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SYSTEMATIC STATUS OF *CERATOPLAX VILLOSA* ZEHNTNER AND SOME RELATED SPECIES (CRUSTACEA, DECAPODA, BRACHYURA)

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Ceratoplax villosa ZEHNTNER と近縁種の分類学的位置

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Among the rare crabs in the collection of the Zoological Laboratory, Kyushu University are several specimens from the Ryukyu Islands identified as *Ceratoplax villosa* ZEHNTNER of the family Goneplacidae, which is known only by the original description based on a small specimen from Amboina. There are no subsequent records of occurrence, but the specimens at hand are in all probability referable to the rare species. In the Goneplacidae the formation of the eyestalks shows the remarkable intergradation from the long or moderate eyestalks with the well developed corneae to the short fixed ones with the obsolete corneae. The male genital openings are coxal or sternal, and if coxal, the membraneous or rather calcified prolongations of the *vasa deference* pass along the grooves protected by the penultimate sternal plate. In the present species in question the male genital openings are coxal, although the general formation of the carapace, chelipeds and ambulatory legs is rather similar to that of the genera *Ceratoplax* STIMPSON and *Notonyx* A. MILNE EDWARDS of the subfamily Rhizopinae, in which the male genital openings are sternal. It may be therefore referable to the subfamily Carcinoplacinae defined by ALCOCK (1900), TESCH (1918) and BALSS (1957), and placed near the genera related to the subfamily Pilumninae of the family Xanthidae. Among the known genera of the Carcinoplacinae the genus *Ser* RATHBUN monotypically represented by *S. fukiensis* RATHBUN from China may be close to the present species. In *Ser*, however, both fingers are long and strongly deflexed in both sexes, being somewhat like those of the genus *Heteropilumnus* DE MAN referred to the Pilumninae of the Xanthidae. It is therefore advisable that a new genus is erected on the present species in the Carcinoplacinae of the Goneplacidae.

It is otherwise probable that *Litocheira amakusae* TAKEDA et MIYAKE referred to the genus with a great hesitation is congeneric with *Ceratoplax villosa*. As remarked by TAKEDA and MIYAKE (1969) the genus *Litocheira* KINAHAN with the species bearing the different types of the male first pleopods is apparently heterogenerous, most of the species being very different

from the type-species, *L. bispinosa* KINAHAN which was well figured by McCULLOCH (1913). The male first pleopod of *L. bispinosa* is finely represented by CHOPRA and DAS (1937), and the present author also could examine several specimens from Wedge Bay in Tasmania and Albany District in Western Australia by the courtesy of Dr. D. J. G. GRIFFIN of the Australian Museum, to whom the author's cordial thanks are tendered. Most of the species hitherto referred to *Litocheira* may be transferred to the Pilumninae of the Xanthidae. *L. amakusae* is also generically distinct from *L. bispinosa* and reasonably referred to the new genus together with a new species described in the present paper.

Zehntneria gen. nov.

Diagnosis. Carapace quadrate or rather ovate and declivous anteriorly with dorsal surface ill-defined. Carapace, chelipeds and ambulatory legs thickly or partially covered with a tomentum, but without fringes of long hairs. Frontal breadth about one third or less than greatest breadth of carapace. Front cut into two weakly convex lobes by a median, small but distinct notch and bears no distinct lateral angles. Fronto-orbital breadth twice of frontal breadth and equal to or slightly less than length of carapace. Eyestalk tightly embedded in more or less transverse small orbit, but movable. Cornea rather prominent and chiefly terminal and ventral, but rather deficient in pigments. Antennule folded almost transversely. Antennal basal segment not reached ventral prolongation of front, and flagellum long. Third maxilliped with subquadrate merus. Anterolateral border of carapace arched with four low teeth, and posterolateral border weakly convergent. Chelipeds distinctly unequal in male and slightly in female. Fingers not strongly curved downwards. Ambulatory legs rather long without spines. Dactylus of last pair curved dorsally. Male abdomen with several distinct segments and wide at first and third segments. Male first pleopod somewhat *Pilumnus*-type, and male genital openings coxal.

Type-species. *Ceratoplax villosa* ZEHNTNER, 1894.

Zehntneria villosa (ZEHNTNER, 1894)

(Fig. 1)

Ceratoplax villosa ZEHNTNER, 1894, p. 173, pl. 8, fig. 8—Amboina.

Description. The carapace is transversely oval and densely and uniformly covered with a fur without long hairs together with adherent inorganic matter, being fairly convex fore and aft; on the removal of them the dorsal surface is very smooth and ill-defined only with the weakly raised mesogastric and cardiac regions.

The front is slightly less than the length of the carapace, almost truncated and bears a median, small but distinct notch; the lateral angle of each lobe is not produced at all, but only roughened, being confluent with the supraorbital border. The orbit is rather small, and its major diameter is equal in length to each frontal lobe; the eyestalk with a fur is stout, entirely fills the orbit and rather protruded forwards beyond the general contour of the cara-

pace, but movable; the supraorbital border is hardly raised along its inner part, and in the dorsal view deeply concave at its inner part and then rather directed forwards towards the blunt external orbital angle; the infraorbital border is transverse and almost entire only with two ventral depression below the external orbital angle and in the middle; its inner angle is not prominent and is touched with the very short ventral prolongation of the front. The antennal flagellum slightly exceeds twice the length of the major diameter of the orbit. The third maxillipeds,

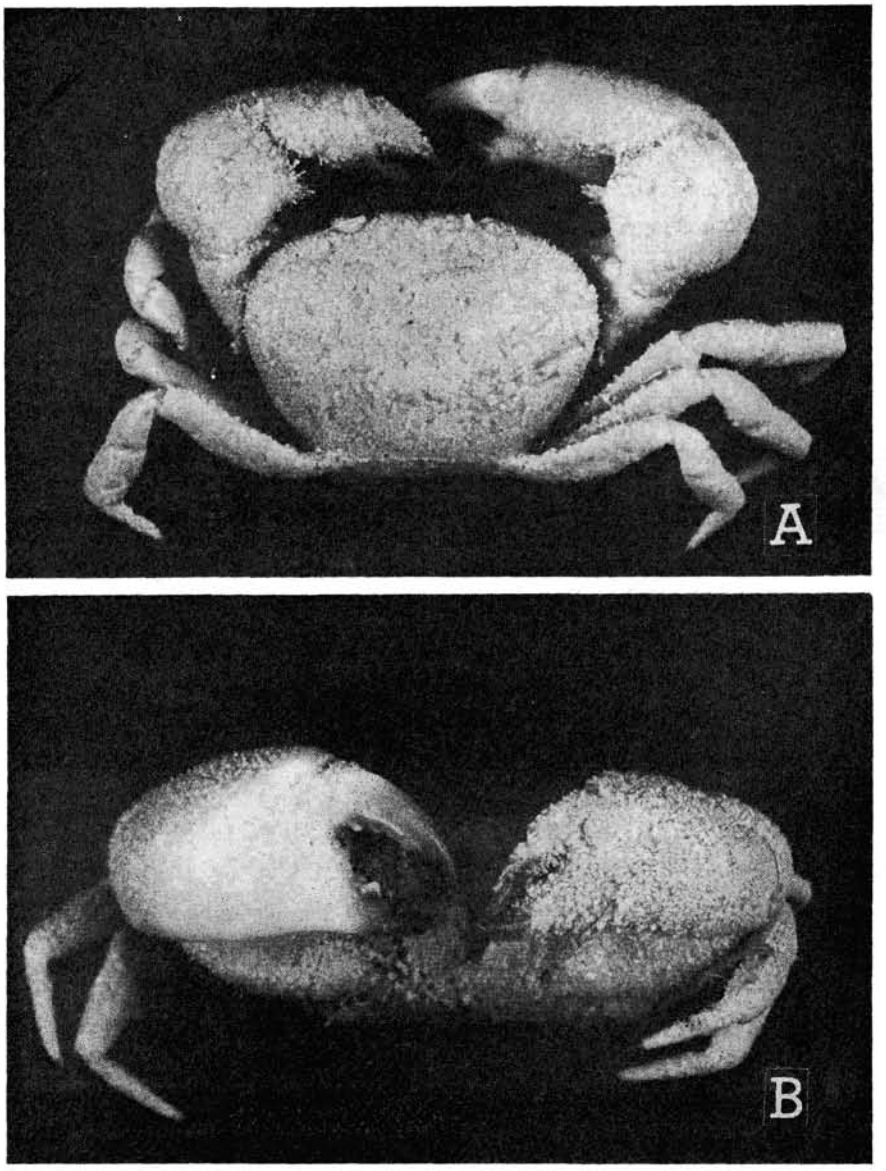

Fig. 1. *Zehntneria villosa* (ZEHNTNER, 1894). ♂ (8.4 × 5.9 mm) from Ishigaki-jima I.

pterygostomial and subhepatic regions are hairy like the dorsal surface of the carapace, but the ischium is rather sparsely covered with a fur; the merus is quardrate with the antero-external angle rather angulated.

The anterolateral border of the carapace is arched, more or less ridge-like with indistinct granules, being interrupted by three notches; in the smaller specimens the last two lobes are rather tooth-like with the deepish notches, but in the larger ones the notches are shallow and those lobes are only convex together with the first two. The posterolateral border is moderately or rather weakly convergent.

The chelipeds are large and unequal in both sexes. The merus is short, while the carpus is prominent, both being densely covered with a fur like the carapace; the inner angle of the carpus is tuberculated. In both chelae of the female and the smaller chela of the male the entire surface of the palm is covered densely with a fur and sparsely with longish hairs, and on the removal of them covered with sparse minute granules; in the larger palm of the male the outer lower surface from the proximal part of the lower border to the base of the movable finger is devoid of a fur and glabrous. The fingers are also hairy nearly towards the tips in the smaller chela, and on the proximal parts in the larger chela; in the smaller chela the upper border of the movable finger is nearly straight or rather concave; the colour is almost restricted to the distal halves and extended back to the proximal parts along the cutting edges.

The ambulatory legs are slender and densely haired like the carapace and chelipeds, being sparsely fringed with long feathered and simple hairs. The dactylus of the last pair is weakly curved dorsally near the terminal small claw.

Material. Maézato, Ishigaki-jima I., Ryukyu Is., 2 ♂♂, 1 ♀, ZLKU 1797, April 3, 1938, 1 ♂, 2 ♀♀, ZLKU 1594, May 1938, C. SENAHA leg.; Miyara-wan, Okinawa-jima I., Ryukyu Is., 1 ♂, February 1959, H. MINEI leg.; Kume-jima I., Ryukyu Is., 1 ♀, July 1960, H. MINEI leg.

Zehntneria miyakei sp. nov.

(Figs. 2, 3)

Diagnosis. Carapace rather rectangular and almost flat laterally and posteriorly; dorsal surface smooth for its greater part and bears a fur along frontal, supraorbital and anterolateral borders. Anterolateral border with a ridge confluent with external orbital angle and with two lobular and a rudimentary teeth. Chelipeds heavy and distinctly unequal in both sexes. Ambulatory legs very slender. Merus and carpus with sparse hairs, and propodus and dactylus with dense fringes of hairs of various length. Dactyli of first three pairs subcylindrical, while in last pair dactylus rather depressed and weakly curved upwards near its tip.

Description of holotype. The carapace is rather rectangular and weakly declivous anteriorly, being almost flat laterally and posteriorly; the dorsal surface is for its greater part smooth

and glabrous without distinct indication of regions; however, tne gastro-cardiac transverse depression is faintly demarcated and marked with a pair of blotches; along the frontal, supraorbital and anterolateral borders is a fur, and row of longish brush-like hairs runs transversely behind the front; the anterolateral surface where is covered with a fur is also rendered distinct by the shallow depression and scantly provided with small rounded granules.

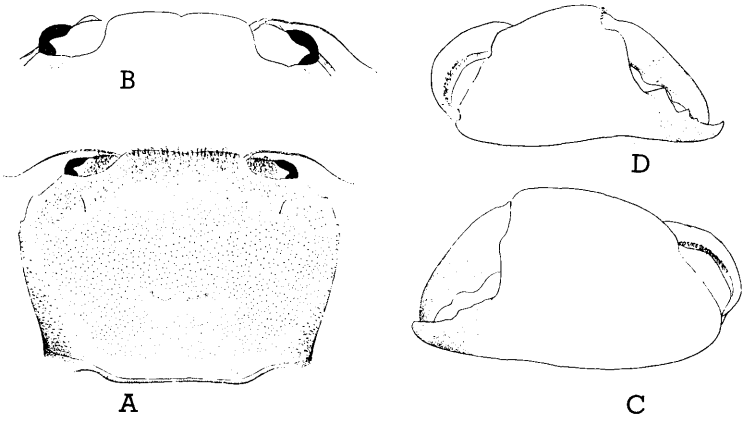

Fig. 2. *Zehntneria miyakei* sp. nov. Paratype ♂. A, carapace, × 8.5; B, fronto-orbital region, slightly tilted posteriorly and hair removed, × 10; C, D, chelae, × 8.5.

The anterolateral border of the carapace is cut into three distinct lobular teeth, behind of which the fourth tooth is obscurely demarcated; they are crested and light-coloured, being more or less roughened by minute granules; the first is a mere ridge and confluent with the external orbital angle, stretching obliquely backwards; the second is the most prominent of series and bears its tip at the anterior end, its outer border being weakly convex; the third is rather similar to, but less prominent than, the preceding. The posterolateral border is weakly convergent and longer than the anterolateral; its dorsal surface is rather sunken and provided with small granules; its posterior end is prolonged downwards. The posterior border of the carapace is wide, rimmed along the whole length and weakly concave in the middle.

The frontal breadth is about one third the breadth of the carapace, and the fronto-orbital breadth is about twice the frontal breadth and equal to the length of the carapace. The front is so declivous that its free margin is not visible in the dorsal view; it is cut into two truncated lobes by a median, small but distinct notch; each of the lateral angles is rounded and entirely continued to the supraorbital border. The supraorbital border is weakly raised and almost entire, but in reality, near the middle an indistinct notch is possibly traceable; the external orbital angle is slightly angulated and confluent with the first lobe of the anterolateral border. The infraorbital border is nearly entire and more or less sinuate, its inner angle is rounded and ventrally convex. The eyestalk is swollen and covered with a fur on the upper surface, the cornea being very prominent; they are protruded from the general contour of the cara-

pace. The antennal basal segment is short and not reached the short prolongation of the front, but its outer angle is raised higher than the inner infraorbital angle; the antennal flagellum is fine and slender, exceeding twice the length of the major diameter of the orbit.

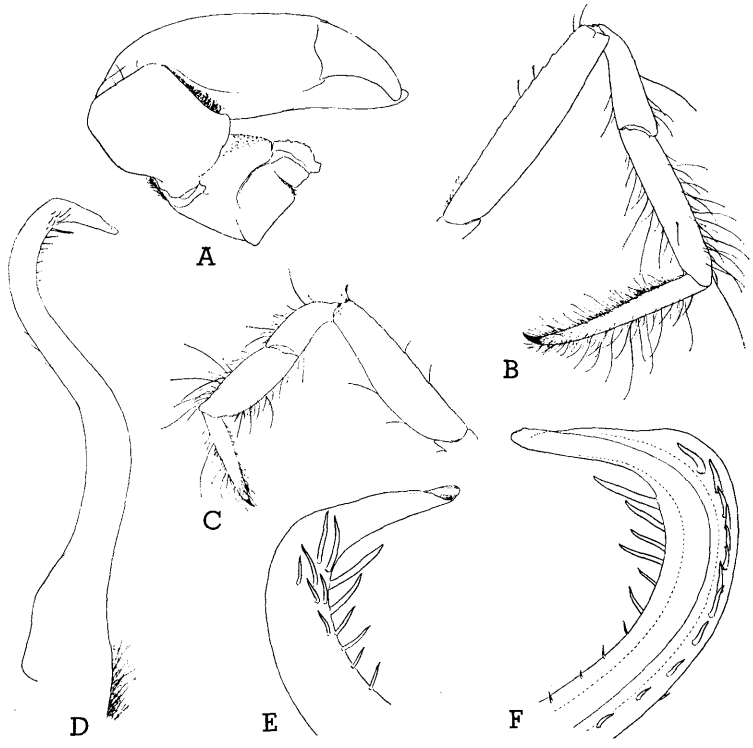

Fig. 3. *Zehntneria miyakei* sp. nov. Paratype ♂. A, left cheliped in dorsal view, × 8.5; B, C, right third and left fourth ambulatory legs, × 8.5; D, left first pleopod in sternal view, × 40; E, F, distal part of left first pleopod in sternal and abdominal view, × 100.

The third maxillipeds are broad. The ischium is glabrous and bears a median rather oblique groove; the inner margin of the ischium is sharp only with sparse hairs, and its anterior angle is weakly extended forwards and rounded. The merus is subquadrate and its median surface is weakly raised on account of presence of two depressions along the inner margin and the anterior and outer margins; the antero-external angle of the merus is thin and weakly curved ventrally, being only slightly angulated.

The chelipeds are heavy, and not quite but distinctly unequal, the left being larger. The merus is very small and only the distal part is exserted beyond the carapace; its whole inner surface is excavated, and the proximal half of the upper border is crested. The carpus is large and glabrous only with the fringes of short hairs on the distal inner and outer margins; the inner angle is produced into a lobular tooth that is weakly curved upwards and not angulated. The palm is entirely smooth and naked. In both chelae the fingers are rather stout, leaving

a narrow gape along the whole length; the cutting edges of both fingers are irregular and blunt with the molar-like teeth in the larger chela and sharply toothed in the smaller chela; the tips are also obtuse in the larger chela and markedly sharp in the smaller. The colouration is restricted to the distal halves of the immovable fingers and to the distal two thirds of the movable fingers in both chelae.

The ambulatory legs are very slender; the third pair is much longer than the others, the second is the next and the first and the fourth are subequal. The anterior border of the merus is thin and minutely serrulated. The merus and carpus are sparsely provided with hairs, while the propodus and dactylus are densely fringed with long hairs of various length. The dactylus is only slightly shorter than the propodus; in the first three pairs each of the dactyli is subcylindrical, while in the last pair it is rather depressed and weakly curved upwards near the tip.

Description of paratypes. In the male the ornamentation of the carapace and the formation of the chelipeds and ambulatory legs are well agreeable with those of the holotype. In the female, however, the median frontal notch is indistinct, the last anterolateral tooth is almost indistinguishable, the smaller palm is provided with minute granules and some long hairs on the upper border and minute granules on the distal part of the lower border, and the fingers of the larger chela is sharply toothed.

Material. S. W. Madalâi, Goréor I., Palau Is. [7° 20′ 30″ N, 134° 28′ E], 1 ♂ (holotype), ZLKU 1621, 1 ♂, 1 ♀ (paratypes), ZLKU 1622, May 20, 1938, S. MURAKAMI leg.

Measurements (in mm). Holotype, male: Breadth of carapace, 4.8; length of carapace, 3.5; breadth of front, 1.7; fronto-orbital breadth, 3.5; length of ambulatory legs—first, 6.8, second, 8.7, third, 11.5, fourth, 7. Paratype, male: Breadth of carapace, 5.2; length of carapace, 3.7; breadth of front, 2; fronto-orbital breadth, 4; length of ambulatory legs—first, 8, second, 9.5, third, 12, fourth, 7.8. Paratype, female: Breadth of carapace, 5.7; length of carapace, 3.9; breadth of front, 2.1; fronto-orbital breadth, 4.1; length of ambulatory legs—first, 8, second, 10.2, third, 13, fourth, 8.3.

Remarks. The new species is closely related to *Z. amakusae* (TAKEDA et MIYAKE). In *Z. amakusae*, however, a fur along the frontal, supraorbital and anterolateral borders is very distinctly delimited from the remainder of the dorsal surface, the gastro-cardiac depression is more distinct, and the last anterolateral tooth is fairly well demarcated. In addition, the ambulatory legs of the new species are apparently much more slenderer than those of *Z. amakusae*.

The new species is named for Emeritus Professor S. MIYAKE of Kyushu University, to whom the author is greatly indebted for his kind guidance.

摘　　要

エンコウガニ科の *Ceratoplax villosa* ZEHNTNER という種は1894年にアンボイナから報告されて以後記録されていないが，九州大学農学部動物学教室に原記載によく一致する石垣島および沖縄産の標本が保存されている。*C. villosa* の原記載には雄の生殖孔の位置は記されていないが，被検標本では第4歩脚の底節に開口している。*Ceratoplax* 属を含む Rhizopinae では雄の生殖孔は胸甲に開口しているため，本種は *Ceratoplax* 属のみならず，Rhizopinae にも含めることはできない。そのため本論文中で新属 *Zehntneria* を設定して Carcinoplacinae に移された。甲，鉗脚，歩脚とも短い軟毛でおおわれ，甲の前側縁には三つの小さな切れ込みがある。鉗脚は雌雄とも著しく大きさが異なり，雄の大鉗脚の掌部外面の下半部には毛も顆粒もない。雄の第1腹肢はオウギガニ科ケブカガニ亜科に見られる型である。

1969年に天草から報告された *Litocheira amakusae* TAKEDA et MIYAKE も本種と同属と考えられる。この種では軟毛が甲の前縁，前側縁に限られるのが特徴的である。またパラオ産の標本の中に天草産の種によく似たものが見い出されたが，歩脚が著しく長いほか若干の相違点から別種として *Zehntneria miyakei* sp. nov. と名づけられた。

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