

1968

LIBRARY
DIVISION OF CRUSTACEA

RECORDED

BEAUFORTIA

SERIES OF MISCELLANEOUS PUBLICATIONS

ZOOLOGICAL MUSEUM OF THE UNIVERSITY OF AMSTERDAM

No. 195

Volume 15

May 17, 1968

Dedicated to Professor Dr. H. Engel

On Hymenosomatidae (Crustacea Decapoda Brachyura) from
fresh water, with the description of a new species

L. B. HOLTHUIS

ABSTRACT

The six freshwater species of the family Hymenosomatidae are enumerated with indication of habitat and distribution; two belong to the genus *Neorhynchoplax* and four to *Halicarcinus*. One species, *Halicarcinus angelicus*, from the central mountain range of Papua is described as new. Details are given of type material of *H. pilosus* (A. Milne Edwards) from New Caledonia.

During a botanical expedition to the Territories of Papua and New Guinea some interesting crabs were collected by Messrs. W. Vink and C. Kalkman, both of the Rijksherbarium at Leiden. The expedition, organized under the joint auspices of the Rijksherbarium (National Herbarium) at Leiden, Netherlands, and the Division of Botany, Department of Forests at Lae, Territory of New Guinea, explored the area of the Doma Peaks in the Tari Subdistrict of the Southern Highlands District in Papua. It is a pleasant duty to express my gratitude to Messrs. Vink and Kalkman, for giving some of their time during this expedition to make this collection of Crustacea and for entrusting me with the study of it.

Apart from a good series of Potamidae three specimens of a new species of Hymenosomatidae were collected. The latter material forms the main subject of the present note, which also deals with other species of the same family.

Hymenosomatidae MacLeay, 1838

Hymenosomidae MacLeay, 1838: 68.

Hymenicinae Dana, 1851: 253.

Hymenosomatidae Stebbing, 1905: 49.

Received: October 20, 1967

INVERTEBRATE
ZOOLOGY
Crustacea

[109]

INVERTEBRATE
ZOOLOGY

The far greater part of the species of Hymenosomatidae are typically marine crabs. Five species of this family, however, have been reported exclusively from fresh water, often at considerable distances from the nearest sea coast. These five species, to which now a sixth is added, are all listed below. They belong to two genera: *Neorhynchoplax* and *Halicarcinus*.

The author of the family name Hymenosomatidae is variously cited as H. Milne Edwards, 1853, Stimpson, 1858, or Ortmann, 1893. Actually, the first author who, to my knowledge, used this family name, be it in the incorrect spelling Hymenosomidae, is MacLeay (1838). The incorrect spelling Hymenosomidae has been used by a great number of authors. In 1905 Stebbing corrected it to Hymenosomatidae: the genitive singular of *soma*, namely, is *somatis*, and the grammatical stem is thus *somat-* (see also, 1964, International Code of Zoological Nomenclature: 129). Though some authors like Kemp (1917 : 243), Stephensen (1945 : 217), Barnard (1950 : 66), and Monod (1956 : 468) followed Stebbing and adopted the correct spelling for the family name, the incorrect Hymenosomidae is still frequently employed by modern authors.

Neorhynchoplax Sakai, 1938

Sakai (1938 : 200) assigned a number of species to his new genus, without, however, indicating a type. As the type species of *Neorhynchoplax* now *Rhynchoplax introversus* Kemp, 1917, is here selected.

Neorhynchoplax and the genera *Elamena* H. Milne Edwards, 1837 (type species, by monotypy, *Hymenosoma mathaei* Desmarest, 1823) and *Trigonoplax* H. Milne Edwards, 1853 (type species, by monotypy, *Ocypode (Elamene) unguiformis* De Haan, 1839) form a subdivision of the Hymenosomatidae characterized by the fusion of the third to fifth somites of the male abdomen. In all other genera of the family these somites are free. *Neorhynchoplax* can at once be distinguished from *Elamena* and *Trigonoplax* by the distinct pattern of grooves on the dorsal surface of the carapace.

Two fresh water species of the present genus are known, *N. introversus* and *N. kempi*. *Neorhynchoplax bovis* (Barnard) has occasionally been found in estuarine waters, but evidently is not a true fresh water species.

***Neorhynchoplax introversus* (Kemp, 1917)**

Rhynchoplax introversus Kemp, 1917 : 262, fig. 11; Kemp, 1918 : 226.
Neorhynchoplax introversus Sakai, 1938 : 200.

This species was described from fresh water of the mouths of creeks emptying into Tai-Hu Lake in the delta of the Yang-tse-kiang River, Kiangsu Province, China, at 40 miles from the sea. No altitude is given, but this locality evidently is practically at sea level. To my knowledge no new finds of the species have been reported since the original description.

Neorhynchoplax kemp (Chopra & Das, 1930)

Rhynchoplax kemp Chopra & Das, 1930 : 416, figs. 2—5.

Neorhynchoplax kemp Sakai, 1938 : 200.

Chopra & Das reported numerous specimens of their new species from fresh water of Shat-al-Arab, the confluence of the Euphrates and Tigris Rivers, near Basra, Iraq, at about 70 miles from the sea. This locality lies in the lowlands area of the estuary of the Tigris-Euphrates system.

Halicarcinus White, 1846

Three fresh water species of this genus were so far known¹). A fourth such species, which proves new to science, is described here. It is not certain that these four species are actually congeneric with *Cancer planatus* Fabricius, 1775, the type species (by original designation) of the genus *Halicarcinus* White, 1846. A revision of the family Hymenosomatidae, especially on the generic level, is badly needed, as the systematics of the group are still very unsettled. Pending such a revision the currently adopted nomenclature for the species under consideration is followed here.

Halicarcinus lacustris (Chilton, 1881)

Elamena (?) *lacustris* Chilton, 1881 : 172.

Hymenosoma lacustris Chilton, 1882 : 69, pl. 1 fig. 2; Fulton & Grant, 1902 : 59, pl. 8;

Hutton, 1904 : 251; Chilton, 1906 : 703; Grant & McCulloch, 1907 : 153; Chilton, 1912 : 128; Chilton, 1915 : 316, 319, fig. 1; Kemp, 1917 : 247 (referred to *Halicarcinus*); Chilton, 1919 : 94; Chilton & Bennett, 1929 : 776; Powell, 1947 : 39, fig. 190.

Hymenicus sp. Etheridge, 1889 : 34, 36.

Hymenicus lacustris Tesch, 1918 : 12.

Halicarcinus lacustris Hale, 1927 : 118; Richardson, 1949 : 67, fig. 44; Dell, 1963 : 39, fig.

Halicarcinus lacustris has been reported from fresh waters in New Zealand, Norfolk Island, Lord Howe Island, Victoria, Tasmania, and South Australia. The records in the literature are the following:

North Island, New Zealand: lagoons at Ahipara and Waikato Heads, northern North Island (Powell, 1947), Lake Pupuke (= Lake Takapuna) near Auckland, a fresh water lake at 200 feet from the sea (Chilton, 1881, 1882, 1906, 1912, 1915, 1919; Fulton & Grant, 1902; Powell, 1947; Dell, 1963), Lake Waikare, Auckland (Chilton, 1906, 1912, 1915; Powell, 1947), Waipa River (Chilton, 1912, 1915; Powell, 1947).

Norfolk Island: a common species in fresh water streams of the island, no precise locality given (Fulton & Grant, 1902; Chilton, 1906, 1912, 1915, 1919; Grant & McCulloch, 1907; Powell, 1947).

¹) Some species, like *Halicarcinus australis* (Haswell) and *H. bedfordi* Montgomery, seem to occur in estuarine waters, but are evidently no true fresh water species.

Lord Howe Island: from “water-carrying gullies of the North Ridge, behind the Old Settlement, at a height of from 200 to 300 feet above high-water mark” (Etheridge, 1889), from “a fresh-water stream on the top of Mount Gower, about 3.000 ft. above sea-level” (Chilton, 1915).

Victoria, Australia: Lake Colac at 35 miles from the nearest sea and “separated from it by a high range of hills” (Fulton & Grant, 1902; Chilton, 1906, 1912, 1915), Moorabool River (Fulton & Grant, 1902; Chilton, 1915).

Tasmania, Australia: “in the crevices of rotting wood in a very small creek” near Flowerdale, N.W. Tasmania (Chilton, 1919).

South Australia: River Murray and Finnis Creek (Hale, 1927).

Several authors (Fulton & Grant, 1902; Chilton, 1906, 1915, 1919; Tesch, 1918) indicated that there exist slight differences between the populations from the various areas, but these differences were not considered of sufficient importance to justify the separation of the various forms as distinct species or subspecies. However, accurate descriptions of the various forms and a careful comparison of the various characters are badly needed, since, notwithstanding the numerous records of this species, it is still poorly known. Many features (e.g., the shape of the male abdomen and pleopods, that of the orbit, etc.) have not or very incompletely been dealt with.

The altitude of the New Zealand localities is unknown to me. Lake Pupuke is situated very close to the sea shore so that its altitude evidently is minimal. Of the Norfolk Island material the altitude is not given either, but the highest point on the island is 1043 feet above sea level. Etheridge (1889) reported his Lord Howe Island specimens from between 200 and 300 feet altitude, while Chilton gave 3000 feet; Chilton's figure is somewhat exaggerated as Mount Gower, where his specimens were found, is only 2835 feet high according to modern data. The Australian localities were all cited without indication of the altitude.

***Halicarcinus angelicus* new species (figs. 1, 2)**

Tigibi, Tari Subdistrict, Southern Highlands District, Territory of Papua, 5°56'S 143°3'E; altitude 1600 m; fresh water of a watercress swamp; 4 June 1966; leg. W. Vink. — 1 ♂ cl. 10 mm, 1 ♀ cl. 8 mm, 1 juv. cl. 5 mm. The male specimen is the holotype and is preserved in the collection of the Rijksmuseum van Natuurlijke Historie under Reg. No. Crust. D. 23282, the two paratypes under Reg. No. Crust. D. 23284.

The upper surface of the carapace (fig. 1a) is almost circular in outline, being as broad as, or only slightly broader than long. It is flat and surrounded by a distinct rim, which is not interrupted at the base of the rostrum and shows a faint, wide and broadly rounded anterolateral angle. The anterior margin of the rim shows two submedian blunt and small, but well delimited teeth, which are placed above the outer extremities of the base of the rostrum. The upper surface of the carapace shows a very distinct pattern of grooves similar to those found in several species of *Neorhynchoplax* and

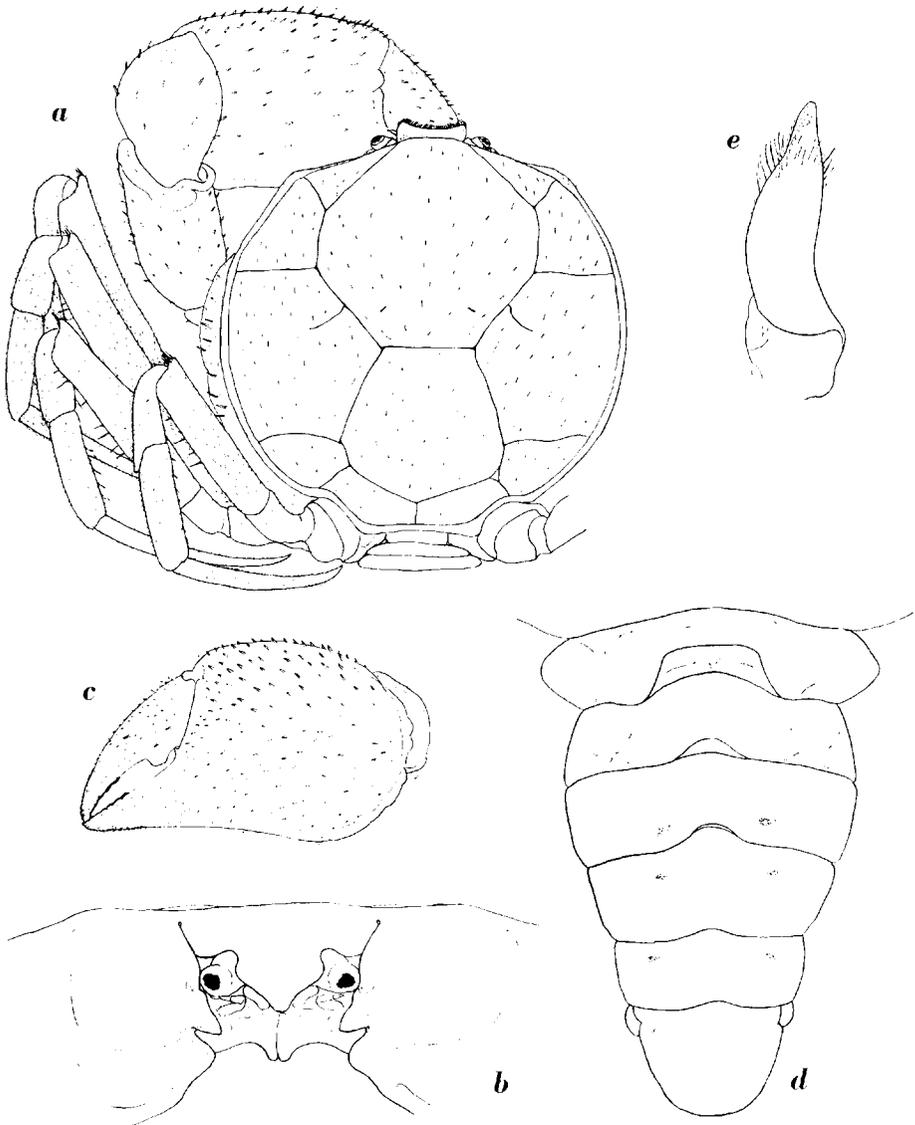


FIG. 1. *Halicarcinus angelicus* new species, male holotype. a, animal in dorsal view, appendages of right half omitted; b, cephalic region in front view; c, chela; d, abdomen; e, left male first pleopod, posterior view. a, c, $\times 5$; b, $\times 7\frac{1}{2}$; d, e, $\times 17$.

Halicarcinus. In the median region of the carapace the grooves enclose two large polygonal areas, the anterior of which is octagonal and has its anterior margin confluent with the rim of the carapace. The posterior area is heptagonal and lies immediately behind the anterior; it is separated from the postero-median part of the carapace rim by two narrowly transverse

areas, which are separated from each other by a median groove that connects the posterior heptagonal area with the carapace rim. From each of the angles of the two median polygonal areas a distinct groove runs towards the carapace rim; a short additional groove starts from the middle of the posterolateral margin of the anterior octagonal area, but stops before it is halfway to the rim. This additional groove, present in the male holotype, lacks in the female. The upper surface of the carapace bears scattered hairs, which are rather regularly distributed over it. Outside the rim, the carapace falls off rather steeply towards the true lateral margin. The subhepatic region is somewhat swollen and bordered below and behind by a broad distinct groove; in its upper part it shows a slight depression. It is separated from the basal part of the rostrum by a narrow closed slit, which is widened in its extreme basal part, showing an opening there. Below this slit the inner margin of the subhepatic region forms the outer margin of the orbit and bears two tubercles there; one lower and more rounded which is placed laterally of the eye, the other higher and conical, which is placed below the eye. Below the stronger of the two tubercles the margin of the subhepatic region shows a triangular incision.

The rostrum (fig. 1b) is directed almost vertically down from the anterior part of the carapace rim. Its basal part (or actually the antero-median part of the carapace, as it lies behind the orbits) is broadly trapezoid and bordered laterally by the above mentioned slits separating it from the subhepatic regions. The basis of this trapezoid area is formed by the carapace rim, while its anterior margin consists of three parts: a median part formed by the base of the true rostrum and two lateral parts formed by the posterior margin of the orbits. The true rostrum (i.e. the part lying between the orbits) is strongly concave in a longitudinal direction. From the wide base the rostrum broadens slightly anteriorly as far as the level of the corneae and then rather rapidly narrows in a bluntly rounded top. Also the lateral angles of the rostrum are rounded. The anterior margin is bordered with ciliae.

In their folded position the antennulae are entirely hidden below the rostrum. The antennae are placed on the lower margin of the orbit just to the inside of the large conical tubercle of the subhepatic region.

The eyes are small. The cornea is much narrower and shorter than the rather swollen peduncle.

The epistome (fig. 2a) is well developed. Anteriorly it ends in a median point, which, however, fails to reach the lower surface of the rostrum, so that the antennular fossae are not completely separated. Posteriorly the epistome ends in a rounded median lobe, which is deeply incised in the middle.

Of the third maxilliped (fig. 2b) the ischium and merus are wide; they are of about equal width, but the merus is somewhat longer than the ischium. The palp is rather slender. An exopod is present and bears a distinct flagellum.

The chelipeds of the male (fig. 1c) are large and high, the left and right are equal in shape and practically equal in size. The fingers are somewhat

shorter than the palm. They taper regularly towards the rather sharp tips. The dactylus bears a blunt molarlike tooth in the basal half, the fixed finger shows an inconspicuous low tooth in the middle. The distal half of the cutting edge of both fingers is provided with low rounded horny teeth, which together form a more or less continuous crenulated edge. The surface of the fingers and the palm bears numerous scattered spinules of a horny substance. The palm is as long as high, it is somewhat swollen, but in its ventral part it is compressed and shows a distinct ventral carina; in its basal part this carina may show some rather indistinct crenulations. The carpus and the merus show the same kind of spinules as the palm; there are no conspicuous teeth or spines on any of the segments. The female chelipeds (fig. 2c) are much smaller and less high than those of the male. The fingers are distinctly longer than the palm and are slender. The cutting edges have no teeth other than the distal horny crenulations. The palm is distinctly longer than high, and is rounded ventrally.

The following legs (fig. 2d) are slender. The dactylus is about 1.5 times as long as the propodus. It ends in a horny tip, and shows no teeth on the posterior margin. Short stiff hairs are placed on all the segments of the legs; these hairs sometimes are placed in more or less distinct longitudinal rows. On the posterior surface these hairs usually are somewhat longer and stronger.

The male abdomen (fig. 1d) is about triangular in outline. It is widest at the second segment, the third being considerably narrower. The fourth segment is again wider than the third, and the following become progressively narrower. The telson is triangular with a bluntly truncate top. The abdomen is highly unusual by that there is a small segment movably attached to the base of the telson and the postero-lateral angle of the sixth somite. Such intercalated plates to my knowledge have so far not been reported from any Brachyuran other than Dromiidae. Whether these structures in the present species (and in the next) are homologous with those of the Dromiids, I am unable to say. The female abdomen is almost circular in outline. It shows two wide and shallow submedian grooves in the basal part.

The first pleopods of the male (fig. 1e) are short, straight, and robust. A tuft of hairs is placed on the ventral surface of the abdomen.

In Tesch's (1918) classification, in which the genera *Halicarcinus* and *Hymenicus* are treated as distinct taxa, the present new species would fall in group I of the genus *Hymenicus*. Of the five species of this group it is with *H. lacustris* that *H. angelicus* shows the closest resemblance, especially in the shape and the outline of the carapace, the fact that the carapace rim continues over the base of the rostrum, and the shape of the eyes. But *H. lacustris* differs from *H. angelicus* in that the orbits and the rostrum touch the carapace rim, in the less complete pattern of grooves on the carapace, the more tongue-shaped rostrum, the shorter ischium of the third maxillipeds, the different dentition of the large chelae of the male, the fact that the carpus of the chelipeds has a ventral tubercle, the much shorter dactyli of the walking legs, and the shape of the male abdomen.

It would be interesting to know whether the intercalated plates of the

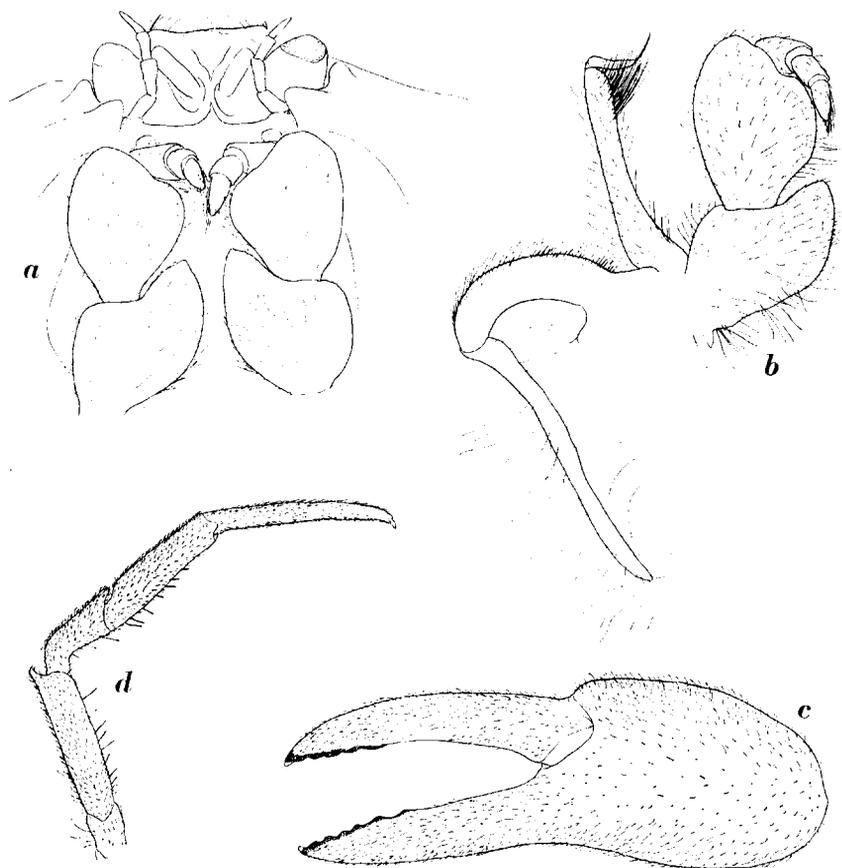


FIG. 2. *Halicarcinus angelicus* new species, female paratype. a, cephalic region in ventral view; b, third maxilliped; c, chela; d, walking leg. a, c, $\times 10$; b, $\times 12$; d, $\times 6\frac{1}{2}$.

male abdomen do also exist in *H. lucustris* and *H. wolterecki*, and to find out whether this feature is of generic importance. In the specimens of *Halicarcinus planatus* that I have examined no such intercalated plates are present.

Halicarcinus angelicus was found farther from the sea than any of the other Hymenosomatidae, and at a much higher altitude. The greatest altitude from which a hymenosomatid crab has so far been reported is less than 2835 feet (= about 864 m).

It is a great pleasure to dedicate this most interesting species to Professor Dr. H. Engel of the Zoological Museum at Amsterdam, at the occasion of his 70th birthday, as a token of my great appreciation.

Halicarcinus wolterecki Balss, 1934

Halicarcinus wolterecki Balss, 1934 : 181, figs. 3—5; Woltereck, 1941 : 140.

Balss (1934) reported a series of 6 specimens of this species from Mainit Lake in northern Mindanao, Philippines. This locality was more extensively described by Woltereck (1941: 138—142, figs. 45, 46), who stated the altitude of the lake to be “nur 27 m über dem Meere”. Mainit Lake lies close to the sea, but is separated from it by a high mountain range.

Halicarcinus wolterecki differs from *H. angelicus* by the presence of conspicuous teeth on the anterior and lateral parts of the carapace rim and on the margin of the rostrum. The rostrum is directed almost straight forward. The legs show a dense and long pubescence, which is much longer than in *H. angelicus*, also the palms of the chelipeds show a woolly pubescence. Additional information about the shape of the male abdomen and pleopods, as well as of that of the orbit of the present species would be most welcome.

Halicarcinus pilosus (A. Milne Edwards, 1873) (fig. 3)

Elamena pilosa A. Milne Edwards, 1873 : 322, pl. 18 fig. 6; Kemp, 1917 : 247 (referred to *Halicarcinus*); Tesch, 1918 : 21; Roux, 1926 : 229, figs. 55, 56.

New Caledonia; fresh or hardly brackish water, sandy bottom; 1868—1872; B. Balansa leg.; A. Milne Edwards don., 1878. — 2 ♂♂ cl. 9 and 14 mm, cb. 11 and 18 mm, both syntypes, in the collection of the Rijksmuseum van Natuurlijke Historie, Leiden, Reg. No. Crust. D 32.

The carapace is distinctly broader than long. Its rim merges with the posterior orbital and rostral margins and does not cross the rostral base. The margin is sinuous, but shows no distinct teeth. The arrangement of the grooves on the dorsal surface differs from that found in *H. angelicus* in that there are three median areas. The third is very small and placed behind the two larger, it does not reach the posterior part of the carapace rim, but is connected with it by a median groove. The anterior half of the carapace rim bears strong horny spinules, posteriorly they become smaller, while also some scattered small spinules are visible on the dorsal surface of the carapace. The subhepatic region (fig. 3a) is less swollen than in *H. angelicus*, but is bordered by the same grooves. Near the orbit the subhepatic region shows the same two tubercles that can be seen in *H. angelicus*, only in *H. pilosus* they are both very conspicuous, being of about the same size. From the upper tubercle a sharp ridge goes up towards the carapace rim, but stops short just before reaching it. This ridge, together with the two tubercles forms a kind of secondary outer orbital margin. These tubercles as well as the large part of the subhepatic region bear conspicuous horny spinules. The rostrum is a simple rounded lobe, which is deeply hollowed dorsally in a longitudinal direction, and ends in a rather narrow but rounded tip. It is not so strongly curved down as in *H. angelicus*. The rim of the carapace merges with the posterior orbital margins and therefore the base of the

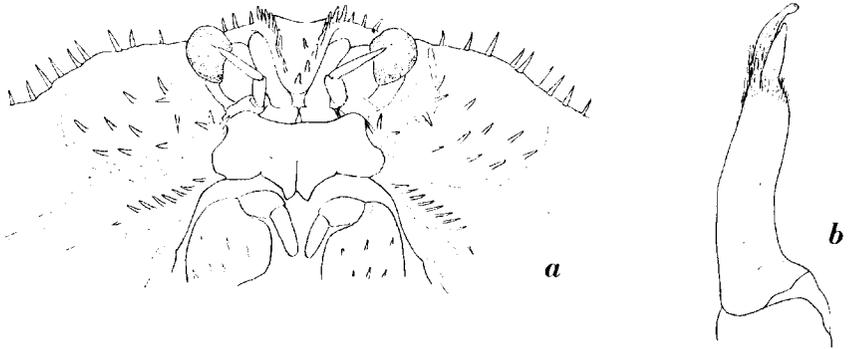


FIG. 3. *Halicarcinus pilosus* (A. Milne Edwards), male syntype. a, cephalic region in oblique front view; b, left male first pleopod, posterior view. a, $\times 5$; b, $\times 13$.

rostrum is at the level of the flattened dorsal surface of the carapace, and not some distance below it as in *H. angelicus*. The margins and the tip of the rostrum are beset with strong and dark horny spinules.

The eyes have the cornea distinctly larger than in *H. angelicus*. It is practically as wide as the peduncle. The posterior margin of the orbit is formed by the carapace rim.

The epistome has the anterior margin straight, and not produced forward as in *H. angelicus*. The posterior margin shows two small triangular submedian teeth.

The third maxillipeds have the ischium and merus relatively wider than in the previous species.

The fingers of the chelipeds are about as long as the palm. The dactylus bears a single bluntly triangular tooth in the middle of the cutting edge. The cutting edges meet in the anterior third only, here they are crenulate by the presence of horny teeth. The basal part of the fingers, the entire palm, carpus and merus bear numerous strong dark horny spinules. The lower margin of the palm is rounded, not compressed as in *H. angelicus*. The following legs are similar to those of *H. angelicus*, only the propodus has $\frac{3}{4}$ of the length of the dactylus. Scattered strong and sharply pointed horny spinules are present on the various segments, especially in the upper parts. Among these there are several much longer spines of the same horny substance, which, however, have the tips blunt and slightly swollen; these long spines are found on the lower (=posterior) surface of the dactylus, propodus and carpus and on both the upper lower surface of the merus. They have been described and figured by Roux (1926). The fifth leg is less strongly armed with spines and spinules than the other legs.

The male abdomen is triangular, tapering regularly from the third segment toward the tip. The telson is triangular with a rounded apex. The abdomen shows intercalated plates at each side of the base of the telson, exactly similar to those of *H. angelicus*. They are movably connected with the telson and

the sixth abdominal somite and rest against a tubercle in the groove of the thoracic sternum when the abdomen is in its normal position.

The male first pleopod (fig. 3b) is short and straight. It ends in a rather slender horny process which has its tip slightly broadened and directed outward; this horny process overreaches a prolongation of the pleopod, which is placed to the outside of it.

No females of this species have been examined by me.

Distribution. — The species was originally described from “le sable des eaux douces ou à peine salées” of New Caledonia (A. Milne Edwards, 1873). Roux (1926) reported it from fresh water in two localities in New Caledonia: Canala and Coula-Boréaré. No altitude is indicated by either author.

Remarks. — A. Milne Edwards gave a short description and excellent figures of the species. The intercalated plates of the abdomen are not mentioned in Milne Edwards's text, but are distinctly shown in his fig. 6b. Roux (1926) gave an additional description and figured the peculiar long hair-like spines. Both authors assigned the species to the genus *Elamena*. Kemp (1917) already correctly pointed out that it certainly is not an *Elamena*, and assigned it to *Halicarcinus*. Tesch (1918) maintained the species in *Elamena* remarking that it is quite aberrant and perhaps should constitute a separate subgenus of that genus.

The four species of *Halicarcinus* discussed here, apart from their similar habitat (fresh water), have many features in common, like the shape of the rostrum, the general shape of the carapace and the appendages. It is possible that they actually do belong to a genus distinct from *Halicarcinus*. But as long as no author has sufficient material at his disposal to make a real thorough revision of the Hymenosomatidae, this question must remain unsolved.

LITERATURE CITED

- BALSS, H.
1934 Die Dekapoden. Mitteilungen von der Wallacea-Expedition Woltereck. Mitteilung XI. — Zool. Anz., **106**: 177—184, figs. 1—5.
- BARNARD, K. H.
1950 Descriptive Catalogue of South African decapod Crustacea. — Ann. S. Afr. Mus., **38**: 1—837, figs. 1—154.
- CHILTON, C.
1881 Additions to the New Zealand Crustacea. — Trans. Proc. New Zealand Inst., **14**: 171—174, pl. 8.
1882 Further additions to our knowledge of the New Zealand Crustacea. — Trans. Proc. New Zealand Inst., **15**: 69—86, pls. 1—3.
1906 Note on some Crustacea from the freshwater lakes of New Zealand. — Proc. zool. Soc. London, **1906**: 702—705.
1912 Miscellaneous notes on some New Zealand Crustacea. — Trans. Proc. New Zealand Inst., **44**: 128—135.
1915 A fresh-water crab, and its distribution in Australia and New Zealand. — Trans. Proc. New Zealand Inst., **47**: 316—320, fig. 1.
1919 Note on the occurrence in Tasmania of the freshwater crab, *Hymenosoma lacustris*, Chilton. — Pap. Proc. Roy. Soc. Tasmania, **1919**: 93—95.

- CHILTON, C. & E. W. BENNETT
1929 Contributions for a revision of the Crustacea Brachyura of New Zealand.
— Trans. Proc. New Zealand Inst., **59** : 731—778.
- CHOPRA, B. & K. N. DAS
1930 On two new species of hymenosomatid crabs, with notes on some other
species. Further notes on Crustacea Decapoda in the Indian Museum, 1.
— Rec. Indian Mus., **32** : 413—429, figs. 1—17.
- DANA, J. D.
1851 Conspectus Crustaceorum quae in Orbis Terrarum circumnavigatione, Carolo
Wilkes e classe Reipublicae Foederatae duce. — Proc. Acad. nat. Sci.
Philad., **5** (10) : 247—254.
- DELL, R. K.
1963 Native crabs. Nature in New Zealand : 1—64, figs.
- ETHERIDGE, R.
1889 The general zoology of Lord Howe Island; containing also an account of
the collections made by the Australian Museum collecting party, Aug.-Sept.,
1887. — Mem. Aust. Mus., **2** : 1—42.
- FULTON, S. W. & F. E. GRANT
1902 Some little known Victorian decapod Crustacea with descriptions of new
species, 2. — Proc. Roy. Soc. Victoria, (2) **15** : 59—68, pls. 7—10.
- GRANT, F. E. & A. R. McCULLOCH
1907 Decapod Crustacea from Norfolk Island. — Proc. Linn. Soc. New S. Wales,
32 : 151—156, pl. 1.
- HALE, H. M.
1927 The Crustacea of South Australia, **1** : 1—201, figs. 1—202.
- HUTTON, F. W.
1904 Index Faunae Novae Zealandiae : i—viii, 1—372.
- KEMP, S.
1917 Hymenosomatidae. Notes on Crustacea Decapoda in the Indian Museum,
10. — Rec. Indian Mus., **13** (5) : 243—279, figs. 1—29.
1918 Decapod and stomatopod Crustacea. In: N. ANNANDALE, Zoological results
of a tour in the Far East. — Mem. Asiat. Soc. Bengal, **6** : 217—297, figs.
1—12.
- MACLEAY, W. S.
1838 Illustrations of the Annulosa of South Africa; being a portion of the ob-
jects of natural history chiefly collected during an expedition into the
interior of South Africa, under the direction of Dr. Andrew Smith, in the
years 1834, 1835, and 1836; fitted out by "The Cape of Good Hope As-
sociation for exploring Central Africa". In: A. SMITH, Illustr. Zool. S.
Africa, Invert.: 1—75, pls. 1—4.
- MILNE EDWARDS, A.
1873 Recherches sur la faune carcinologique de la Nouvelle-Calédonie. Deuxième
partie. — Nouv. Arch. Mus. Hist. nat. Paris, **9** : 155—332, pls. 4—18.
- MONOD, T.
1956 Hippidea et Brachyura ouest-africains. — Mém. Inst. Franç. Afr. Noire,
45 : 1—674, figs. 1—884.
- POWELL, A. W. B.
1947 Native Animals of New Zealand : 1—96, figs. 1—411.
- RICHARDSON, L. R.
1949 A guide to the Oxyrhyncha, Oxystoma and lesser crabs. — Tuatara, **2**
(2) : 58—69, figs. 24—51.
- ROUX, J.
1926 Crustacés décapodes d'eau douce de la Nouvelle-Calédonie. In: F. SARASIN
& J. ROUX, Nova Caledonia, **4** (2) : 181—240, figs. 1—56.

SAKAI, T.

1938 Brachygnatha, Oxyrhyncha. Studies on the crabs of Japan, (3): 193—364, pls. 20—41.

STEBBING, T. R. R.

1905 South African Crustacea, 3. — Mar. Invest. S. Africa, 4: 21—123, pls. 17—26.

STEPHENSON, K.

1945 The Brachyura of the Iranian Gulf. With an appendix: The male pleopoda of the Brachyura. — Danish sci. Invest. Iran, 4: 57—237, figs. 1—60.

TESCH, J. J.

1918 Hymenosomidae, Retroplumidae, Ocypodidae, Grapsidae and Gecarcinidae. The Decapoda Brachyura of the Siboga Expedition, 1. — Siboga Exped. Monogr., 39 c: 1—148, pls. 1—6.

WOLTERECK, R.

1941 Inseln und Seen der Philippinen. Die Seen und Inseln der "Wallacea"-Zwischenregion und ihre endemische Tierwelt. Zweiter Teil. — Int. Rev. ges. Hydrobiol. Hydrogr., 41: 37—176, figs. 1—63.

DR. L. B. HOLTHUIS

Rijksmuseum van Natuurlijke Historie

Raamsteeg 2a

Leiden — The Netherlands

For sale at the Administration of the Zoological Museum of the University of
Amsterdam
Price Hfl. 3.50 (Dutch Florins)