ABSTRACT. – A number of genera traditionally placed in the Varunidae or Varuninae have been reappraised and found to represent two new subfamilies. The Thalassograpsinae, for *Thalassograpsus harpax* Hilgendorf, 1892, has a number of unique apomorphies including the form of the frontal margin, maxillipeds, endostome, thoracic sternites, and the male abdomen with segments 5 and 6 functionally fused. The Gaeticinae is remarkable for having mouthparts and sternum highly modified for suspension feeding, and having male abdominal segments 3–6 fused. The subfamily includes the type genus *Gaetice* Gistel, 1848, and a new genus *Sestrostoma* split from the Varuninae genus *Acmaeopleura* Stimpson, 1858. *Gaetice americanus* Rathbun, 1923, does not belong to *Gaetice* as here redefined and is transferred to a new genus in the Varuninae.


INTRODUCTION

The higher phylogenetic relationships within the Grapsoidea have been the subject of much interest during recent years. A new family from the Americas, Glyptograpsidae, affiliated with the Varunidae, was recognised by Schubart et al. (2002). Davie (2002) removed the Plagusiinae to a separate family, the Plagusiidae, but he otherwise took the conservative approach of treating the Grapsinae, Sesarmae, Cyclograpsinae and Varuninae as subfamilies of the Grapsidae. It has nevertheless become increasingly clear over the intervening years, that the Grapsidae, Sesarmae and Varunidae must be recognised as families, with the Cyclograpsinae included as a subfamily of the Varuninae. This seems well supported on the basis of adult and larval morphology, and 16S mtDNA (see Schubart & Cuesta, 1998; Sternberg & Cumberlidge, 1998; Schubart et al., 2000, 2002, 2006; Karasawa & Kato, 2001; Kitaura et al., 2002; and Davie, 2002). Another significant change is the establishment of the Xenograpsidae N. K. Ng, Davie, Schubart & P. K. L Ng, 2007, for the aberrant *Xenograpsus* that inhabits hydrothermal-vents. Schubart et al. (2006) have more recently suggested that the superfamily groupings Grapsoidea and Ocypodoidea are not monophyletic in their current composition. We consider this still an open question as their trees may not be sufficiently resolved at higher taxonomic levels, and our own morphological work, aimed at understanding the phylogenetic relationships of the Grapsoidea, still supports its traditional superfamilial structure.

We examined all genera in the Varuninae and found that some genera showed significant patterns of divergence that cannot be accommodated within this subfamily. Two new subfamilies are thus established for these genera.

Specimens examined are deposited in the: Institute of Zoology, Academia Sinica, Taipei (IZAS); Muséum national d’Histoire Naturelle, Paris (MNHN); Museum Zoologicum Bogoriense, Bogor (MZB); Zoologisk Museum, Natural History, Basel (NMB); National Museum, Crustacean Collection, Manila (NMCR); National Museum of Natural History, Taichung (NMNS); National Science Museum, Tokyo (NSMT); National Taiwan Ocean University, Institute of Marine Biology, Keelung (NTOU); Queensland Museum, Brisbane (QM); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); Senckenberg Museum, Frankfurt (SMF); Taiwan Museum, Taipei (TMCD); Zoological Museum of Amsterdam, (ZMA); Zoological Museum, Berlin (ZMB); Zoological Reference Collection, Raffles Museum of
Biodiversity Research, National University of Singapore, Singapore (ZRC).

All measurements provided are of the carapace widths and lengths respectively. The abbreviations G1 and G2 are used for the male first and second gonopods respectively; cw = carapace width.

**TAXONOMY**

**VARUNIDAE** Alcock, 1900

**Thalassograpsinae**, new subfamily

*Type genus.* — *Thalassograpsus* Tweedie, 1950, by present designation.

*Diagnosis.* — Carapace glabrous, flat, regions moderately defined; anterolateral margins with 3 teeth including exorbital angle; posterior margin convex; no raised line on the branchial region defining posterolateral facet. Front deflexed; broad, less than half maximum carapace breadth; broadly bilobed, but with short distinct lateral sulcus adjacent to inner orbital edge, such that the frontal and supra-orbital margins are not continuous. Orbits open laterally; sub-orbital crest relatively straight, extending short distance across lateral branchial region, stri dulatory against inner edge of cheliped merus; pterygostomial grooves opening into anterolateral corner of buccal cavity; pterygostome non-setose, lacking vertical groove subparallel to buccal cavity. Third maxillipeds with subtriangular ischium, with a faint longitudinal sulcus; merus subquadrate without convex lateral margins; almost no gape when closed; exopod narrow. Epistome granular, medially prominent, very narrow. Chelipeds subequal, large in size. Ambulatory legs dorso-ventrally flattened; posterodistal border of propodus of walking legs with subapical spine. Thoracic sternites 3 and 4 flat, broad; sternite 3 lateral margins relatively straight; the suture of thoracic sternite 3/4 not visible (vs. slightly visible in all other subfamilies); and medial groove in thoracic sternites 7, 8 proportionately wider (with narrower medial groove in sternite 8 of other subfamilies).

**Thalassograpsus** Tweedie, 1950

*Brachynotus* Hilgendorf, 1892: 38 (part).


*Type species.* — *Brachynotus harpax* Hilgendorf, 1892, by monotypy; gender masculine.

*Diagnosis.* — Genus monotypic; characters are the same as for the new subfamily, Thalassograpsinae.

*Remarks.* — *Thalassograpsus* was established by Tweedie (1950) for *Brachynotus harpax* Hilgendorf, 1892, because it was clear that it differed from typical *Brachynotus* in many features: 1) the frontal and supra-orbital margins are not continuous (continuous in other varunine taxa); 2) the third maxillipeds meet completely in the middle line leaving no gape between them (a distinct rhomboidal gape in other varunine taxa); 3) there is no raised line on the branchial region defining a posterolateral facet (present in *Brachynotus* and other varunine taxa). In fact, there are many other significant character differences between these genera, and the resemblance to the typical varunine *Brachynotus* is at best, superficial.

**Thalassograpsus harpax** (Hilgendorf, 1892)

(Figs. 1, 2, 3)

*Brachynotus harpax* Hilgendorf, 1892: 38; Sakai, 1939: 675, Figs. 119a-c; Horikawa, 1940: 29; Lin, 1949: 29.


*Material examined.* — Types: Lectotype – 1 male (11.0 × 9.7 mm) (ZMB 8472), Fundorf, Aden, coll. Hildebrandt. Paratypes – 3 males (8.0–10.0 × 8.8–9.0 mm), 3 females (ovig.) (7.8–10.3 × 6.7–9.0 mm) (ZMB 8472), Fundorf, Aden, coll. Hildebrandt; 11 males (6.8–12.0 × 5.9–10.3 mm), 4 females (6.1–10.8 × 5.7–9.1 mm)
Red Sea). Habitat pebbles on sheltered rocky shores.

- **Size**
  - 1 male (11.3 x 9.8 mm) (MNHN-B12532), Red Sea, coll. 1897; 1 male (7.6 x 6.6 mm), 1 female (6.1 x 5.4 mm) (MNHN-B12535), Red Sea, coll. 1897; 1 male (9.4 x 8.1 mm) (MNHN-B12537), Red Sea, coll. 1897; 5 males (7.8–10.1 x 6.6–9.0 mm), 2 females (6.0–8.1 x 4.6–7.5 mm), 3 females (ovig.) (6.6–7.8 x 5.8–6.8 mm) (MNHN-B12533), Djibouti, D’Jousseaume, coll. 1897; 1 female (7.2 x 6.0 mm) (SMG-17272), Bbijoubi, Djibouti, Stadlogebrel, Triton beach, eulitoral, coll. F. Allspach, 18 Mar 1987.
  - Japan – female (8.2 x 7.3 mm), ovig. female (6.7 x 6.2 mm) (RU), Japan; 1 male (8.7 x 7.4 mm) (RU), Japan, coll. 28 May 1984; 1 male (10.9 x 9.3 mm) (RU), coll. 28 Jul.1985.
  - **Taiwan** – male (8.9 x 7.6 mm) (NMNS), Chi-Han, coll. 15 May 1994.
  - **Philippines** – 1 male (6.0 x 5.3 mm) (NMCR No. 531), University of Philippines collection; 5 males (4.7–10.7 x 3.0–9.5 mm), 1 female (8.8 x 7.5 mm), 1 female (ovig.) (9.0 x 8.0 mm) (NMNS), Cumming Island, Philippines, coll. H.T. Shih, 30 Aug 2003. **Singapore** – male, 12.3 mm cw (ZRC 19657922), Singapore, coll. R. Serène.

**Diagnosis.** Carapace subquadrate, with dorsal surface flat, front broad, anterior border concave medially, divided into four lobes. Dorsal orbital margin with suture. Ventral orbital margins with 3 long ridges. Third maxillipeds with merus quadrate, ischium broad, exopod narrow. Chelipeds stout, margins with 3 long ridges. Third maxillipeds with merus four lobes. Dorsal orbital margin with suture. Ventral orbital margin with suture lines still evident.  

**Colour.** Fresh specimens cream to light brown (H. T. Shih, pers. comm.). Preserved specimens are light brown.

**Size.** A relatively small species. Largest male specimen examined 11.3 x 9.8 mm (MNHN-B12532), largest female 9.0 x 8.0 mm (NMNS).

**Habitat.** Reported from under corals and stones, or among pebbles on sheltered rocky shores.

**Distribution.** Indo-West Pacific (China, Japan, Taiwan, Singapore, Indonesia, Samoa, Cocos (Keeling) Islands and Red Sea).

**Remarks.** Relatively uncommon despite its wide distribution. Nothing is known of its biology.

**GAETICINAE, new subfamily**

**Type genus.** Gaetice Gistel, 1848 (replacement name for Grapsus (Platynotus) De Haan, 1833); gender masculine.

**Included genera.** Gaetice Gistel, 1848, and Sestrostoma, new genus.

**Diagnosis.** Varunidae with orbit open laterally; sub-orbital crest straight, variable in length; striudatory pterygostomial grooves not opening into anterolateral corner of buccal cavity. Third maxillipeds leaving narrow gape when closed; without oblique setose crest on merus, ischium; reaching as far as epistome, completely closing buccal cavity anteriorly; ischiomeral articulation strongly, inwardly oblique (Gaetice) or normal (horizontal); exopod normal, not swollen or unusually enlarged; palp markedly elongated, armed with very long brush of setae used for suspension feeding reaching almost to abdomen when folded. Sternal plastron with relatively deep longitudinal sulcus anterior to abdomen, into which setal brush of third maxillipeds is folded for protection. Epistome smooth, relatively prominent medially. Male abdomen with segments 3–6 functionally fused although suture lines still evident.

**Remarks.** The most striking apomorphy of the new subfamily Gaeticinae is the modified third maxillipeds having elongated palps each bearing a long setal brush that lies, at rest, in a corresponding longitudinal, anterior sternal sulcus. These mouthparts are used for suspension feeding. Suspension feeding amongst the Brachyura has been previously reported for *Gaetice depressa* by Depledge (1989), but the phylogenetic significance of this has not been previously emphasised. The only other reference to a crab using suspension feeding that we are aware of is Harminto & Ng (1991), who noted such behaviour in a camptandriid crab (*Baruna*), but in a different way from gaeticine crabs. Suspension feeding is common in porcellanid crabs (Robinson & Tully, 2000; Valdivia & Stotz, 2006).

The other important character of the Gaeticinae is the effective fusion of the male abdominal segments 3–6, even though the suture lines are still evident.

In reviewing the varunine genus *Acmaeopleura* Stimpson, 1858 (considered to consist of five species viz. A. parvula Stimpson, 1858; A. rotunda Rathbun, 1909; A. balssi Shen, 1932; A. depressa Sakai, 1965, and A. toriumii Takeda, 1971), we realised that A. balssi, A. depressa and A. toriumii have third maxillipeds strongly modified for suspension feeding, as well as a medial sulcus on the anterior sternal plates. A new genus was needed to accommodate these two species, here named *Sestrostoma*. On this basis, the affinities of *Sestrostoma* thus appeared to be with *Gaetice* in the Gaeticinae. *Sestrostoma* and *Gaetice* species are dramatically different from each other in carapace morphology, and the
likelihood of a close relationship seems difficult to accept initially. Nevertheless, the two genera share three important apomorphies: 1) the palp of the third maxillipeds carries long setae clearly used for suspension feeding; 2) the anterior segments of the sternum have a longitudinal sulcus, into which the maxilliped setae extend; 3) the male abdomen has segments 3–6 fused and immovable. This set of characters is unique among grapsoid crabs, and strongly points to a monophyletic lineage.

There is strong evidence that all the Sestrostoma species live as symbionts in the burrows of thalassinidean shrimps or other burrowing invertebrates such as large polychaetes and perhaps echiurids. Davie (1992) and Sakai (2000) have reported the probable association of S. toriumii with the large mud-shrimps Upogebia major and U. yokoyai, which has been confirmed by recent work by Itani (2002, 2004). Sakai (1976) reported S. balassi as “found associated with annelids”. Itani (pers. com.) has found S. depressum in the burrows of thalassinideans. Given that Sestrostoma species live in burrows of invertebrates, this would result in several morphological adaptations such as the loss of anterolateral teeth, the presence of small, slender and unarmed legs, and a smooth, glabrous rounded carapace. Thus a symbiotic in contrast to a free-living habit can help explain the dramatic differences in carapace morphology between Gaetice and Sestrostoma species.

**Key to genera of Gaeticinae**

1. Carapace distinctly quadrangular; dorsal surface glabrous, flat. Third maxillipede suture line between merus and ischium oblique ...................................................... **Gaetice Gistel, 1848**
   - Carapace distinctly rounded; dorsal surface punctate, convex. Third maxillipede suture line between merus and ischium straight ...................................................... **Sestrostoma, new genus**

**Gaetice Gistel, 1848**

Grapsus (Platynotus) De Haan, 1833: 63 (type species Grapsus (Platynotus) depressus De Haan, 1835, by monotypy; gender masculine; preoccupied name).


Platygrapsus Stimpson, 1858: 107; 1907: 128.

**Type species.** – Grapsus (Platynotus) depressus De Haan, 1833.

**Diagnosis.** – Carapace quadrangular, broader than long; dorsal surface glabrous, punctate; regions well defined, flat.

---

Fig. 2. *Thalassograpsus harpax* (Hilgendorf, 1882). Male, 12.3 mm cw, Singapore, coll. R. Serène, ZRC 1965.7922: A, Frontal view; B, large male chela; C, third maxillipeds and pterygostome; D, male abdomen and sternum.
Fig. 3. *Thalassograpsus harpax* (Hilgendorf, 1882). Male, 10.0 × 9.0 mm; female, 10.3 × 9.0 mm (ZMB 8472): A, carapace; B, third maxilliped; C, male abdomen; D, female abdomen (part); E, chela; F, last ambulatory leg; G, G1; H, distal end of G1; I, female gonopore. Scale bars =1.0 mm.

Remarks. – *Gaetice americanus* Rathbun, 1923, clearly does not belong to *Gaetice* because it does not have the mouthpart and sternal modifications for suspension feeding that are characteristic of true *Gaetice* species. It is here transferred to a new genus in the Varuninae (see below). *Gaetice* thus includes only two known species, *G. depressus* De Haan, 1833, and *G. ungulatus* Sakai, 1939.

Key to species of *Gaetice*

1. Carapace subquadrate; frontal margin strongly lobed; infraorbital ridge with numerous small, round granules. Propodus of last ambulatory leg short, broad. ……………. *G. depressus* (De Haan, 1833) (Figs. 4–6)

   *Grapsus (Platynotus) depressus* De Haan, 1833: 63, Pl. 8 Fig. 2; *Platynotus convexiusculus* Stimpson, 1858: 104; 1907: 128, Pl. 17 Fig. 3. *Gaetice depressus* – Jeng et al., 1994: 98; Yu et al., 1996: 15; Ieng et al., 1996: 100; Jeng, 1997: 18; Jeng et al., 1998: 123 (wrong spelling).

   *Gaetice depressus* – Balss, 1922: 50; Maki & Tsuchiyia, 1923: 100; Urita, 1926: 25; Gordon, 1931: 528; Shen, 1932: 180, text-fig. 114–116, Pl. 7 Fig. 4; Sakai, 1934: 323; 1935: 230, Pls. 61 Fig. 3; 1939: 677, Pl. 47: 3; Sato, 1936a: 1951; 1936b: 137; Horikawa, 1940: 29; Kamita 1941: 209, text-fig. 116; Lin, 1949: 29; Kim, 1973: 477; text-fig. 211, Pl. 43 Fig. 162; Miyake, 1983: 176; Dai et al., 1986: 482, Fig. 270: 3–4, Pl. 68: 1; Fukui et al., 1989: 229; Dai & Yang, 1991: 528, Fig. 270: 3–4, Pl. 68: 1; Shih et al., 1991: 142; Yamaguchi & Baba, 1993: 470, Fig. 179; Huang, 1994: 597; Hsu, 1996: 35; Wang & Liu, 1996a: 113, Figs. 144, 145; Wang & Liu, 1996b: 86; Jeng et al., 1997: 100; Jeng et al., 1998: 59; Ng et al., 2001: 44.

Material examined. – Types: Lectotype – male (25.6 × 21.3 mm) (RMNH-1226), Japan, coll. P. F. von Siebold, 1823–1829 (det. Yamaguchi & Baba, 1993), Paralectotype – 1 female (12.1 × 10.0 mm) (RMNH-1227), Japan, coll. P. F. von Siebold, 1823–1829; 4 specimens mounted on board (RMNH-D-42279, dry), Japan, coll. P. F. von Siebold, 1823–1829. Other material. Japan – 10 males (6.8–17.3 × 6.0–14.9 mm), 6 females (9.3–11.7 × 8.5–9.8 mm), 3 ovig. females (10.1–17.7 × 8.6–14.5 mm) (RMNH-B-12090), Tokyo area, Japan, coll. Harmand, 1906. 1 male (17.0 × 14.2 mm) (QM), Sakada, Shirihama, Wakayama Prefecture, Japan, coll. Y. Fukui, 6 Aug.1996; 9 males (13.5–22.2 × 11.8–19.2 mm), 1 female (20.0 × 17.8 mm), 5 ovig. females (13.6–21.4 × 12.0–17.5 mm) (RMNH-D-1225), Amoy, coll. G. Schlegel, no collection date; 2 males (10.3–20.0 × 8.9–17.2 mm), 3 females (10.0–15.8 × 9.3–12.3 mm) (RMNH-D-12461), Shirihama, Wakayama Prefecture, Japan, coll. S. M. Shino, 7 Aug.1958; 1 male (21.2 × 17.9 mm), 1 ovig. female (16.0 × 13.3 mm) (RMNH-D-25135), Sagami Bay, Kanagawa Prefecture, coll. H. Suzuki, 10 Sep.1968; 13 males (17.9–24.7 × 15.4–21.2 mm), 1 female (20.6 × 16.8 mm), 1 ovig. female (16.2 × 13.3 mm) (RMNH-D-41894), Matsushima, Amakusa, Kyushu, Japan, coll. T. Yamaguchi, 4 Sep.1985; 3 males (12.7–15.2 × 11.1–12.8 mm) (RUNCatalogued), river mouth of Okukubi River, Okinawa Island, Ryukyu, Japan, 27 Jun.1987; 1 male (30.4 × 27.0 mm) (SMF-7655), Sagami Bay, Japan, coll. T. Sakai; 4 males (6.0–15.2 × 4.8–12.9 mm), 1 female (13.5 × 11.2 mm) (SMF-7685), Ishigaki Island, Okinawa, Japan, coll. T. Sakai; 1 male (16.0 × 13.5 mm) (USNM 60247), Hokkaido Imperial University, Wakayama Prefecture, Honshu, Japan, coll. M. Sasaki, 1925; 2 males (12.0–15.3 × 10.0–12.8 mm), 1 female (13.0 × 11.8 mm) (ZMA-de-24040), Tokyo, Japan, coll. Harmand, 1906. South Korea – 5 males (11.0–27.3 × 9.5–22.6 mm), 1 ovig. female (20. × 16.9 mm) (ZRC), rocky tidal pools, Seong San Beach, Cheju Island, South Korea, coll. N. K. Ng & J. C. Y. Lai, 28 Aug.2002. China – 11 males (8.9–20.9 × 7.2–17.8 mm), 9 females (10.0–17.0 × 8.0–15.2 mm), 3 ovig. females (12.3–12.8 × 10.0–10.3 mm) (RMNH-D-12089), Amoy, coll. C. F. Wang, Jul.1925; 1 male (11.3 × 9.9 mm), 6 females (8.9–13.3 × 7.0–10.9 mm) (RMNH-B-12091), Tonkin, coll. 1897; 11 specimens mounted on board (RMNH-D-45218, dry), Amoy, coll. 1859–1862, coll. G. Schleid; 8 males (16.2–24.3 × 15.7–20.4 mm), 8 females

Fig. 5. *Gaetice depressus*(de Haan, 1833), male, $18.3 \times 15.3$ mm; female, $13.6 \times 10.0$ mm (NTOU): A, carapace; B, third maxilliped; C, male abdomen; D, female abdomen (part); E, outer surface of chela; F, inner surface of chela; G, last ambulatory leg; H, male sternum. Scale bars =1.0 mm.
Davie & Ng: Two new subfamilies and two new genera of the Varunidae

(11.4–20.5 × 9.6–17.3 mm) (SMF-22115), Shilao, Qingdao, Shandong Province, coll. M. Turkay, 16 Apr. 1992; 1 male (22.2 × 18.5 mm) 1 female (11.5 × 10.0 mm) (USNM 64952), Amoy, coll. C. J. Shen, Nov. 1928; 4 males (10.5–17.0 × 9.1–14.5 mm) 8 females (9.0–15.5 × 7.8–13.0 mm) (ZRC), seashore along road from Changpo to Huenan, Hainan Island, coll. N. K. Ng & Y. Cai, 1 Dec. 1998; 10 males (14.5–21.3 × 12.3–17.5 mm), 2 females (13.3–16.0 × 1.17–13.3 mm) (ZRC), Bainau Beach, Nan’ao Island, Guangdong Province, coll. Y. Cai & N. K. Ng, 13 Nov. 1998.

**Hong Kong** – 1 males (12.1–22.5 × 10.0–18.8 mm), 3 females (12.3–15.3 × 10.3–12.8 mm) (ZRC 1998.1023), inner Tolo Harbour, Wu Kwai Sha, New Territories, Hong Kong, coll. P. K. L. Ng & S. Y. Lee, 6 Jun. 1996; 10 males (14.2–21.9 × 10.3–18.3 mm), 4 females (10.5–17.2 × 8.8–14.1 mm), 1 ovig. female (14.5 × 11.9 mm) (SMF-12042), Hong Kong, coll. Galathea Expedition, no collection date; 1 male (12.0 × 10.7 mm) (MNHN-B-9133), Hong Kong.

**Taiwan** – 3 males (15.4–19.6 × 12.3–16.0 mm), 1 female (16.6 × 14.0 mm) (ASIZ-71687), He-Mei, Taiwan, coll. M. S. Jeng, 4 Nov. 1997; 3 males (16.7–20.4 × 13.7–17.4 mm) (TMCD), Ao-Di, Taiwan, coll. H. C. Liu, 6 Jun. 1971; 21 males (7.3–17.2 × 6.2–14.5 mm), 10 females (7.5–13.5 × 6.0–11.5 mm) (NTOU), Peng-Hu islands, coll. 11 Oct. 1984; 20 males (15.7–24.4 × 13.7–21.0 mm) (TMCD-2335), Jin-Cheng, Jin-Men Islands, Taiwan, coll. L. R. Dong, 29 Jan. 1988.

**Diagnosis.** Carapace subquadrate, broadening anteriorly, dorsal surface flat, smooth; frontal margin strongly lobed. Anterolateral margin with 3 teeth including orbital tooth. Third maxilliped with oblique suture between merus/ischium. Medial sulcus on anterior sternal plates narrow. Intraorbital ridge with numerous small, round granules. Chelipeds symmetrical, occasionally unequal, larger in male, large gape between fingers of adult males, usually with one or two large teeth near base of moveable finger. Propodus of last ambulatory legs short, broad.

**Colour.** Highly variable, ranging from light cream to dark brown, with dark brown and/or black spots (unpublished data).

**Size.** Largest male specimen examined 25.6 × 21.3 mm (lectotype), largest female 20.1 × 16.6 mm (USNM 62867).

**Habitat.** Found under small rocks, on coral-sand substrate close to the river mouth. They sometimes stack on top of each other in large numbers. Actively suspension feed while covered by high tide.

**Remarks.** This species can be easily distinguished from *G. ungulatus* by the following: 1) the lateral lobes of the frontal margin are very distinct (not distinct in *G. ungulatus*); 2) the infraorbital ridge has numerous (usually more than 12) small, isomorphic granules (usually less than 8 larger granules in *G. ungulatus*); 3) the anterolateral angle of the merus of the third maxillipeds is very convex (less convex in *G. ungulatus*); 4) the propodus of the last ambulatory leg is broad and short (long and narrow in *G. ungulatus*); 5) the sixth abdominal segment is broad and stout (long and narrow in *G. ungulatus*), 6) the male telson is broadly triangular (more elongated in *G. ungulatus*).

**Gaeticus ungulatus** Sakai, 1939

**Gaeticus ungulatus** Sakai, 1939: 678, Fig. 120a–e; Sakai, 1976: 653, text-fig. 358a–c.

**Material examined.** – **Japan** – 5 males (10.7–15.3 × 9.7–13.1 mm), 1 female (10.0 × 9.3 mm), 3 ovig. females (10.8–12.6 × 9.2–10. mm) (QM), Uchinoura, Tanabe, Wakayama Prefecture, Japan, coll. Y. Fukui, 7 Aug. 1996; 4 males (10.7–15.3 × 9.7–13.1 mm) (QM), Uchinoura, Tanabe, Wakayama Prefecture, Japan, coll. Y. Fukui, 7 Aug. 1996; 1 juvenile specimen (RU), Yawadi, Japan, coll. 4 May 1985; 1 female (18.7 × 14.9 mm) (USNM 48350), Beach at Kagoshima, Japan (under stones), coll. T. Urita.

**China** – 26 males (10.5–23.8 × 8.0–19.4 mm), 3 females (11.1–16.4 × 9.8–13.8 mm), 7 ovig. females (13.0–17.5 × 11.9–14.9 mm) (ASIZ-C00203), Jiaopo, Guangdong Province, coll. 27 Jun. 1957; 45 males (6.0–20.0 × 5.5–17.0 mm), 12 females (6.0–18.1 × 4.9–14.9 mm), 3 ovig. females (11.1–16.4 × 9.8–13.8 mm) (ASIZ-C02541), Haimen, Guangdong Province, coll. 10 Aug. 1957; 24 males (12.4–24.0 × 10.7–20.1 mm), 2 females (12.5–20.3 × 10.8–16.2 mm), 8 ovig. females (9.0–19.0 × 7.7–16.0 mm), (ASIZ-C00198), Puqian, Hainan Island, coll. 17 May 1957; 5 males (9.2–13.4 × 8.0–12.3 mm), 2 females (16.1–17.5 × 13.0–15.2 mm), 5 ovig. females (8.0–11.8 × 6.9–9.8 mm) (ASIZ-C00206), Beihai, Guangxi Province, coll. 19 Apr. 1956; 11 males (7.9–10.1 × 7.0–10.1 mm), 3 females (8.4–10.5 × 7.0–9.0 mm) (ZRC-uncatalogued/mk0194), seashore outside Institute of Oceanology, Qingdao, Shandong Province, coll. P. K. L. Ng & H. L. Chen, 22 Aug. 2002.

**Hong Kong** – 7 males (7.8–15.6 × 8.0–12.3 mm), 2 females (8.5–12.7 × 7.2–10.5 mm) (ASIZ-C00216), Hong Kong; 1 male (9.3 × 8.5 mm) (MNHN-B-9139), Hong Kong; 1 male (14.0 × 12.0 mm) (USNM 19674), Hong Kong.

**Taiwan** – 1 male (16.9 × 14.1 mm), (NTOU), Tong-Lei, Coll. 17 Aug. 2000; 1 male (16.6 × 14.2 mm) (NMNS), Ma-Gang Fish port, coll. 11 Aug. 1995.

**Diagnosis.** Carapace subquadrate, broadening anteriorly, dorsal surface flat, smooth; frontal margin weakly lobed. Anterolateral margin with 3 teeth, including orbital tooth. Third maxilliped with oblique suture between merus/ischium. Medial sulcus on anterior sternal plates broad. Intraorbital ridge with very few large, round granules. Chelipeds symmetrical, occasionally unequal, larger in male, fingers close with wide gape, usually with one or two large teeth near base of moveable finger. Propodus of last ambulatory legs long, narrow.

**Distribution.** – Japan, Korea, China and Taiwan.
THE RAFFLES BULLETIN OF ZOOLOGY 2007

Colour. – Similar to G. depressa, ranging from light cream to dark brown, with dark brown and/or black spots (Y. Nakasone, pers. comm.).

Size. – Largest male examined 24.0 × 20.1 mm (ASIZ-C-00198), largest female 20.3 × 16.2 mm (ASIZ-C-00198).

Habitat. – Found under small rocks, on coral-sand substrate close to river mouths. They can stack on top of each other in large numbers (pers. observ.; Y. Nakasone, pers. comm.).

Distribution. – China, Taiwan and southern Japan.

Remarks. – Differences with Gaetice depressus are discussed under that species. This species is less common. The type material is not in Kanagawa Prefecture Natural History Museum, National Science Museum, Tokyo, or Research Institute and Natural History Museum, Senkenberg, so it can probably be assumed to be lost though this is not certain. As G. depressus is currently easily recognised from the description, no neotype designation is required (see Article 75.1 of the International Code of Zoological Nomenclature (1999) which states that a neotype is not to be erected unless “… an author considers that a name-bearing type is necessary to define the nominal taxon objectively.”). If in the future a new species is discovered that can be potentially confused with G. depressus, it will then be necessary to erect a neotype.

Sestrostoma new genus

Type species. – Acmaeopleura balssi Shen, 1932, by present designation.

Diagnosis. – Carapace rounded, elliptical, longer than broad; dorsal surface glabrous, regions not well defined, convex or depressed. Frontal margin slightly convex, bilobed. Anterolateral margin subcristerate without teeth. Posterolateral margins not clearly demarcated from anterolateral margin. Orbits small, eyes completely filling orbit, Third maxillipeds do not close the buccal cavity; tips of cheliped fingers typically meet, or cross only slightly; smaller species (to ca. 7 mm cw) ……………………….. S. balssi

1. Ambulatory legs long, slender; posterolateral epimera visible in dorsal view; carapace with dorsal surface depressed, obviously punctate and minutely granular; margin strongly emarginated; anterior margin of meri of walking legs cristate …………………

2. Male suborbital crest consisting of two elongate crests and one tubercle; third maxillipeds do not close the buccal cavity completely; tips of cheliped fingers obviously cross apically; larger species (to ca. 17 mm cw) ……………………….. S. depressum

3. Male suborbital crest consisting of nine tubercles; third maxillipeds completely close the buccal cavity; tips of cheliped fingers typically meet, or cross only slightly; smaller species (to ca. 7 mm cw) ……………………….. S. toriumii

Sestrostoma balssi (Shen, 1932), new combination (Figs. 7, 8)

Acmaeopleura balssi Shen, 1932: 155, text-fgs. 98–101, Pl. 6, Fig. 1–2; 1948: 114, text-fig. 5; Shen & Dai, 1964: 125; Sakai, 1965: 197, text-fig. 26b; Sakai, 1976: 643, Pl. 220 Fig. 1; Kim, 1973: 463, text-fig. 200, Pl. 92 Fig. 153; Dai et al., 1986: 472, text-fig. 265, Pl. 66 Fig. 5; Dai & Yang, 1991: 518, text-fig. 265, Figs. 2–3, Pl. 66 Fig. 5; Takeda & Miyachori, 1992: 149; Itami, 2002: 129; Itami et al., 2002: 43; Itami, 2004: 33; Itami et al., 2005: 1.


Material examined. – Japan – 1 male (13.2 × 9.6 mm), 1 female (10.3 × 8.0 mm) (NSMT-Cr-11327), Sagamii Bay, Japan, coll. H. Ikeda, no collection date; 1 female (6.1 × 4.5 mm) (SMF spec., dry), Marayama, Japan, coll. 18 Dec.1952, no collection date; 1 specimen (SMF spec., dry), Hiroshima, Japan, collected with Upogebia, coll. 1958; 1 male, 1 female in pieces (SMF; dried), Hiroshima, Japan, collected in Upogebia tunnels, coll. 17 Oct.1958; 1 male stuck to bottle (SMF; dried), Japan, coll. 1 Aug.1932; 1 male (16.9 × 13.4 mm) (SMF ex T. Sakai collection), Fushiki, Toyama, Japan, no collection date; 1 dried specimen stuck to bottle (SMF, ex T. Sakai collection), Hiroshima, in Upogebia tunnel, coll. 1958. China – 1 male (IZAS) (cracked carapace), Yantai, Shangdong Province, China, coll. 1 Feb.1948.

Diagnosis. – Carapace transversely ovate, approx. 1.1–1.3 times wider than long, dorsal surface convex, punctate, regions not defined. Frontal margin with moderate medial concavity. Lateral margins slightly emarginate, unarmed. Male suborbital crest consisting of 2 elongated crests and one tubercle. Epimera visible posterolaterally in dorsal view. Third maxilliped broad, leaving a narrow gape when closed;
Davie & Ng: Two new subfamilies and two new genera of the Varunidae

setae of palp very long, extending beyond first sternal segment. Cheliped symmetrical, large, glabrous, finger shorter than palm; tips of cheliped fingers obviously cross apically. Ambulatory legs long, slender, sparingly setose. G1 long, slender, chitinous process at apex. Female gonopore operculate, circular in shape. Large species reaching approximately 17 mm cw.

Colour. – Colour in life typically light buff; specimens from Sone-higata tidal flat in Japan, with red or brown spots (Itani et al., 2002).

Size. – The largest male specimen examined was 16.9 x 13.4 mm (SMF, ex T. Sakai collection), largest female 10.3 x 8.0 mm (NSMT-Cr-11327).

Habitat. – This species is not easily collected. While it has been reported to be found in burrows of annelids, echiurans and possibly thalassinideans, none of these associations have been definitely confirmed (Sakai, 1976; Itani et al., 2002).

Distribution. – Japan, China and Taiwan.

Remarks. – The type specimen of *S. balssi* (Shen, 1932) is believed to be lost. However, the following institutions were contacted, but none could find a type: The Institute of Zoology, The Chinese Academy of Sciences, Beijing (G. Chen, pers. comm.); Beijing Natural History Museum (S. Yang, pers. comm.); Institute of Oceanography, The Chinese Academy of Sciences, Qingdao (R. Liu, H. Chen, pers. comm.) and the Museum of Natural History, London (P. F. Clark, pers. comm.). The type locality is Shangdong Province in northeastern China. Several attempts to collect a fresh specimen from China with the intention of erecting a neotype were unsuccessful. With the redescription of Itani et al. (2002), the identity of the species seems clear for the moment, and a neotype is thus probably not necessary. If future collections were to cast doubt on the Japanese and Chinese specimens being conspecific then a neotype should be established.

Itani et al. (2002) commented that “Japanese specimens are readily assigned to *Acmaeopleura balssi* by the form of the male sub-orbital crest. The only notable difference from Chinese specimens, as described by Shen (1932, 1948) and Dai & Yang (1981), is in the presence of dense setae in the gape of the cheliped.” Shen (1932, 1948) did not mention the presence or absence of setae, but the figure in Shen (1932) shows that there are short sparse setae in the gape. Otherwise, the exact conformity of the Japanese specimens with those from China in the shape of the carapace, male suborbital crest, third maxilliped, and ambulatory legs, suggests that the presence of setae in the chela gape may be simply due to infraspecific geographic variation.

Itani et al. (2002) listed numerous major characters by which *S. balssi* can be separated from its closest relative, *S. toriumii*. *Sestrostoma balssi* has a narrower fronto-orbital width than *S. toriumii*; the male suborbital crest has two elongated crests and one tubercle in *S. balssi*, while there are nine tubercles in *S. toriumii*; the tip of the cheliped dactylus more curved inwardly in *S. balssi* so that the cheliped fingers clearly cross apically, whereas the tips of the fingers typically meet or cross only slightly at the very tip in *S. toriumii*; the chitinous cusps at the tips of the cheliped fingers are smaller in *S. balssi*. The third maxillipeds do not completely close the buccal cavity in *S. balssi* whereas they do in *S. toriumii*. In *S. balssi* the dactylus of the third maxilliped is longer, the inner-distal projection of the merus less conspicuous, and the inner-proximal projection of ischium also less conspicuous than in *S. toriumii*. *Sestrostoma balssi* has a larger chitinous process at the tip of the male first gonopod, and the setae on the outer margin are denser than in *S. toriumii*.

Adult size differs greatly between the two species, with *S. balssi* reaching as large as 17 mm carapace width, while *S. toriumii* is a smaller species with the largest specimens attaining a maximum carapace width of about 8 mm. *Sestrostoma depressum* is similarly, a small-sized species, reaching to about 7 and 6 mm in maximum carapace width.

![Fig. 7. Sestrostoma balssi (Shen, 1932), male (16.2 mm cw), NSMT-Cr 11261: A, frontal region in dorsal view; B, frontal view showing orbit and pterygostome; C, left third maxilliped, showing elongated palp with very long setae; D, anterior sternum showing anterior medial sulcus; E, frontal view of orbit and pterygostome. (After Itani et al., 2002).](image-url)
**Sestrostoma depressum** (Sakai, 1965), new combination

_Acmaeopleura balssi_ – Sakai, 1939: 663, text-fig. 116.
_Acmaeopleura depressa_ Sakai, 1965: 191, Pl. 91 Fig. 4, text-fig. 26a; 1976: 643, text-fig. 352; Itani, 2004: 33; Itani et al., 2005: 1.

**Materials examined.** – Syntype, 1 female (5.5 × 4.5 mm) (SMF 24720, ex T. Sakai collection), Japan, coll. K. Sakai, no collection date.

**Diagnosis.** – Carapace ovate, approx. 1.3 times wider than long; dorsal surface depressed, clearly evenly punctate, microscopically granulated; regions not defined. Frontal margin finely granular; almost straight, not medially emarginated; breadth much less than one-third of carapace. Lateral margins unarmed but markedly emarginate; epimera not visible posterolaterally in dorsal view. Ambulatory legs short, relatively robust; meri cristate along anterior border.

**Colour.** – This species has been illustrated in colour by Sakai (1965: Pl. 91 Fig. 4), being apparently a relatively uniform pale brown to buff; the dry female examined was cream.

**Size.** – The largest specimen recorded is a female syntype (7.2 × 6.0 mm) (see Sakai 1965: 196).

**Habitat.** – Originally recorded from “among pebbles in upper tidal zone, and littoral zone of rocky beach” (Sakai, 1965). It is believed to be associated with upogebiids and callianassids (Itani, 2004; Itani et al., 2004).

**Remarks.** – This species was originally described from four females from Arasaki, Tenjinjima and Manazura, Japan, without a holotype being designated. Therefore all must be considered syntypes. The only syntype we have examined is in SMF. It is unfortunately dry, and the information on its exact locality in Japan is no longer preserved with the specimen so we refrain from designating this specimen as the lectotype. Apparently no specimen of this species was donated to the Kanagawa Prefectural Museum of Natural History by Tune Sakai (see Muraoka, 1998). This species is still poorly known. The male has not been described.

**Distribution.** – Japan.

**Sestrostoma toriumii** (Takeda, 1974), new combination

_Acmaeopleura toriumii_ Takeda 1974: 17–20, Figs. 2, 3; Marumura, 1994: 65, Fig. 2; Davie, 1992: 351; Sakai, 2000: 1158, Fig. 1i–j; Takeda et al., 2000: 138, 141; Itani et al., 2002: 43; Itani, 2004: 33; Itani et al., 2005: 1; Karasawa & Tanaka, 2005: 95; Anker et al., 2005: 179.

**Materials examined.** – Types: Holotype – 1 male (4.5 × 4.0 mm) (NSMT-Cr-971), shore of Onagawa Bay, Japan, coll. M. Toriumi, 10 Jul.1972. Other material: 2 males (5.6–5.9 × 4.7–4.9 mm), 1 ovig. female (5.6 × 4.7 mm) (QM-W25610), Yamaguchi Bay, Seto Inland Sea, Yamaguchi Prefecture, Japan, coll. G. Itani, 7 May 1997; 4 males, 3 females (QM-W16485), Starfish Bay, Wu Kwai Sha, mud and coarse sand, associated with burrows of _Upogebia major_ and the echiurid _Ochetostoma erythrogrammon_, coll. P. Davie, 15 Apr.1989.

**Diagnosis.** – Carapace transversely ovate, approx. 1.2–1.5 times wider than long, dorsal surface convex, punctate, regions not defined. Frontal margin with slight medial concavity. Lateral margins smooth, slightly emarginate, without teeth; epimera visible posterolaterally in dorsal view. Male suborbital crest consisting of 9 tubercles. Third maxillipeds broad, completely closing buccal cavity when closed. Chelae large, with tuft of setae on outer face at base of fingers; tips of fingers meet, or cross only slightly. Ambulatory legs relatively long, slender. G1 long, slender, with corneous process apically. Female gonopore operculate, circular in shape. Small species (to ca. 7 mm cw).

**Colour.** – Not documented for fresh specimens; preserved specimens cream to light brown.

**Size.** – Largest male 8.4 mm cw; largest female 6.2 mm (see Itani et al., 2002).

**Habitat.** – Seems primarily associated with a thalassinidean shrimp, _Upogebia major_, although other burrow hosts such as callianassids and echiurans have been reported (Davie, 1992; Sakai, 2000; Itani, 2002, 2004).

---

Fig. 8. _Sestrostoma balssi_ (Shen, 1932), male (cw = 9.8 mm), collected at Sone-higata tidal flat: A, dorsal view; B, ventral view. (After Itani et al., 2002).
Distribution. – Only known from Japan.

Remarks. – Differences with its closest relative, *S. balssi* are discussed under the Remarks for that species.

VARUNINAE Alcock, 1900


Diagnosis. – Carapace quadrate or quadrangular in shape, with lateral margins convex to subparallel; regions often discernible; dorsal surface usually glabrous, flat to deeply vaulted or very convex; anterolateral margins entire, or with 1, 2 or 4 epibranchial teeth or notches. Front deflected; broad, less than half maximum carapace breadth. Orbits open laterally; sub-orbital crest relatively straight, typically long, extending some distance across lateral branchial region, not stridulatory; pterygostomial grooves opening into anterolateral corner of buccal cavity; pterygostome, sub-branchial, sub-hepatic regions may be setose but without regular reticulation of hooked setae; pterygostome without vertical groove placed subparallel to buccal cavity. Third maxillipeds without oblique setose crest extending across merus and outer distal corner of ischium; merus normal or markedly produced; with small rhomboidal gape when closed; reaching forward to margin of epistome to completely close buccal cavity anteriorly; exopod narrow to broad, inflated; flagella not especially elongated, not noticeably protruding from behind third maxilliped. Endostome smooth, more or less mediolaterally prominent. Chelipeds usually symmetrical, large in adults. Ambulatory legs of moderate length; males, fingers shorter than palm, with marked gape developing in males. Ambulatory legs of moderate length; meri convex anteriorly; dactyi short, broad. Male abdomen narrowly triangular in shape with all segments freely moveable. G1 thick, stout; corneous projection apically.

Etymology. – *Pseudo*, Greek for “false” in combination with *Gaetice* alluding to the confusion of the new species with species of *Gaetice*. Gender masculine.

Remarks. – *Gaetice* Gistel, 1848, has been considered to include three species: *G. depressus* De Haan, 1933 (type species), *G. ungulatus* Sakai, 1939, and *G. americanus* Rathbun, 1923. The first two species, both from the northwest Pacific, are distinctly different from *G. americanus* (from the Pacific coast of Mexico) in morphology and feeding habits, and are here transferred to the new subfamily Gaeticinae. “*Gaetice* americanus” must therefore be reallocated, and is here transferred to a new genus, *Pseudogaetice*.

Although *Pseudogaetice americanus* superficially resembles species of *Gaetice* sensu lato in the form of the carapace and ambulatory legs, it is otherwise morphologically similar to typical *Varuninae* genera. The differences with the Gaeticinae have been discussed above.

*Pseudogaetice* is most closely related to *Hemigrapsus* Dana, 1851 (a revision of *Hemigrapsus* is in preparation by the second author) and *Tetragrapsus* (*T. jouyi* Rathbun, 1918). It differs from these two genera as follows: A) the merus of the third maxilliped is noticeably longer than the ischium, and both segments are subrectangular in *Pseudogaetice*; while in *Tetragrapsus* the merus is subequal in length to the ischium and the margins are rounded and strongly diverging distally. In *Hemigrapsus* the merus is typical of most varunines, being shorter than the ischium and with the lateral margins obviously convex and narrowing proximally; B) the palp of the third maxilliped is strongly developed in *Pseudogaetice*, reaching the distal end of the ischium when folded; in the other two genera the palp is much shorter; C) the anterolateral margins in *Pseudogaetice* are relatively shorter, first anterolateral tooth not as broad, margins subparallel, and not markedly narrower than the second anterolateral tooth; this condition is similar to *Tetragrapsus*, but unlike *Hemigrapsus*, which typically has broader, more convex anterolateral teeth; D) the frontal lobes are separated by a much stronger medial concavity in *Pseudogaetice* than in the other two genera; E) the chela of *Pseudogaetice* can develop a very broad gape between the fingers of adult males, something not shown by either of the two other genera; F) the moveable finger of the chela has a large, broad tooth in the proximal half, that is absent from both *Hemigrapsus* and *Tetragrapsus*; G) the dactyi of the walking legs of *Tetragrapsus* are very long, narrow, and relatively strongly curved; whereas those of *Pseudogaetice* and *Hemigrapsus* are broad and not markedly curved.

Pseudogaetice, new genus

*Gaetice* – Rathbun, 1923: 629 (not *Gaetice* Gistel, 1848).

Type species. – *Gaetice americanus* Rathbun, 1923, here designated; gender feminine.

Diagnosis. – Carapace subrectangular, broader than long, dorsal surface flat, smooth; frontal margin bilobed. Anterolateral margins short, not strongly convex. Third maxilliped with merus/ischium subrectangular; merus longer than ischium; palp strongly developed, reaching distal end of ischium when folded; exopod narrow, flagellum short. Infrabnital ridge granular. Chelipeds symmetrical, larger in males, fingers shorter than palm, with marked gape developing in males. Ambulatory legs of moderate length; meri convex anteriorly; dactyi short, broad. Male abdomen narrowly triangular in shape with all segments freely moveable. G1 thick, stout; corneous projection apically.
Pseudogaetice americanus (Rathbun, 1923),
new combination
(Fig. 9)

Gaetice americanus Rathbun, 1923: 629.

Material examined. – Types: Holotype – 1 male (15.4 × 14.2 mm) (USNM 17452), Mexico, San Luis Gonzales Bay, Gulf of California, coll. U.S. Fish Commission Steamer ALBATROSS, 27 Mar.1889. Paratypes, 69 males (6.2–16.8 × 6.0–15.3 mm), 41 females (9.2–12.7 × 8.5–11.4 mm), 27 ovig. females (12.0–12.9 × 10.7–11.6 mm) (USNM 17452), San Luis Gonzales Bay, Gulf of California, coll. U.S. Fish Commission Steamer ALBATROSS, 27 Mar.1889. Other material: 2 males (12.4–13.8 × 11.1–12.4 mm), 5 ovig. females (12.8–17.3 × 11.4–15.3 mm) (USNM 68397), Guaymas Bay, Sonora, Mexico, coll. B. J. Yost, 21 Jun.1923; 1 female (5.3 × 4.7 mm) (USNM 17685), Baja California, no collection date; 1 male (11.5 × 10.5 mm) (USNM 17454), San Bartolomé Bay, coll. U.S. Fish Commission, 11 Apr.1889; 1 male (13.1 × 11.5 mm) (USNM 17453), Puerto Refugio, Angel Island, coll. U.S. Fish Commission, 29 Nov.1889; 2 ovig. females (7.2–12.5 × 6.0–11.0 mm) (USNM 31511), shore of Guaymas Bay, Sonora, Mexico, coll. W. Palmer, 20 Feb.1902; 1 ovig. female (16.7 × 15.0 mm) (USNM 89515), Puerto Peñasco, Mexico, coll. Mac’Dinities family, 24 Dec.1947; 2 males (15.7–17.4 × 13.6–15.4 mm), 1 female (12.6 × 11.4 mm), 1 ovig. female (12.7 × 11.0 mm) (USNM 110649), Tiburón Island, Gulf of California, eastern side, coll. S. A. Glaswell, 28 Dec.1931; 1 male (7.5 × 6.4 mm), 2 female (8.2–8.4 × 7.3–7.4 mm), 11 ovig. females (7.3–10.1 × 6.2–8.5 mm) (USNM 17293), Guaymas, Mexico, near harbour, coll. P. J. Jouy, 23 Feb.1891; 10 males (8.6–13.0 × 6.8–11.4 mm), 3 females (7.1–8.3 × 6.6–7.5 mm), 8 ovig. females (7.4–16.7 × 6.5–14.7 mm) (numerous specimens) (USNM 17292), Guaymas, near harbour, Mexico, coll. P. J. Jouy, 23 Feb.1891; 8 males (12.9–18.3 × 11.2–16.6 mm), 1 female (12.9 × 11.2 mm), 3 ovig. females (11.0–15.5 × 9.6–12.0 mm) (USNM 74526), Punta Peñascosa, Sonora, Mexico, coll. H. N. Lowe, Feb.1934; 5 males (7.5–6.6 × 9.9–8.8 mm) (QM-W25613), Camp Archelon, Bahía de Los Angeles, Baja California: A, dorsal view; B, frontal view; C, sternum and abdomen.

Fig. 9. Pseudogaetice americanus (Rathbun, 1923), male (9.9 × 8.8 mm), QM-W25613, Camp Archelon Bahía de Los Angeles, Baja California: A, dorsal view; B, frontal view; C, sternum and abdomen.
**Diagnosis.** – Carapace subrectangular, broader than long, dorsal surface flat, smooth; frontal margin strongly bilobed. Anterolateral margins relatively short, first anterolateral tooth not particularly broad, margins subparallel, not markedly narrower than the second anterolateral tooth. Third maxilliped with merus, ischium subrectangular; merus longer than ischiun; palp very strongly developed, reaching distal end of ischiun when folded; epoxopod narrow, flagellum short. Infracostal ridge with very few large, round granules. Chelipeds symmetrical, larger, high, fingers shorter than palm in males; fingers close with almost no gape in females, young males, but can develop wide gape in males; dactylius often with large broad tooth on proximal half of cutting margin. Ambulatory legs of moderate length; meri convex anteriorly; dactyli short, broad. Male abdomen narrowly triangular, with all segments freely moveable; telson broad. G1 thick, stout; short conocephal projection apically. Female gonopore with crescent-shaped operculum.

**Colour.** – Not documented to our knowledge. All preserved specimens are dark cream to brown.

**Size.** – The largest male specimen examined is 19.5 × 17.3 mm (USNM), largest female 18.1 × 15.6 mm (USNM).

**Habitat.** – Found under small rocks, close to river mouths (Rathbun, 1923).

**Distribution.** – Only recorded from the west coast of Baja California and the Gulf of California, Mexico.

**Remarks.** – The affinities of this species with species of *Gaetice*, *Hemigrapsus* and *Tetragrapsus* are discussed under Remarks for the genus *Pseudogaetice*.

**ACKNOWLEDGEMENTS**

The first author is grateful to the Raffles Museum of Biodiversity Research, National University of Singapore, for travel funds that allowed this research to be completed. We are both very grateful to Peter K. L. Ng (Raffles Museum of Biodiversity Research) for valuable discussions, encouragement and comments on the manuscript. The first author is also grateful to Ernesto Campos and Christoph Schubart for sending him specimens of *Gaetice americanus*, and for early discussions on the status of the American *Gaetice*.

**LITERATURE CITED**


Davie & Ng: Two new subfamilies and two new genera of the Varunidae


Sakai, T. 1965. The crabs of Sagami Bay, collected by His Majesty the Emperor of Japan. Edited by the Biological Laboratory, Imperial Household, Tokyo. 206 pp., text-figs. 1–27, Pls. 1–100.


