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Two new xanthid crabs inhabiting coral reefs of the  
Ryukyu Islands\*

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In the course of a study of the brachyuran crustaceans, the following two new species of the family Xanthidae, which are designated as *Actaea quadriareolata* sp. nov. and *Pilodius etisoides* sp. nov., are added to the fauna of the Ryukyu Islands. Unfortunately, those two species are known only by an ovigerous female respectively, but readily distinguished from the congeners by some definite features. Many species of the genus *Actaea* are well distinguished from each other, since Odhner's excellent monograph was published in 1925. Recently Serène (1961) remarked on and rearranged all known species, and into this vast genus reintroduced two genera, *Banareia* and *Glyptoxanthus*, which were often set on the generic or subgeneric rank by many previous authors and afterwards united with this genus by Odhner. On the other hand, the genus *Pilodius* which is represented by about nineteen species inhabiting the coral reefs seem to be rather natural and compact as at present understood.

The type specimens are preserved in the collection of the Zoological Laboratory, Faculty of Agriculture, Kyushu University (ZLKU).

*Actaea quadriareolata* sp. nov.

(Fig. 1, Pl. 8, A, B)

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\* Contributions from the Zoological Laboratory, Faculty of Agriculture, Kyushu University, No. 391.

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*Diagnosis*: Carapace deeply sculptured; those convex areolae widely separated and rather thickly covered with pearly granules, being provided each with a blush-like tubular hair. Areola 2M longitudinally divided, and each areolet again transversely subdivided. Carpus of cheliped with four or five nodules on its outer surface, and palm with three on its upper border. Ambulatory legs rather stout, granulated and bordered with long plumose hairs; each carpus bears a longitudinal furrow near its upper border and a transverse furrow at its subterminal upper portion, forming a prominent lobule at its distal upper portion.

*Description of holotype*: The carapace is narrow and slightly convex in both directions; the surface is very well divided by wide deep furrows into areolae which are very convex, rather thickly covered with pearly granules and usually provided each with a blush-like hair; those interregional furrows are devoid of granules and hairs; by a deep furrow 2M is longitudinally subdivided into two areolets, of which the inner one is slightly narrower, and each areolet is again transversely subdivided into two by a shallow furrow; 3M is subdivided into three, but the anterior portion is marked only by some granules of good size, the anteriormost of those granules being placed near the anterior border of the antero-inner areolet of 2M; 1L is not at all marked, while 2L is subdivided into two areolets by a shallow transverse furrow; 3L and 4L are distinct; 5L is again obliquely subdivided into two and 6L is separated from 5L by a rather shallow furrow; the posterolateral region is irregularly divided into some areolets.

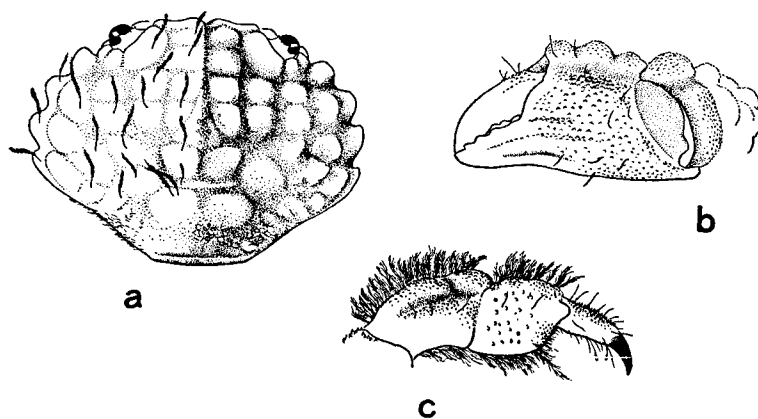


Fig. 1. *Actaea quadriareolata* sp. nov., holotype.

a. Carapace, showing disposition of hairs and areolation. Many pearly granules omitted.  $\times 7$ ; b. Left chela.  $\times 10$ ; c. Distal three segments of right third ambulatory leg.  $\times 10$ .

The front is slightly produced and cut into two lobes by a rather deep V-shaped median sinus; each lobe is sinuous laterally and deeply separated from the supraorbital angle. The inner part of the supraorbital border is raised and prominent; there are two deep notches which are placed side by side near the external orbital angle. The infraorbital border bears also a notch just below the external orbital angle, and is shallowly excavated in the middle and again produced at its inner angle. The antennal flagellum is fine and less than as long as the major diameter of the orbit.

The anterolateral border is divided into four convex teeth in addition to the external orbital angle which is also rather prominent; those teeth are subequal or the hindmost is slightly smaller, and thickly covered with small granules like the areolae on the carapace. The posterolateral border is strongly convergent, of which the anterior half is rounded and the posterior half is concave dorsally. The posterior border is straight and nearly equal to, or only slightly less than the breadth of the front.

The chelipeds are equal. The outer surfaces of the carpus and palm are thickly covered with small granules and provided with sparse fine short hairs; the outer surface of the carpus is rather irregularly divided into four or five lobules which are so convex that they are enough to be the nodules. The palm bears three nodules only on its upper border; the granules on the outer surface are not arranged longitudinally except for those on the distal portion.

The ambulatory legs are comparatively short and stout. Each segment is granulated and bordered with longish plumose hairs. Each carpus bears a longitudinal shallow furrow near the upper border and a short transverse one at the subterminal upper portion; the latter transverse one makes a right angle with the longitudinal one, a lobule thus formed at the upper distal portion being somewhat prominent. The dactylus is much narrower than the preceding segments.

Colour in formalin is entirely whitish except for the blackish brown fingers of the chelipeds.

*Holotype*: Ovig. ♀, ZLKU No. 12341, Sani, Amami-Oshima I., Ryukyu Is., Aug. 14, 1966, K. Honda and M. Takeda leg.

*Measurements* (in mm):

Length of carapace .....	4.5
Breadth of carapace .....	6.6
Breadth of front.....	2.0
Fronto-orbital breadth .....	3.8

*Remarks:* The present species is closely related to *A. consobrina* A. Milne Edwards, which is briefly characterized below.

In *A. consobrina*, the areolae on the carapace are well separated by wide interregional furrows; they are not very convex, but rather flat, and are provided with thick setae and pearly granules; the areola 2M is longitudinally divided, each areolet as well as 2L being entire. The chelipeds are very roughened by conical granules, but bear no distinct nodule.

The present species is readily distinguished from *A. consobrina* by the features that the carapace is divided by deep interregional furrows into very convex areolae which are not provided with setae, 2M is subdivided into four areolets and 2L into two, and that in the cheliped the palm bears three nodules on the upper border. Furthermore, in the species the first anterolateral tooth is entirely fused with the external orbital angle, while in the present species it is distinctly separated from the angle.

*Pilodius etisoides* sp. nov.

(Fig. 2, Pl. 8, C, D)

*Diagnosis:* Carapace well sculptured and thickly provided with minute granules of equal size, and with several small tufts of and some single tubular hairs; on areolae some transverse short rows of granules present. Front cut into two lobes by a deep median sinus, each lateral angle being very prominent and projected forward. Anterolateral border with four teeth, each bearing only minute granules. Ambulatory legs fringed with long tubular hairs and with minute granules. Tip of dactylus biunguiculate, but upper semitransparent horny one supplementary.

*Description of holotype:* The carapace is transversely oval, and evenly convex in both directions; its dorsal surface is well sculptured by rather wide smooth furrows into areolae which are provided thickly with minute granules of equal size and very sparsely with several small tufts of and some single tubular hairs; on most of the areolae some transverse short rows of granules are present, of which those on 2M are the most prominent and more or less undulated; the areolae are only slightly convex, being not subdivided. The front is bordered with granules and by a median deep sinus cut into two lobes which are most produced near the sinus and generally arched laterally; each lobe is so deeply excavated laterally that its lateral angle is produced in a prominent triangular tooth which projects forward. The supra-orbital angle is prominent and separated from the prominent tooth-like

lateral angle of the front by a wide V-shaped notch; the supraorbital border is also granulated and bears two subequal interruptions, one in the middle and the other just inner the external orbital angle which is strongly produced and conical in the dorsal view. The infraorbital border is provided with several granules and bears a deep excavation just near the external orbital angle; its inner angle is somewhat produced and subacute. The basal antennal segment is prolonged into the orbit nearly half or more the hiatus between the inner supraorbital and infraorbital angles; thus the antennal flagellum is more or less incompletely excluded from the orbit.

The anterolateral border is armed with four teeth behind the prominent external orbital angle; the first is low and provided with several crowded granules, being placed just behind and at lower level of the external orbital angle; the second is nearly conical with a small protuberant tip somewhat anteriorly, being bordered with minute spiniform granules; the third and fourth are high and prominent without broad bases, and also provided with crowded granules; those granules on the teeth are not large enough to interrupt the general contour of the carapace. The lateral wall of the carapace is densely provided with long tubular hairs which are visible from above.

The chelipeds are distinctly unequal, the left one being the larger. The merus is hairy and granulated, but is entire on the upper border. The carpus is roughened by thick minute granules interspaced with scant short setae, bearing a small protuberance without broad base at its inner angle; in the carpus near the distal margin a transverse prominent furrow is impressed. The larger palm is nearly like the smaller one, but is much stouter; the outer surface of the palm is thickly covered with minute granules interspaced with scant short setae like the carpus; those granules on the outer surface are, however, slightly more prominent than those on the carpus except for those near the lower border where they become smaller; otherwise the outer surface of the palm is provided with a longitudinal furrow near the upper border. The fingers of the larger chela are rather stout and deeply hollowed at the tips; in the immovable finger the cutting edge is provided with three molar-like teeth, of which the middle one is the most prominent, while in the movable finger the proximal one of three teeth is very prominent than the others; the fingers of the smaller chela are rather slender and also deeply hollowed at the tips; the cutting edges of both fingers are irregularly toothed, being composed of some teeth of different size; in both chelae each movable finger is provided with a prominent longitudinal furrow near the upper border, which nearly reaches the tip, while each immovable finger is impressed by two furrows near the cutting edge and the lower border; on both

fingers the ridges are produced on account of bearing the furrows, and along the ridges the minute conical granules are arranged nearly half way of or more the fingers; those granules on the movable fingers are more prominent than those on the immovable ones. The blackish brown colour of the fingers is not extended back on to the palm.

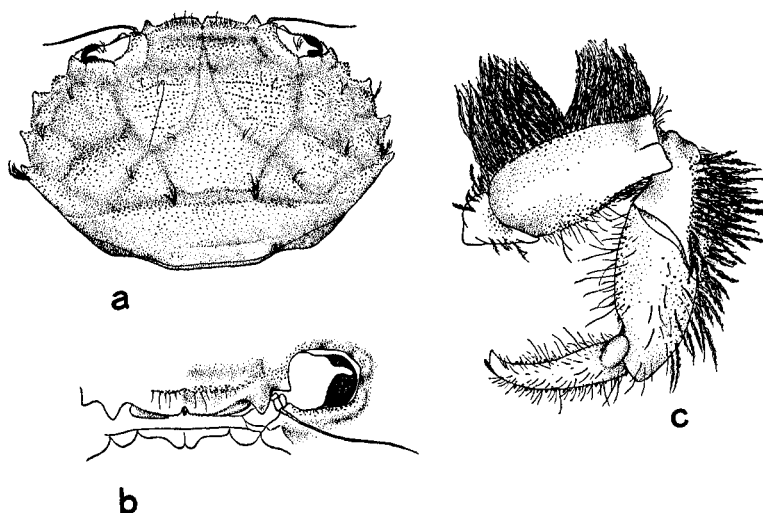


Fig. 2. *Pilodius etisoides* sp. nov., holotype.

a. Carapace.  $\times 5$ ; b. Frontal region.  $\times 7.5$ ; c. Right third ambulatory leg.  $\times 10$ .

The ambulatory legs are densely fringed with long tubular hairs. Each merus is devoid of granules and hairs on the upper surface, but on the upper and lower borders provided with same small granules as those on the carapace. Each carpus is also granulated on the upper border, and otherwise provided with a granulated ridge on the upper surface, by which the longitudinal shallow cavity is formed near the upper border. Each of the propodus and dactylus is also granulated, but the granules on the lower border of the propodus are very small; those on the upper border of the dactylus are rather sparse, but spiniform; the distal middle part of the propodus is strongly produced, and the oval protuberance on the proximal part of the dactylus is very prominent, with which both segments are characteristically joined each other; the tip of the dactylus is strongly biunguiculate, but the upper semitransparent horny one is apparently supplementary.

In formalin the carapace is mottled with white, yellowish and reddish brown; most of the granules on the areolae and chelipeds are reddish brown; some transverse rows of granules on the areolae are white. The fingers are blackish brown with white tips. The greater

parts of the chelipeds and ambulatory legs are white.

*Holotype*: Ovig. ♀, ZLKU No. 12505, Yo, Kasari, Amami-Oshima I., Ryukyu Is., Aug. 6, 1967, S. Aoki and M. Takeda leg.

*Measurements* (in mm):

Length of carapace.....	6.3
Breadth of carapace including lateral teeth.....	9.8
Breadth of front including lateral teeth .....	3.0
Fronto-orbital breadth .....	6.6

*Remarks*: This species is the nearest kin of *P. serenei* Miyake et Takeda which was recently described from the Palau Islands, but readily separated from the latter species by the following respects. (1) The areolae are provided with thick minute granules of equal size, and with some rows of granules. In the latter species the granules on the areolae are unequal size and become larger near the front and the anterolateral borders, and not arranged in rows. (2) The lateral angle of the front is very prominent and directed forward instead of projecting laterally. (3) The anterolateral teeth are not spine-tipped, and are provided with minute granules which are so small that the general contour of the carapace is not interrupted. In the latter species, however, the anterolateral teeth are spine-tipped, and provided with some prominent accessory spinules. (4) In the cheliped the carpus bears a protuberant tooth instead of the spiniform granules or spines at its inner angle. (5) The ambulatory legs are armed only with the same minute granules as those on the carapace. The dactylus is biunguiculate, but the upper semitransparent horny one is small and supplementary. In the latter species the ambulatory legs are armed with several prominent spines, and in each dactylus the upper horny one is prominent and placed at the tip and the lower is at the subdistal part, which is the usual form.

### Literature

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## Explanation of Plate 8

**Figs. A, B.** *Actaea quadriareolata* sp. nov., holotype.

**Figs. C, D.** *Pilodius etisoides* sp. nov., holotype.



