Arthropoda Selecta 25(4): 357–372

Xiphonectes tuerkayi sp.n. from the Indian Ocean with notes on *Xiphonectes longispinosus* Dana, 1852 (Crustacea: Decapoda: Portunidae)

Xiphonectes tuerkayi sp.n. из Индийского океана с замечаниями о *Xiphonectes longispinosus* Dana, 1852 (Crustacea: Decapoda: Portunidae)

Vassily A. Spiridonov
В.А. Спиридонов

P.P. Shirshov Institute of Oceanology of Russian Academy of Sciences, Nakhimovskiy Prospekt, 36, Moscow 117997, Russia. E-mail: vspiridonov@ocean.ru
Институт океанологии им. П.П. Ширшова Российской Академии наук, Нахимовский просп., 36, Москва 117997, Россия.

KEY WORDS: Species complex, *Xiphonectes*, *Portunus*, revision, characters, sympatry, upper and lower subtidal zone, Red Sea, Bab al Mandab, Gulf of Aden, Arabian Sea.

КЛЮЧЕВЫЕ СЛОВА: Комплекс видов, *Xiphonectes*, *Portunus*, ревизия, признаки, симпатрия, верхняя и нижняя сублитораль, Красное море, Баб эль Мандеб, Аденский залив, Аравийское море.

ABSTRACT. The *Xiphonectes longispinosus* complex which has been a continuing problematic issue of the Portunidae taxonomy is partly revised on the basis of information on the extant type specimen of *X. longispinosus* and the material from several European museums. A female collected by the US Exploring Expedition (1838–1842) and deposited in the Museum of Comparative Zoology of the Harward University, the only remaining syntype of *Amphitrite longi-spinosa* Dana, 1852 is selected as a lectotype of this species. Two apparently different morphological forms belonging to the *X. longispinosus* complex were found in the Indian Ocean. One of them is considered as belonging to the intertidal — upper subtidal species *X. longispinosus* s.str., the other is described herein as *X. tuerkayi* sp.n. which occurs mostly on the shelf in the lower subtidal zone.

РЕЗЮМЕ. Комплекс видов *Xiphonectes longispinosus*, бывший серьезной проблемой для таксономии, частично ревизован на основе данных о сохранившемся типовом экземпляре *X. longispinosus* и коллекций ряда европейских музеев. Самка из сборов Национальной Исследовательской экспедиции США (1838–1842), хранящаяся в Музее сравнительной зоологии Гарвардского университета, представляет собой единственный сохранившийся синтип *Amphitrite longi-spinosa* Dana, 1852. Этот экземпляр обозначен в качестве лектотипа данного вида. Две морфологически различные формы, относящиеся к комплексу *X. longispinosus* обнаружены в сборах из Индийского океана. Одна из них отнесена к верхнее-сублиторальному — литоральному виду *X. longispinosus* s.str., а другая описана как *X. tuerkayi* sp.n., виду, преимущественно обитающему в нижней сублиторали.

Introduction

The Portunidae are one of the most diverse brachyuran crab families mostly occurring in the tropical waters [Ng et al., 2008; Spiridonov, 2013]. Portunid classification at the generic level has been relatively stable for long time since the studies of Stephenson [Stephenson, 1972 and references to earlier works of the 1950–60s herein] and Crosnier [1962] but recently it is in the process of revision [Ng et al., 2008; Schubart, Reuschel, 2009; Spiridonov, 2013; Spiridonov et al., 2014]. In particular, a large genus *Portunus* Weber, 1795 which previously encompassed portunids having nine anterolateral teeth with a broad carapace, and long and relatively narrow chelae [Stephenson, 1972; Ng et al., 2008] was proved to be heterogenous and polyphyletic [Schubart, Reuschel, 2009; Spiridonov et al., 2014; Koch et al., in prep.]. Small species with spiny posterolateral angles of the carapace formerly included in *Portunus* are currently assigned to the genus *Xiphonectes* A. Milne-Edwards, 1873 which appears to be heterogenous itself [Spiridonov, 2013; Spiridonov et al., 2014; Koch et al., in prep]. The status of several species of *Xiphonectes* remains unclear. One of the problematic species of the group is *X. longispinosus* (Dana, 1852) with a number of tentative and sometimes dubious identifications and records in the literature.

Taxonomical and nomenclature history of *Xiphonectes longispinosus*

When examining the collections of the US Exploring Expedition (1838–1842) Dana [1852a] described two small crab species and referred them to the genus *Amphitrite* de Haan, 1833 [preoccupied name, see Ng et al. 2008]. The first species, *Amphitrite longi-spinosa* was described from Ovalau, Fidji Archipelago, Polynesia, while the syntypes of second one, *Amphitrite vigilans* Dana, 1852 originated from the Hawaiian Islands and from Ovalau as well. Milne-Edwards [1873] established the genus *Xiphonectes* to accommodate Dana's species and described *Xiphonectes leptocheles* A. Milne-Edwards, 1873 from New Caledonia. Paulson [1875] recorded and illustrated *X. longispinosus* from the northern Red Sea and synonymized *Xiphonectes vigilans* to this species. Later on and until the recent time the researchers of the Portunidae considered these species within the genus *Portunus* or *Neptunus* de Haan, 1833, the latter being the junior synonym of *Portunus* Weber, 1795 [i.e. Alcock, 1899; Rathbun, 1906; Sakai, 1939; Stephensen, 1945; Stephenson, Campbell, 1959; Crosnier, Thomassin, 1974; Apel, Spiridonov, 1998; Crosnier, 2002; Ng et al., 2008]. The synonimization of *X. longispinosus* and *X. vigilans* was followed by Rathbun (1906) and became generally accepted [Ng et al., 2008]. Subsequently Stephenson and Campbell [1959] also included *X. leptocheles* into the synonymy of *X. longispinosus*.

Many authors mentioned variability of the species. Alcock examined several specimens from the Andaman and Laccadive Islands, Mauritius and the Persian Gulf and noted significant variability: "the number of (anterolateral) teeth … varies from 6 in the young to 9 in the adult, though there are adults with less than 9", "3 or 4 spines on the anterior border of arm" [Alcock, 1899: 41]. Crosnier [1962] and Stephenson and Rees [1967] discussed two forms of *Xiphonectes* (in their combination *Portunus*) *longispinosus*: the one with relatively short chelipeds, such as recorded by Rathbun [1906] from the Hawaian Islands, and the one with long and slender chelipeds, such as recorded by Sakai [1939] from Japan. Spiridonov [1994] suggested to name *Xiphonectes longispinosus* sensu Sakai as forma *longimera* (exemplified by a specimen recorded by him from the Socotra I. area in the Arabian Sea). This name was introduced as a working infraspecific name with extension "forma" after 1960 and this did not make it available in the sense of International Code of Zoological Nomenclature (ICZN) [International Commission on Zoological Nomenclature, 1999: Article 15.2]. Apel and Spiridonov [1998] noticed that apparently more than one species was recorded under the name *longispinosus* in the Indian Ocean and preferred to identify their material from the Persian Gulf as cf. *longispsinosus*. Furthermore Crosnier [2002] presented description of relatively deep living *Portunus* cf. *longispinosus* from Marquises which was apparently not conspecific to the shallow water specimens from the Persian Gulf. The situation became increasingly confusing and could not be resolved without examining the type material of *X. longispinosus*.

When studying the portunid crabs fauna of the Red Sea and the adjacent Arabian region I was challenged to clarify status of two apparently different forms belonging to the *X. longispinosus* complex. Fortunately it was possible to locate Dana's syntype and revise the diagnosis of *X. longispinosus* s. str along with some of its records. Furthermore particular specimens from the Indian Ocean previously recorded under *X. longispinosus* have been recognized as a new species which description is presented herein.

Material and methods

The material used in the present study originates from several museum collections: Natural History Museum in London (NHM), Naturhistorisches Museum Wien (NHMW) in Vienna, Forschungsinstitut und Museum Senckenberg in Frankfurt on Main (SMF), Zoologisches Museum der Universität Göttingen (ZMG, in deposition in SMF), and Zoological Museum of Moscow University (ZMMU). Besides this I examined a photograph of the syntype specimen of *Amphitrite longi-spinosa* deposited in the Harward Museum of Comparative Zoology of Harward University (HMCZ) taken and kindly sent to me by Mr. Adam Baldinger, the curator of invertebrate collection.

The terminology for description follows Crosnier [1962], Apel and Spiridonov [1998], Ng et al. [2008], and Spiridonov et al. [2014]. The terms "pleon" and "pleonal" are used in favor of "abdomen" and "abdominal". Ov is abbreviation for "ovigerous", P1 to 5 is abbreviation for "pereiopod". Measurements include carapace length (CL) along the midline, maximum carapace width (CWmax) between the tips of posterior anterolateral teeth. Other measurements: carapace width between bases of pre-posterior anterolateral teeth (CW0), length of pereopods 1–5 (P1–5). All sizes are given in mm.

Taxonomy

Order Decapoda Latreille, 1802
Infraorder Brachyura Linnaeus, 1758
Section Heterotremata Guinot, 1977
Superfamily Portunoidea Rafinesque, 1815
Family Portunidae Rafinesque, 1815
Genus *Xiphonectes* A. Milne-Edwards, 1873

Diagnosis to the *Xiphonectes longispinosus* species group

Carapace broad, more than twice as broad as long in males and about twice as broad as long in females; regions are better expressed in males than in females. Surface with granular patches and ridges but without

tubercular elevations. Anterolateral border with 9–7 teeth, last forming a long lateral spine. Front four-lobed, median lobes distinctly smaller than laterals. Chelipeds slender, finely granular; merus with four (sometimes five) spines on anterior and a single spine on posterior border near distal corner. Manus with three spines on upper and four costae on upper and outer face, lower and inner face granular. Chelae heterodontic, with moderately developed molariform tooth in one chela. Pereopods 5 with merus subquadrate, posterodistal border serrate; propodus moderately elongate with smooth posterior border. Gonopod 1 short and stout, curved with evenly tapering tip; scattered minute spinules on all surfaces proximal to tip. Female genital opening located in median part of sternite, broadly ovoid with longer axis oriented slightly obliquely to anterior edge of sternite [modified from Apel, Spiridonov 1998].

Xiphonectes longispinosus (Dana. 1852)
Figs 1A–E, 2A–F, 3A–D.

Amphitrite longi-spinosa Dana, 1852a: 84.

Amphitrite longi-spinosa — Dana 1852b: 277, pl. 17 fig. 2.

Xiphonectes longispinosus — Paulson, 1875: 56, pl. 8, figs 4, 4a.

Portunus longispinosus — Rathbun, 1902: 131.

? *Portunus* (*Xiphonectes*) *longispinous* — Rathbun, 1906: 871, fig. 30, pl. XII, fig. 6. — Sakai, 1976: 345, text-fig. 183. — Edmondson, 1954: 241, figs 18a–c.

Portunus longispinosus — Stephenson, Campbell, 1959: 104, fig 2F, 3F, pl. 2, fig. 2, pls 4F, 5F.

Portunus cf. *longispinosus* Crosnier, Thomassin, 1974: 1101–1104, figs 3a, 4d–g. — Apel, Spiridonov, 1998: 296–298, figs 92, 114.

Portunus (*Xiphonectes*) *longispinosus longispinosus* — Ng et al., 2008: 150.

Neptunus (*Hellenus*) *longispinosus* — Klunzinger, 1913: 339–340. — Balss, 1924: 3. —Stephensen, 1945: 123.

Portunus longispinnus — Fishelson, 1971: 119 (misspelling).

? *Xiphonectes vigilans* var. *obtisidentatus* Miers, 1884: 538, pl. XLVII, fig. A.

? *Portunus longispinosus obtusidentatus* — Ng et al., 2008: 150.

Not *Portunus longispinosus* — Zarenkov, 1971: 182, fig. 81. — Crosnier, 1984: 404, figs 2D, E. — Neumann, Spiridonov, 1999: 20 (= *Xiphonectes tuerkayi* sp.n.).

Not *Portunus longispinosus* forma *longimera* — Spiridonov, 1994: 136–138, fig. 5 (= *Xiphonectes tuerkayi* sp.n.).

Not *Portunus* (*Xiphonectes*) *longispinosus* Nagai, 1991: 27, pl. I A–D ((= *Xiphonectes* cf. *tuerkayi* sp.n.)

Not *Portunus* cf. *longispinosus* — Crosnier 2002: 405–410, figs 1, 2 (= *Xiphonectes* cf. *tuerkayi* sp.n.].

MATERIAL. Syntype of *Amphitrite longi-spinosa*. 1 female (HMCZ 4290), Fidji (Feejii) Islands, US Exploring Expedition, J.D. Dana coll. (photo provided by A. Baldinger).

OTHER MATERIAL. 3 males, 3 females ov (ZMG 1102), Philippines, Panglao I. near Bohol I., 1876. C. Semper coll. 1 female (NHM 88.34), Andaman Sea, Burma, Gulf of Martaban, 1888, J.W. Oates coll. 1 female (SMF 24394), Persian Gulf, Saudi Arabia, Karan Island, 27°43′N 49°49′E, 10–13 m, 22.V.1995, M. Apel coll. 1 male (SMF 24395), Gulf of Oman, United Arab Emirates Fujairah, Al-Aqqa , Sandy Beach Hotel , 25°30′N 56°22′E, 3–4 m, 4.VII.1995, M. Apel coll.. 1 female ov (NHMW 2820), Red Sea, SMS "Pola Expedition. 1 male (NHMW 2821), Red Sea Saudi Arabia, Jeddah, SMS "Pola" Expedition, 8.11.1895. 1 male, 1 juv. (ZMMU Ma 3478), Red Sea, Egypt, off Hurghada, Shaab Sheer Reefs, sand, night dive, 10–12 m, 30.01.2000, V Spiridonov, D Zhadan coll. 3 males, 3 females, 1 juv (ZMMU Ma 3491), Red Sea, Egypt, off Hurghada, reefs Fanoose East, 10 m, sand, night dive, 31.01.2000, V. Spiridonov, D. Zhadan coll.

Holotype of *Xiphonectes vigilans* var. *obtusidentatus*. Ovigerous female (NHM 82.24), Seychelles, presented by the Lords of Admiralty (additional data taken from Coppinger [1984: 4] and Miers [1884: 538]: HMS "Alert", March 1882, dredging, 4–12 fathoms, collected by R.W. Coppinger).

TYPE MATERIAL. Dana [1852a, b] did not mention the number of individuals studied by him. Important characters of his description are the following: "carapace areolate …; antero-lateral teeth five, minute, not contiguous, inter-antennary front four-toothed, the two median teeth minute, the other prominently triangular … arm with a single spine at the outer apex, and three on the inner margin. … The third joint of the outer maxillipeds is oblong, but nearly flat to its anterior margin, yet somewhat obliquely curved in its anterior part" [Dana 1852b: 277–278]. As the outer orbital lobe was not counted by Dana as an anterolateral tooth, the actual number of these teeth in the type specimen is seven, that is confirmed by the illustration of a male specimen [Dana, 1855: pl. 17, fig. 2a–2c].

Rathbun [1902: 131] wrote that "two types (male and female) of Dana's *Xiphonectes longispinosus* are preserved in the Museum of Comparative Zoology". However, subsequently Stephenson [1976] stated that Dana's types were lost. According to the information received from the curator of the HMCZ invertebrate collection Adam Baldinger [pers. comm..] a male and a female were registered in the Catalogue of HMCZ with the following data: Catalogue number 4290; original number 165; name "*Xiphonectes longispinosus* (D.)", later "*Xiphonectes*" was put in brackets and lined through, "*Portunus*" was written above it by other hand; sex "male and female", locality "Feejee Is.", nature of specimen "dry"; collected by "U.S. Explor. Exp."; when collected "1838–1842"; received from "Smithson. Inst."; when received "not indicated"; number of specimens 2; remarks "types". On the same page of the catalogue several other portunid species collected by US Exploring Expedition including the ones described by Dana [1852 a] were registered: *Thalamita spinimana* (# 171 / 4282), *Charybdis orientalis* (# 173/ 4287), *Carupa tenuipes* (# 167/ 4291), *Lissocarcinus orbicularis* (# 177/ 4292), *Thalamita integra* (# 4297, no original number). Currently only the female syntype is extant in HMCZ. It is stored in alcohol, most likely in a rehydrated condition. The specimens lacks pereopods 2–4, chelipeds are separate, dactyli are missing in P 5, a round perforation in the middle of anterior part of cephalothorax may indicate that the specimen could have been mounted on a plate with a needle (Fig. 1A–D). The label with the original registration number clearly states that this is *Amphitrite longi-spinosa* collected at Feejee Islands by the US Exploring Expedition commanded by Charles Wilkes and identified by J.D. Dana (Fig. 1E).

The male syntype described and figured by Dana and the female syntype show dissimilarity apparently

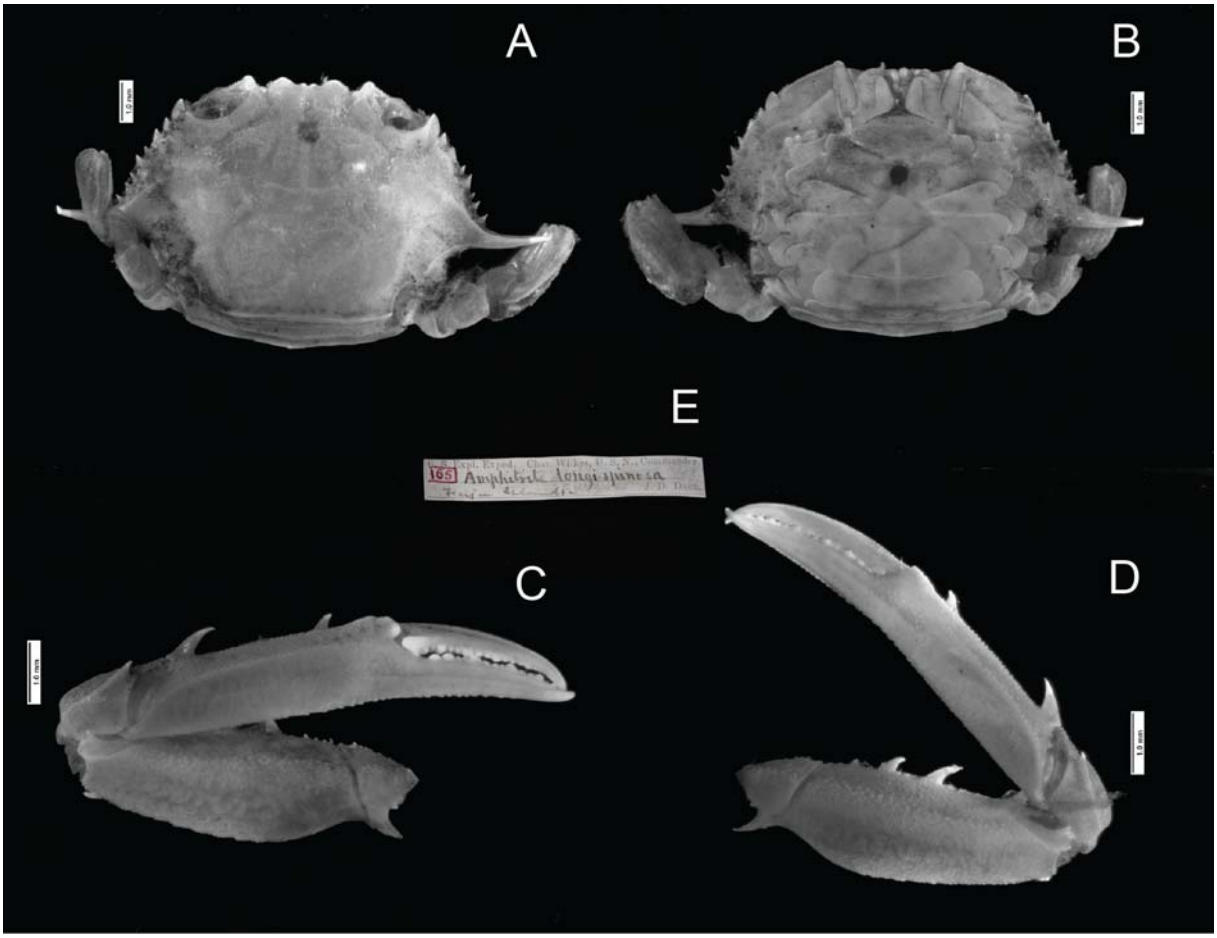

Fig. 1. *Xiphonectes longispinosus* (Dana, 1852). The female syntype of *Amphitrite longi-spinosa* Dana, 1852 (HMCZ 4290) designated here as a lectotype. A: cephalothorax with pereiopods 5, dorsal view; B — cephalothorax with pereiopods 5, ventral view; C, D — right cheliped in different views; E — original label. Photo courtesy of Adam Baldinger.

Рис. 1. *Xiphonectes longispinosus* (Dana, 1852). Синтип *Amphitrite longi-spinosa* Dana, 1852б самка (HMCZ 4290), обозначенный в данном исследовании как лектотип. A — цефалоторакс с перейоподами 5, дорсальный вид; B — цефалоторакс с перейоподами 5, вентральный вид; C, D — правая хелипеда в двух различных планах; E — оригинальная этикетка. Фото предоставлено Адамом Болдингером.

not related to sex. In particular this is the number of anterolateral teeth (seven in the male, and nine in the female), and the number of spines on the anterior margin of cheliped merus (three in the male and four in the female). The frontal margins differ as well, the female has lower and more rounded lateral frontal lobes. While differences in the shape of the frontal margin may be related to accuracy of drawing, the number of spines in both cases is consistently documented in both the description and the illustration. Even though, there is still a possibility that the proximal spine on the anterior margin of cheliped merus (small in the female syntype, see Fig. 1C) has been overlooked in the male syntype and the number of anterolateral teeth varies within a species (see remarks on the Red Sea specimens below), it is possible that Dana's type series is heterogenous. The male syntype is particularly close to *Xiphonectes iranjae* (Crosnier, 1962) (compare to Crosnier, 2002: figs 4, 5) while the female fits the generally adopted concept of *X. longispinosus* (with 9 anterolateral teeth and 4 spines on the anterior margin of cheliped merus). In this situation, in order to provide stability of nomenclature I select the only known to be extant female syntype (HMCZ 4290) as a lectotype of *Amphitrite longi-spinosa* Dana, 1852.

DIAGNOSIS. Carapace with patches of moderate granules, posterolateral granular ridge relatively low, diffused (Figs 1A, 2A, C, E). Usually nine anterolateral teeth but the number may be reduced to 8–7 (Figs 1A, 2A, C, E). Lateral frontal lobes relatively low, often not reaching to level of inner infraorbital lobes, distinctly broader than long, terminally rounded in females (Figs 1A, 2C, 3B–D), but may be sharpened in males (Figs 2A, 3A); median frontal lobes minute, broader than long, usually terminally rounded, separated from lateral lobes by a broad u-shaped gap (Figs 1A, 2C, E, 3B–D). Mesial corner of inner supraorbital lobe usually rounded (Figs 1A, 2C, E, 3A–D). Cheliped about 2.5 times or more longer than carapace in males but usually less in females; its merus 3 times as

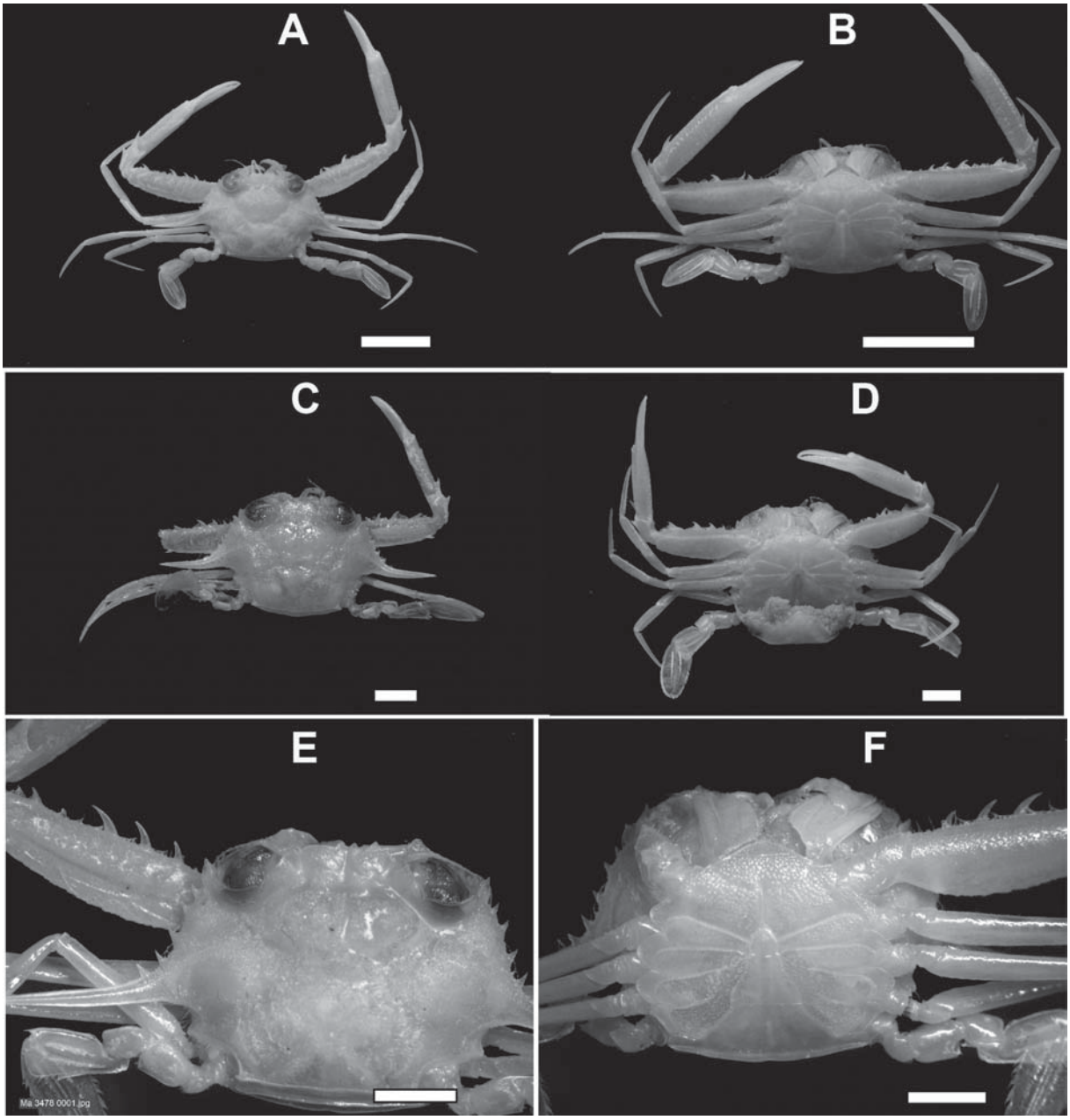

Fig. 2. *Xiphonextes longispinosus*. A — male (ZMG 1102), Philippines, 9.0 × 22.8 mm, dorsal view; B — same specimen, ventral view; C — female (NHM 88.34), 6.5 × 16.5 mm, Gulf of Martaban, dorsal view; D — female ov (NHMW 2820), 6.5 × 16.5 mm, Red Sea, ventral view; E — male, (ZMMU Ma 3478), 6.5 × 17.8 mm, Red Sea, dorsal view; F — same specimen, ventral view. Scale bar: 10 mm (A); 2 mm (C, D, E, F).

Рис. 2. *Xiphonextes longispinosus*. A — самец (ZMG 1102), Филиппины, 9,0 × 22,8 мм, дорсальный вид; B — тот же экземпляр, что A, вентральный вид; C — самка (NHM 88.34), 6,5 × 16,5 мм, залив Мартабан, дорсальный вид; D — яйценосная самка (NHMW 2820), 6,5 × 16,5 мм, Красное море, вентральный вид; E — самец, (ZMMU Ma 3478), 6,5 × 17,8 мм, Красное море, дорсальный вид; F — тот же экземпляр, что E, вентральный вид. Масштабная линейка: 10 мм (A); 2 мм (C, D, E, F).

long as broad in males but usually less in females. Pleomere 3 of male lacks a distinct keel. Pleomere 6 of male broader than long with not markedly sinuous, converging lateral margins (Fig. 2B, F).

COLOURATION. Background colouration of the carapace white-grayish. Gastric region and granular ridges of carapace emarginated by greenish bands and small orange spots. Transverse greenish bands on pereopods (authors's notes on live colouration made after collecting specimens ZMMU Ma 3478 and 3491 in the Red Sea).

VARIATION. Among the studied material the specimens from Philippines and the Gulf of Martaban are most similar to the lectotype; while females have the frontal margin resembling the lectotype, lateral and median lobes in males are more sharpened (Figs 2A,

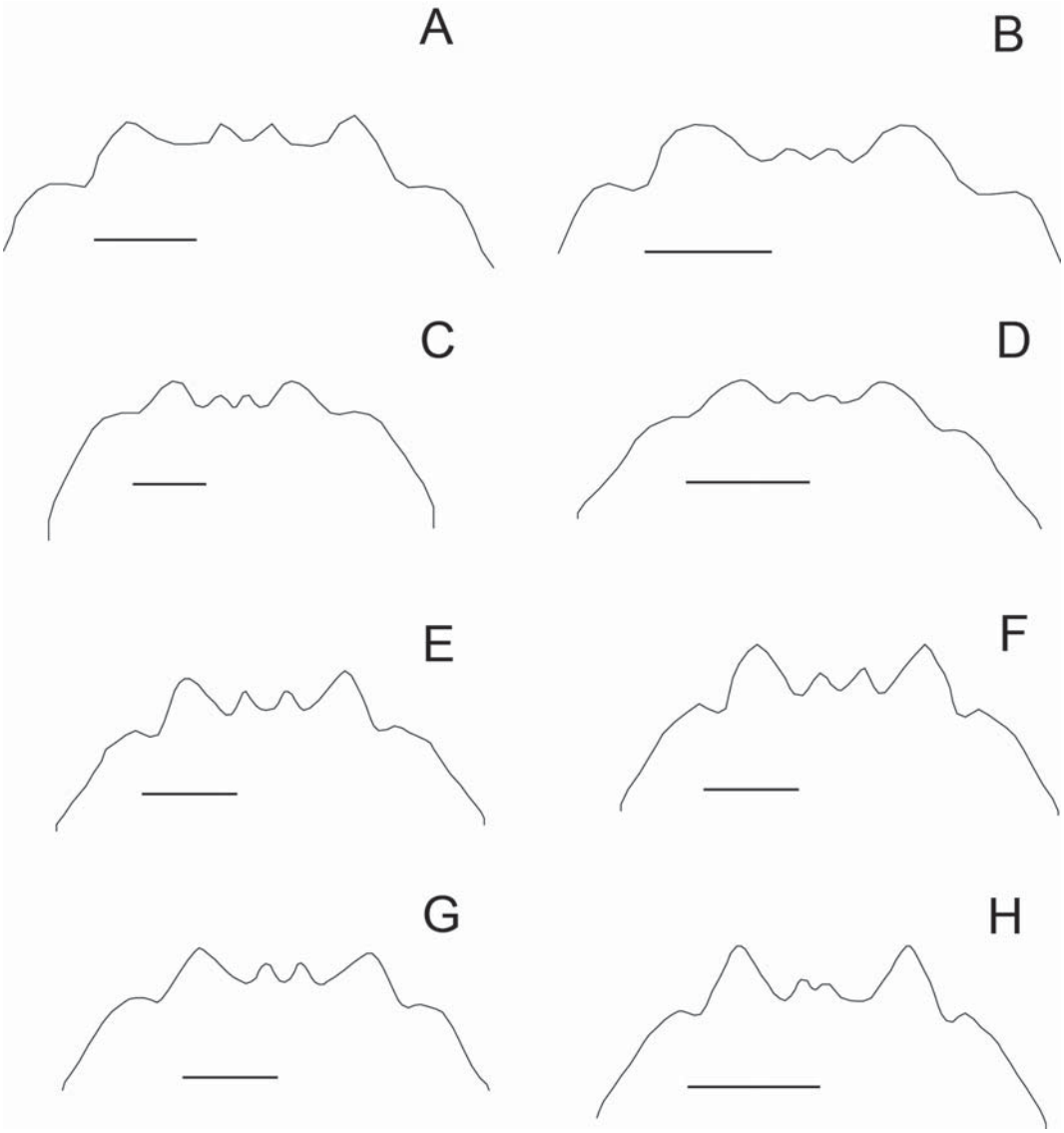

Fig. 3. Outlines of the frontal margin of carapace. A — *Xiphonectes longispinosus*, male (ZMG 1102), 9.0 × 22.8, Philippines; B — *X. longispinosus*, female ov (ZMG 1102), 8.5 × 19.3, Philippines; C — *X. longispinosus*, female (NHM 87 16), 7.0 × 14.6 mm, Gulf of Oman; D — female ov (NHMW 2820), 6.5 × 16.5 mm, Red Sea; E — *Xiphonectes tuerkayi* sp.n., female (ex NHM 87 16), 8.6 × 21.0 mm, Gulf of Oman; F — *X. tuerkayi* sp.n., male (SMF 22973), 11.4 × 25.0 mm, Gulf of Aden; G — *X. tuerkayi* sp.n., juvenile male (SMF 22973), CL 5.0 mm, Gulf of Aden; H — *X. tuerkayi* sp.n., male (ZMMU Ma 3497), CL 8.5 mm, Bab al Mandab. Scale bar 1 mm.

Рис. 3. Контур фронтального края карапакса. A — *Xiphonectes longispinosus*, самец (ZMG 1102), 9,0 × 22,8 мм, Филиппины; B — *X. longispinosus*, яйценосная самка (ZMG 1102), 8,5 × 19,3 мм, Филиппины; C — *X. longispinosus*, самка (NHM 87 16), 7,0 × 14,6 мм, Оманский залив; D — яйценосная самка (NHMW 2820), 6,5 × 16,5 мм, Красное море; E — *Xiphonectes tuerkayi* sp.n., самка (из NHM 87 16), 8,6 × 21,0 мм, Оманский залив; F — *X. tuerkayi* sp.n., самец (SMF 22973), 11.4 × 25,0 мм, Аденский залив; G — *X. tuerkayi* sp.n., ювенильный самец (SMF 22973), CL 5,0 мм, Аденский залив; H — *X. tuerkayi* sp.n., самец (ZMMU Ma 3497), CL 8,5 мм, проливы Баб эль Мандеб. Масштабная линейка 1 мм.

3E). This generally stands for sex related variation in the specimens from the Persian Gulf/ Gulf of Oman and the Red Sea. Some specimens from the Persian Gulf, in particular SMF 24394 have a reduced number of anterolateral teeth, i.e. 8 on the right side, while the specimen from the Gulf of Oman has a complete set of teeth. In the Red Sea specimens variation in the anterolateral teeth number was also recorded. In particular two largest males from Egypt with CL 6.3 and 6.9 mm have 8 teeth and a minute 5th tooth on the right side (Fig. 2F) and 7 teeth on the left side (ZMMU Ma 3478) (Fig. 2E), or 9 (ZMMU Ma 3491) teeth with minute the 6th tooth, respectively. Smaller males may also have either complete or incomplete and assymetric (up to 7 on one side and 8 on the other side) number of teeth. The ovigerous female from the Red Sea (NHWW 2820) has 7 anterolateral teeth on both sides.

Throughout the studied sample no specimens with less than 4 spines on the anterior margin of cheliped merus were found although the male from the Persian

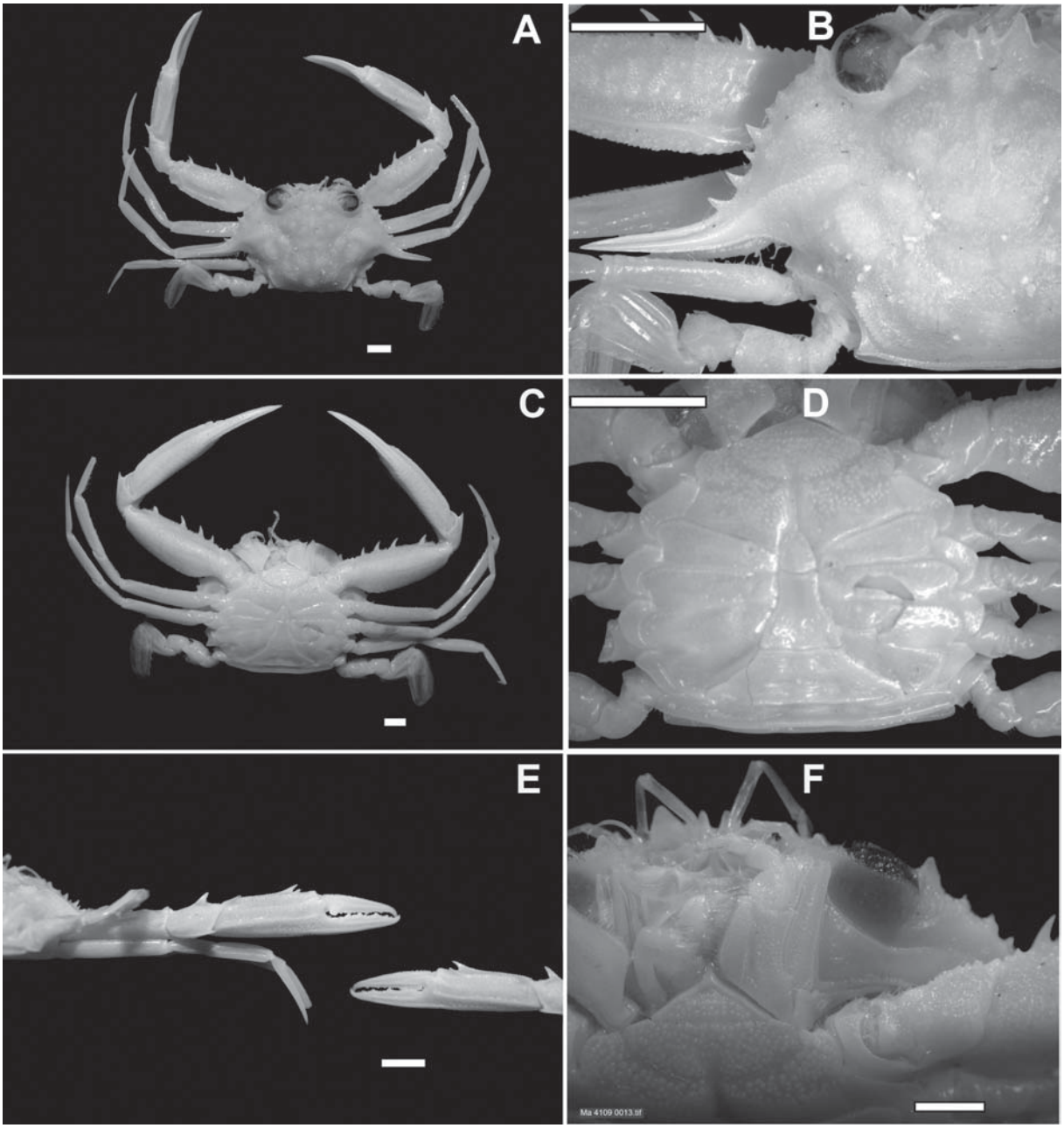

Fig. 4. *Xiphonectes tuerkayi* sp.n., male, holotype (ZMMU Ma 4109), Arabian Sea, off Socotra I. A — dorsal view; B — details of dorsal carapace and proximal parts of pereiopods; C — ventral view; D — details of thoracal sternal region and pleon; E — chelae and cheliped carpi, outer view; F — maxillipeds, buccal cavity and orbit, ventral view. Scale bar: 2 mm (A, C, F), 5 mm (B, D), 4 mm (E).

Рис. 4. *Xiphonectes tuerkayi* sp.n., самец, голотип (ZMMU Ma 4109), Аравийское море, район о. Сокотра. A — дорсальный вид; B — детали дорсальной поверхности карапакса и проксимальной части перейопод; C — вентральный вид; D — торакальный стернальный отдел и плеон; E — клешни и карпоподиты хелипед, вид с внешней стороны (латеральный); F — максилипеды, предротовая полость и орбита глаза. Масштабная линейка: 2 мм (A, C, F), 5 мм (B, D) 4 мм (E).

Gulf has a poorly distinguishable proximal spine so that illustration of this specimen in Apel and Spiridonov [1998: fig. 114] may leave impression of the presence of 3 spines only. The largest male from Philippines has the 5th proximal spine (smallest in size) on the anterior margin of cheliped merus.

SIZE. Female lectotype measures 6.3 × 12.9. Male paralectotype measured by Dana [1852b: 278] had CL 3 lines (7.6 mm), and CWmax 6.75 lines (17.1 mm).

Gulf of Martaban: female 6.5 × 16.5. Philippines: males 9.0 × 22.8 – 9.2 (CL), females ov 7.9 × 18.8 – 9.4 × 19.5. Persian Gulf and the Gulf of Oman: male 7.2 × 15.8, female 6.5 × 14.3. Red Sea: males 6.3 × 17.8 – 6.9 × 16.5; females 3.6 × 9.6 – 4.0 × 9.4; female ov 6.5 × 15.0.

Ovigerous female, holotype of *Xiphonectes vigilans* var. *obtusidentatus* 10.5 × 24.0.

ECOLOGY. The type material originates from a coral reef [Dana, 1952b]. The specimens collected in

the Persian Gulf, the Gulf of Oman [Apel, Spiridonov, 1998], Madagascar [Crosnier, Thomassin, 1975] and the Red Sea (present study) inhabited sandy (in one case muddy) bottom in the vicinity of coral reefs in the upper subtidal zone (3–13 m) and demonstrated nocturnal activity (author's observation). In the Red Sea *X. longispinosus* was also recorded as a characteristic species of the lower intertidal – upper subtidal communities of sandy bays [Fishelson, 1971].

DISTRIBUTION. Ovalau, Fidji (type locality), Philippines (present study). Australia [Stephenson, Campbell, 1959]. Andaman Sea (present study). Persian Gulf, Gulf of Oman [Apel, Spiridonov, 1998]. Maldive Islands [Rathbun, 1902]; Madagascar, Toulear [Crosnier, Thomassin, 1975]. Red Sea [Paulson, 1875; Klunzinger, 1913; Balss, 1924; Fishelson, 1971; present study]. Other records in the literature need confirmation of the species identity (see Remarks).

REMARKS. When recognizing heterogeneity in *X. longispinosus* Stephenson and Rees [1967] pointed out variation in the ratio of cheliped to carapace length. This is a variable character being also subject to sexual dimorphism, i.e. relatively shorter chelipeds in females. The male of *X. longispinosus* sensu Sakai [1939, 1976] is characterized by relatively long chelipeds (about 2.5 times as long as CL) and thus it could be referred either to the present species or *X. tuerkayi* sp.n. but for the final decision details of the carapace granulation, frontal margin and male pleon morphology should be examined. *X.* cf. *longispinosus* sensu Crosnier [2002], another form with long cheliped is closer but probably not conspecific to *X. tuerkayi* sp. n (see below). On the other hand *X. longispinosus* sensu Rathbun [1906: pl. 12, fig. 6) from the Hawaian Islands appears to be different from *X. longispinosus* in the present concept. It has 8–9 anterolateral teeth, relatively short chelipeds (about 2.5 times longer than CL) but 4–5 teeth on the anterior margin of cheliped merus while the ratio of cheliped merus length to width in males measured using a photograph [Rathbun, 1906: pl. 12, fig. 6] is less than 2.5.

Dana [1852a] described *Amphitrite vigilans* based on the specimens from Ovalau, Fidji and Sandwich Islands (Hawaii). The difference between this species and *X. longispinosus* may be derived from Dana's description and illustrations [1852b: 278, pl.17, figs 3a–3d]: among 8 anterolateral teeth, the 2nd and 3rd are larger than teeth 4–7 and pointing "nearly forward". The 3rd pleomere of male appears to have a transversal keel. It is not known whether Dana's figure illustrated the specimen from Fidji or from the Hawaian Islands. We were not able to locate the types of *Amphitrite vigilans* in the HMCZ or elsewhere. In the Hawaian form of *X.* "*longispinosus*" anterolateral teeth 2–4 (5) are relatively large and directed forward while the frontal margin is similar to Dana's illustration of *X. vigilans* [see Rathbun, 1906: pl. 12, fig. 6; Edmondson, 1954: fig. 18a]. The Hawaian material urgently needs to be studied with special attention to morphological variation and genetic barcode, particularly with regard to the necessity of designating neotype of *X. vigilans*.

Xiphonectes vigilans var. *obtusidentatus* Miers, 1884 was described on the basis of a single female from the Seychelles (depth 4–12 fathoms, or 7–22 m). According to the description of zoological work during the cruise of HMS "Alert" the type locality may be more precisely identified as at Bird Island or in the channel between Mahe and St. Anna islands [Coppinger, 1884]. Ng et al. [2008] considered it to be a subspecies of *Xiphonectes longispinosus* (as *Portunus longispinosus obtusidenatus*). Miers [1884: 538] compared the type specimen of this subspecies ("variety" in his definition) to Dana's description of *X. longispinosus longispinosus* and concluded that the variety described by him differed from the nominotypical subspecies "by the form of the frontal lobes which are not triangular and acute but obtuse and broad so that the two prominent submedian lobes are semicircular in form". I examined the holotype of *Xiphonectes longispinosus obtusidentatus* (NHM 82.24) and found no differences between the frontal carapace margin and most other characters of this specimen and the lectotype of *Amphitrite longi-spinosa*. The holotype of *X. logispinosus obtusidentatus* also has a reduced number of anterolateral teeth (7) on the left side. As mentioned above the paralectotype of *Amphitrite longi-spinosa* figured by Dana may indeed belong to different species. Therefore *X. longispinous obtusidentatus* appears to be much more morphologically similar to *X. longispinosus* in the present concept and could be regarded as its synonym. However, the holotype of this taxon has a relatively weak granulation of carapace with even less distinct granular patches than in *X. longispinosus*. Because of this and the unavailability of the male specimens for study I consider it for the time being as a questionable synonym of *X. longispsinosus*.

Xiphonectes tuerkayi **sp.n.**

Figs 3E–H, 4A–F, 5A–D, 6A–B, 7A–D.

Portunus longispinosus — Zarenkov, 1971: 182, fig. 81. — Crosnier, 1984: 404, figs 2D, E. — Neumann, Spiridonov, 1999: 20.

Portunus longispinosus forma *longimera* — Spiridonov, 1994: 136–138, fig. 5 (non-available name in the sense of ICZN: Article 15.2).

Portunus longispinosus longimerus — Ng et al., 2008: 150 (non-available name in the sense of ICZN: Article 15.2).

? *Portunus* (*Xiphonectes*) *longispinosus* — Nagai, 1981: 27, pls. I A–D.

? *Portunus* cf. *longispinosus* — Crosnier, 2002: 405, figs 2–3.

Not *Amphitrite longi-spinosa* Dana, 1852a: 84.

MATERIAL EXAMINED. Holotype. Male (ZMMU Ma 4109), Arabian Sea, Yemen Exclusive Economic zone, off Socotra I., R.V. "Odissey", cruise 33, Sigsbee trawl haul # 2, 11°55.9′N 53°47.9′E, 86 m, coll. B.I. Sirenko.

OTHER MATERIAL. Straits of Bab al Mandab.1 male, 1 female ov (ZMMU Ma 2409, identified as *Portunus longispinosus*), R.V. "Akademik Alexander Kowalevsky", Stat. 607/57A, Sigsbee trawl, 35 m, sand with remains of bryozoans and shell, 8.09.1963, V.V. Murina coll. 1 male (ZMMU Ma 3497), Bab al Mandab, R.V. "Akademik Alexander Kowalevsky", Stat. 401, 11.01.1962.

Inner Gulf of Aden. 20 males, 8 females, 20 juv. (SMF 22968, identified as *Portunus longispinosus*), Jibouti, R.V. "Meteor",

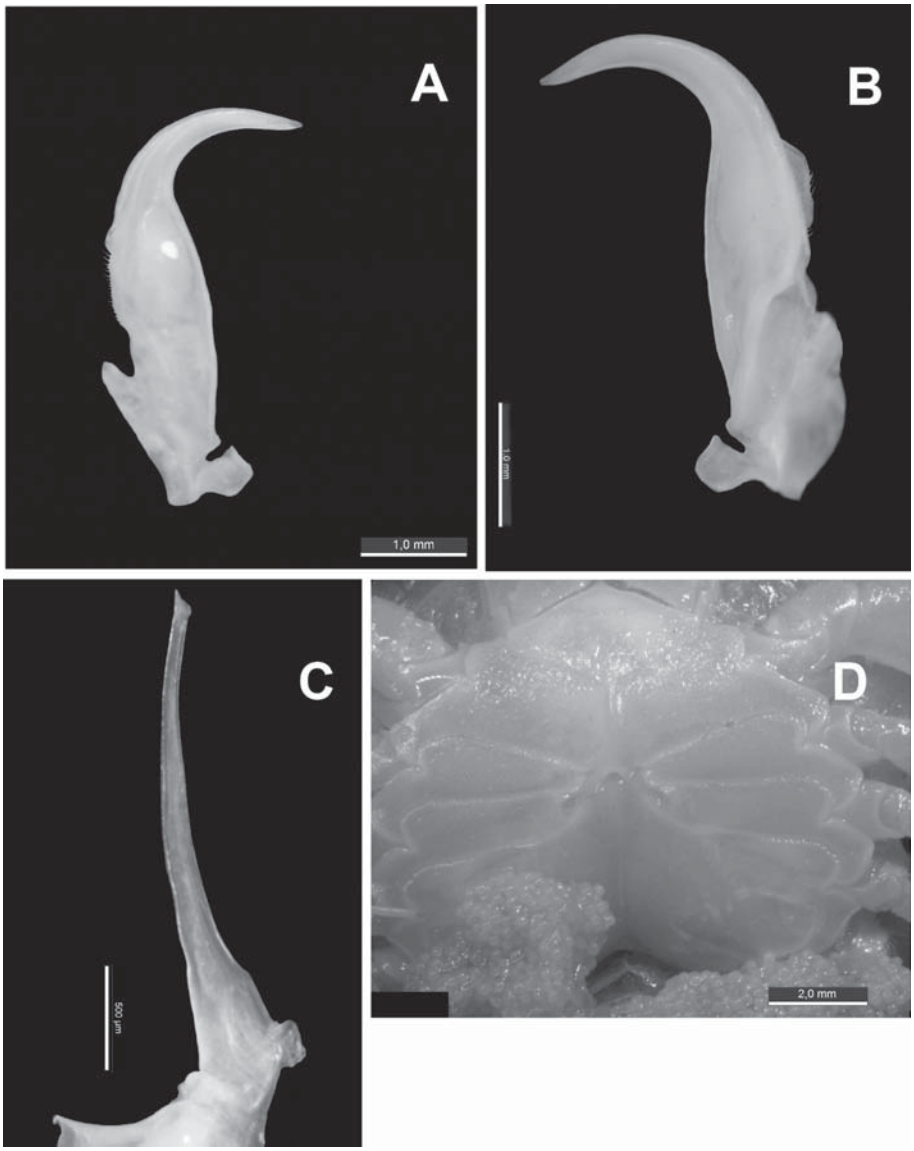

Fig. 5. External genital characters of *Xiphonectes tuerkayi* sp.n.. A — holotype, gonopod 1, pleonal view; B — same specimen as A, sternal view; C — holotype, gonopod 2, pleonal view; D — ovigerous female (ZMMU Ma 2409), Bab al Mandab, thoracal sternal region and genital openings. Scale bar: 1 mm (A, B), 0.5 mm (C), 2 mm (D).

Рис. 5. Внешние генитальные признаки *Xiphonectes tuerkayi* sp.n.. A — голотип, гонопод 1, вид со стороны плеона; B — тот же экземпляр, что A, вид со стороны торакально-стернального отдела; C — голотип, гонопод 2, вид со стороны плеона; D — яйценосная самка (ZMMU Ma 2409), проливы Баб эль Мандеб, торакально-стернальный отдел и генитальные поры. Масштабная линейка: 1 мм (A, B), 0,5 мм (C), 2 мм (D).

Cruise 5, Stat. 236 Ku, 12º21.2′N 43º27.1′E – 12º219.0′N 43º 27.8′E, 35–45 m, 6.03.1987. 7 males, 5 females (SMF 22974, identified as *Portunus longispinosus*), Jibouti, R.V. "Meteor", Cruise 5, Stat. 236 Ku, 12º21.2′N 43º27.1′E – 12º219.0′N 43º 27.8′E, 35–45 m. 16 juv. (SMF 33390), same data as SMF 22974, Baumkurre. 5 males, 7 females, 3 juv. (SMF 22973, identified as *Portunus longispinosus*), Jibouti, R.V. "Meteor", Cruise 5, Stat. 236 KD, 12º21.4′N 43º26.9′E – 12º20.6′N 43º27.3′E, 35–45 m, 6.03.1987. 1 female (ex NHM 87.16, identified as *Xiphonectes longispinosus* var.), Gulf of Oman, Muscat, 9–36 m (5–20 fm), Al. J.B. Miles coll. 1 female (ex NHM 88.34), Andaman Sea, Burma, Gulf of Martaban, J.W. Oates coll.

COMPARATIVE MATERIAL of *Xiphonectes* cf. *longispinosus* sensu Crosnier, 2002. 1 male (NHM 83.31) Tongatabu (Tonga Is.), HMS "Challenger", Station 172, 18 fathoms (about 32.5 m), 22.07.1874.

TYPE LOCALITY. Arabian Sea, off Socotra I. (Yemen).

DIAGNOSIS. Carapace with patches of coarse granules, posterolateral granular ridge relatively high, consolidated. Nine anterolateral teeth both in adult and juvenile specimens. Lateral frontal lobes relatively long, usually reaching to level of inner infraorbital lobe, about as broad as long, triangular, sharpened terminally in both sexes, median frontal lobes about half as long as submedians, triangular, sharpened terminally,

separated from lateral lobes by a V-shaped gap. Mesial corner of inner supraorbital lobe usually angled. Inner infraorbital lobe sharpened terminally (Figs 3E–H, 4A, B, 7A, C). Pleomere 3 of male with a distinct transverse keel. Pleomere 6 of male at least as broad as long with markedly sinuous lateral margins (Figs 4D, 7C, D).

DESCRIPTION (based on holotype). Cephalothorax quasi-hexagonal (Fig. 4A), 2.2 times broader than long, ratio of CW excluding last anterolateral teeth to CL equals to 1.56. Carapace covered with coarse granules and tomentum, regions well defined by grooves. Carapace maximum height to length ratio about 0.5. The following ridges and patches consisting of larger granules are present in the anterior part of carapace: a pair of postfrontal patches, two granular anterolateral patches proximal to 2nd–4th and 5th–6th anterolateral teeth; diffuse large granules on the boundary of postorbital and gastric regions; a pair of short protogastrics and two pairs of elevated mesogastric patches, a median gastric ridge and a pair of elevated metagastric granular patches posterior to mesogastric ones. Broad and arched epibranchial ridges extend from tips of last anterolateral tooth to about fourth of carapace width at level of 5th anterolateral teeth. Two pairs of broad elevated mesobranchials are located nearly parallel to posterolateral margin. Anterior mesobranchial ridge produces somewhat beyond metagastric patch; posterior mesobranchial ridge directed nearly at right angle towards the proximal end of epibranchial ridge. Three groups of large granules between posterior mesobranchial ridge and posterolateral margin. A pair of tuberculated cardiac ridges located parallel to meso- and metagastrics; besides of this there are two broad lateral postcardiac and median postcardiac granular patches. Elevated narrow posterior posterolateral granular ridges are located along posterolateral reentrants (Fig. 4A, B).

Frontal margin comprises about 13% of CW, frontorbital margin is about 40% of CW. Four relatively sharp triangular frontal lobes separated by deep v-shaped notches present (left lateral lobe damaged in holotype): median ones about twice narrower and twice shorter than laterals. Laterals are reaching to level of inner infraorbital lobes (Fig. 4A, B). Orbits subcircular, orbital margins granular, inner supraorbital lobe faintly defined, reaching to level of base of median frontal lobes, angled; supraorbital margin with two incisions (Fig. 4B). Inner infraorbital lobe quasi-triangular, sharp, mesial and lateral margins steeply sloping, granules along ifraorbital margin larger than those on supraorbital margin (Fig. 4F).

Nine anterolateral teeth. First tooth (or outer supraorbital lobe) lanceolate, with granulated outer margin. Teeth between outer supraorbital lobe and last anterolateral tooth sharp, spiniform, narrower than these two, teeth 3, 5, 7, 8 being longest among them (Fig. 4A, B). Last (9th) tooth very long, sharp, with slightly concave anterior margin and sinuous (distally convex, proximally concave) posterior margin (Fig. 4A). Posterolateral margin markedly concave, posterolateral reentrant well developed. Posterior margin comprises about 33% of carapace width, slightly convex, its corners are spiniform and turned upward.

Subhepatic and pterygostomial regions moderately granulated (Fig. 4F). Sutures of thoracic sternum relatively distinct, 2nd, 3rd and anterior part of 4th sternite covered with coarse granules; median hollow running along sternite 4. Sternites 5, 6 and lateral part of sternite 7 with finely granulated anterior margins, otherwise nearly smooth. Sternite 5 with mesial posteriorly directed projection bearing a button of the pleon-locking mechanism. Median portion of posterior margin of sternite 4, secondary sternal sulci and mesial projections of sternite 5 form horseshoe-shaped cavity. Suture 5/6 nearly complete, suture 6/7 complete in lateral two thirds, suture 7/8 complete in lateral half. Sutures between sternites and episternites complete. Episternites sickle-shaped (Fig. 4D). Penial furrow shallow, with short feebly produced quasitriangular lobes in lateral portion of sternite 8; penis reaching to about 80% of sternite width.

Mouthparts characteristic for Portunoidea. Endopod of maxilliped 1 with a somewhat enlarging distally and terminating in a tuft of setae lobe which extends beyong mesial margin of broadened distal part of endopod (Fig. 4F). Endopod of maxilliped 2 with terminal three articles perpendicular to merus; propodus with anteriorly directed lobe; strong bristles along mesial margins of this lobe and dactilus. Maxilliped 3 smooth in inner face, pilose in outer face and setose on margins. Exopod, and the coxa, basis and ischium of endopod have characteristic for Brachyura Heterotremata morphology. Ischium of endopod with a clear longitudinal groove on outer face, mesial margin beset with relatively sparse rigid setae. Anterior margin of merus produced forward and convex, with few long setae. Mesial margin narrowing from articulation with carpus to articualtion with ischium, in posterior half densely beset with strong setae. Carpus, propodus and dactylus are of characteristic for Heterotremata morphology (Fig. 4F).

Chelipeds 2.5 times longer than carapace, finely and irregularly granular, covered with irregularly placed tomentum. Coxa and basis nearly smooth; ischium smooth to finely granulated in dorsal face, irregularly granular in ventral face and with a proximal eminence and a row of dentiform increasing in size granules along anterior margin. Merus 2.9 times as long as broad; a costa-like suture extends in posterior half of dorsal face ending in a distal spine on posterior margin; anterior to costa there are irregular oblique rows of granules; less regular granulation posterior to costa; on ventral face there is dense fine granulation in anterior half and a reticulate granular pattern in posterior half; curved distal spinule in dorsal face at articulation with carpus. Four sharp curved spines at anterior margin of merus: distal most one located close to the articulation with carpus, about ten of large granules between it and three spines in the proximal half, most proximal one

being smallest (Fig. 4A, B). On dorsal face of carpus there are 3 diverging carinae, most lateral one ending in a sharp and relatively broad in dorsal view outer spine, one in middle going towards a proximal spine on cheliped propodus but not reaching margin of carpus, mesial one ending in a usual for Portunidae inner spine; scattered granules between carinae; distal margin beset with sharp granules (Fig. 4A, E). Chelae differ in size, heterodontic. On dorsal face of chela manus a usual spine at articulation with carpus present, being curved and sharp; two diverging granular carinae end in conspicuous spines in distal third of manus (Fig. 4A, E). Two less distinct carinae are present on outer (lateral) face of manus. Faces of manus between carinae and inner face evenly granulated, lower face with moderate squamiform marking. Chela fingers carinated. A moderate prismatic molariform tooth on cutting edge of dactylus of larger chela opposes to a mucronate tooth on the polex. Anterior to the dactylus there is a series of closely set conical teeth resembling a saw, proximal of them are larger, then few large teeth are intermittent with numerous smaller ones. On cutting edge of polex next to mucronate tooth there are 3 multi-lobed teeth with large central lobes (Fig. 4E).

Pereiopods 2–4 shorter than chelipeds, decreasing in size posteriorly; they are slender, smooth or finely granulated on anterior faces and morphologically similar to each other. Basis and ischium short, merus longest, about 5 times as long as broad, comprising about one third of pereopod length, carpus and propodus little narrower than merus, propodus and dactylus of about same length, dactylus narrow, styliform, indistinctly grooved. Sparse short hairs on anterior face of propodus and distal half of dactylus.

Pereiopod 5 shortest; merus and carpus are about as broad as long, antero-lateral corner of the latter serrated; propodus and dactylus comprise more than half of pereiopod length, with usual for Portunidae costae and emargination of dense tuft of hairs, propodus paddle-shaped, nearly 1.7 times as long as broad, dactylus foliaceous about 2.3 times as long as broad (Fig. 4A–C).

Male pleon broad at level of pleomeres 1–5 and then tapering. Pleonal terga 1–2 with transverse keels over nearly entire width. Terga 3–5 fused, their lateral margin sinuous. Distinct transverse keel extending over more than 70% width of tergite 3. Sixth pleomere about as broad as long, with sinuous lateral margins. Anterior margin slightly concave with wrapping posterolateral corners of last pleomere. Telson nearly as broad as long, with convex lateral margins and rounded tip (Fig. 4D).

Gonopod 1 with quasi-trapezoidal basal lobe having rounded corners; proximal part robust, the sternal face is flattened and the pleonal one is convex. Sparse hairs along canal opening on sternal face, otherwise proximal part is bare. Neck is curving laterally smoothly but sharply to tapering tip and small laterally exposed opening. A row of about 15 microscopical spinules in the distal part run along sternal face nearly to the tip; there few additional spinules are irregularly

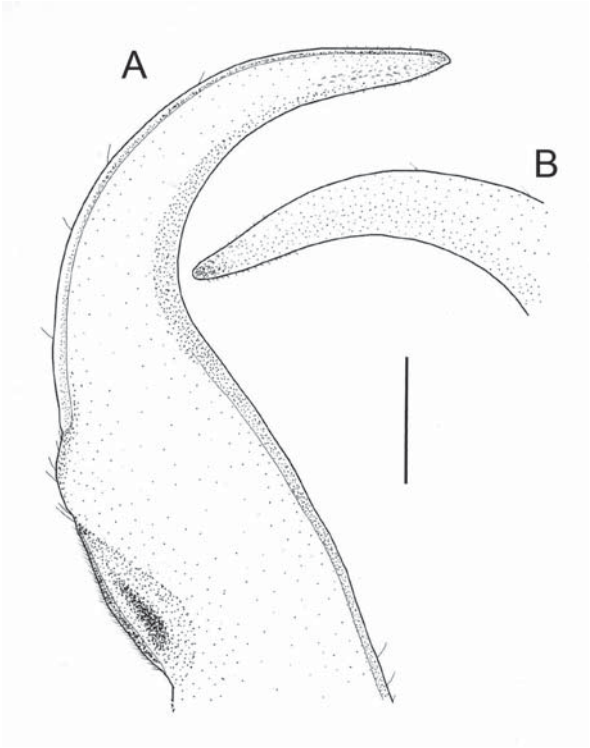

Fig. 6. Gonopod 1 of *Xiphonectes tuerkayi* sp.n., holotype. A — distal part, pleonal face; B — tip, sternal face. Scale bar 0.5 mm.

Рис. 6. Гонопод 1 of *Xiphonectes tuerkayi* sp.n., голотип. A — средняя и дистальная часть, вид со стороны плеона; B — концевая часть, вид со стороны торакально-стернального отдела. Масштабная линейка 0,5 мм.

placed; similar row of spinules and scattered spinules near tip on pleonal face. About 20 minute spinules on mesial face and about 12 ones on lateral face just near the tip (Figs 5A, B; 6A, B). Gonopod 2 more than half length of gonopod 1, thin, sinuous, tapering to tip but slightly enlarging to juncture with minute leaf-like terminal article (Fig. 5C).

FEMALE CHARACTERISTICS (specimem from the Bab al Mandab, Red Sea). CW/CL ratio is somewhat less than in male amounting to 2.0. Pleon broad, covering sterno-pleonal cavity. Pleomere terga 2–3 with transverse keels extending over entire width, in tergum 4 transverse keel extending for more than half of width. Terga 5–6 smooth. Genital opening occupies more than half length of mesial part of the sternite, tapering mesially and broadening laterally, broader than long, with long axis nearly parallel to posterior margin of sternite (Fig. 5D).

COLOURATION. Colour in live unknown.

VARIATION. Specimens from the Gulf of Aden (including numerous juveniles) and the female from the Gulf of Martaban show relatively longer and narrower median frontal lobes (Figs 3F, G, 7C) than specimens from Bab al Mandab (Figs 3H, 7A). The penultimate pleomere in the males from the Gulf of Aden is usually longer than broad (Fig. 7B, D) vs. about as long as broad in the holotype and the specimens from Bab al Mandab (Fig. 4D).

In contrast to *X. longispinosus* which demonstrates a tendency to reduction of the anterolateral teeth number, even juveniles of the present species have a complete set of nine teeth. The only example of the reduced number of anterolateral teeth is a juvenile male from the Gulf of Aden, which has 9 teeth on the right side and only 5 on the left one. However, an abnormally large 2nd tooth indicates malformation, possibly fusion of at least three teeth and reduction of others (Fig. 7C).

SIZE. Holotype measures CL 13.5, CWmax 30.0, CW0 21.0; P1 (right) 34.2, P1 (let) 33.3, P2 30.0, P3 27.4; P4 22.0; P5 15.0. The male and ovigerous female from Bab al Mandab measure respectively (CL × CW × CW0) 11.4 × 26.5 × 17.0 and 11.0 × 22.0 × 15.8. Males from the Gulf of Aden with externally recognized sex-specific shape of pleon measure 7.8 (CL) to 11.4 × 25.0 × 18.5, smallest externally recognized female measures 7.5 × 19. 4 × 16.5. Juveniles with CL 4.0–5.5 can be hardly sexed using external characters.

Female from the Gulf of Martaban measures 8.0 × 18.0 × 12.4.

AFFINITIES. The present species belongs to the group of *Xiphonectes* species with four-lobed front, very long last anterolateral tooth (spine), a single distal spine on the posterior face of cheliped merus, and two distal spines on the upper face of cheliped manus. These species differ from such species as *Xiphonectes bidens* (Laurie, 1906) which have only one distal spine on the upper face of cheliped manus. This group includes *Xiphonectes emarginatus* (Stephenson et Campbell, 1959) (= *Portunus stephensoni* Moosa, 1981), *X. longispinosus* (Dana, 1852), *X. iranjae* (Crosnier, 1962), *X. leptocheles* A. Milne-Edwards, 1873, *X. macrophthalmus* (Rathbun, 1906), *X. tenuicaudatus* (Stephenson, 1961). They also have similar first gonopods, (i.e. Stephenson, 1961: figs 2C, 3H; Crosnier, 1962: figs 115–116; Crosnier, Thomassin, 1974: fig. 4g; Apel, Spiridonov, 1998: fig. 114b; Crosnier, 2002: fig. 3B); in *X. leptocheles* and *X. macrophthalmus* the gonopod is not illustrated). Macroscopic morphology of these gonopods can be hardly used for distinguishing between species while microscopic details have not been described for most of species.

From *X. emarginatus* [Stephenson, Campbell, 1959: 107, figs 2H, 3H, pl. 2, fig. 4] the new species differ by distinct and well-developed median and lateral frontal lobes *vs*. the frontal margin being markedly flattened, median lobes being very low and the lateral ones faint to practically absent [Crosnier, 1962: fig. 108].

X. tuerkayi differs from *X. iranjae*, *X. leptocheles*, and *X. tenuicaudatus* by 4–5 vs. 3 spines on the anerior margin of cheliped merus. *X. tuerkayi* also differ from *X. iranjae* by thinner anterolateral teeth of carapace (usually 9 in the new species vs. 6–7 in *X. iranjae*), by the absence of fused granular patches in the mesogastric and cardiac regions [Crosnier, 2002: fig. 4], by more elongated and rounded anterior part of the 3rd maxilliped merus which in *X. iranjae* is truncated [Crosnier, 1962: fig. 110].

From *X. leptocheles* [Milne-Edwards, 1873: 159–158, pl. 4, 1, 1a] X. *tuerkayi* differs by markedly developed granular patches and fine granulation of carapace surface between them and chelipeds vs. transformation of granular patches to solid tubercles and nearly smooth surface of the carapace and chelipeds in the former species.

From *X. tenuicaudatus* the new species also differs by the absence of elevated tubercles on the carapace in the gastric, mesobranchial and cardiac regions, relatively high and sharp median frontal lobes (vs. low and rounded) and sharper anterolateral teeth

The new species differs from *X. macrophthlamus* by the presence of 9 anterolateral teeth vs. 7–8 ones and by morphology of penultimate pleomere which in the latter species is distinctly longer than broad and much constricted anteriorly [Rathbun, 1906: fig. 31].

X. tuerkayi is most similar to *X. longispinosus* sensu str. Even though the material is not yet sufficient for correct statistical comparison the first species appears to be a larger species than the second attaining greater maximum size in both males (Cl 13.5 vs. 9.2) and females (CL 11.0 vs. 9.5). In the Red Sea and the Gulf of Aden area these contrasts are stronger than in other areas. While in *X. longispinosus* females as small as those with CL 6.5 may be ovigerous, in *X. tuerkayi* this is still a size of juveniles. Morphological differences between these two species are summarized in the Table.

The present species is also very similar to *Xiphonectes* cf. *longispinosus* sensu Crosnier, 2002 which is most likely not conspecific to the lectotype of *X. longispinosus* (see above). In our material we found a specimen apparently conspecific to *X.* cf. *longispinosus* sensu Crosnier [2002]. This male specimen (NHM 83.31) measuring (CL × CWmax × CW0) 8.5 × 20.0 × 13.0 (Fig. 7E, D) and Crosnier's specimens from Marquises Is. (maximum size of female, CL × CWmax 12.3 × 25.6, maximum size of ovigerous female 8.8 × 20.7) are distinguished by the following characters. They have moderately granular carapace, long and broad sharp triangular lateral frontal lobes and relatively narrow triangular median lobes, about half as along (in the specimens from Marquises) or less (in the specimen from Tonga) than lateral lobes. In contrast to *X. tuerkayi* the number of anterolateral teeth is reduced to 8 [Crosnier, 2002: figs 2, 3A] or 7 (Fig. 7E). Chelipeds possess 4 to 5 spines (Fig. 7E) on the anterior margin of merus; the latter condition we have not yet observed in *X. tuerkayi* but in *X. longispinosus*. Similarly to *X. tuerkayi* the penultimate pleomere of male is clearly not broader than long but there is no distinct keel on the 4th pleomere. Finally the gonopod 1 has more numerous bristles and spinules in the terminal part [Crosnier, 2002: fig. 3D].

Xiphonectes longispinosus (as *Portunus longispinosus*) recorded and illustrated by Nagai [1981] from Kushimoto, Wakayama Prefecture in Japan (about 10–20 m depth, on sand) [Nagai, 1981: pl. I D] is in most respect similar to *X. tuerkayi*, it has a short keel on the 4th male pleomere [Nagai 1981: pl. I A]. Its gonopod [Nagai, 1981: pl.. I B, C] is more similar to *X.* cf. *longispinosus* sensu Crosnier [2002].

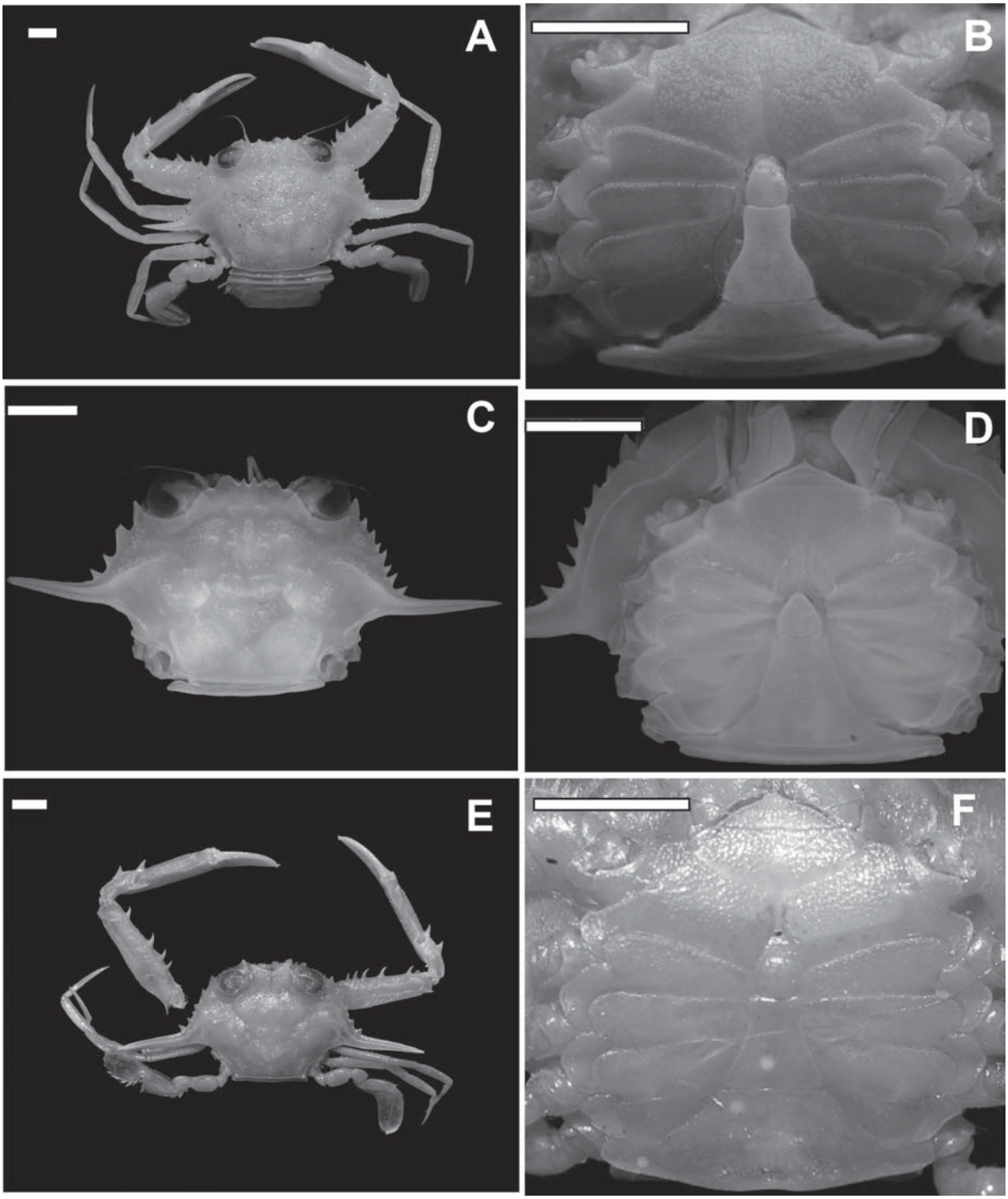

Fig. 7. *Xiphonectes tuerkayi* sp.n. and *X. longispinosus* sensu Crosnier, 2002. A — *X. tuerkayi* sp.n., ovigerous female (ZMMU Ma 2409), Bab al Mandab, dorsal view; B — *X. tuerkayi* sp.n., male (SMF 22973), 11.5 × 27.5 mm, Gulf of Aden, sternal region and pleon; C — *X. tuerkayi* sp.n., juvenile male (SMF 33390). 5.3 × 12.4 mm, Gulf of Aden; D — same specimen as C, sternal region and pleon; E — *X. longispinosus* sensu Crosnier, male (NHM 83.31), 8.5 × 20.0 mm, Tonga Is., dorsal view; F — same specimen as E, sternal region and pleon. 2 mm (A, C, E, F), 2.3 mm (D), 3 mm (B).

Ри. 7. *Xiphonectes tuerkayi* sp.n. и *X. longispinosus* sensu Crosnier, 2002. A — *X. tuerkayi* sp.n., яйценосная самка (ZMMU Ma 2409), проливы Баб эль Мандеб, дорсальный вид; B — *X. tuerkayi* sp.n., самец (SMF 22973), 11,5 × 27,5 мм, Аденский залив, торакально-стернальный отдел и плеон; C — *X. tuerkayi* sp.n., ювенильный самец (SMF 33390). 5,3 × 12.4 мм, Аденский залив; D — тот же экземпляр, что C, торакально-стернальный отдел и плеон; E — *X. longispinosus* sensu Crosnier, самец (NHM 83.31), 8,5 × 20,0 мм, о-ва Тонга, дорсальный вид; F — тот же экземпляр, что E, торакально-стернальный отдел и плеон. Масштабная линейка 2 мм (A, C, E, F), 2,3 мм (D), 3 мм (B).

Table. Comparison of *Xiphoncectes tuerkayi* sp.n. and *Xiphonectes longispinosus*.
Таблица. Сравнение *Xiphoncectes tuerkayi* sp.n. и *Xiphonectes longispinosus*.

Character	***Xiphonectes longispinosus***	***X. tuerkayi*** sp.n. (Socotra Island, Gulf of Aden, Bab al Mandab)
Ridges and patches on carapace	Moderately granulated, usually low	Coarsely granulated, elevated
Anterolateral patches	Few granules	As a distinct patch
Posterolateral carapace ridge	Low, diffused (Fig. 1A, 2A, C, E)	Elevated, distinct (Fig. 4A, B; 7A, C)
Lateral frontal lobes	Distinctly broader than long, relatively low, usually not reaching to inner infraorbial lobes, usually rounded at top (at least in females) (Fig. 1A; 2E; 3A–D)	Not distinctly broader than long or as broad as long, triangular, relatively high, usually reaching to inner infraorbital lobes, sharpened at top (Fig. 2B, 7A, C; 3E–H)
Median frontal lobes	Small, usually distinctly broader than long, separated from lateral lobes by shallow U-shaped gap, usually rounded at top (Fig. 3A–D)	Usually half or more than half as long as lateral lobes, separated from them by deep V-shaped incision, at least not distinctly broader than long, triangular, sharpened at top Fig. 3E–H)
Mesial corner of inner supraorbital lobe	Usually rounded (Fig. 3A–D)	Usually angled (Fig. 3E–H)
Anterolateral teeth	With tendency to reduction, 7–9; inequal number on both sides possible	No tendency to reduction, always 9, even in juveniles
Keel on 4th pleonal tergum of male	Absent (Fig. 2B, F)	Present (Fig. 4C, D; 7B, D)
Pleomere 6	Distinctly broader than long (width to length ratio 1.1–1.5) (Fig. 2B, F)	As broad as long or longer than broad (width to length ratio 1.0–0.8) (Fig. 4C, D; 7B, D)

I regard *X.* cf. *longispinosus* sensu Crosnier [2002] as a possibly separate but not yet described species of the *X. longispinosus* complex. However since transitional forms have been reported [Nagai, 1981], I refrain from description a new species until more material from the intermediate area between its range in Polynesia and the distribution area of *X. tuerkayi* sp.n. in the Indian Ocean, and phylogeographic data are available.

ETYMOLOGY. This species is dedicated to the memory of my friend and colleague Prof. Michael O. Türkay (1948–2015) in recognition of his remarkable contribution to taxonomy of Brachyura and biology of the Indian Ocean and the Red Sea.

ECOLOGY. The species is generally known from sandy substrates at the low subtidal zone (35–86 m), the record from the Gulf of Oman originates from dredging in the depth range 9–36 m. Similarly to *X. tuerkayi* sp.n. *X.* cf. *longispinosus* from Polynesia is generally a lower subtidal species, occurring on the insular shelves at depth from about 32 m (Tonga) to 54–150 m in the Marquises area (one record from 95–350 m [Crosnier, 2002]).

DISTRIBUTION. Straits of Bab al Mandab in the Red Sea, Gulf of Aden, Arabian Sea (type locality), Gulf of Oman, Andaman Sea (present study), Seychelles [Crosnier, 1984], possibly Japan [Nagai, 1981].

REMARKS. The specimens recorded by Crosnier from the Seychelles are regarded *X. tuerkayi* sp.n. on the basis of the drawing of frontal region of carapace and male pleon [Crosnier, 1984: figs 2D, E].

Discussion

Xiphonectes longispinosus was considered as a species complex since Stephenson's and Rees' [1967] study. The present study changes the concept of this complex by excluding such taxa as *Xiphonectes bidens* (Laurie, 1906), *X. iranjae* (Crosnier, 2002), *X. leptocheles* A. Milne-Edwards, 1873, *X. macrophthlamus* (Rathbun, 1906), and *X. tenuicaudatus* (Stephenson, 1961). They are morphologically well separated from *X. longispinosus* sensu lato and can be easily diagnosed. However, their diagnostic characters mainly refer to external morphology (carapace sculpture, cheliped morphology and male pleon) while the first gonopods are not clearly distinguishable between the species at least at the macroscopic level. The species of *X. longispinosus* complex in the present concept also show similar first gonopods to the discussed group. This is not a common situation in the Portunidae and even within those *Xiphonectes* spp. which are morphologically similar to the above mentioned species, there are species with very distinct gonopods, i.e. *Xiphonectes guinotae* Stephenson et Rees, 1961 [Stephenson, Rees, 1961: fig. 2D–F; see also Apel, Spiridonov, 1998: figs 102–103]. However, it may happen that microscopic investigation and, in particular scanning electronic microscopy will show differences in the pattern and morphology of spinules in the distal part of the gonopod which likely fuction as sensillae.

The *Xiphonectes longispinosus* complex in the present concept includes the following morphological species: *X. longispinosus* s.str., *X. emarginatus*, *X.*

tuerkayi. It may also include *X. vigilans* if it turns that there is a separate species in the Hawaian waters which should bear this name (see Remarks to *X. longispinosus*). These taxa differ from each other by a combination of characters and show a significant level of sympatry. In particular, both *X. longispinosus* and *X. emarginatus* were recorded from Australia and Madagascar, while *X. longispinosus* and *X. tuerkayi* were found by the same collectors in the Gulf of Oman and the Gulf of Martaban (in the collection of NHM). In the Red Sea – Gulf of Aden region *X. longispinosus* and *X. tuerkayi* appear to be separated: the first species is recorded so far only in the Red Sea proper while the second was found only in the Straits of Bab al Mandab connecting the Red Sea to the Gulf of Aden and in the Gulf of Aden proper. It is difficult to conclude at present if this reflects a real distribution pattern or it is a result of insufficient sampling.

None of the species of *X. longispinous* complex was examined for the molecular barcode, the gene of mitochondrial cytochrome oxidase I and genomic identity. The future studies based on more extensive morphological material and involving molecular genetics and phylogeographic analysis will need to test the following hypotheses.

The zero-hypothesis is that these morphological species, in particular *X. longispinosus* and *X. tuerkayi* sp.n. are extreme phenotypic forms of a single polymorphic species. The alternative hypothesis is that these are separate biological species possibly originating as a result of ecological speciation [Nosil, 2012] that appears to be a relatively common process in tropical seas [Bowen et al., 2013; Li et al., 2016]. *X. longispinosus* might have been thus diverged as a species associated with lower intertidal – upper subtidal conditions and shallow reef areas, and *X. tuerkayi* sp.n. might have formed as a shelf species associated with the lower subtidal zone.

ACKNOWLEDGEMENTS. My gratitudes are extended to Dmitry G. Zhadan for joint collecting of *X. longispinosus*, Adam Baldinger for kind sending of the photo and information on the type of *Amphitrite longi-spinosa*, Paul F. Clark for the help in studying collections in the NHM and Peter Dworschak for the guidance in the collection of NHMW. The research stays in the SMF was funded by the guest grants of the SMF while the visit to NHM was supported by the Russian Foundation for Basic Research grant # 16-04-01526.

References

Alcock A. 1899. Materials for a carcinological fauna of India, no 4. The Brachyura Cyclometopa, Part 2. A revision of the Cyclometopa with an account of the families Portunidae, Cancridae and Corystidae // Journal of Asiatic Society of Bengal. Vol.68. No.2. P.1–104.

Apel M., Spiridonov V.A. 1998. Taxonomy and zoogeography of the portunid crabs (Crustacea: Decapoda: Brachyura: Portunidae) of the Arabian Gulf and the adjacent waters // Fauna of Arabia. Vol.17. P.159–331. Pls 1–12.

Balss H. 1924. Expedition S.M. Schiff "Pola" in das Rote Meer. Zoologische Ergebnisse. XXXIV. Decapoden des Roten Meeres III. Die Parthenopiden, Cyclo- und Catometopen // Denkschriften der Akademie der Wissenschaft Wien. Mathematisch-Naturwissebschaftliche Klasse. Bd.99. S.1–30. Taf. 1.

Bowen B.W., Rocha L.A., Toonen R.J., Karl S.A. 2013. The origins of tropical marine biodiversity // Trends in Ecology and Evolution. Vol.28. P.359–366.

Coppinger R.W. 1884. Summary of the voyage // Report on zoological collections made in the Indo-Pacific Ocean during the voyage of HMS "Alert" 1881-2. London: Taylor and Francis. P.2–4.

Crosnier A.1962. Crustacés decapodes portunides // Faune de Madagascar. Vol.16. P.1–154, 13 pls.

Crosnier A. 1984. Sur quelques Portunidae (Crustacea Decapoda Brachyura) des iles Seycheles // Bulletin du Muséum National d'Histoire naturelle, 4e ser., sect.A. Vol.6. P.397–419.

Crosnier A. 2002. Portunidae (Crustacea, Decapoda, Brachyura) de Polynésie française, principalement des îles Marquises // Zoosystema. Vol.24. No.2. P.401–449.

Crosnier A., Thomassin B. 1975. Decapoda Brachyura) de Madagascar ou des iles avoisinantes, nouveaux, rares ou non encore signalés // Bulletin du Muséum National d'Histoire naturelle, 3e ser. Vol.304 (Zool. 214). P.711–742.

Dana J.D. 1852a. Conspectus of the Crustacea of the Exploring Expedition under Capt. Wilkes, U.S.N., including the Crustacea Cancroidea & Corystoidea // Proceedings of the Academy of Natural Sciences Philadelphia. Vol.6. P.73–86.

Dana J.D. 1852b. Crustacea. Part I. United States Exploring Expedition during the years 1838–1842 under the command of Charles Wilkes, U.S.N. 13(2). Philadelphia: C. Sherman. P. i–viii + 1–685.

Dana J.D. 1855. Crustacea. Atlas. United States Exploring Expedition during the years 1838–1842 under the command of Charles Wilkes, U.S.N. 13(2). Philadelphia: C. Sherman. P.1–27. Pls.1–96.

Edmondson C.H. 1954. Hawaian Portunidae // Occasional Papers of Bernice P. Bishop Museum. Vol.21. No.12. P.217–274.

Fishelson L. 1971. Ecology and distribution of the benthic fauna in the shallow waters of the Red Sea // Marine Biology. Vol.10. P.113–133.

International Commission on Zoological Nomenclature. 1999. International Code of Zoological Nomenclature. Fourth Edition. London: International Trust for Zoological Nomenclature. 306 p.

Klunzinger C.B. 1913: Die Rundkrabben des Roten Meeres // Abhandlungen der Kaiserlich Leopoldinischen-Carol. Deutschen Akademie der Naturforscher Halle. Bd.99. H.2. S.97–402, Taf. 5–11.

Koch M., Spiridonov V.A., Ďuriš Z. (in preparation). Partial revision of the genus *Portunus*, *s.l.* (Decapoda: Brachyura: Portunidae) based on molecular and morphological analyses // Zoological Journal of Linnean Society.

Li J., Foighil D., Strong E.E. 2016. Commensal associations and benthic habitats shape macroevolution of the bivalve clade Galeommatoidea // Proceedings of the Royal Society. Biological Science. doi: 10.1098/rspb.2016.1006.

Miers E.J. 1884. Crustacea // Report on zoological collections made in the Indo-Pacific Ocean during the voyage of HMS "Alert" 1881-2. Part II. Collections from the Western Indian Ocean: London: Taylor and Francis. P.513–575. Pls 46–51.

Milne-Edwards A. 1873. Recherches sur la faune carcinologique de la Nouvelle-Caledonie. 2-eme partie. Chapitre II. Groupe des cyclometopes. Portuniens // Nouvelle Archive du Muséum d'Histoire naturelle. Vol.9. P.155–170. Pl. 4.

Nagai S. 1981. [Notes on *Portunus* (*Xiphonectes*) *longispinosus* and some related species from Japan] // Nanki Seibutu.. Vol.23. Issue 1. P.27–32 [in Japanese].

Nosil P. 2012. Ecological speciation. Oxford: Oxford University Press. 280 p.

Neumann V., Spiridonov. V.A. 1999. Shallow water crabs from the Western Indian Ocean: Portunoidea and Xanthoidea excluding Pilumnidae (Crustacea Decapoda Brachyura) // Tropical Zoology. Vol.12. P.9–66.

Ng P.K.L., Guinot D., Davie P.J.F. 2008. Systema Brachyurorum: Part I. An annotated checklist of extant brachyuran crabs of the world // The Raffles Bulletin of Zoology. Supplement 17. P.1–286.

Paulson O. 1875. [Studies on Crustacea of the Red Sea, with notes regarding other seas. Part I. Podophthalmata and Edriophthalmata (Cumacea)]. XV + 144 pp. Kiev: S.V. Kulzhenko. [in Russian; English translation published by F.D. Por. 1961. 164 pp. Jerusalem, Israel program for scientific translations]

Rathbun M.J. 1902. Crabs from the Maldive Islands // Bulletin of Museum of Comparative Zoölogy at Harvard College. Vol.39. No.5. P.123–138.

Rathbun M.J.1906. Brachyura and Macrura of Hawaian Islands // Bulletin of United States Fish Commission. Vol.23. P.827–930, pls. 1–24.

Sakai T. 1939. Studies on the crabs of Japan. Brachygnatha, Brachyrhyncha. Tokyo: Yokendo Ltd. P.365–741, pls 42–111.

Sakai T. 1976. Crabs of Japan and the adjacent Seas. Tokyo: Kodansha Ltd. Vol.1. P.xxix + 1–773; Vol.2. P.1–16. pls.1–251.

Schubart C.D., Reuschel S. 2009. A proposal for a new classification of Porlunoidea and Cancroidea (Brachyura: Heterotremata) based on two independent molecular phylogenies // Martin J.W., Crandall K.A., Felder D.L. (eds.) Decapod Crustacean Phylogenetic. Crustacean Issues. Vol.18. P.533–550.

Spiridonov V.A. 1994. [The swimming crabs (Crustacea, Brachyura, Portunidae) of submerged rises and insular shelves of the Atlantic and Indian Oceans] // [Kuznetsov A.P., Mironov A.N. (eds.): Bottom fauna of seamounts. Transactions of the P.P. Shirshov Institute of Oceanology] Vol.129. P.126–152 [in Russian].

Spiridonov V.A. 2013. [Portunoid ("swimming") crabs of the World Ocean: taxonomic revision, ecology and distribution]. Dissertation Dr. of Science. Moscow: P.P. Shirshov Institute of Oceanology. 276 p. [in Russian].

Spiridonov V.A., Neretina T.V., Schepetov D. 2014. Morphological characterization and molecular phylogeny of Portunoidea Rafinesque, 1815 (Crustacea Brachyura): implications for understanding evolution of swimming capacity and revision of the family-level classification. Zoologischer Anzeiger. Vol.253. P.404–429. DOI: 10.1016/j.jcz.2014.03.00

Stephensen K. 1945. The Brachyura of the Iranian Gulf // Danish Scientific Investigations of Iran. Copenhagen. Pt.4. P.57–237.

Stephenson W. 1961. The Australian Portunids (Crustacea, Portunidae). V. Recent collections // Australian Journal of Marine and Freshwater Research. Vol.12. P.92–128.

Stephenson W. 1972. An annotated checklist and key to the Indo-West-Pacific swimming-crabs (Portunidae) // Bulletin of the Royal Society of New Zealand. No.10. P.1–64.

Stephenson W. 1976. Notes on Indo-West-Pacific portunids in the Smithsonian Institution // Crustaceana. Vol.31. P.11–26

Stephenson W., Campbell B., 1959. The Australian portunids (Crustacea: Portunidae). III. The genus *Portunus* // Australian Journal of Marine and Freshwater Research. Vol.10. P.84–124, 4 pls.

Stephenson W., Rees M. 1961. Sur deux nouveaux crustaces Portunidae Indo-Pacifiques // Bulletin du Muséum national d'Histoire naturelle. Ser.2. Vol.33. No.4. P.421–427.

Stephenson W., Rees M. 1967. Some portunid crabs from the Pacific and Indian Oceans in the collections of the Smithsonian Institution (Crustacea: Portunidae) // Proceedings of US National Museum. No.120 (3556). P.1–114.

Zarenkov N.A. 1971. [Species composition and ecology of Crustacea Decapoda of the Red Sea] // Vodianitzky V.A. (ed.) [Benthos of the continental shelf of the Red Sea]. Kiev: Naukova Dumka. P.155–203 [in Russian].

Responsible editor K.G. Mikhailov