, one

of *Agononida*, seven of *Munida*, four of *Munidopsis*, and one of *Paramunida*. In total, 77 species (39 of Chirostylidae and 38 of Galatheidae) have been described as new species, including a galatheid *Shinkaia crosnieri* Baba & Williams, 1998 from active thermal vent systems in the Bismarck Archipelago and Okinawa Trough that constitutes the subfamily Shinkaiinae Baba & Williams, 1998.

Deep-sea species of the Indian Ocean including the Red Sea and South Africa are well known through the collections of the "Investigator" and "Valdivia" (see above). Owing to subsequent contributions, the total number of deep-sea species now known in this region is 124: 2 of *Chirostylus*, three of *Gastroptychus*, six of *Eumunida*, 39 of *Uroptychus*, three of *Agononida*, one of *Bathymunida*, four of *Galathea*, 27 of *Munida*, and 39 of *Munidopsis* (Lloyd, 1907; Laurie, 1926; Gordon, 1930; Barnard, 1950; Tirmizi, 1964, 1966, 1980; Lewinsohn, 1969; Haig, 1974; Tirmizi & Javed, 1976; Kensley, 1968, 1977, 1981a; Baba & Tirmizi, 1979; Baba, 1986a, 1986b, 1990; Türkay, 1986; de Saint Laurent & Macpherson, 1988; Macpherson, 1991, 1999; Tirmizi & Javed, 1993; Galil, 1999; Macpherson & de Saint Laurent, 2002). Stebbing (1910) described *Hapaloptyx defcilis* n. gen., n. sp. in the Uroptychidae [= Chirostylidae] from South Africa, but it was not placed in the correct systematic position (Family incertae sedis; Baba, 1988). Kensley (1981b) discussed the zoogeography of southern African decapod crustaceans including six species of chirostylids and 11 species of galatheids (including three shallow species of *Galathea*).

On the other hand, the eastern Pacific galatheidean fauna has received little attention since the publications of Faxon (1893, 1895) and Benedict (1902) who described four species of Chirostylidae and 37 species of Galatheidae. South eastern Pacific species were listed by Haig (1955), and the occurrence of some deep-sea chirostylids and galatheids off California was noted by Haig (1956, 1968) and Haig & Wicksten (1975). Subsequently, the following were reported: a new species of *Munida* and a new species and a new subspecies of *Munidopsis* from Chile (Bahamonde & López, 1962; Bahamonde, 1964); new record of one *Munida* and one *Munidopsis* species from Peru (Garth & Haig, 1971); occurrence of two *Munida* and three *Munidopsis* species off Oregon (McCauley, 1972); a new species of *Munidopsis* off California (Pequegnat & Pequegnat, 1973); *Munidopsis* from north and south eastern Pacific, including four new species (Khodkina, 1973, 1975, 1991); a new species of *Gastroptychus*

off Ecuador and northern Peru (Baba, 1977d); a list of species taken from the eastern Pacific and kept in the collection of the Scripps Institution of Oceanography (Luke, 1977); *Munidopsis* off north western United States, including three new species (Ambler, 1980); *Galathea* (= now *Janetogalathea* Baba & Wicksten, 1997), *Munida* and *Munidopsis* off California (Wicksten, 1982); one *Munida* and one *Munidopsis* species from British Columbia (Hart, 1982); a new species of *Munidopsis* off southern Baja California (Williams & van Dover, 1983); a new species of *Munidopsis* from hydrothermal vents off northwestern United States (Williams, 1988); distributions of eastern Pacific decapods including chirostylids and galatheids (Wicksten, 1989); a new species of *Gastroptychus* off Baja California (Baba & Haig, 1990); two new *Munidopsis* species from the East Pacific Rise and off Strait of Juan de Fuca (Baba & Williams, 1990); a checklist of anomuran crabs from the eastern Tropical Pacific, including five species of Chirostylidae and 40 species of Galatheidae (Hendrickx, 1999). Recently Hendrickx has extensively studied eastern Pacific Galatheidae, reporting 12 species of *Munida* from the eastern tropical Pacific, including two new species (Hendrickx, 2000); four species of *Munidopsis* from deep-waters in the southeastern Gulf of California (Hendrickx, 2001); six species of *Munida* from the temperate region of the east Pacific, including a new species and a key to species of *Munida* from the eastern Pacific (Hendrickx, 2003).

Including species that have so far been reported from the continental shelf, but may be taken in depths below 200 m, a total of 580 deep-sea species are known from the Indo-Pacific including the Southern Ocean: 161 species in six genera of Chirostylidae and 419 species in 26 genera of Galatheidae. (see below under list of species).

Thermal vent species

Active thermal vent systems, first explored in 1976 around the Galapagos Rift using the DSRV Alvin, and then around 12–13°N on the East Pacific Rise, the Guaymas Basin in the Gulf of California, and the Juan de Fuca Ridge and Explorer Ridge, in the northeast Pacific, were found to yield numerous new taxa, including galatheids (Jones, 1985; van Dover *et al.*, 1986; Williams, 1988). Decapod crustaceans taken by the above expeditions and extensive surveys conducted around Mariana Back Arc Basin, Bismarck Archipelago, Lau and Fiji Basins, Gulf of California, Okinawa Trough, and Taiwan, etc. include three new

species of Chirostylidae (three of *Uroptychus*) and 10 new species of Galatheidae (one of *Munida*, eight of *Munidopsis*, one of *Shinkaia*) (Williams, 1988; Williams & Baba, 1990; Khodkina, 1991; Baba & de Saint Laurent, 1992; Baba, 1995; Baba & Williams, 1998; Chan *et al.*, 2000; Watabe, 2000; Fujikura *et al.*, 2002). Chevaldonné & Olu (1996) reviewed occurrence of anomuran crabs in hydrothermal vent and cold-seep communities in both the Pacific and the Atlantic Oceans.

Terminology and presentation

Terminology: The general terminology employed largely follows Zariquiey (1952), Baba in Baba *et al.* (1986), and Baba & de Saint Laurent (1996). The terminology for sternal plates follows Baba (2004). The main terms used in the keys and descriptions are shown in Fig. 1. Oceanic areas used in the text are cited from Holthuis & Rosa (1965: 20–21).

Presentation: Genera and species are placed in alphabetical order. Measurements of carapace lengths including rostral spines are indicated in parentheses under “Material” and pertinent places in the text.

Keys to all known genera of Chirostylidae and Galatheidae including shallow water forms are given. Provided under the account of each species are diagnosis, description of holotype where newly described, variations where observed, color when information is available (notes taken by T. Wolff on board the “Galathea”), remarks for relationships and/or additional notes on systematics and ecology, and horizontal and vertical ranges.

Included in the list of deep-sea species are synonymy, locality records, location of type material and registration number for each species. A key to species of each genus is given where necessary. Depth and geographic distributions are discussed under multi-species genera.

The abbreviations used in the text include:

G1, G2	Gonopod 1 (first male pleopod), Gonopod 2 (second male pleopod)
Mxp(s)	Maxilliped(s)
P1	Pereopod 1 (cheliped)
P2–4	Pereopods 2–4 (first to third walking legs)

Repository acronyms:

AHF	Allan Hancock Foundation, Los Angeles
AM	Australian Museum, Sydney
BLIH	Biological Laboratory, Imperial

	Household, Tokyo
BMNH	Natural History Museum, London
BMH	Bishop Museum, Honolulu
EMU	Estación Mazatlán, Universidad Nacional (UNAM), Mazatlán
LACM	Los Angeles County Museum of Natural History, Los Angeles
MCSNM	Museo Civico di Storia Naturale, Milano
MCZ	Museum of Comparative Zoology at Harvard University, Massachusetts
MNHN	Muséum National d’Histoire Naturelle, Paris
MNHNC	Museo Nacional de Historia Natural, Chile, Santiago
MZS	Musée Zoologique, Strasbourg
NFUS	National Fisheries University, Shimono-seki
NHMIC	Natural History Museum and Institute, Chiba
NMV	Museum Victoria, Melbourne
NMW	Naturhistorisches Museum, Vienna
NSMT	National Science Museum, Tokyo
NTOU	National Taiwan Ocean University, Keelung
OIRAS	Oceanology Institute, Russian Academy of Sciences, Moscow
QMW	Queensland Museum, Brisbane
RMNH	Nationaal Natuurhistorisch Museum, Leiden
SAMA	South Australian Museum, Adelaide
SAMC	South African Museum, Cape Town
SCSFRI	South China Sea Fisheries Research Institute, Guangzhou
SMF	Senckenberg Museum, Frankfurt a.M.
SMNH	Swedish Museum of Natural History, Stockholm
SNU	Seoul National University, Seoul
SUM	State University of Moscow, Moscow
TAM	Texas A&M University, Department of Oceanography, Texas
USNM	National Museum of Natural History, Washington, D.C.
ZLKU	Kitakyushu Museum of Natural History, Kitakyushu
ZMA	Zoological Museum, Amsterdam
ZMB	Zoologisches Museum, Zentralinstitut der Humboldt-Universität, Berlin
ZMUC	Zoological Museum, University of Copenhagen, Copenhagen
ZSIC	Zoological Survey of India, Calcutta
ZSM	Zoologische Staatssammlung, Munich

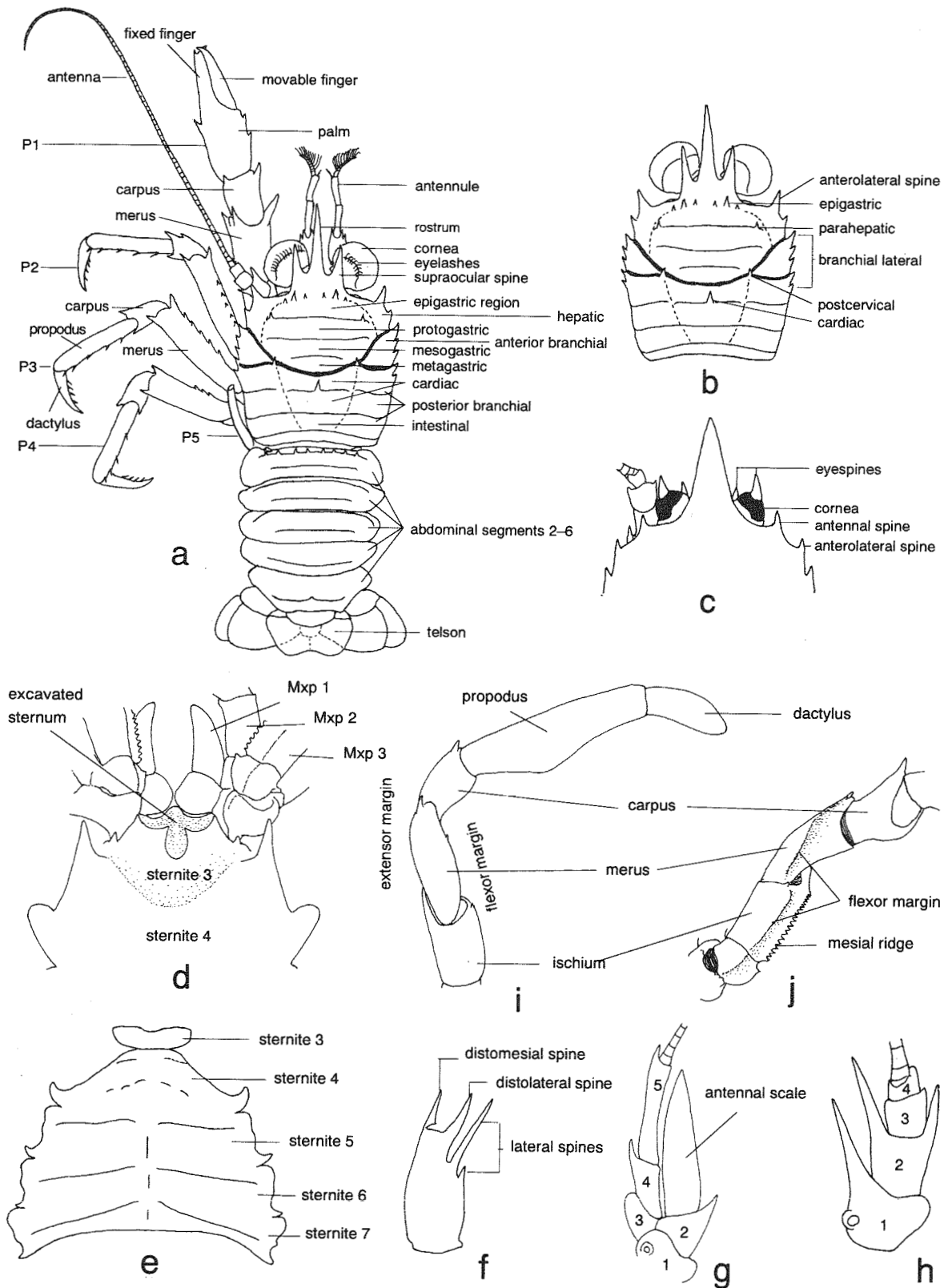


Fig. 1. Selected figures illustrating terms used in descriptive accounts: a, b, e, f, h, based on *Munida*; c, based on *Munidopsis*; d, g, i, j, based on *Uroptychus*: a, entire animal, right appendages omitted, dorsal view; b, carapace, spines; c, anterior part of carapace, including ocular peduncles; d, excavated sternum and anterior part of sternal plastron, including Mxps 1, 2, 3; e, sternal plastron; f, antennular basal article, ventral; g, antennal peduncle consisting of 5 articles; h, antennal peduncle consisting of 4 articles; i, endopod of Mxp 3, lateral; j, endopod of Mxp 3, including basal 2 articles, distal articles omitted, central.

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Munidopsis depressa, as also did Rafael Lemaitre the type material of *Munida* species in the USNM collection. Rodolfo Quintana then of Hokkaido University, Sapporo translated the Spanish article of Bahamonde (1964), and I. V. Khodkina of the University of Moscow, Moscow provided me with station data for her publication of 1975. Arthur Anker of the University of Alberta, Edmonton translated a Russian article of Khodkina (1973). Paul Clark, Charles Oliver Coleman, Nguyen Ngoc-Ho of the Muséum national d'Histoire naturelle, Paris, Dirk Platvoet, Rafael Lemaitre and Karen Reed of the Smithsonian Institution, and Karin Sindemark of the Swedish Museum of Natural History, Stockholm helped me by locating type materials under their care. Tin-Yam Chan of the National Taiwan Ocean University, Keelung, Gustavo A. S. de Melo and Marcos Tavares of the University of Sao Paulo, and Rafael Lemaitre helped me with references inaccessible to me. The manuscript was reviewed by Shane T. Ahyong of the Australian Museum, Sydney, Enrique Macpherson of the Centro de Estudios Avanzados de Blanes, Gerona, Colin L. McLay of the University of Canterbury, Christchurch, and Gary C. B. Poore of Museum Victoria, Melbourne. The manuscript also benefited from discussions with Enrique Macpherson and Shane Ahyong. Alain Crosnier allowed me to include part of the collections made by MUSORSTOM projects in the present report. Michel E. Hendrickx of the Instituto de Ciencias del Mar y Limnología, Mazatlan, helped me with checking some characters of eastern Pacific species of *Munida*. To all of them I wish to express my sincere appreciation.

SYSTEMATIC ACCOUNT

Family CHIROSTYLIDAE Ortmann, 1892

Diptycinés A. Milne Edwards & Bouvier, 1894: 296, 312.

Chirostylidae Ortmann, 1892: 241. — Balss, 1957: 1594. Davie, 2002: 29.

Uroptychidae Alcock, 1901: 278.

Diagnosis: Carapace with or without transverse striae, rostrum and supraocular spines present or absent. Sternal plastron consisting of sternites 3–7, no sternal

plate for thoracic somite 8. Tailfan folded beneath preceding abdominal segment, telson transversely divided into 2 lobes. Antennal peduncle consisting of 5 articles, antennal acicle present or absent. Mandible with incisor ridge serrated. Mxp 3 lacking epipod.

Remarks: The thoracic sternites in the Chirostylidae are divided into anterior and posterior parts. The anterior part is usually depressed in ventral view. In the genera *Chirostylus* Ortmann, 1892 and *Uroptychus* Henderson, 1888 and one of two groups of species in