Parhippolyte uveae Borradaile, 1899 (Crustacea: Decapoda: Hippolytidae) from Kakaban Island, Indonesia

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Key words: Crustacea; Decapoda; Caridea; Hippolytidae; *Parhippolyte*; Indo-West Pacific; anchialine lagoon.

Parhippolyte uveae Borradaile, 1899 is recorded from Kakaban Island, East Kalimantan, Indonesia. Its morphological variation is described, and its taxonomical status discussed.

Introduction

In 1994, a collection of eight hippolytid shrimps was gathered by the second author and Mrs A. Tomascik in an anchialine lagoon of an Uplifted atoll (Kakaban Island) off the northeast coast of East Kalimantan, Indonesia. Recently a new crab genus and species, *Orcovita saltatrix,* was described from the same anchialine lake by Ng & Tomascik (1994) as well as two new species of holothurians (Massin & Tomascik, in press). Details on the geomorphology of the lake are given by Ng & Tomascik (1994) and Tomascik & Mah (1994) respectively.

The Kakaban specimens were found conspecific with *Parhippolyte uveae* Borradaile, 1899.

Description of the species

Parhippolyte uveae Borradaile, 1899
(fig. 1)

Parhippolyte uveae Borradaile, 1899: 414, pl. 38 fig. 11a-g; Holthuis, 1955: 99; Manning & Hart, 1984: 659, 661, fig. 4; Titgen & Fielding, 1986: 294, 295; Fielding & Robinson, 1987: 76, fig. 60; Baensch & Debelius, 1992: 482, colourfigure; Allen & Steene, 1994: 142, colourfigure.

Ligur uveae; Kemp, 1914: 123; Borradaile, 1917: 401; Gordon, 1936: 102, fig. 1; Holthuis, 1947: 7, 32; Holthuis, 1963: 271; Monod, 1968: 772, figs 1-8; Bruce, 1972: 368, 2 figs.; Holthuis, 1973: 36; Por & Tsurnamal, 1973: 43; Yaldwyn, 1973: 505; Monod, 1975: 101; Fricke, 1976: 129, fig. 51; Wear & Holthuis, 1977: 125, pl. 1 fig. 1, 3; Fricke & Fricke, 1979: 163-167; Sket, 1981: 645; Maciolek, 1983: 607, 609, fig. 1; Bruce, 1987: 231.

Ura buta; Derrick, 1957: 160, 223.

Long-whiskered Prawn; Marden, 1958: 555, 2 figs.

Prawns of Vatulele; Reed & Hames, 1967: 163-165.

Material.— 8 specimens (RMNH D 45576): Indonesia, Kakaban Island, E of Borneo, 2.06'N 118.33'E; central Lake; v.1994; caught at night, not found during daytime; depth 0.5 m; leg. et don. & T. Tomascik. Reference material.— 5 specimens (RMNH D 30879): Indian Ocean, Aldabra Island, West Island; in anchialine pool; 9.ix.1975; leg. H.W. Fricke.— 6 specimens (RMNH D 3764): Indonesia, Halmahera; leg. H.A. Bernstein.— 8 specimens (RMNH D 30878): Philippines, Tiniguiban Island, 1 km from Guimaras Island, 20 km from Panay; vi.1973; leg. R.G. Wear.— 3 specimens (RMNH D 35237): Philippines, Tiniguiban Island near Guimaras Island, between Panay and Negros; i.1976; leg. N. Gundermann.— 5 specimens (RMNH D 28943): Ellice Islands, Funafuti Atoll, N end of Fangafale Islet; 1-3.iii.1972: leg. S.R. Rawlins.

Morphology.— In the original description of the species by Borradaile (1899) several characters were omitted and not shown in figures. Monod (1968) and Wear & Holthuis (1977) described some more features of the species and noted morphological variation of several characters. Still several features are being cited in the literature, which are based on the inaccurate description and figures by Borradaile, 1899. The specimens at the seniour author's disposal were checked for the characters about which confusion exists.

1. The pleura of the fourth abdominal somite never bear a posteroventral tooth. Usually the ventral margin is slightly convex, almost straight or sinuous in few specimens. In fig. 11a of Borradaile (1899), however, the fourth abdominal pleura has the posteroventral angle acute. This false feature has been used by Manning & Hart (1981: 660) in the diagnosis of the genus, and by Holthuis (1993: 217) in his key to the hippolytid genera to separate *Parhippolyte* from *Somersiella* Hart & Manning, 1981.

2. Borradaile (1899) mentioned the presence of 4 pairs of dorsal spines on the telson and 2 pairs of posterior spines. All specimens from the Kakaban collection have only 3 pairs of dorsal spines and 2 pairs of posterior spines, the posteriormost dorsal pair of spines being situated just anterior of the posterior 2 pairs of spines. Monod (1968: 773) indicated this pair to be one of 3 pairs of posterior spines, in which case he counted only 2 pairs of dorsal spines.

Monod (1968) studied topotypical material in which he found the same arrangement of spines on the telson as in the material under study here. Manning & Hart (1981: 660) in the diagnosis of the genus *Parhippolyte* wrote: "Telson with 3 pairs of dorsal spines, 1 pair subterminal, and 2 pairs of terminal spines" which presumably is the configuration described by Borradaile (1899). In his key to the hippolytid genera, Holthuis (1993: 217) separates *Parhippolyte,* with "three pairs of dorsal spines", from *Somersiella,* with "two pairs of dorsal spines". *Somersiella sterreri* Hart & Manning, 1981, has the same configuration of spines on the telson as the *Parhippolyte uveae* specimens studied here.

3. Borradaile (1899) only mentions the carpus of the second pereiopod to be multiarticulate, which can also been seen in his fig. 11a. All specimens in the Kakaban collection, however, also have the merus and usually the distal end of the ischium articulate. The articulation of the merus and ischium is rather obscure in a few specimens.

4. The antennal lobe sometimes bears a spine. In some specimens this spine is present on one side and absent on the other side. It might well be that this spine must be regarded homologous with the antennal spine in many other carideans whereas the more posterior, carinated spine, often referred to as antennal, actually is not (see also J. Clark, 1989: 450).

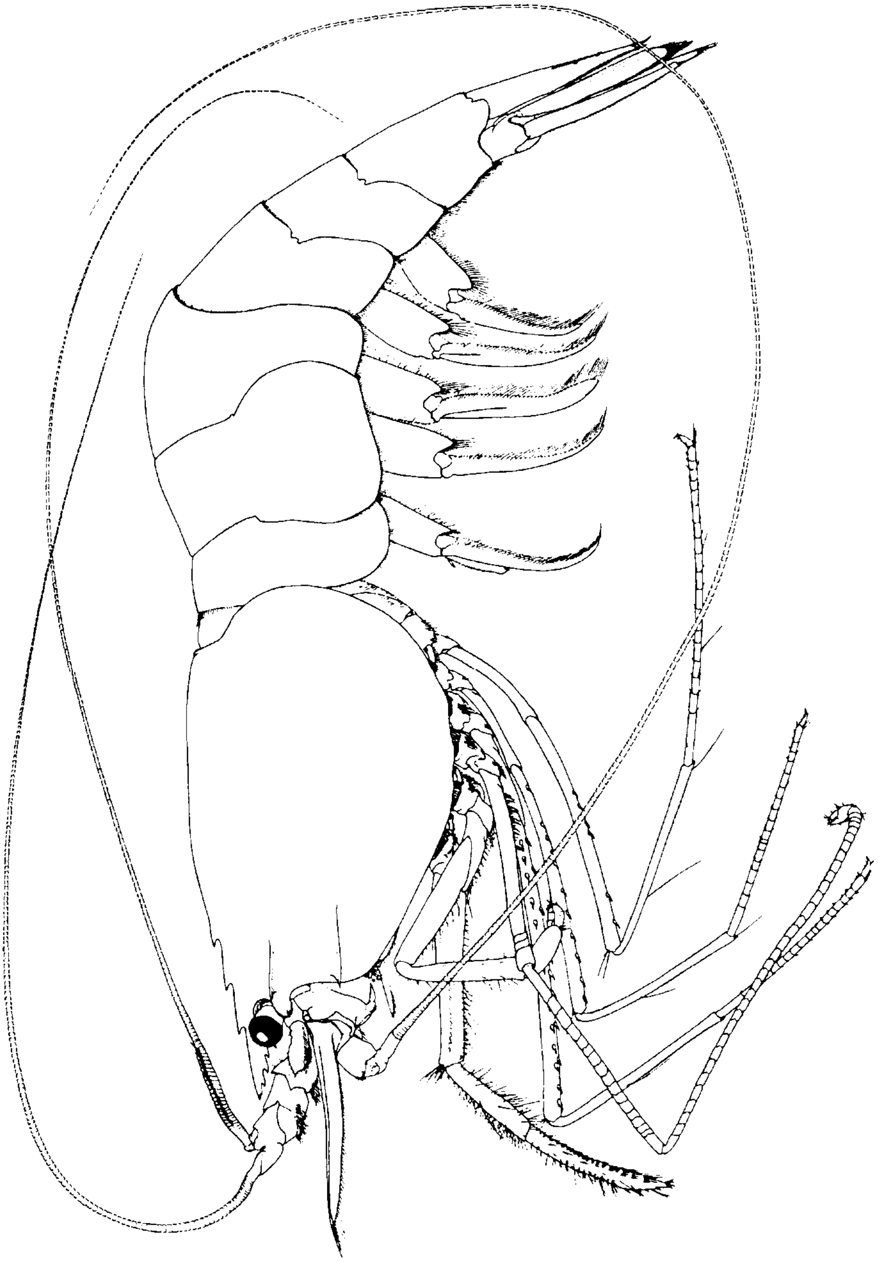

Fig. 1. *Parhippolyte uveae* Borradaile, 1899. ♂ specimen, cl. 9.3 mm (RMNH D 45576).

5. The number of ventral rostral teeth varies between 1 and 7 in the present material. The lenght of the rostrum varies between reaching the distal end of the first segment of the antennular peduncle, and reaching the distal end of the second segment of the antennular puduncle. In those specimens with many ventral rostral teeth the rostrum is about twice as long as high, whereas in those specimens with only one or two ventral rostral teeth, it can be five times as long as high.

6. The appendix masculina usually is as long as the appendix interna, in few specimens it is slightly shorter or slightly longer.

Colour.—The colouration of the specimens agrees with the findings of Wear & Holthuis (1977), who also described the variation in colouration and influence of exposure to strong sunlight which intensifies the carmine red colour.

Behaviour.— Wear & Holthuis (1977) described the Philippine population from Tiniguiban Islet as being "sun lovers". All specimens from Kakaban lagoon were collected at night. Efforts to find them during daylight hours were not successful. Based on limited night-time observations it seems that the Kakaban lagoon population is strongly negatively phototaxic. The shrimps come out of their hiding places about one hour after sunset, and were observed feeding in the shallow nearshore areas at a depth of about 1-2 m. When illuminated by an underwater torch they moved rapidly away from the light. Once out of the direct path of the light beam the shrimps resumed normal activity. Survey of caves and caverns on the seaward slope of the uplifted atoll strongly suggests that the shrimps are restricted to the lagoon and are not found in the outer reefal habitats. To our knowledge adult shrimps have no predators in the lagoon.

Systematic position.— Some diagnostic features used by Manning & Hart (1984) to separate *Parhippolyte* and *Somersiella* are based on the incomplete and in some features probably incorrect description by Borradaile (see number 1 and 2 under morphology). Distinguishing features in the gill formula are probably due to loss of gills during dissection of Manning & Hart's specimen. The absence of an epipod with a podobranch on the second maxilliped as shown by Manning & Hart (1984) fig. 13 is rather unusual, and contradicted by their fig. 4 in which both structures can be seen. Wicksten (1986: fig. 4A) found a podobranch present on the second maxilliped in specimens of *S. sterreri* from Iguana Cay, Exuma Island, Bahamas. The arthrobranch drawn in fig. 13 of Manning & Hart (1984) does not belong to the second, but to the third maxilliped. When dissecting a *Parhippolyte uveae* specimen from Kakaban, the first author also removed the arthrobranch of the third maxilliped when taking out the second maxilliped.

As no distinguishing features remain, *Somersiella* must be regarded a junior synonym of *Parhippolyte*, a conclusion also drawn by Chace (in press) and Wicksten (1996). It is possible that *Parhippolyte sterreri* (Hart & Manning, 1981) described from Bermuda is conspecific with *P. uveae* Borradaile, 1899. This would add an Atlantic anchialine population of the species to the many Indo-West Pacific populations known.

Another species in this group of hippolytids is *Koror misticus* J. Clark, 1989. The genus was separated from *Parhippolyte* on the basis of the following characters (J. Clark, 1989): "In *Koror* the rostrum is slender, about five times longer than high, whereas in *Parhippolyte* it is much deeper, about two and one-half times longer than high. In *Koror* the appendix masculina is distinctly longer than the appendix interna on the second male pleopod, whereas in *Parhippolyte* it is subequal in length to the appendix interna. The pleuron of the fourth abdominal somite is rounded posteroventrally in *Koror*, whereas in *Parhippolyte* it is acute posteroventrally." Taking into account the corrections of the original description of *Parhippolyte* and the described variation of the species, the only remaining character to distinguish *Parhippolyte* and *Koror* is the relative length of the appendix masculina and appendix interna. This difference is rather minor, and does not constitute a character on which a generic difference should be based, a conclusion also drawn by Chace (in press) and Wicksten (1996). On the basis of the examined material no definite conclusions can be drawn about the conspecificity of *Parhippolyte mistica* (J. Clark, 1989) and *P. uveae* Borradaile, 1899.

Wicksten (1996) discovered a new species of *Parhippolyte* from a sea cave from Lower California in the East Pacific. This species, *P. cavernicola*, can be distinguished from *P. uveae* in having 4 to 5 dorsal rostral teeth (versus 3 in *P. uveae*) and only one ventral rostral tooth (versus 4-5 in *P. uveae*).

Distribution (fig. 2).— *Parhippolyte uveae* is known from anchialine environments ranging from the western Indian Ocean to Hawaii: Aldabra, western Indian Ocean (Borradaile, 1917; Gordon, 1936; Bruce, 1972; Fricke, 1976); Halmahera, northern Moluccas, Indonesia (Holthuis, 1947; 1963); Tiniguiban Island, Philippines (Wear & Holthuis, 1977); Uvea, Loyalty Islands (Borradaile, 1899; Gordon, 1936); Sayawa Islet near Uvea, Loyalty Islands (Monod, 1968); Eniwetak Atoll (Bruce, 1987); Vatulele Island, Fiji Archipelago (Gordon, 1936; Derrick, 1957; Marden, 1958; Reed & Hames, 1967); Vanua Vatu and Vanua Levu Islands, Funafuti Atoll, Ellice Islands (Holthuis,

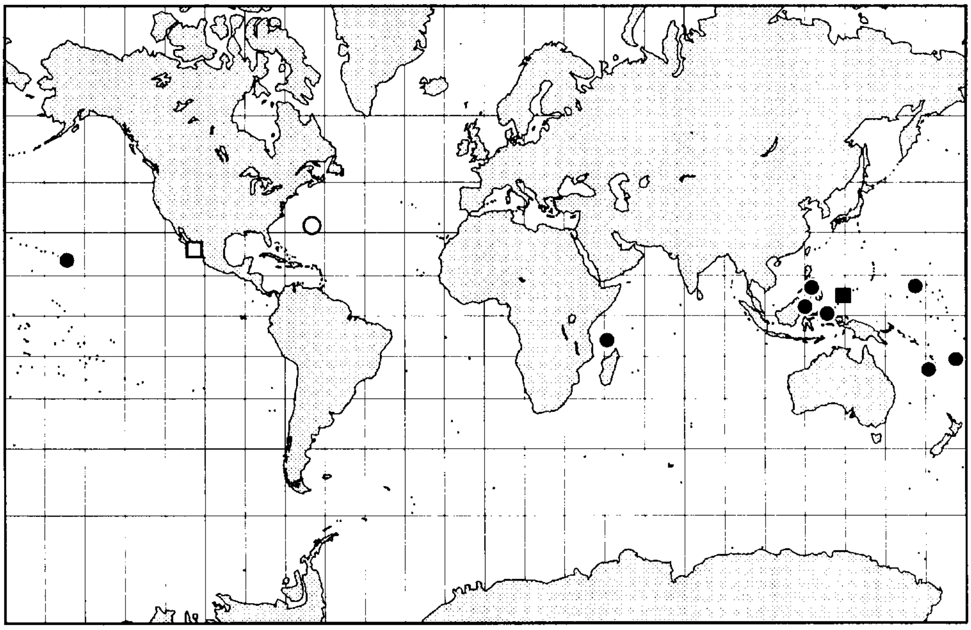

Fig. 2. Distribution of: ● *Parhippolyte uveae* Borradaile, 1899; ○ *P. sterreri* (Hart & Manning, 1981); ■ *P. mistica* (J. Clark, 1989); □ *Parhippolyte cavernicola* Wicksten, 1996.

1973); Oahu, Hawaii and Maui, Hawaiian Islands (Maciolek, 1983; Titgen & Fielding, 1986; Fielding & Robinson, 1987).

Maciolek (1983) noted that the species has been observed by divers at several littoral marine locations, the habitat being submerged caves. Collecting in this hidden habitat has not often been done. According to Maciolek this broadened habitat hypothesis allows the species to occur in groundwaters of many isolated and archipelagic islands where they have not yet been found.

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