

THREE NEW SPECIES OF MARINE WATER - STRIDERS
FROM THE AUSTRALASIAN REGION,
WITH NOTES ON OTHER SPECIES
(GERRIDAE: HALOBATINAE, TREPOBATINAE)

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ABSTRACT. - Three new species of marine water striders are described: *Stenobates australicus* and *S. carpentaria*, both from Australia, and *Halobates murphyi* from Papua New Guinea. Habitat preferences are given for these species and for *Stenobates insularis* Polhemus & Cheng and *S. biroi* Esaki. An illustrated key is provided for the four described species of *Stenobates*. New synonymies are noted for three *Halobates* species: *H. melleus* Linnauvori, 1971 = *H. mangrovensis* Schmidt & Müller, 1973; *H. calyptus* Herring, 1961 = *H. australiensis* Malipatil, 1988; *H. princeps* White, 1883 = *H. ashmorensis* Malipatil, 1988.

INTRODUCTION

Our continuing analysis of marine water strider collections made by ourselves and others in the island archipelagos between Asia and Australia continues to uncover new species, including the three described herein. The present paper provides names for these taxa to facilitate the progress of systematic and ecological studies currently underway by other authors, as well as ourselves, and also contains notes on the synonymies and ecological preferences of several previously described species. (More extensive distributional data and descriptions of still more new taxa in both the Halobatinae and Trepobatinae will be included in larger contributions in the future.)

Most of the material reported herein was collected during several expeditions by the authors over the last decade, sponsored in part by the National Geographic Society. All material upon which the descriptions are based is held in the J. T. Polhemus collection (JTPC) unless otherwise noted. CL numbers following locality data refer to a coding system used to reference ecological data. Institutional abbreviations are as follow: U.S. National Museum of Natural History (USNM); British Museum (Natural History) (BMNH); Hungarian Museum of Natural History (HMNH); American Museum of Natural History (AMNH); Bernice P. Bishop Museum, Honolulu (BPBM) and Zoologisk Museum, Copenhagen, Denmark (ZMUC). All measurements are given in millimetres.

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TAXONOMY

SUBFAMILY TREPOBATINAE

There are presently three described marine genera in the subfamily Trepobatinae. Two of these, *Rheumatometroides* Hungerford & Matsuda and *Stenobates* Esaki, are restricted to the Australasian region, while *Telmatometroides* Polhemus is restricted to the New World tropics. Lansbury (1989) recently described two species in *Rheumatometroides*, and below we add two new *Stenobates* species and provide a key to the latter genus. The separation of these two Australasian genera is at present somewhat arbitrary, a matter that will be dealt with in a forthcoming publication dealing with generic concepts and higher classification of the entire subfamily.

KEY TO *STENOBATES* ESAKI

1. Head without sharply contrasting deep brown markings medially (Fig. 10)
..... *carpentaria*, new species
- Head with sharply contrasting deep brown markings medially (Figs. 9, 11, 12) 2
2. Light pronotal markings large, subquadrate, occupying anterior two-thirds to three-fourths of pronotum (Fig. 9) *insularis* Polhemus & Cheng
- Light pronotal markings smaller, transverse, occupying roughly anterior one-half of pronotum (Figs. 11, 12) 3
3. Posterolateral dark markings on head small, ovate or triangular; posterior margin of head medially yellowish (Fig. 11) *biroi* Esaki
- Posterolateral dark markings on head transverse, elongate, wedge-shaped, extending medially, continuous across posterior margin of head although often very narrow medially (Fig. 12) *australicus*, new species

Stenobates insularis Polhemus & Cheng
(Figs. 1, 5, 9)

Stenobates insularis Polhemus & Cheng, 1982: 225 (holotype male, Singapore, USNM).

Material examined. - Paratypes - 2 males, 2 females (all apterous) (JTPC), Mandai mangrove stream, Singapore, leg. L. Cheng, 5.viii.1976.

Others - 9 males, 9 females, 5 nymphs, Kranji mangrove, leg. D. H. Murphy, 5.v.1985. — 34 males, 24 females, 22 nymphs, Kranji mangrove, leg. J. T. & D. A. Polhemus, 13.x.1986. — 2 females, Pulau Ubin Island, near Changi, leg. J. T. & D. A. Polhemus, 17.x.1986 (all JTPC). All apterous. All localities in Singapore.

Remarks. - Based on our observations this species inhabits the inner mangrove zone of estuaries surrounding Singapore, and is common in the Kranji Mangrove Swamp near the Johor Bahru causeway. At low tide it is found along the shore and in pools quite removed from the shoreline, usually in the shade. See discussion under *S. biroi*.

***Stenobates biroi* Esaki**

(Figs. 3, 7, 11)

Stenometra biroi Esaki, 1926: 119 (type series 3 males, Singapore, HMNH)
Stenobates biroi - Esaki 1927: 4 (replacement of preoccupied generic name)

Material examined. - 7 males, 8 females, 12 nymphs (all apterous) (JTPC), Pulau Ubin Island, near Changi, Singapore, leg. J. T. & D. A. Polhemus, 17.x.1986.

Remarks. - Esaki had no habitat data for *S. biroi*, which has remained elusive since its original description (Fernando & Cheng, 1974). The recent rediscovery of this species in Singapore by D. H. Murphy and subsequent collections there by the authors provide the first reliable ecological information. *S. biroi* seems to occupy the outer mangrove fringe along the seaward estuary margins, whereas *S. insularis* lives in the inner mangrove zone along the shore, a more tidally unstable yet better protected habitat. Both species are known so far only from Singapore, and have been found together in the same estuary at the Ubin Island locality, along with *Asclepios annandalei* Distant.

***Stenobates australicus*, new species**

(Figs. 4, 8, 12)

Material examined. - Holotype - apterous male and allotype apterous female (Australian National Insect Collection, Canberra), Queensland, Lower Mulgrave River, Deeral Landing, CL 1724, Australia, leg. J. T. & D. A. Polhemus, 15.viii.1983.

Paratypes - (all apterous) 31 males, 55 females, 12 nymphs, same data as holotype. — 6 males, 4 females, Daintree Ferry, CL 1731, leg. J. T. & D. A. Polhemus, 17.viii.1983. — 5 males, 12 females, Torres Strait, Horn Island, CL 1767, leg. J. T. & D. A. Polhemus, 30.viii.1983. 15 males, 11 females, 21 nymphs, mouth of the Jardine River, CL 1768, leg. J. T. & D. A. Polhemus, 30.viii.1983 (all JTPC). All from Queensland, Australia.

Description - Apterous male: Ground color leucine to yellow-brown; dorsum and pleural regions extensively marked with black and brown. Head dorsally extensively marked with black; band along inner eye margins, broad crescent-shaped band ahead of posterior margin contiguous with base of median figure roughly the shape of a tuning fork, yellowish. Pronotum entirely black except two (1+1) elongate transverse ovate leucine marks on anterior half, located on either side of midline, each extending to posterior eye margin. Mesonotum and mesopleura black, medially with two (1+1) additional shorter longitudinal stripes situated more laterally, two (1+1) posterolateral stripes along metapleura, orange yellow. Dorsal spot on metacarabulae, most of tergite 8 dorsally, leucine. Posterior margins of abdominal tergites 5-7, orange brown. Entire dorsum of thorax and abdomen appearing frosted in oblique light. Head laterally along and ahead of inner eye margin set with 6-8 stout black setae, in addition to the normal three pairs

of long trichobothria; eyes posteriorly each with two very long ocular setae. Body set with very short pubescence, without long hairs or spines. First antennal segment set with about 15 dark stiff setae; second segment with 1 similar seta at distal one-third. Middle femora and tibia set with short stiff black setae; posterior half of middle femora and posterior femora each with a single ventral closely set row of tiny black denticles, appearing as a thin black line except basally where denticles are sparser. Fore tibia strongly dorsoventrally flattened, dorsally with numerous erect long setae; anteriorly with numerous erect yellowish setae, four regularly spaced long stiff black setae on basal two-thirds, and a brush of stiff dark setae on distal one-third. Antennae, legs, rostrum, leucine to brown; antennal segment I brown on sides, otherwise leucine, distal segments brown; rostrum leucine, darker distally; anterior legs leucine, darker dorsally; middle and posterior femora brown, leucine beneath, darker dorsally and distally; middle and posterior tibia, tarsi brown.

Length of head (0.67) much more than narrowest interocular space (0.41); width of eye 0.31; eyes extending posteriorly about one-third length of propleura. Rostrum long, stout, reaching onto mesosternum, segments 3-4 curved, tip pointing almost ventrally. Pronotum short (0.31), wide (0.77), anterior margin straight, posterior margin curved. Mesonotum long (1.02), broad across posterior part (1.38) separated from metanotum by distinct suture. Tergites 1, 2, 5 of about equal length (0.20), tergites 3-4 shorter (0.15), tergites 6-7 shortest (0.10); tergite 8 long (0.31), broad (0.36); tergite 9 produced laterally into long, spine-like anterolaterally directed processes as shown in Figs. 4, 8. Connexiva slightly raised, continuous along abdomen, without spines or processes. Metasternum triangular, anterior margin strongly produced anteriorly, with large median scent gland opening anteriorly. Posterior margin of sternite 7 shallowly arched anteriorly. Antennae long, all segments of about equal thickness; all segments basally set ventrally with silvery pile, most prominent on segments II-III; length of segments I-IV; 1.13; 0.61; 0.41; 0.51. Measurements of legs as follows: Femur, tibia, tarsal-1, tarsal-2 of fore-leg, 1.13: 0.92: 0.10: 0.56; of middle-leg, 2.92: 3.38: 1.23: 1.02; of hind-leg, 3.12: 1.18: 0.20: 0.31.

Length, mean 3.73 (N=10, min. 3.64, max. 3.79);
Width, mean 1.42 (N=10, min. 1.38, max. 1.43)

Apterous female: Coloration similar to male, but dorsum of mesonotum differently colored, i.e., broad median portion widening posteriorly and continuing posteriorly along connexiva, membranous, brown, wrinkled. Body more robust. Gonapophysis serrate.

Length, mean 3.91 (N=10, min. 3.48, max. 4.20)
Width, mean 1.64 (N=10, min. 1.48, max. 1.69)

Etymology. - The species name *australicus* refers to the country of origin, Australia, where this species is apparently endemic along the north Queensland coastline.

Remarks. - *Stenobates australicus* is closest to *S. biroi*, but is distinguished by the pattern of dark markings on the head (see key) and mesonotum, and differently shaped anterior metasternal margin, i.e. simply triangular in *australicus* (Fig. 8), sinuate in *biroi* (Fig. 7). These two species share the anteriorly produced metasternum, whereas in *S. carpentaria* and *S. insularis* the metasternum is broadly curved anteriorly and not nearly as long; this character was used by Matsuda (1960) to separate the marine Trepobatine genera, however it is unreliable. *S. australicus* shares with all other members of the genus the long slender spine-like processes on the male terminalia; these are located on the shield shaped proctiger (segment 9; see subsequent

discussion of terminology under *Halobates murphyi*, new species), and are distinctive for each species. Other distinguishing characters of *australicus* as compared to *biroi* are: smaller body size; mesonotum relatively shorter ($L/W = 0.74$ vs. 0.83 in *biroi*); posterior margins of sternites 2-6 thick, declivant vs. thin and sloping in *biroi*, especially noticeable on sternite 6.

Stenobates australicus is very common along the shady margins of mangrove estuaries in north Queensland. It frequently co-occurs with immatures of *Halobates herringi* Polhemus & Cheng, the adults of which are much stronger skaters and usually inhabit more open waters further from shore.

Stenobates carpentaria, new species

(Figs. 2, 6, 10)

Material examined. - Holotype - apterous male and allotype apterous female (USNM), Northern Territory, Groote Eyl., Australia, leg. R. R. Miller, 3-4.vi.1948.

Paratypes - 3 apterous males, 4 apterous females, same data as holotype (USNM, JTPC, ZMUC).

Description. - Apterous male: Ground color leucine to yellow-brown; dorsum and pleural regions extensively marked with black and brown. Head dorsally tinged with fuscous, darker anteriorly; median Y-shaped figure yellowish. Pronotum deep brown along anterior and posterior margins, medially; propleura dark on posterior half. Mesonotum and mesopleura black, with two (1+1) large leucine to light orange brown regions on either side of dark midline, covering most of mesonotum. Large area on middle acetabulae, small area on hind acetabulae, most of metapleura, blackish brown. Posterior margins of all abdominal tergites orange brown. Entire dorsum of thorax and abdomen appearing frosted in oblique light, except greasy specimens. Head dorsally with a few scattered long setae in addition to the normal three pairs of trichobothria; laterally along and ahead of inner eye margin set with six to eight stout black setae; eyes posteriorly each with two very long ocular setae. Body densely set with very short pubescence, without long hairs or spines. First antennal segment set with about 15 dark stiff setae; second segment with three similar setae. Middle femora and tibia set with short stiff black setae; middle and posterior femora each with a single ventral closely set row of tiny black denticles, appearing as a thin black line except basally where denticles are sparser. Fore tibia strongly dorsoventrally flattened, dorsally with about 15 erect long dark setae; anteriorly with numerous erect yellowish setae plus a number of longer stiff light setae, and a brush of stiff dark setae on distal one-third (most easily seen on inner side). Antennae, legs, rostrum, leucine to brown; antennal segments brown; rostrum leucine, darker distally; anterior legs leucine; middle and posterior femora light brown, darker dorsally and distally; middle and posterior tibia, tarsi brown.

Length of head (0.77) much more than narrowest interocular space (0.41); width of eye 0.31; eyes extending posteriorly about one-third length of propleura. Rostrum long, stout, reaching onto mesosternum, segments 3-4 curved, tip pointing almost ventrally. Pronotum short (0.31), wide (0.82), anterior margin straight, posterior margin almost straight except curved laterally. Mesonotum long (1.13), broad across posterior part (1.43) separated from metanotum by distinct suture. Metanotum, abdominal tergites 1, 2 fused medially, indicated only by suture vestiges laterally. Tergites 1-4 of about of equal length (0.14), tergite 5 longer (0.17), tergite 6 shortest

(0.10), tergite 7 hidden in dorsal view; tergite 8 tumid, convex dorsally, long (0.56), broad (0.41); tergite 9 produced laterally into long, spine-like anterolaterally directed processes as shown in Figs. 2,6. Connexiva slightly raised, continuous along abdomen, without spines or processes. Metasternum relatively short, anterior margin weakly curved anteriorly, with large median scent gland opening anteriorly not raised. Posterior margin of sternite 7 almost straight. Antennae long, all segments of about equal thickness; without evident ventral pile; length of segments I-IV: 0.92: 0.56: 0.51: 0.56. Measurements of legs as follows: Femur, tibia, tarsal-1, tarsal-2 of fore-leg, 1.02: 0.87: 0.10: 0.51; of middle-leg, 2.46: 2.87: 0.82: 0.92; of hind-leg, 2.66: 0.97: 0.15: 0.31.

Length, mean 3.80 (N=4, min. 3.69, max. 3.94)

Width, mean 1.48 (N=4, min. 1.38, max. 1.54)

Apterous female. Coloration similar to male, but dorsum of mesonotum differently colored, i.e., broad median portion widening posteriorly and continuing posteriorly along connexiva, membranous, brown, wrinkled. Body more robust. Gonapophysis serrate.

Length, mean 3.73 (N=5, min. 3.64, max. 3.89)

Width, mean 1.53 (N=5, min. 1.43, max. 1.59)

Etymology. - The species name *carpentaria* refers to the place of origin, the Gulf of Carpenteria, Australia, where this species is apparently endemic on Groote Eylandt (= great island in Dutch).

Remarks. - *Stenobates carpentaria* is closest to *S. insularis*, but is distinguished by the diffuse color pattern and lack of distinctive dark markings on the head (see key), the very large light areas on the mesonotum, and the shorter anterior tarsi. These two species share the relatively short anteriorly arched metasternum (see the discussion under *S. australicus*), however in *carpentaria* the large scent gland opening is located close to the anterior margin and not raised (Fig. 6) whereas in *insularis* it is quite removed from the anterior margin, set on the posterior half of the metasternum, and strongly raised (Fig. 5). A habitus figure of this species was provided by Andersen (1982: 190, Fig. 366) as *Stenobates* sp.

Nothing is known regarding the habitat preferences of this species.

SUBFAMILY HALOBATINAE

The subfamily Halobatinae presently contains ten genera, most of them confined to fresh water. The nominate genus *Halobates* is marine, except for a single freshwater species, *H. acherontis* Polhemus, that was discovered on the Daly River of northern Australia (Polhemus, 1982). Within *Halobates* are five pelagic species that represent the only known insects to have successfully colonized the open ocean regions that cover three fourths of the earth's surface. All other *Halobates* species are confined to coastal regions and are often local endemics with rather restricted distributions as far as is known, although recent collections by J. T. and D. A. Polhemus have considerably expanded the known ranges of several such species. Taking into account the new species described below, and the synonymies noted herein and in Polhemus & Polhemus (in press; *H. eschscholtzi* Herring = *H. flaviventris* Eschscholtz) the number of species of *Halobates* now stands at 42. Three additional undescribed species from Sri Lanka and

Madagascar will be treated in a forthcoming paper, however, and we expect that *H. kudrini* Nasanov will eventually prove synonymous with *H. flaviventris* Eschscholtz.

***Halobates melleus* Linnauori**

Halobates melleus Linnauori, 1971: 360 (holotype, male, Mersa, Halaib, Red Sea, in Linnauori Coll., AMNH)

Halobates mangrovensis Schmidt & Müller, 1973: 6 (holotype, male, El Gharqana mangrove lagoon north of Nabq, Red Sea, repository unclear)

Remarks. - This is a new synonymy. One of us (JTP) has studied the type series of *melleus* and compared this species with the detailed description of *mangrovensis* (Schmidt & Müller, 1973), and there is no doubt that the two are synonymous. This species and the much larger, darker *H. hayanus* White are the only *Halobates* species known to occur in the Red Sea. Linnauori (1971) has provided comparative notes with other Indian Ocean species.

***Halobates calyptus* Herring**

Halobates calyptus Herring, 1961: 285 (holotype, male, Varadero Harbor, Mindoro Is., Philippines, USNM)

Halobates australiensis Malipatil, 1988: 157 (holotype, male, Wessel Is., Northern Territory, Australia, in Northern Territory Museum, Darwin)

Remarks. - This is a new synonymy. One of us (JTP) has studied the type series of *calyptus*, including the holotype male, as well as numerous other specimens, and compared this species to the excellent description of *australiensis* given by Malipatil (1988). There is no doubt that the two species are synonymous. Malipatil was apparently misled by Herring's (1961) key, wherein the use of the ratio of interocular space divided by eye width as illustrated in figure 109 will cause females (and often males) of many species to fall into the first group (couplets 2-6), containing the open ocean species and a few others, when in fact they belong in the second group (couplets 7-45). The use of figure 108 as a guide will not give the results published in Herring's species descriptions either. In order to get approximately the same results as published by Herring, and usable in his key, one must use the maximum eye width and maximum interocular space, necessitating two different measurements. In the descriptions given below we give the minimum interocular space and maximum eye width when discussing this ratio.

The problems experienced by Malipatil exemplify the difficulties facing workers who lack access to a good comparative collection. Malipatil's "*australiensis*" occurs at the southern edge of the presently known range of *calyptus*.

***Halobates princeps* White**

Halobates princeps White, 1883: 44, Pl. 1 (holotype female, Celebes Sea, BMNH)

Halobates ashmorensis Malipatil 1988: 158 (holotype male, Ashmore Reef, Western Australia, in Northern Territory Museum, Darwin)

Remarks. - This is a new synonymy. One of us (JTP) has studied the female holotype of *princeps*, as well as numerous other specimens from the Indo-Pacific region, and compared this species to Malipatil's (1988) excellent description of *ashmorensis*. Once again, there is no doubt that the two species are synonymous. Here too Malipatil was apparently misled by Herring's (1961) key (see discussion above under *calyptus*), wherein use of the ratio of interocular space divided by eye width as illustrated in figure 108 will cause the key to fail. For *princeps* Herring gives this ratio as 3.5 for both males and females in the descriptions. If figure 108 is followed, the ratio is about 3.65 for males and about 4.35 for females. If maximum interocular space is divided by maximum eye width, the ratio is about 2.75 for males and about 3.65 for females.

Malipatil's "*ashmorensis*" occurs at the southern edge of the presently known range of *princeps*.

***Halobates murphyi*, new species**
(Figs. 13-16)

Material examined. - Holotype - apterous male and allotype apterous female (BPBM), Morobe Province, Labu Lakes, Markham River estuary, Papua New Guinea, CL 1838, leg. J. T. & D. A. Polhemus, 20.ix.1983.

Paratypes - 35 apterous males, 29 apterous females, 24 nymphs (JTPC), same data as holotype. -- 9 apterous males, 12 apterous females (JTPC), East Sepik Prov., Wom Point Estuary, NW of Wewak, CL 1800, leg. J. T. & D. A. Polhemus, 11.ix.1983. -- 18 apterous males, 3 apterous females, 7 nymphs (BPBM), Louisiade Archipelago, Yela Is., Pembwa, sea level, leg. W. C. Gagne, 22.iii.1979. All localities in Papua New Guinea.

Description. - Apterous male - Ground color blackish grey; head with two orange brown wedge-shaped marks posteriorly on vertex, tips meeting medially at posterior margin to form a shallow V; mesothorax blushed with deep orange brown; acetabulae beneath, venter of abdomen, trochanters beneath at least distally, leucine tinged with fuscous. Legs, antennae black, embrowned beneath. Body without black hairs or spines, covered with usual closely appressed pile, dorsally with very short semi-erect setae. Second antennal segment with 4, third with 3 dorsal short black spines; anterior femur laterally with 7 black spines, 6 in a single row, length about half of the width of femur; most of middle tibia and first tarsal segment with swimming hairs typical of *Halobates*.

Length of head (0.67) slightly more than narrowest interocular space (0.61); width of eye 0.36; eyes extending posteriorly about 1/3 length of propleura. Rostrum short, reaching between anterior coxae. Pronotum short (0.61), wide (1.08), anterior margin slightly sinuate, posterior margin more so. Mesonotum fused with metanotum and abdominal tergites 1-3, but segments demarcated laterally by short sulci. Mesonotum length 1.69 (measured from posterior margins of sulci separating segments). Tergites 1-4 about of equal length (0.20), tergites 5-7 shorter, subequal (0.70-0.10), 8 hidden medially in dorsal view; tergite 9 expanded laterally terminating in digitate processes; male terminalia as shown in Figs. 13-16, slightly asymmetrical. Connexiva not raised, consisting of a long basal part along metanotum and tergites 1-3, shorter part along tergite 4. Posterior margin of sternite 7 shallowly arched anteriorly. Antennae long; segments III-IV slightly stouter; segment I distally, all of II-III, IV basally set ventrally with dense silvery pile; length of segments I-IV: 1.33; 0.51; 0.36; 0.51. Anterior femur thickened on

basal half, slightly flattened ventrally; anterior tibia widened distally as usual, with distal spur. Measurements of legs as follows: Femur, tibia, tarsal-1, tarsal-2 of fore-leg, 1.79: 1.38: 0.26: 0.51; of middle-leg, 5.58: 3.89: 1.59 (measured across curve): 0.56; of hind-leg, 4.86: 2.20: 0.26: 0.41.

Length, mean 4.54 (N=10, min. 4.40, max. 4.71)
Width, mean 1.67 (N=10, min. 1.64, max. 1.69)

Apterous female - Coloration as in male. Body more robust. Anterior femora not thickened, without spines. Mesonotum set with numerous erect black setae in specimens from the Labu Lakes and Wom Point Estuary localities, but these spines are absent in specimens from the Louisiade Archipelago. Middle and posterior acetabulae set with stout black spines.

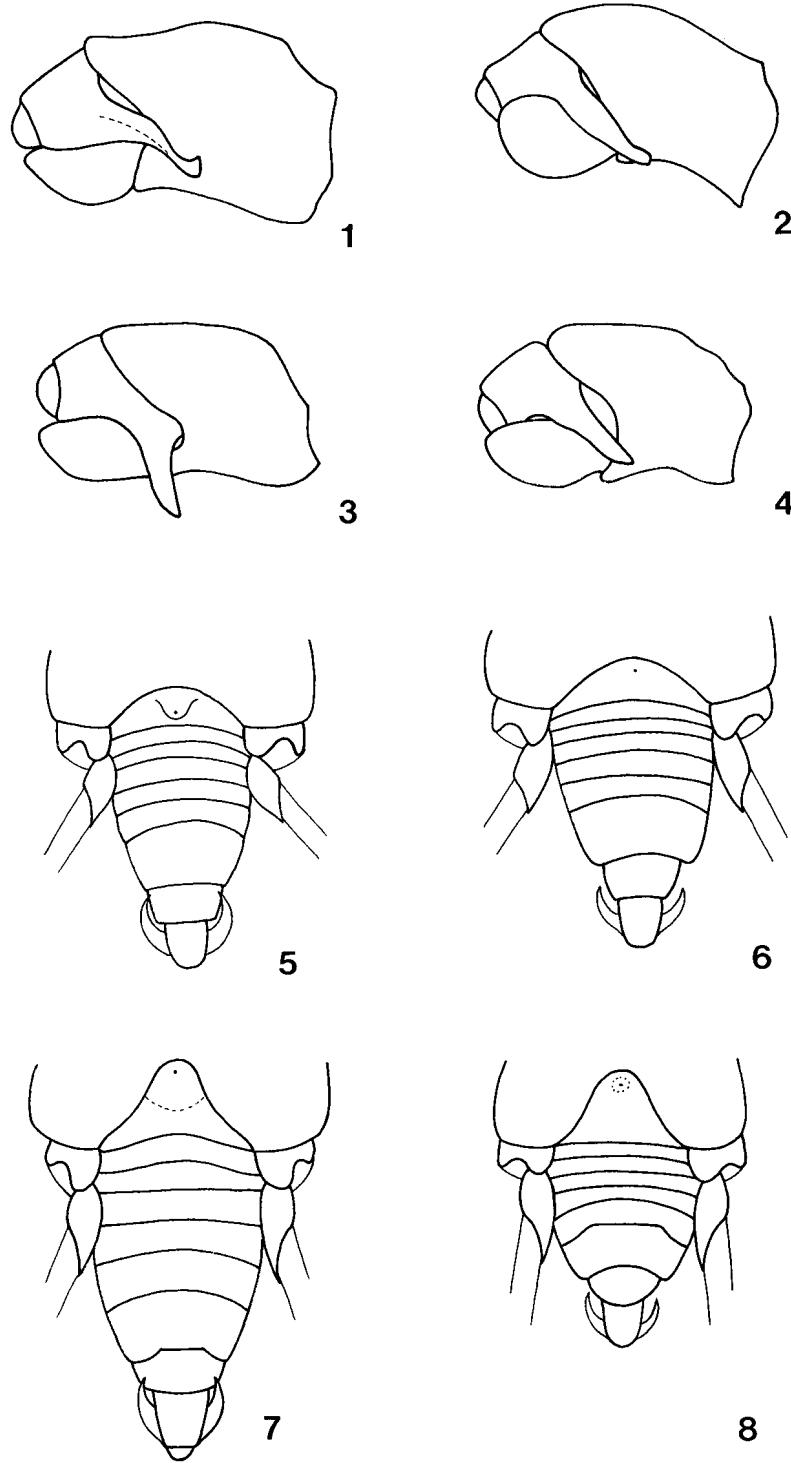
Length, mean 4.58 (N=10, min. 4.20, max. 4.76)
Width, mean 2.15 (N=10, min. 2.10, max. 2.20)

Etymology. - The patronym *murphyi* honors Assoc. Prof. D. H. "Paddy" Murphy in recognition of his significant contributions to marine entomology.

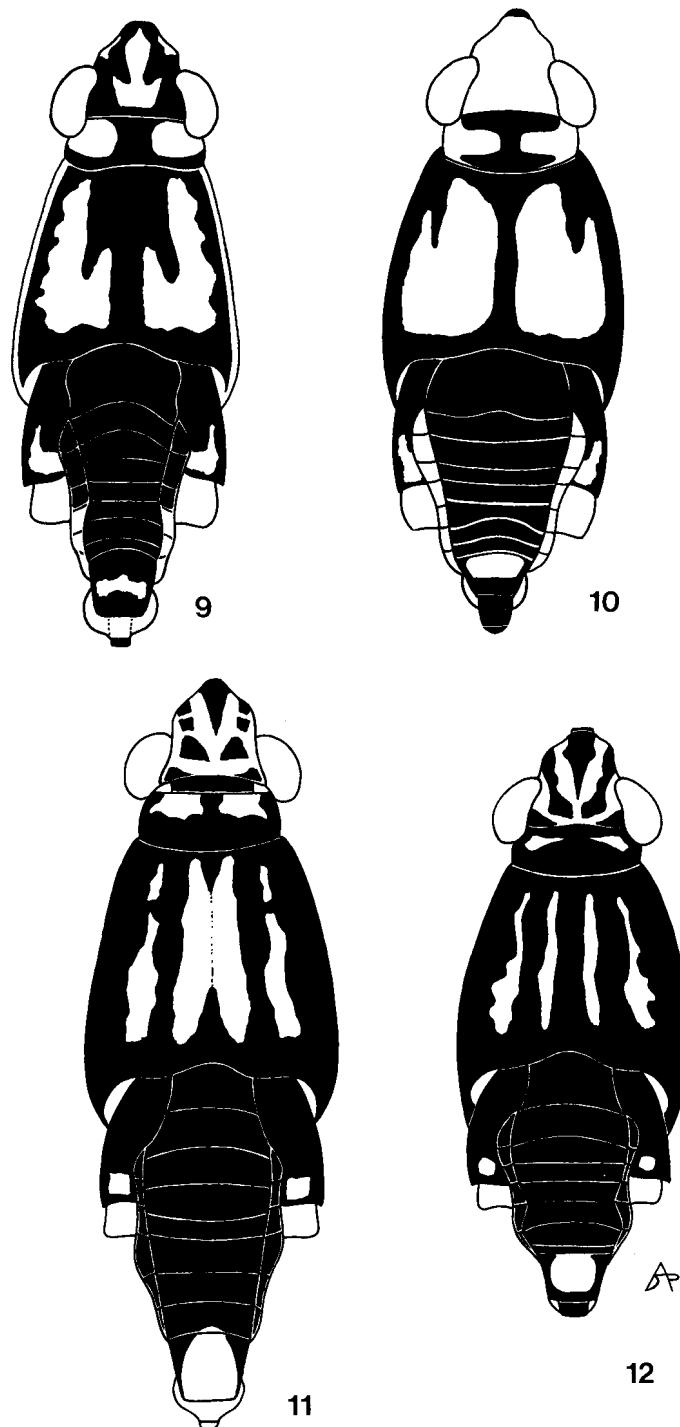
Remarks. - *Halobates murphyi* is distinguished by the long asymmetrical processes on the male terminalia; these are located on the shield shaped proctiger (terminology of Andersen, 1981; termed the suranal plate by Matsuda, 1960). Other distinguishing characters are: anterior tarsal segment 1 half the length of 2; female mesonotum often with numerous black bristles, that of male bare; fore-femur robust, set with stout spines. In Herring's monograph of *Halobates* (1961), *murphyi* keys to the couplet *bryani-poseidon* but does not match either of these species. If the head markings were more extensive it would key to *H. peronis* Herring, however the latter is a much smaller species with a quite different male fore femur, i.e. thickened over entire length except distal extreme. In overall appearance *murphyi* resembles *H. darwini* Herring, but the body is not as elongate and male tergum 9 is much shorter than in the latter species.

Halobates murphyi frequents the quiet open waters of mangrove-lined estuaries. At the two localities along the north coast of New Guinea it was taken in accompaniment with *Rheumatometroides browni* Hungerford and Matsuda, although the latter species is a much weaker swimmer and prefers to skate among the mangrove roots rather than in the open channels.

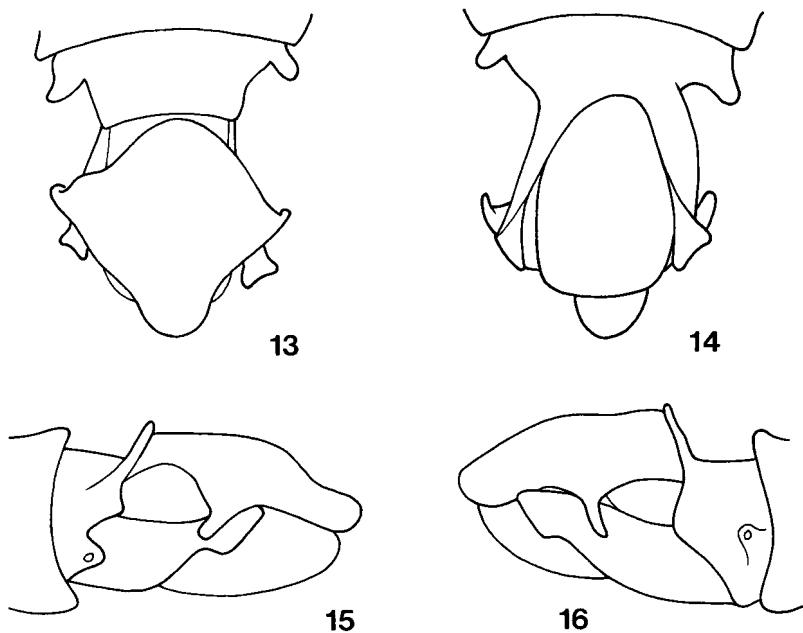
Acknowledgements. - We are indebted to the following for gifts, loans or permission to study specimens under their care: R. C. Froeschner (USNM); R. Linnavuori, Somersoja, Finland; W. R. Dolling (BMNH); T. Vasarhelyi, (HMNH). We are also grateful to N. M. Andersen (ZMUC) for useful information and the opportunity to study material loaned to him. Assoc. Prof. D. H. "Paddy" Murphy of the National University of Singapore, provided valuable information and field assistance in Singapore, particularly in locating populations of *Stenobates biroi*, and A. Allison of the Bishop Museum kindly provided logistical assistance through the Wau Ecology Institute during our stay in Papua New Guinea. Our expeditions to north Queensland, Papua New Guinea and the Malay Peninsula were funded in part by the National Geographic Society, Washington, D.C., to whom we are very grateful for their continuing support. This work was supported in part by National Science Foundation grant BSR-9020442.



Figs. 1-4. *Stenobates* species, male terminalia, lateral view. 1. *S. insularis* Polhemus & Cheng; 2. *S. carpentaria*, new species; 3. *S. biroi* Esaki; 4. *S. australicus*, new species. Figs. 5-8. *Stenobates* species, metasternum and abdomen, ventral view. 5. *S. insularis* Polhemus & Cheng; 6. *S. carpentaria*, new species; 7. *S. biroi* Esaki; 8. *S. australicus*, new species.



Figs. 9-12. *Stenobates* species, habitus, showing color patterns. 9. *S. insularis* Polhemus & Cheng; 10. *S. carpentaria*, new species; 11. *S. biroi* Esaki; 12. *S. australicus*, new species.



Figs. 13-16. *Halobates murphyi*, new species, male genitalia. 13. Dorsal view; 14. Ventral view; 15. Left lateral view; 16. Right lateral view.

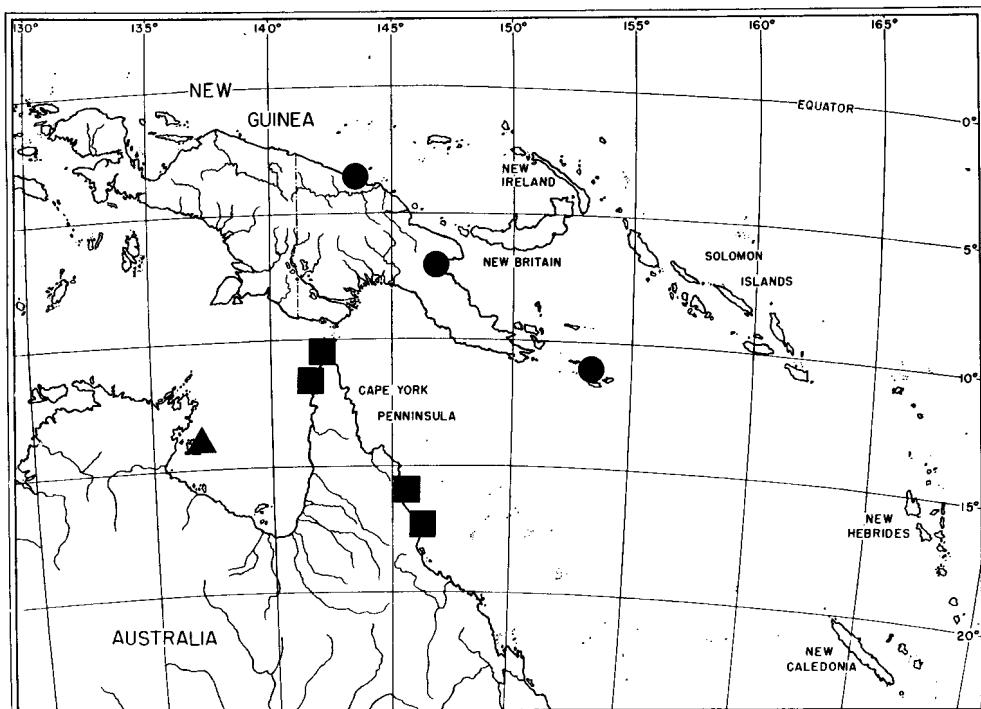


Fig. 17. Distributions of new species of marine Gerridae described herein. Circles = *Halobates murphyi*, new species; Squares = *Stenobates australicus*, new species; Triangles = *Stenobates carpentaria*, new species.

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