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Iranian Subtidal Leucosiid Crabs (Crustacea: Deacapoda: Brachyura) of the Persian Gulf: Taxonomy and Zoogeography

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Total of 35 species of leucosiid crabs have been recorded by several authors and the current survey from the Persian Gulf. Here, zoogeography of these species and their zoogeographical affinities within Indo-West Pacific region are discussed. In addition, present taxonomic survey of the Iranian coasts of the Persian Gulf resulted in finding 14 leucosiid crabs, of which *Arcania erinacea* and *Pariphiculus mariannae* are new records for the area.

Key words: Iran, Leucosiid crab, Persian Gulf, taxonomy, zoogeography.

INTRODUCTION

Leucosiid crabs constitute one of the commonest but least known brachyuran taxa in the Indo-West Pacific region. Though studied by generations of taxonomists starting with Bell (1855), they largely remain a source of systematic and nomenclatural confusion (Miers, 1879; Alcock, 1896; Galil, 2001a, b). But, recently genus *Leucosia* is revised thoroughly by Galil (2005a, b; 2004a, b). The most recent study on leucosiids of the Iranian coast of the Persian Gulf was published 60 years ago (Stephensen, 1945), from the material collected during the Danish Expedition in 1937-38 through fishery investigations carried out in the service of the Iranian Government. Stephensen (1945: 200-202) identified 21 species and listed several more from the works of Alcock (1895-1900), MacGilchrist (1905), and Nobili (1906).

During 2003 and 2004, specimens were collected along Iranian coast of the Persian Gulf (except Khuzestan Province) in 80 and 54 stations of Hormuzgan and Bushehr Provinces, respectively. The specimens were collected by trawl net using the Fisheries Research Organization of Iran vessel, *Ferdous I*. In addition, specimens were collected using Petersen grab at 40 stations along the entire Iranian coast of the Persian Gulf in August 2004.

The specimens were preserved in 70% alcohol and shipped to the laboratory of Zoology, University of Tehran, and they were deposited in the Zoological Museum, University of Tehran (ZUTC).

The extensive survey resulted in finding 14 leucosiid species. The 10 species that were identified to species level are presented in this paper, two of which are new records for the Persian Gulf. The remaining four could not be identified beyond the genus level because the specimens were juvenile. Therefore, these are not treated here.

Abbreviations used:
CL. = Carapace length
CB. = Carapace breadth
mm = Millimeter
cm = Centimeter

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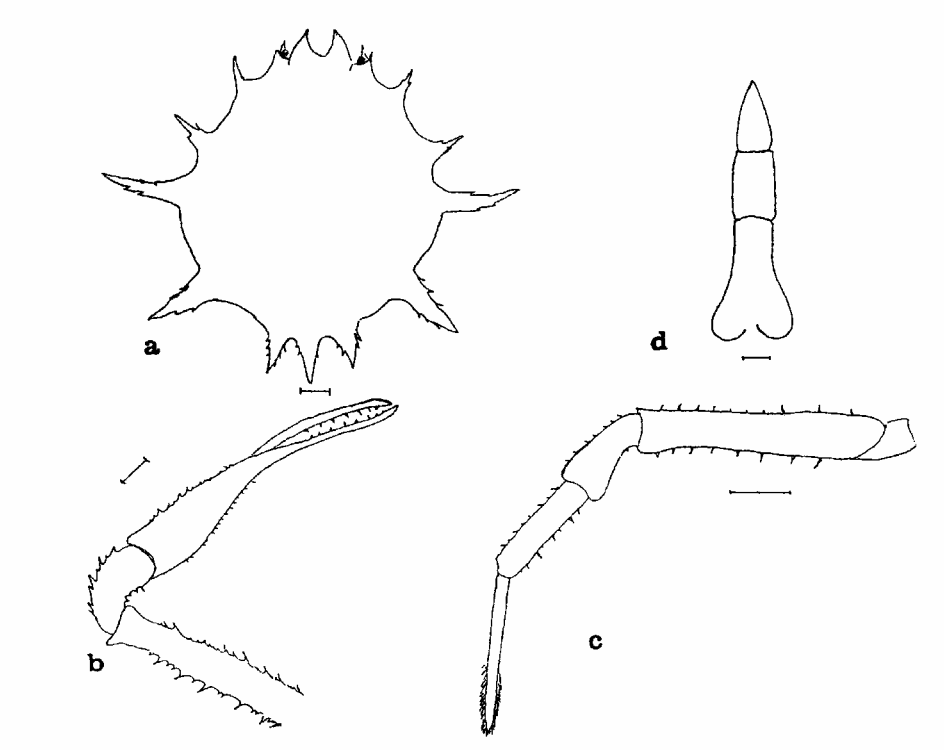

FIG. 1.– *Arcania erinacea* (Fabricius, 1787): a, carapace; b, cheliped; , fourth walking leg; d, male abdomen. Scale: 1 mm.

TAXONOMIC ACCOUNT

Family LEUCOSIIDAE Samouelle, 1819
Subfamily ILIINAE Stimpson, 1871
Genus *Arcania* Leach, 1817
1- *Arcania erinacea* (Fabricius, 1787)
(Fig. 1)

Leucosia erinaceus Fabricius, 1787: 352.
Cancer erinaceus Herbst, 1790: 258. Pl. 20, fig. 3.
Arcania erinaceus Alcock, 1896: 268; Tirmizi & Kazmi, 1986: 72, fig. 20.
Arcania erinacea Sakai, 1999: 16, pl. 6c.; Galil, 2001a: 179, fig. 1E, 5A.

MATERIAL

1♂ CL. 18 mm, CB. 19 mm (ZUTC Brach. 1001), 26° 41' N, 56° 55' E, 44 - 45 m, trawl, 27. 12. 2003.

TYPE LOCALITY

Indian Ocean.

REDESCRIPTION

Carapace (Fig.1-a) circular, dorsal surface covered with spinules of various size and shape, eleven large spines on the margins of the carapace, all of which are secondarily spinulose, that makes it easily distinguishable from the other species of this genus. Front bidentate, with two large triangular teeth, closely covered with granules. Chelipeds (Fig.1-b) large, merus granulate on ventral surface,

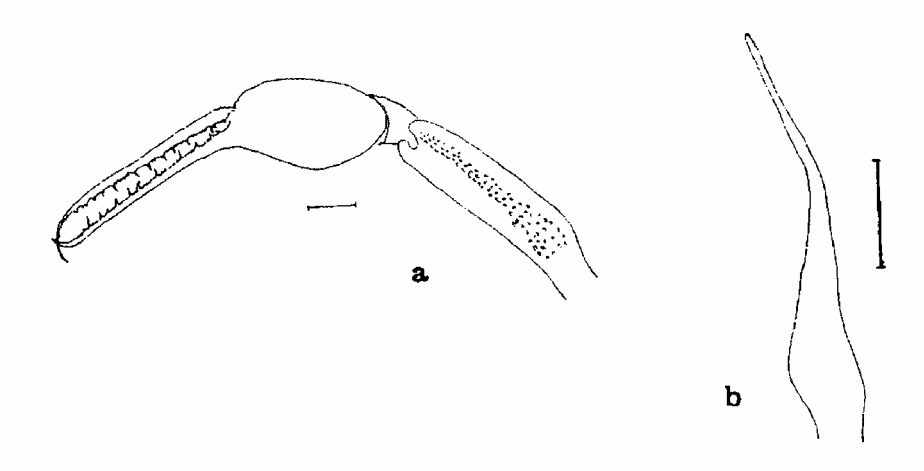

FIG. 2.– *Iphiculus spongiosus* Adams & White, 1848: a, cheliped; b, first gonopod. Scale: 1 mm.

spinose on dorsal surface, anterior and posterior margins. Merus of walking legs (Fig.1-c) bearing spines on the upper and lower margins, carpus and propodus minutely spinulate. Outer denticle on anterior margin of efferent respiratory channel larger than inner one, infraorbital lobe (Fig.1-a) spinose. Thoracic sternites granulate. Male abdomen basally swollen (Fig.1-d).

DISTRIBUTION

Indian Ocean, Oman, Pakistan, India, Sri Lanka, Singapore, Thailand, China, Japan. This is the first record of this species from the Persian Gulf.

Genus *Iphiculus* Adams and White, 1849

2- *Iphiculus spongiosus* Adams and White, 1849

(Fig.2)

Iphiculus spongiosus Adams and White, 1849: 57, pl. 13, fig. 5; Alcock, 1896: 256; Nobili, 1906: 170; Ihle, 1918: 252; Stephensen , 1945: 70-71, figs 6D, E; Guinot, 1967: 248 (in list); Chen, 1989: 233, fig. 4 c-f, pl. IV 5.

MATERIAL

1♀ CL. 8.7 mm, CB. 14.4 mm; 1♂ CL. 7.4 mm, CB. 11.5 mm (ZUTC Brach. 1002), 29° 46' N, 49° 55' E, 14 m, trawl, 31. 12 .2003; 1♂ CL.11 mm, CB.16.8 mm (ZUTC Brach. 1003), 26° 33' N, 55° 59' E, 57 m, trawl, 27. 12. 2003; 1♀ CL. 12.3 mm, CB. 20 mm, 1♂ CL. 8.8 mm, CB. 12.5 mm (ZUTC Brach. 1004), 26° 40' N, 55° 09' E, 20 m, trawl, 27. 12. 2003.

TYPE LOCALITY

Philippines

DIAGNOSIS

Carapace much broader than long, transversely ovoid, dorsal surface densely pubescent. Four spines on the anterolateral margins of carapace, successively larger posteriorly. Two dentiform tubercles laterally on the posterolateral border. Front bilobed. Manus of Chelipeds (Fig. 2-a) swollen, fingers slender, longer than manus (about 1.5 times). First gonopod (Fig. 2-b) stout, distally bent.

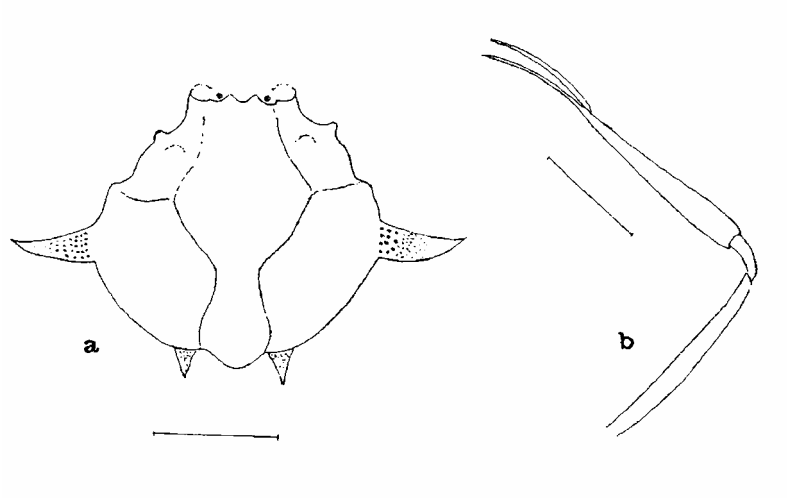

FIG. 3.– *Ixoides cornutus* Mac Gilchrist, 1905: a, carapace; b, cheliped.
Scale: 1 cm.

DISTRIBUTION
Persian Gulf, India, Gulf of Thailand, Singapore, Indonesia, Philippines, China and Japan.

Genus *Ixoides* MacGilchrist, 1905
3- *Ixoides cornutus* MacGilchrist, 1905
(Fig. 3)

Ixoides cornutus MacGilchrist, 1905: 255; Alcock & MacGilchrist, 1905, pl. 73, fig. 2, 2b; Ihle, 1918: 314; Sakai, 1937: 137, pl. 19, figs.1-4; Stephensen, 1945: 74; Ser`ene & Lohavanijaya, 1973: 39-40, pl. V, fig. D; Chen, 1989: 277, fig. 21a-c, pl. I 11, Pl. IV4.

MATERIAL
1♀ CL. 17.2 mm, CB. 27.5 mm (ZUTC Brach. 1005), north of Hormuz Island, 20 m, trawl, 26. 12. 2003.

TYPE LOCALITY
Persian Gulf**.**

DIAGNOSIS
Carapace (Fig. 3-a) broader than long (including lateral spines), a strong spine-like process medially on lateral margins. This shape of the process is exceedingly variable, but it seems independent of sex or age (Sakai, 1937). In the single specimen collected, the lateral process is 1⁄4 width of carapace, basally granulate and pointed in the tip, which is at variance with Chen (1989) and Sakai (1937), and basally granulate. Two basally granulate dentiform tubercles on the posterior margin of the carapace. Two small tubercles anteriorly on the anteriolateral margins. Chelipeds (Fig. 3-b) slender, merus long, distally granulate, manus much longer than fingers. This species differs greatly from the specimens described from Japan (Sakai, 1937) and from the Philippines (Chen, 1989).

DISTRIBUTION
Persian Gulf, Vietnam, Philippines, China and Japan.

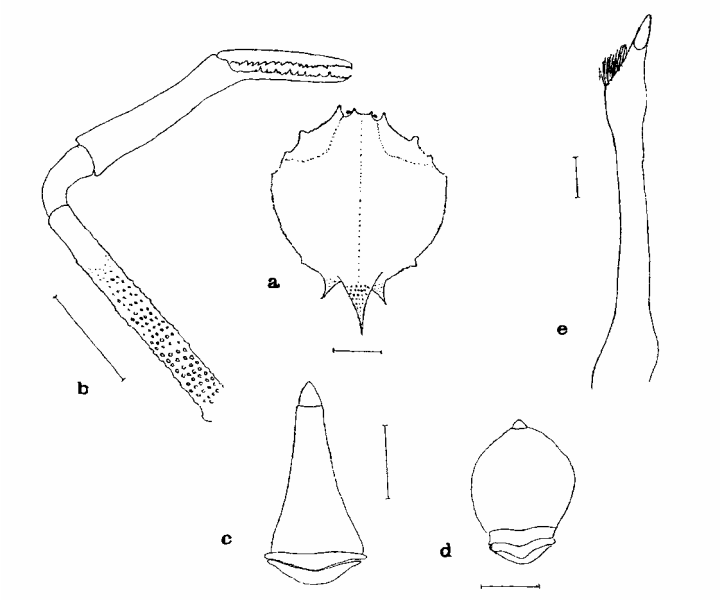

FIG. 4.– *Myra pernix* Galil 2001b: a, carapace; b, cheliped; c, abdomen of male; d, abdomen of female; e, first gonopod. Scales: a, b, c & d, 1 cm; e, 1 mm.

Genus *Myra* Leach, 1817
4- Myra pernix Galil, 2001b

(Fig.4)

Myra pernix Galil, 2001b: 430-431, Figs. 2f, 15.
Myra fugas Alcock, 1896: 202-204; Stephensen, 1945: 72, figs. 7b-c; Tirmizi & Kazmi, 1986: 89-92, fig.26.

MATERIAL

1♂ CL. 18.2 mm, CB. 13.5 mm (ZUTC Brach. 1006), 26° 56' N, 53° 26' E,17-19 m, trawl, 18. 2. 2004; 2♂ CL. 23.1-22.8 mm, CB. 16.8-16.6 mm (ZUTC Brach. 1007), 26° 38' N, 53° 15'E, 20 m, trawl, 18. 9. 2003; 1♂ CL. 22.9 mm, CB. 16.6 mm (ZUTC Brach.1008), 26° 23'N, 54° 32'E, 43-45 m, trawl, 23. 9. 2003; 1♀ CL. 24.3 mm, CB. 16.9 mm (ZUTC Brach. 1009), 29° 28' N, 50° 21'E, 28 m, trawl, 4. 3. 2004; 2♂ CL. 23.3-22.1 mm, CB. 19.2-16.5 mm (ZUTC Brach. 1010), 29° 28' N, 50° 21' E, 28 m, trawl, 3. 3. 2004; 1♂ CL. 16.1 mm, CB. 12 mm (ZUTC Brach. 1011), North Kish, 20 m, grab, 22. 7. 2004; 1♂ CL. 16.8 mm, CB. 12.5 mm (ZUTC Brach. 1012), 28° 47' N, 50° 28' E, 45 m, trawl, 5. 3. 2004.

TYPE LOCALITY

Indian Ocean

DIAGNOSIS

Carapace (Fig. 4-a) subcircular, three large granulate spines in the posterior margin of carapace, the

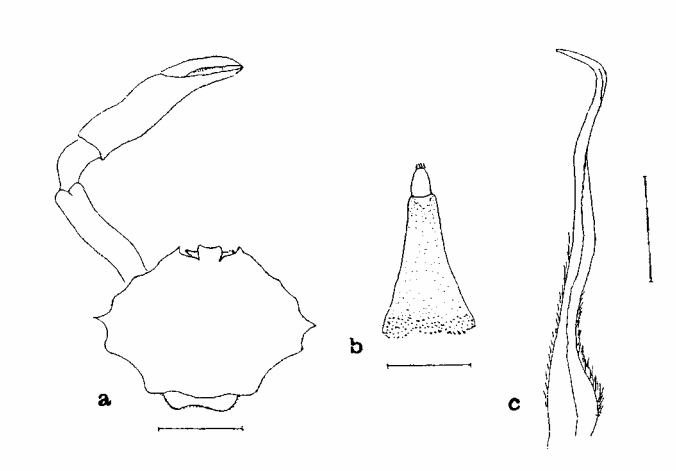

FIG. 5.– *Nursia plicata* (Herbst, 1804): a, carapace; b, abdomen of male; c, first gonopod scales: a & b, 5mm; c, 1 mm.

middle one larger than the other two, small tubercles in margins of carapace, two large tubercles in the posterolateral border. Front distinctly bidentate, with two small sharp teeth. Ischium of third maxilliped tomentose. Chelipeds (Fig. 4-b) are slender and long. Chelipeds vary depending on age and size (Alcock, 1896), manus longer than fingers. In the young male, manus equal to finger, or slightly longer than finger (Chen, 1989). Merus covered in its proximal three-quarters length with granules. Abdomen of male (Fig.4-c) triangular. Abdomen of female (Fig.4-d) nearly subcircular. The first gonopod (fig. 4-e) nearly straight and stout, with slender and curved tip, a patch of long hairs on outer surface of distal part.

DISTRIBUTION
Mediterranean, Red Sea, Pakistan, Persian Gulf, India, Zanzibar, East Africa, Japan.

Genus *Nursia* Leach, 1817

5- *Nursia plicata* (Herbst, 1804)

(Fig. 5)

Cancer plicatus Herbst, 1804: 2, pl. 59, fig. 2.
Nursia plicata, - de Man, 1881: 129. - Alcock, 1896: 180; Ihle, 1918: 311 (in list); Stephensen, 1945: 70, fig. 6C; Sakai, 1999: 16, pl.6B.

MATERIAL
1♂ CL. 8.00 mm, CB. 10.5 mm (ZUTC Brach. 1013), 26° 54'E, 56° 10' E, 19 m, grab, Aug. 2004.

TYPE LOCALITY
East India.

DIAGNOSIS
Carapace (Fig.5-a) nearly pentagonal, a little wider than long, with the posterior margin in the form of two semi-circular lobes. Front hardly projecting beyond the eyes, with thickened granular edge. The surfaces of the third maxillipeds, pterygostomian regions, thoracic sterna and proximal part of

the male abdomen are distinctly granular (Fig.5-b). The chelipeds long and stout, outer surface of the merus granulate, bearing very small granules proximally on upper and inner surfaces of carpus and manus; manus longer than finger. First gonopod (Fig. 5-c) sinuous, proximally setose and distally bent.

DISTRIBUTION
Persian Gulf, India, Palk Straits, Bombay, China, Hong Kong , Japan

Genus *Pariphiculus* Alcock, 1896

6- *Pariphiculus mariannae* (Herklots, 1852)

(Fig.6)

Ilia mariannae Herklots, 1852: 36-37, Pl. 1, fig. 2.
Pariphiculus rostratus Alcock , 1896 : 258 , pl. 8 , fig. 2; Alcock & Anderson 1897, plate 3 fig. 7.
Priphiculus mariannae Nobili, 1906: 165; Ihle, 1918: 249-250; Tirmizi & Kazmi, 1986: 83, fig. 24; Chen, 1989: 231, fig. 23. pl. IV, 3.

MATERIAL
1♀ CL. 23.9 mm, CB. 23.00 mm (ZUTC Brach.1014), 27° 52' N, 56° 20' E, 20 m, trawl, 31. 12. 2003.

TYPE LOCALITY
China

REDESCRIPTION
Carapace globular (Fig.6-a), the length of carapace slightly more than its breadth (CL./CB. 1.02), completely pubescent, there are small vesicles under the pubescent cover, intestinal region nearly pentagonal but sometimes round (cf. Tirmizi & Kazmi, 1986) with two spines, posterior one is clearly larger than anterior one (Fig.6-a). Marginal border of carapace with 12 spine-like denticles, the first pairs are in the middle of pterygostomian regions and small, second, fourth and fifth pairs are small and nearly triangular, third pairs are larger than the others and bent forward, sixth ones perfectly bent upwards. There are two rows of small granules under the posteriolateral denticles of carapace. Posterior denticles also perfectly spine-like. Front bifid, projecting far beyond of orbits, with round tips. Orbit broader than front, with two deep fissures in the posterior lope. The first antennae folded obliquely, about as long as twice the second antennae, second antennae short. Pterygostomian region swollen and granulate, with a large triangular denticle. Anterior half of third maxilliped covered with hairs, merus with a longitudinal row of granules. Cheliped (Fig.6-b) nearly longer than carapace length, merus of cheliped covered with vesicles except in the lateral part, the manus of hand swollen, much shorter than fingers, fingers slender, about as long as twice the manus, with hooked-tip, completely denticulate in the cutting edge. Walking legs slender, becoming shorter posteriorly, with smooth joints, propodus with long hairs (Fig.6-c). Male abdomen (Fig. 6-d) is narrowly triangular with 3-5 fused segments, proximal part of fused segment swollen in either side, and granulate.
The first gonopod (Fig.6-e) stout with long hair especially in distal part, with curved tip. The second gonopod is slightly longer than half of the length of the first gonopod and has a long distal process, the border of which becoming thin and concave in the middle (Chen,1989).

DISTRIBUTION
China, Philippines, Indonesia, Burma, India, Pakistan. This is the first record from the Persian Gulf.

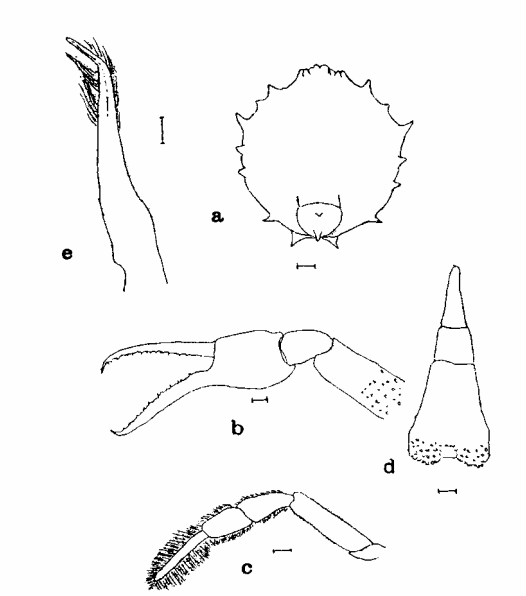

FIG. 6.– *Pariphiculus mariannae* (Herklots, 1852): a, carapace; b, cheliped; c, left last walking leg; d, male abdomen; e, first gonopod. Scales: a, b, c and d, 1 cm; e, 1 mm.

Subfamily LEUCOSIINAE Samouelle, 1819

Genus *Seulocia* Galil, 2005

7- *Seulocia anahita* Galil, 2005b

(Fig. 7)

Seulocia anahita Galil, 2005b: 43 Fig. 1A.

Leucosia pubescens; Alcock, 1896: 233; Stephensen, 1945: 95, fig. 17A-B; Tirmizi and Kazmi, 1986: 94.

MATERIAL

1♂ CL. 19.2 mm, CB. 16 mm (ZUTC Brach. 1015), 29° 46' N, 49° 55' E, 15 m, trawl, 6.3.2004; 1♂ CL. 13 mm, CB. 10.8 mm (ZUTC Brach. 1016), 29° 12' N, 50° 4' E, 20 m, trawl, 9. 3. 2004.

TYPE LOCALITY

Persian Gulf

DIAGNOSIS

Carapace (Fig. 7-a) hexagonal, longer than broad, anterolateral margin making an angle junction with posterolateral, posterior border of carapace granulate and making an angle junction with posterolateral margin. The front as long as broad, ending in three sharp teeth, central larger than

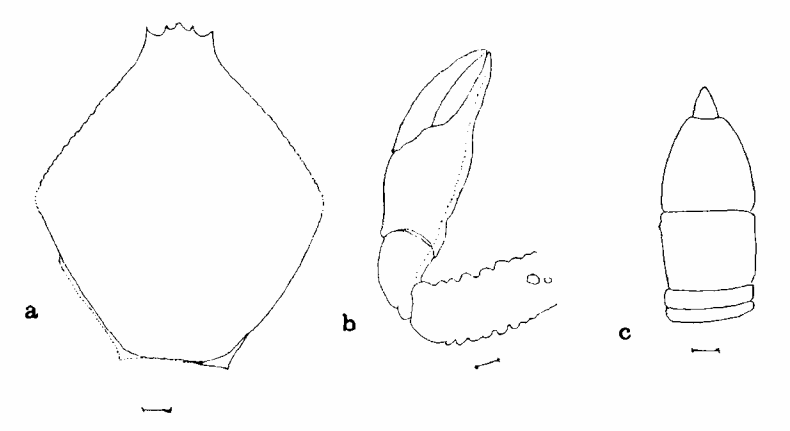

FIG. 7.– *Seulocia anahita* Galil, 2005b: a, carapace; b, cheliped; c, male abdomen. Scale: 1 mm.

laterals. Chelipeds (Fig. 7-b) in normal size with two lines of granules in the anterior and posterior margin of cheliped merus decreasing in size distally, two granules on the distal part of upper surface, a large path of sponge-like granules in the base of merus, a line of small granules on the anterior border of carpus and manus, finger curved and shorter than manus. Female and male abdomens with segments 3-6 fused a distinct suture between fifth and sixth segments of male abdomen (Fig.7-c).

DISTRIBUTION
Persian Gulf, Arabian Sea, Indian Ocean.

Genus *Philyra* Leach, 1817
8-*Philyra platycheir* de Haan, 1841

(Fig. 8)

Philyra platycheir de Haan, 1841: 132, pl. 33, fig. 6.
Philyra platychira Alcock, 1896: 242; Ihle, 1918: 315; Barnard, 1947: 374; 1950: 382, fig. 72j; Tyndale-Biscoe & George, 1962: 75, fig. 4.9; Guinot, 1967 (in list): 249; Titgen, 1982: 248 (in list) ; Basson *et al.*, 1977: *242*, 243.
Philyra variegata Stephensen, 1945: 89, figs. 15, 16.
Philyra platycheir Tirmizi & Kazmi, 1986: 100, fig. 29.

MATERIAL
2♀ CL. 13.4 × 12.3 mm, CB. 12.3 × 11.4 mm (ZUTC Brach. 1017), 29° 54' N, 49° 56' E, 15 m, trawl, 6. 3. 2004; 2 Juvenile (ZUTC Brach 1018), 29° 31' N, 49° 54' E, 34m, trawl, 7. 3. 2004

TYPE LOCALITY
Japan.

DIAGNOSIS
Carapace (Fig. 8-a) subcircular, slightly longer than broad. Front bilobed. The Persian Gulf adult specimens have dorsal surface much mottled with green and brown. Surface of third maxilliped smooth. Chelipeds (Fig. 8-a) long, about 2.5 times the carapace length, merus with small granules in

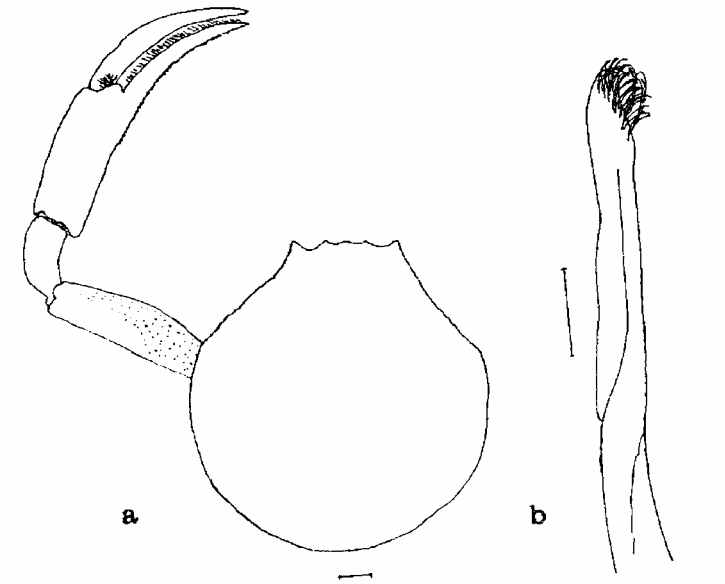

FIG. 8.– *Philyra platycheir* de Haan, 1841**:** a, carapace; b, first gonopod. Scale: 1 mm.

proximal part, fingers nearly as long as the manus, slightly curved, cutting edge of immovable finger with a visible line of long hair (discriminative character of this species) and denticulate beyond the line of hair. The first gonopod (Fig.8-b) long, straight, with hairs in the apical part.

DISTRIBUTION

East Africa, South Africa, Persian Gulf, India, Pakistan, Mergui Archipelago, Andamans, Hong Kong, Philippines, Timor, Australia.

9- *Philyra globulosa* H. Milne Edwards, 1837

(Fig. 9)

Leucosia globulosa Fabricius, 1798: 349.

Philyra globulosa H. Milne Edwards, 1837: 132; 1849, pl. 24. fig. 4; Alcock, 1896: 245; Ihle, 1918: 273-275, 315 (in list); Stephensen, 1945: 77, figs. 10, 11; Barnard, 1947: 374: 1950; 383, fig. 72; Titgen, 1982: 248 (list); Tirmizi & Kazmi, 1986: 98, fig. 28.

Material

1♂ CL. 11.7 mm, CB. 11.9 mm (ZUTC Brach. 1019), 29° 54' N, 49° 56' E, 15 m, trawl, 6.3.2004; 1♂, CL. 18.5 mm, CB.18.0 mm, 1♀ CL. 19.1 mm, CB. 19.3 mm, (Senckenberg mus. [29992]), Persian Gulf, 29° 1' N, 48° 29' E, 28. 03. 1972, T. Sakai; 1 dry carapace, CL. 17.4 mm, CB. 17 mm (ZUTC Brach. 1020), 26º 40' N, 54º 16' E; 1 dry carapace, CL. 12.2 mm, CB. 13.2 mm, 28º 9' N, 51º 24' E, 43 m, trawl, 7. 3. 2004.

TYPE LOCALITY

Unknown

DIAGNOSIS

Carapace (Fig.9-a) circular, dorsal surface of carapace completely covered with small granules. The

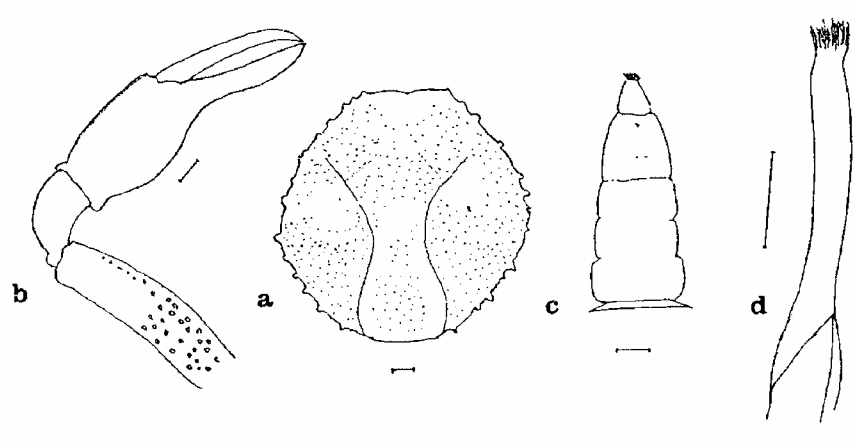

FIG. 9.– *Philyra globulosa* H. Milne Edwards, 1837: a, carapace; b, cheliped; c, male abdomen**;** d, first gonopod. Scale: 1 mm

margins of carapace granulate (in young specimens, some granules are large and distinctly denticle-like, which makes it more easily distinguishable from other species of the genus). Front hairy and broadly bilobed, slightly broader than posterior margin. Anterior edge of the third maxilliped hairy, similar to *P. globus*, but this is coarsely in *P. globulosa*. The Chelipeds (Fig.9-b) less than twice the carapace length, merus of chelipeds with granules in distal part of upper surface and along the anterior edge, carpus and manus smooth. Abdomen of male (Fig.9-c) with three small denticles in the penultimate segment, hardly visible with the naked eyes and much smaller than those of *P. globus*. The first gonopod (Fig.9-d) straight and stout, with apical hairs.

DISTRIBUTION

East Africa, South Africa, Persian Gulf, Pakistan, India, Gulf of Thailand, Moluccas.

10- *Philyra globus* (Fabricius, 1775)

(Fig. 10)

Cancer globus Fabricius, 1775: 401.
Philyra globosa Alcock, 1896: 243; Ihle, 1918: 274, 275 (in list); Stephensen, 1945: 83, fig. 12 a-d; Barnard, 1947: 373; Guinot, 1967: 250 (in list); Titgen, 1982: 248 (in list); Tirmizi & Kazmi, 1986: 103-106, fig.30.
Philyra globus Sakai, 1999: 19.

MATERIAL

1♂ CL. 8.2 mm, CB. 8.00 mm (ZUTC Brach. 1021), 29º 35' N, 50º 05' E, 26 m, trawl, 5.3. 2004.

TYPE LOCALITY

Malabar Coast (south-east India).

DIAGNOSIS

Carapace (Fig.10-a) subcircular, slightly longer than broad, dorsal surface (except in the interior part)

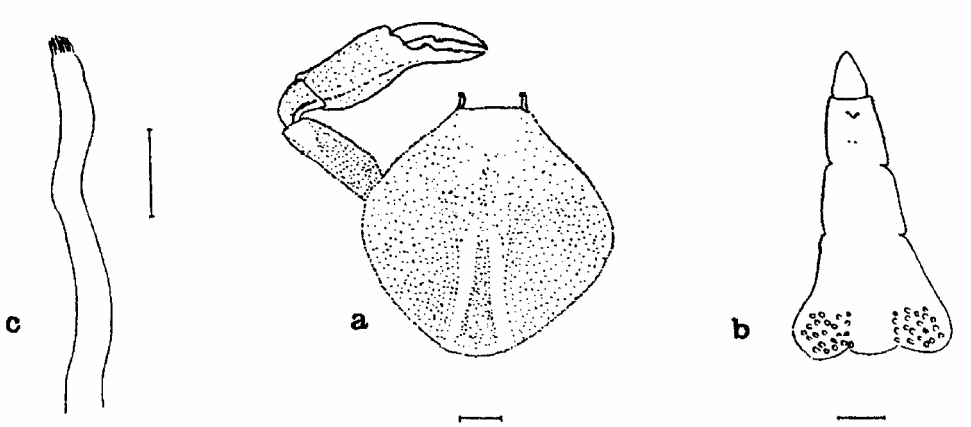

FIG.10.– *Philyra globus* (Fabricius, 1775): a, carapace; b, male abdomen; c, first gonopod. Scale: 1 mm.

closely granulate. Compared to *P. globulosa,* margins of carapace bearing small granules. Chelipeds nearly twice as long as of carapace length, merus of cheliped covered with granules, small granules on the surface of carpus and manus, manus longer than fingers. A median denticle on the penultimate segment of the male abdomen (fig.10-b), and two very small ones in the lower part of the segment which are hardly visible by naked eyes. The first gonopod (fig.10-c) not straight, sinuous form, with apical hairs.This species is distinguished from the *P. globulosa* by sinuous form of the first gonopod and margin of the carapace which has small granules.

DISTRIBUTION

South Africa**,** Persian Gulf, Pakistan, India, Mergui Archipelago.

ZOOGEOGRAPHY

Based on Alcock (1896), Stephensen (1945), Titgen (1982), Apel (2001), Galil (2001a, b; 2003a, b;2005a, b) and data of the present study, 35 species of leucosiid crabs are known from the Persian Gulf, comprising 17% of the brachyurans of the area. 18 species are recorded along the Iranian coast of the Persian Gulf.

Amongst the Iranian leucosiids of the present study, the most common species were *Myra pernix* and *Iphiculus spongiosus*. The genus *Philyra* with eight species has the highest species richness, and the genera *Iphiculus, Pariphiculus* and *Oreophorus*, each with one species, have the lowest species richness.

According to the observed distribution of species, 35 leucosiid crabs of the Persian Gulf could be categorized in four regions as in the following (Table. 1).

1- Six species (17%) including *Arcania septemspinosa, Leucosia anatum, Myra pernix, Nursia dentata, Philyra platychier, P. cancella* are widely spread in the Indo-West Pacific region, with two exceptions: *Leucosia anatum*, which is not found in the Red Sea and African coast, and *P. platychier* which has not been recorded from the Red Sea.

2- Eleven species (31%) are known from the Indian Ocean, five of these restricted to the North Indian Ocean (*Leucosia biannulata, L. elata, Philyra globulosa* and *P. sexangula*, *Urnalana hilaris*), and six species *(Ebalia abdominalis, Seulocia anahita, Nursia rubifera, Philyra globus, P. granigera* and *P. variegat*a) are recorded from the North West Indian Ocean.

3- Eight species (23%) are recorded from North Indian-West Pacific region *(Arcania erinacea, A. quinquespinosa, Iphiculus spongiosus, Ixoides cornutus, Myra affinis, Nursia plicata, Pariphiculus mariannae* and *Pseudophilyra tridentat*a). *Myra affinis* is also found in the west Australia. Two of these (*A. quinquespinosa* and *Iphiculus spongiosus*) are also recorded from the Red Sea. *A. erinacea* and *Pariphiculus mariannae* are

TABLE 1. – Distribution of the Persian Gulf leucosiid crabs

No. Species	WIWP	IO	NIWP	Endemic	Unknown
35	6 (17%)	11(31%)	8 (23%)	7(20%)	3 (9%)

-WIWP (Wide spread Indo-West Pacific) from the Red Sea to south coast of Africa, the Persian Gulf, through East and West India to Australia and Japan.
-NIWP (North Indian-West Pacific).From the Persian Gulf to India, Sri Lanka, China and Japan.
-IO (Indian Ocean) from the Red Sea to south coast of Africa, Persian Gulf, India, Sri Lanka.
-Endemic, including the Persian Gulf, Pakistan and the Gulf of Oman.

new records for the Persian Gulf.

4- Seven species (20%) (*Ebalia sagittifera, Ixa holthuisi, Nursia blandfordi, N. persica, Oreophorus fenestrus, Philyra concinus* and *Pseudophilyra blandfordi*) are endemic to the Persian Gulf and Oman Sea region. *Nursia plicata* is endemic to the Persian Gulf.

Geographical distributions for three other recorded species by Stephensen (1945) and Apel (2001) are unknown.

Based on previous works (Sakai, 1937; Tyndale-Biscoe and George, 1962; Hill, 1982; Chen,1989; and Apel, 2001) the zoogeographical affinities of the Persian Gulf leucosiid crabs are approximately 37% with Japan, 29% with the Red Sea, 20% with the coast of Africa and 20% with Western Australia.

It must be pointed out that leucosiid crabs comprise about one sixth of all brachyuran fauna of the Persian Gulf. According to Apel (2001)16%, Titgen (1982) 15%, Stephensen (1945) 17% and the present study also 17% of the Persian Gulf Crabs belong to Leucosiidae. Compared to the values presented by Apel (2001) for the other regions of the Indian Ocean such as: the Red Sea (10%), East Africa (4%), South Africa (6%), Pakistan (13%) and India (14%), the Persian Gulf shows higher diversity of leucosiid crabs. It seems that the observed diversity could be related to the type of sediment of the sea bed in the Persian Gulf. This is mostly muddy, muddy-sand and sandy-mud. This might also be partly related to the shallow waters of the Persian Gulf with the average depth of 50m.

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