

**DESCRIPTIONS OF TWO NEW SPECIES OF HERMIT CRABS,  
*CLIBANARIUS RUBROVIRIA* AND *C. RUTILUS* (CRUSTACEA:  
DECAPODA: ANOMURA: DIOGENIDAE) FROM INDONESIA**

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**ABSTRACT.** - Two new species of pagurid crabs, *Clibanarius rubroviria* and *C. rutilus*, from Indonesia are described. These two species belong to the group of *Clibanarius* which possesses a dactylus of the second and third ambulatory legs which is shorter than the propodus, and the absence of a longitudinal line on the ocular peduncles.

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**INTRODUCTION**

The hermit crabs of the genus *Clibanarius* mostly inhabit littoral waters in tropical and temperate seas, with some species living in estuarine and mangrove areas. In Indonesian waters, *Clibanarius* species are very common in intertidal zones on sand, mud and sandy-muddy bottoms, seagrass and mangrove areas, as well as coral reefs, reef flats and rocky or stony sites in the splash zone.

Twenty-two species of *Clibanarius* are now known to occur in Indonesian waters (Buitendijk, 1937; Rahayu & Forest, 1992). A recent collection of pagurids from East Timor, Lombok Island and Lembeh Strait (North Sulawesi) interestingly contained two new species of *Clibanarius*.

The two new species of *Clibanarius* belong to a group which possesses dactylis of the second and third ambulatory legs which are shorter than the propodis, and there is also no longitudinal stripe present on the ocular peduncles. *Clibanarius rubroviria*, new species, resembles *C. bimaculatus* (sensu Buitendijk, 1937) in colour pattern but differs in several key morphological features. *Clibanarius rutilus*, new species, most closely resembles *C. arethusa* De Man, 1888, but differs in many important characters.

The type materials of these two new species are deposited in the Zoological Museum Bogor (MZB) Cibinong, R&D Center for Oceanology (RDCO) Jakarta, Indonesian Institute of Sciences, Indonesia; the Zoological Reference Collection (ZRC) of the Raffles Museum,

National University of Singapore; and Muséum national d'Histoire Naturelle (MNHN), Paris, France. The abbreviation SL indicates the shield length, measured from the tip of the rostrum to the midpoint of the posterior margin of the shield. P2 and P3 refer to the second and the third ambulatory legs respectively.

## TAXONOMY

### *Clibanarius rubroviria*, new species

Figs. 1a, 2

*Clibanarius bimaculatus* Buitendijk, 1937: 263 (not *Clibanarius bimaculatus* De Haan, 1854).

**Material examined.** - Holotype female, SL 6 mm (MZB), Kuta, Lombok, intertidal area, coll. W.W. Kastoro, 7 Sep.1995.

Paratypes: 1 male, SL. 9 mm (RDCO), Dili, East Timor, intertidal area, coll. D.L. Rahayu, 16 Dec.1993; 1 male, SL.8.5 mm (ZRC), 1 female, SL. 4 mm (MNHN), Kuta, Lombok, intertidal, coll. W.W. Kastoro, 7 Sep.1995.

**Description.** - Shield longer than broad (fig. 2a), rostrum very broadly triangular, approximately as long as lateral projection. Lateral projections broadly triangular. Anterior margin between rostrum and lateral projections slightly concave, posterior margin slightly rounded. Dorsal surface of shield with scattered tufts of setae.

Ocular peduncles slender, inflated basally; about 5/7 length of shield, longer than antennal peduncles; corneae weakly dilated, diameter approximately 1/5 length of peduncles. Ocular acicles small, nearly approximate basally; with 3 - 4 terminal marginal spines.

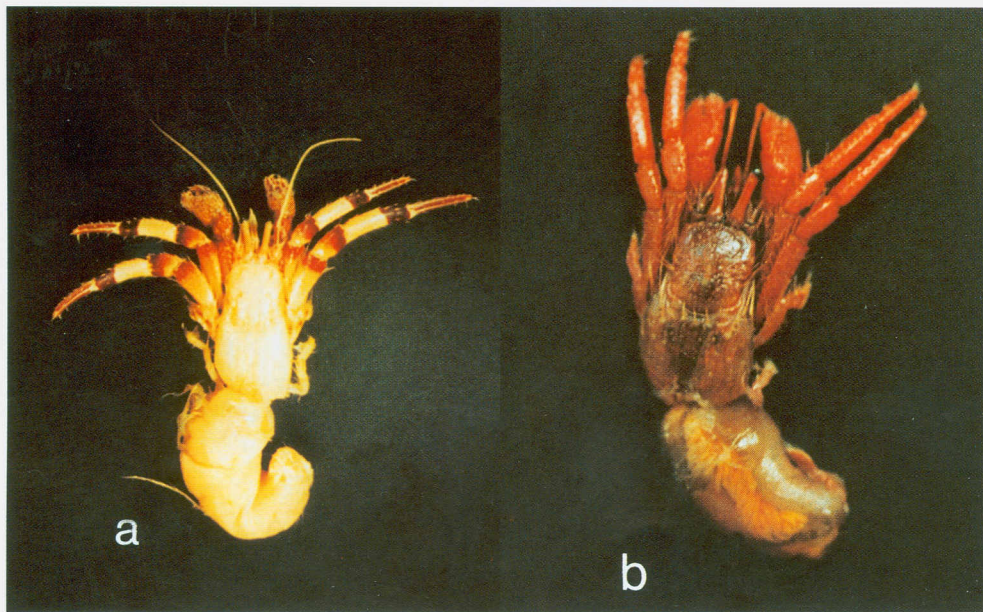


Fig.1. a. *Clibanarius rubroviria*, new species, paratype, male, SL. 9 mm, entire animal, photographed from animal preserved in alcohol for 1 month; b. *Clibanarius rutilus*, new species, holotype, male, SL. 4 mm. entire animal, photographed from fresh animal.

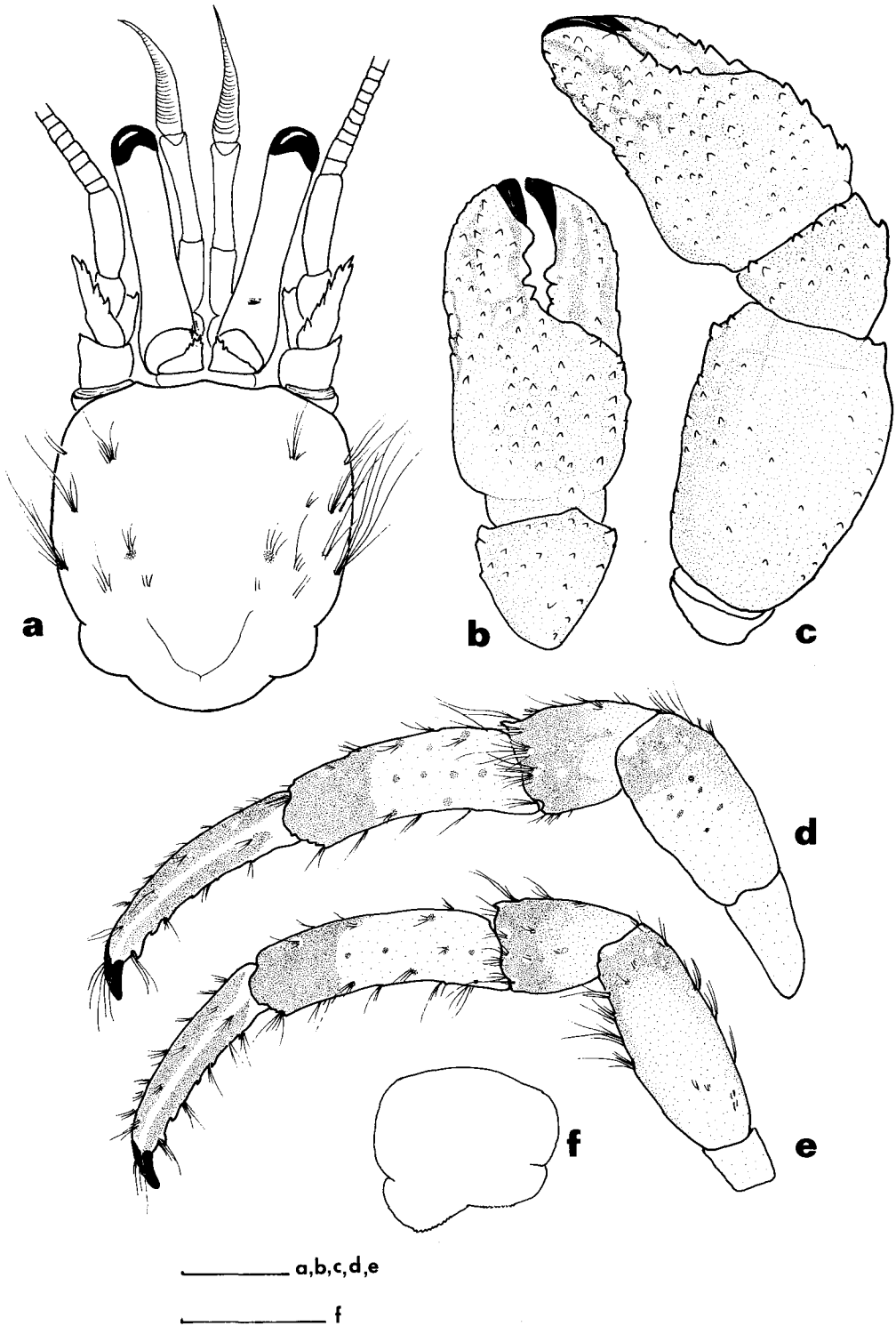


Fig. 2. *Clibanarius rubroviria*, new species, holotype, female, SL 6 mm. a. shield and cephalic appendages; b. left cheliped dorsal view; c. left cheliped lateral view; d. left third ambulatory leg; e. left second ambulatory leg; f. telson. Scale 2 mm.

Antennular peduncles, when fully extended, as long as ocular peduncles. Ultimate and penultimate segments unarmed, basal segment with spine ventrally.

Antennal peduncles not reaching bases of corneae. First segment short, unarmed, second segment with dorsolateral distal angle produced, terminating in small spine; dorsomesial distal angle unarmed. Third segment with spine on ventrodistal margin; fourth and fifth segments unarmed. Antennal acicle exceeding base of fifth peduncular segment; mesial margin with 3-4 spines, terminating in acute spine; lateral margin with distal spine and tuft of setae.

Chelipeds subequal, left slightly larger than right (fig. 2 b, c). Dactylus longer than palm, cutting edge with 2 strong and 1 small calcareous teeth terminating in corneous claw; dorsal surface with row of corneous tipped tubercles; dorsomesial margin with blunt tubercles. Cutting edge of fixed finger with 3 or 4 strong calcareous teeth, terminating in corneous claw. Palm as long as carpus, dorsomesial margin with blunt tubercles, ventral margin unarmed; dorsal surface with scattered corneous tipped tubercles. Carpus with row of spines on dorsomesial margin, stronger distally; dorsal surface with scattered conical tubercles; ventral margin unarmed. Merus twice length of carpus; ventral margin with small subdistal spine followed by small tubercles.

Second and third pereopods (figs. 2d, e) sparsely setose; dactyli slightly shorter than propodi, ventral margin with row of 5-8 corneous spines, dorsal margin unarmed; propodi and meri unarmed; carpi with dorsodistal spine.

Telson (fig. 2f) with posterior lobes asymmetrical; left lobe with several spines, right lobe with weaker spines; terminal margin with setae.

Colour in alcohol. - Shield reddish-white with two red spots on dorsolateral surface. Ocular and antennular peduncles reddish. Ocular acicles red with yellowish setae. Second segment of antennal peduncle red, fifth segment yellowish with red longitudinal stripe, rest of peduncle orangish-white. Chelipeds orangish-white, dactyli with two or three red longitudinal stripe, fixed fingers each with one or two red longitudinal stripes. Carpi and meri red. Dactyli of second and third pereopods orangish-white with four red longitudinal stripes, two on lateral face and two on mesial face. Propodi, carpi and meri each with red distal transverse bands, rest orangish-white mottled with red.

**Etymology.** - From the Latin *rubro* for red, and *viria* for bracelet, alluding to the red rings on the propodi, carpi and meri of the ambulatory legs. Used as a noun in apposition.

**Remarks.** - The colour pattern of *Clibanarius rubroviria*, new species, is similar to *C. bimaculatus* (De Haan, 1854) (type locality Japan) as is now currently understood (see Buitendijk, 1937). Buitendijk (1937) also mentioned that there are no spines on palm of the cheliped and no ridge separating the upper and outer surfaces of the propodi of her specimens, which is also the case for the present specimens from Dili and Lombok. Comparison with the brief description and drawings of the Japanese *C. bimaculatus* (fide De Haan, 1854) shows important differences in morphology and colour with the present Indonesian specimens as well as those of Buitendijk (1937). Compared to the Indonesian material of *C. rubroviria*, the Japanese specimen of *C. bimaculatus* has the ocular acicles triangular and straight (against small and with several spines on terminal margin), the left cheliped is much larger than the right (against both chelae subequal in size, with the left only slightly larger than the right),

and the dactylus and propodus of the P2 are of the same length and beset with setae (against the dactyli of P2 and P3 being shorter than the propodi and only slightly setose). De Haan (1854) noted that the colour of his material was yellowish-red in colour, with a distal red ring around the propodi of the P2 and P3, although his illustrations (pl. 49, fig. 7 and pl. 50, fig. 4) show a distal ring on the propodi and carpi of the P2 and P3. *Clibanarius rubroviria* on the other hand, has a distal red ring on the propodi, carpi and meri of the P2 and P3; with the dactyli possessing four red longitudinal stripes.

A note on the identity of *Clibanarius bimaculatus* (De Haan, 1854) is necessary. After De Haan's description of *Pagurus bimaculatus* from Japan, Ortmann (1892) and Balss (1914) reported it from Japan again. Buitendijk (1937) considered that the specimens of Ortmann and Balss in the Strassbourg Museum (France) and Munich Museum (Germany) respectively, were actually *C. virescens* (Krauss, 1843) instead. Despite this, many Japanese authors still mistook *C. virescens* for *C. bimaculatus* (see Nishimura & Suzuki, 1971, Matsuzawa, 1977, Fujio, 1990). De Haan mentioned that the left cheliped of *C. bimaculatus* is distinctly larger than the right, which is also clearly shown in his figure (pl. 50, fig. 4). One of the main generic characters of *Clibanarius*, however, is the possession of equal chelipeds, and if they are unequal, then the left or the right is only very slightly larger. On this basis, *C. bimaculatus* (De Haan) is probably not a real *Clibanarius* species, but from De Haan's description and figures, more likely to be a species of *Paguristes* instead. Unfortunately, the type of *Pagurus bimaculatus* De Haan, 1854, is no longer extant (Buitendijk, 1937; Yamaguchi, 1993). The left cheliped of a female from unknown locality during Snellius expedition in Indonesia, identified as *C. bimaculatus* by Buitendijk (1937), unfortunately, is missing, and we do not know if the chelipeds are equal. Although her description was very brief, her notes of the colour are diagnostic: there were four red lines on the dactyli of the ambulatory legs, three lines on the upper and one on the under surface of the immovable finger; and the carpi and propodi of the ambulatory legs had a distal red ring and small red dots on the cream coloured part of propodi. This colour pattern is the same as the specimens from Dili and Lombok and persist after long after preservation. As such, it seems unlikely that De Haan would completely missed the distinctive red longitudinal lines on the dactyli of the P2 and P3. As such, we are confident the present specimens from Dili and Lombok are specifically (and probably generically) different from *Pagurus bimaculatus* De Haan s. str., and should be referred to a new species, here named *Clibanarius rubroviria*. We believe, however, that our specimens are conspecific with those of Buitendijk.

*Clibanarius rubroviria* most closely resembles *C. boschmai* Buitendijk (1937) with regards to the following colour pattern: presence of longitudinal stripes on the dactyli of the P2 and P3, and the presence of transverse coloured bands on the propodi, carpi and meri. In *C. boschmai*, the dactyli of second and third pereopods have a longitudinal stripe on each dorsal, ventral, mesial and lateral face; the propodus and carpus each has a median coloured transverse band; and the merus has a narrow distal coloured transverse band. In *C. rubroviria*, however, the dactyli of the second and third pereopods have two longitudinal stripes on each mesial and lateral surface only; and the propodi, carpi and meri each has a distal coloured transverse band. Morphologically, *C. boschmai* is also more setose than *C. rubroviria*, and its antennal and antennular peduncles are distinctly shorter than the ocular peduncles (the antennal peduncles slightly shorter and antennular peduncles are equal in length to the ocular peduncles in *C. rubroviria*).

**Distribution.** - For this moment, this species is known only from Dili in East Timor and Lombok Island, living on sandy bottoms of pebble beaches.

*Clibanarius rutilus*, new species

Figs. 1b, 3

**Material examined.** - Holotype male, SL. 4 mm (MZB), Lembah Strait, North Sulawesi, 0.5 – 1 m, black sand, coll. D.L. Rahayu, 19 Jun.1997.

Paratypes : 1 male, SL. 2.5 mm, 2 ovigerous females, SL. 4 mm (ZRC); 3 ovigerous females SL. 3 – 4 mm (MNHN); 1 male, SL. 4mm, 2 ovigerous females, SL. 3 & 4 mm (RDCO); & 4 mm, Lembah strait, North Sulawesi, 0.5 – 1 m, black sand, coll. D.L. Rahayu, 19 Jun.1997.

**Description.** - Shield (fig. 3a) longer than broad; anterior margin between rostrum and lateral projections concave; anterolateral margin slightly concave; posterior margin slightly rounded, dorsal surface sparsely setose. Rostrum strongly produced, triangular, overreaching base of ocular acicle, reaching beyond level of lateral projections. Lateral projections broadly triangular, terminating in small spine.

Ocular peduncles long, inflated basally, as long as antennular peduncles, length of shield. Corneal width approximately 1/5 length of peduncles. Ocular acicles small, triangular, separated basally by rostrum, distal margins multispinose.

Antennular peduncles as long as or slightly longer than antennal peduncles. All segments unarmed, sparsely setose.

Antennal peduncles reaching middle of corneae or slightly beyond corneae. First segment short, unarmed, second segment with one dorsolateral spine, hidden under tuft of setae. Third segment with minute distoventral spine, fourth segment with minute spine on distodorsal margin, and fifth segment unarmed. Antennal acicles exceeding the base of the fifth segment of antennal peduncle, terminating in small spine, lateral margin with 1 proximal spine, mesial margin with 3 spines.

Chelipeds (fig. 3b, c) with scattered short, stiff setae; subequal, left slightly larger than right, with same ornamentation. Dactylus and fixed finger each with strong corneous claw, cutting edge with 2 or 3 strong calcareous teeth. Dactylus slightly longer than palm, dorsal surface scattered with conical tubercles, dorsomesial margin with row of corneous-tipped tubercles. Dorsal surface of propodus covered with conical tubercles except for dorsoproximal region of palm which is smooth; weaker tubercles on palm. Palm slightly longer than carpus; dorsomesial margin with row of corneous-tipped tubercles. Carpus short, dorsomesial margin with strong spines distally, dorsal surface with some tubercles. Ventral margin of merus with 1 small and 1 strong bifid spine followed by several weaker spines.

Second and third pereopods (fig. 3e, f) considerably overreaching chelipeds, terminating in strong corneous claws and sparsely setose. Dactyli distinctly shorter than propodi, about 2/3 length of propodi. Dactylus of second pereopod with 5 spines on ventral margin, propodus with 2 or 3 minutes laterodistoventral spines, ventral margin with 3 spines. Carpus with 1 or 2 spines at distal end of dorsal margin; merus with some spinules on ventral margin, stronger distally. Dactylus of P3 with 5 spines on ventral margin; propodus with 3 or 4 minute laterodistoventral spines, followed by 4 minute spines on ventral margin. Carpus with 1 or 2 spines at distal end of dorsal margin; merus with some spinules on ventral margin. Telson symmetrical (fig. 3d), posterior lobes with row of spinules and setae.

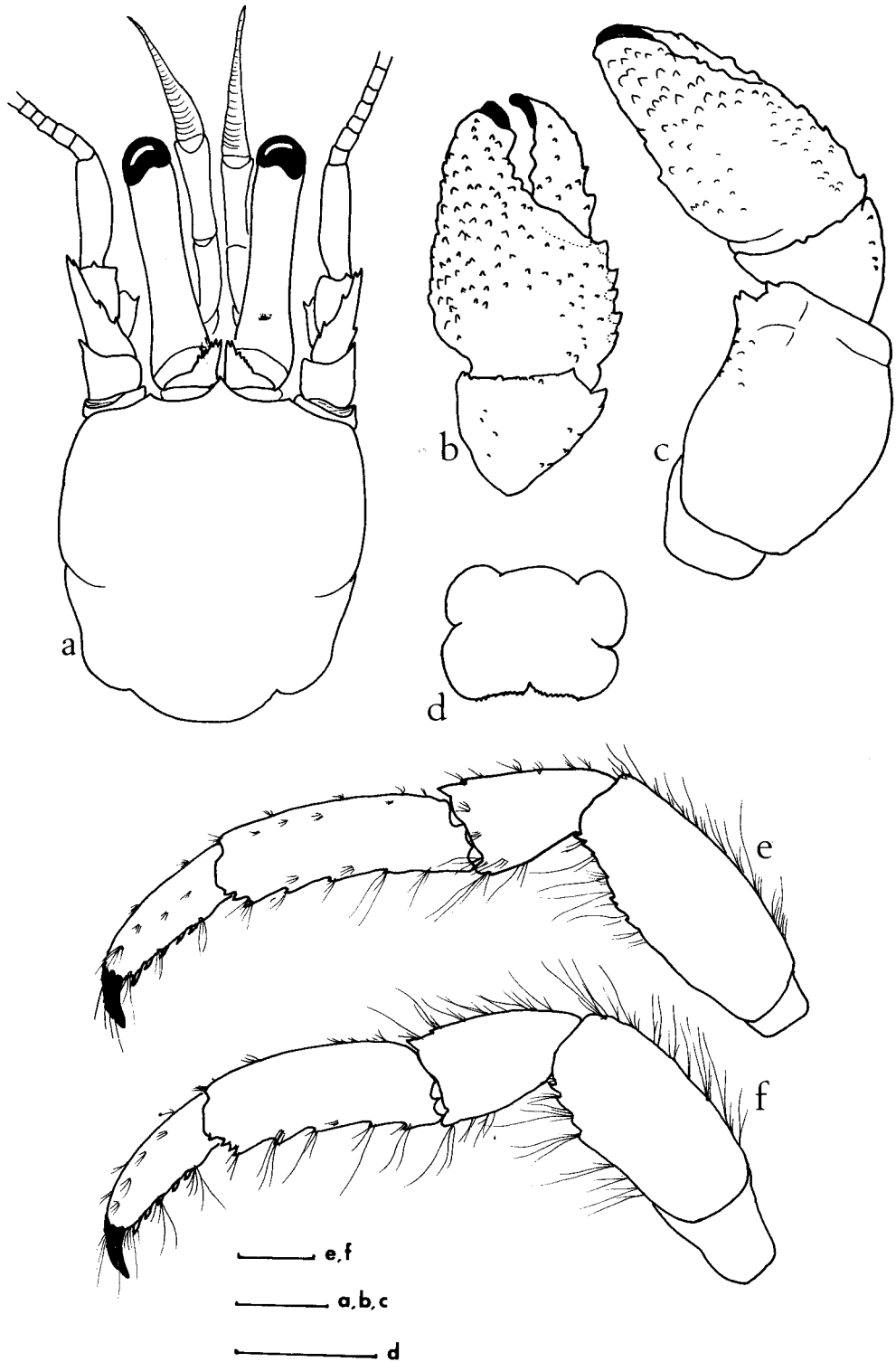


Fig. 3. *Clibanarius rutilus*, new species, holotype, male SL. 4 mm. a. shield and cephalic appendages; b. left cheliped dorsal view; c. left cheliped lateral view; d. telson. e. left second ambulatory leg; f. left third ambulatory leg; Scale 1 mm.

**Colour in life.** - Colour in general orangish-red. Shield brownish-red. Ocular peduncles orangish-red, corneae black. Antennular peduncles brownish-red, antennal peduncles brownish-red, the fifth segment bright red, flagella orangish-red. Chelipeds and pereopods bright red or orangish-red, merus dark red.

**Etymology.** - From the Latin *rutilus* meaning red, in reference to its red colour.

**Remarks.** - *Clibanarius rutilus*, new species, resembles *C. arethusa* De Man, 1888, with regards to general colouration, the cephalic appendages and ambulatory legs being orangish-red or bright red. De Man (1888) recorded that after preservation in alcohol, specimens of *C. arethusa* had greyish shield with faint traces of red colour on the legs, with a small white ring separating the corneae from the red ocular peduncle. Henderson (1893) noted that the specimens of *C. arethusa* from Madras (India) had a similar shield colour, with the chelipeds, ambulatory legs and shield appendages brick-red and without any bands. Specimens of *C. arethusa* from the Arakan Coast and Mergui archipelago (Burma) have a yellow shield and deep orangish-red cephalic appendages and legs (Alcock, 1905). Fize & Serène (1955) described Vietnamese specimens of *C. arethusa* as having the anterior part of the shield greenish with a brown spot, the colour beyond the cervical suture being light brown with the posterolateral part blue; and the cornea is black and separated from the reddish-brown ocular peduncles by a white ring.

*Clibanarius rutilus*, however, has a bright red to reddish-brown shield, chelipeds, ambulatory legs and cephalic appendages, and there is only a faint trace of a white ring below the cornea. This red colour persists in formalin, being paler in alcohol.

Morphologically, *Clibanarius rutilus* differs from *C. arethusa* in several characters. In *C. arethusa*, the dactyli of the right and left P2 and P3 are longer or similar in length to the propodi (fide De Man, 1888: 255; Fize & Serène, 1955: 117) except for the right second pereopod of one specimen whose dactylus is slightly shorter than the propodus (Fize & Serène, 1955), and the ventral margin of the propodus is smooth. In *C. rutilus*, the right and left dactylus of the P2 and P3 are always shorter than the propodus and the ventral margin is lined with spinules. The propodus of the left cheliped of *C. arethusa* only has few spinules, and the dorsal margin of the propodus is not armed with prominent tubercles but with three to four spinules, whilst in *C. rutilus*, the propodus is covered with conical tubercles (except for dorsoproximal part) and the dorsal margin has distinct conical tubercles. In addition, the ocular peduncles of *C. arethusa* are longer than the width of shield (4/5 the width of the shield in *C. rutilus*), the antennal peduncles are distinctly shorter than the ocular peduncles (equal in length or slightly shorter than the ocular peduncles in *C. rutilus*), and the rostrum is slightly longer than the lateral projections (distinctly longer than the lateral projections in *C. rutilus*).

The present specimens of *C. rutilus* were inhabiting shells of the intertidal snail *Nerita polita*, and were collected between boulders on black sand in 0.5 to one meter depth of water.

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