REDESCRIPTION OF CTENOCHILES BALSSI KISHINOUYE, 1926, WITH COMMENTS ON ITS SYSTEMATIC POSITION AND ESTABLISHMENT OF A NEW SUBFAMILY GOURRETIINAE (DECAPODA, CALLIANASSIDAE)

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ABSTRACT

Ctenocheles balssi Kishinouye, 1926 is redescribed. This species is the type of the genus Ctenocheles, the type genus of the family Ctenochelidae. The Ctenochelidae are reduced to the rank of a subfamily of the Callianassidae. The genera Gourretia and Dawsonius should be included in a new subfamily, Gourretiinae.

INTRODUCTION

Ctenocheles balssi Kishinouye, 1926, an interesting species known from the Japan Sea, was reported for the first time from the Pacific side of Shikoku Island, Japan by Matsuzawa & Hayashi (1997). The authors graciously allowed me to examine their specimens in order to enable me further studies on the species and on its place in the system of the Thalassinidea.

Ctenocheles balssi is a very important species for the taxonomy of the group as it is the type species of the genus Ctenocheles, which is the type genus of the family Ctenochelidae Manning & Felder, 1991. In their key, Manning & Felder (1991: 766) separated two families, Ctenochelidae and Callianassidae Dana, 1852 by the presence or absence of the appendix masculina on the male Plp2, viz., male Plp2 with appendix masculina in the Ctenochelidae and without...
appendix masculina in the Callianassidae. However, Lepidophthalmus Holmes, 1904, Glypturus Stimpson, 1866, Neocallichirus Sakai, 1988, Calliax De Saint Laurent, 1973, and Paraglypturus Türkay & Sakai, 1995 in the family Callianassidae, are characterized by the male Plp2 bearing an appendix masculina. This implies that the Ctenochelidae do not warrant a family status. Manning & Felder (1991) included 3 subfamilies (all new) in the Ctenochelidae, viz., Ctenocheli- nae, Callianopsinae, and Anacalliacinae (incorrectly spelled Anacallaiinae), and four genera in the Ctenochelinae, viz., Ctenocheles, Dawsonius, Gourretia, and Paracalliax. The definition of their Ctenochelinae states: “Carapace lacking dorsal oval. Mxp3 propodus and dactylus slender. Plp2-5 similar, different from and larger than Plp1, with finger-like appendices internae”. Several characters, not mentioned by Manning & Felder (1991) in their definition, in my opinion are quite important (see the definition of the subfamily Ctenochelinae). Later, Poore (1994) diagnosed the family as “Callianassoidea. Linea thalassinica present, lateral to antennae; posterior margin of carapace evenly curved, with cardiac prominence; rostrum obsolete or a spike; eyestalks flattened; maxilla 2 scaphognathite without long seta on posterior lobe; abdominal somite 1 without anterolateral lobes, weakly chitinised; pereopods 1 chelate; pereopod 3 propodus without distal spiniform seta on lower margin; pereopod 3 propodus linear or weakly ovate; coxa of pereopod 4 flattened, mobile; thoracic sternite 7 narrow; pleopod 2 similar to pleopods 3-5, rami lanceolate; uropodal exopod simply ovate; only abdominal somite 6 sometimes with setal rows.” A computer-aided phylogenetic analysis of the Thalassinidea induced Poore (1994) not to recognize the subfamily Anacalliacinae and to place its only genus in the Callianassidae.

The two above-cited definitions are not fully accurate, because a number of included species disagree with some of these characters: in the Anacalliacinae and Callianopsinae, the dorsal oval is distinct, while in the Ctenochelinae the dorsal oval is absent as in the Callianassinae (Lepidophthalmus, Glypturus, Neocallichirus, Calliax, and Paraglypturus). Manning & Felder (1991), and Poore (1994) mentioned with regard to the family Ctenochelidae (and the subfamily Ctenochelinae) that Plp2-5 are clearly similar in shape in both males and females, however, Plp2 is really smaller than Plp3-5, and the appendix masculina and appendix interna are present in males, while also the appendix interna is present in females as it is for Lepidophthalmus, Glypturus, Neocallichirus, Calliax, and Paraglypturus, but in Paracalliax bollorei of the Ctenochelidae, Plp2 is, exceptionally, slightly larger than Plp3-5 (fig. 3h-i, Ngoc-Ho in litt.). Besides the characters given by Manning & Felder (1991) and Poore (1994), the Ctenochelidae typically have a rostral dorsomedian carina and a cardiac prominence with a mid-pit as in Anacalliacinae and Eucalliacinae (incorrectly spelled Eucalliiinae),
however, in *Ctenocheles collini* Ward, 1945 the rostral carina is absent. In my opinion the Ctenochelidae should not be recognized as a family, and they should rank no more than a paraphyletic subfamily of the Callianassidae.

As far as the genera *Gourretia* and *Dawsonius* are concerned, a new subfamily *Gourretiinae* should be established, since those two genera cannot be included in the other known subfamilies because of the shape of the rostral carina, the P/3 propodus, the carapacial oval, and the Mxp3 dactylus (see the remarks on the subfamily *Ctenochelinae*, below).

Abbreviations include: CL (carapace length), TL (total length of the animal from the tip of the rostrum to the end of the telson); Mxp (maxilliped); P (pereiopod); Plp (pleopod); FUS (National Fishery University in Shimonoseki, Japan); MMM (males); FFF (females).

**DESCRIPTIVE PART**

**Family CALLIANASSIDAE Dana, 1852**

Callianassidae Dana, 1852: 12, 14; Poore, 1994: 101, 102.

**Subfamily CTENOCHELINAE Manning & Felder, 1991**


Genera included. — *Ctenocheles* Kishinouye, 1926; *Paracalliax* De Saint Laurent, 1979.

Remarks. — *Dawsonius* Manning & Felder, 1991, and *Gourretia* De Saint Laurent, 1973, were included in the Ctenochelinæ by Manning & Felder (1991) and Poore (1994). These two genera are here excluded from the Ctenochelinæ, and separated as *Gourretiinae* n. subfam., because in *Dawsonius* and *Gourretia* the rostral carina is absent; and the propodus of P/3 is broadened in a heeled form, as it is in the Callianassidae, but the carapace bears no oval structure; and the Mxp3 dactylus is elongate as in the Ctenochelinæ. However, in *Paracalliax* the
propodus of P/3 is elongate (see De Saint Laurent & Le Loeuff, 1979, fig. 26g), so that the genus is kept here in the Ctenochelinae.

The sexually modified Plp1-2 are not only found in Ctenochelinae, but also in Callianassinae (Lepidophthalmus, Glypturus, and Neocallichirus) and Eugaliacinae (Calliax and Paraglypturus). In Manning & Felder’s (1991) definition of the Ctenochelidae the Plp2-5 are similar and larger than Plp1, however, these characters are not found in Ctenocheles. The present examination of Ctenocheles balssi proves that Plp2 differs from Plp3-5 in shape and size as in Lepidophthalmus, Glypturus, Neocallichirus, Calliax, and Paraglypturus. However, in Paracalliax the holotype female was reported by De Saint Laurent & Le Loeuff (1979: 86) to have Plp2 similar to Plp3-5 in shape and size; but it is slightly larger (fig. 3h-i) (Ngoc-Ho in litt.). Also, the male Plp2 appendix masculina is not only found in Ctenocheles, but also in Lepidophthalmus, Glypturus, Calliax, and Paraglypturus, so that it is impossible to place any genus except Ctenocheles and Paracalliax in the subfamily Ctenochelinae.

**Ctenocheles** Kishinouye, 1926


Diagnosis. — Left and right P/1 dissimilar in shape and size; palm of the larger cheliped subglobular, and chela comb-like on the prehensile margins. Mxp3 exopod present or absent; endopod pediform, ischium-merus oblong, and merus usually with a distal spine; carpus, propodus, and dactylus all slender.

Type species. — *Ctenocheles balssi* Kishinouye, 1926, by monotypy, gender masculine.


**Ctenocheles balssi** Kishinouye, 1926 (figs. 1a-e, 2a-g, 3a-g)

? *Pentacheles* nov. sp.? Balss, 1914: 75, fig. 43.


*Ctenocheles Balssi* — De Man, 1928: 25.
Material examined. — FUS 530-2-1787, 1 MMM (TL 77 mm; CL 18 mm including rostrum), None, Toyo-cho, east coast of Muroto Peninsula, Shikoku Island, Pacific Ocean, muddy, up to 200 m deep, gill-netted, coll. K. Matsuzawa, 09.11.1995; FUS 530-2-1789 1 FFF (TL c. 69 mm, CL 16 mm), same locality in 70 m depth by gill-net, coll. K. Matsuzawa, 07.02.1991.

Description. — Rostrum (fig. 1a-c) narrowly protruded, laterally compressed, and continuous to a mediadorsal carina extending to middle of gastric region. Anterior part of dorsal carina bears row of eight denticles in male and row of 10 denticles in female. Cardiac region dorsally elevated and provided with conspicuous cardiac prominence with mid-pit. Cervical groove distinct, and located in anterior third of carapace (rostrum included). Linea thalassinica extends entire length of the carapace.

![Fig. 1. Ctenocheles balssi Kishinouye, 1926, male. a, carapace in lateral view; b, anterior part of carapace, lateral view; c, same, dorsal view; d, telson; e, uropod. Scale 1 mm.](image-url)
Telson (fig. 1d) subquadrate, slightly longer than broad; lateral margin slightly convex in anterior third, then extending posteriorly to a rounded corner; posterior margin convex with a median tooth, bearing sparse setae. Dorsal surface swollen in anterior third, and depressed posteriorly, ornamented by a lower mid-dorsal groove and a pair of lateral longitudinal ridges extending to near posterior margin. Uropodal endopod rectangular, twice as long as broad, truncate on posterior margin; dorsal surface with a weak longitudinal carina. Uropodal exopod (fig. 1e) larger than endopod, slightly longer than broad; dorsal surface provided with a shallow median carina, extending to a distinct notch in the lateral margin.

Eyestalks (fig. 1c) oval, contiguous, convex on dorsal surface, twice as long as broad, with the tip obtusely angular, reaching halfway between distal end of antennular basal article and tip of rostrum; cornea subterminally located some distance behind the tip, and pigmented under the surface. Antennular peduncle distinctly shorter than antennal peduncle, terminal article about as long as penultimate, almost reaching to proximal margin of antennal terminal article. Antennal peduncle with small but distinct dorsal scale; penultimate article elongated and longer than terminal article. Maxillule 2 scaphognathite without a long posterior bristle. Mxp2 with rudimentary exopod and rudimentary podobranch. Mxp3 (fig. 2a) without exopod; endopod pediform; basis armed with accessory tooth in males but unarméd in females; ischium subrectangular, internal surface defined with crista dentata bearing curved row of sharp denticles; ischium and merus separate and forming a broad elongate plate with long setae on mesial margin; merus with a blunt distomesial tooth; terminal three segments also with long setae on flexor margins; length of endopodal merus-ischium exceeding twice width.

Gill-formula as follows:

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P1 (fig. 2b-c) unequal in size and dissimilar in shape. In larger cheliped ischium slender and unarmed; merus also slender, unarmed and about as long as ischium, carpus short and cup-shaped, chela characterized by comb-teeth on prehensile margins, palm subglobular, 1.5 times as long as broad, glabrous, in-
inferior margin largely rounded, extending to base of fixed finger; fixed finger slender, about twice as long as palm, prehensile margin entirely armed with a row of sharp teeth, and sharply incurved distally; dactylus also slender, prehensile margin entirely armed with a row of sharp teeth and sharply incurved terminally, crossing with fixed finger. Smaller cheliped slender and less massive than larger cheliped; ischium and merus slender and unarmed; carpus subtriangular, proximo-inferior margin regularly diverging to distoventral angle, length half that of merus; chela four times as long as broad; palm subrectangular, twice as long as high; fixed finger slender, slightly longer than palm, prehensile margin armed with a row of obtuse denticles; dactylus slender, prehensile margin armed with obtuse denticles.

P/2 (fig. 2d) chelate, coxa, basis, and ischium unarmed; merus with sparsely distributed long setae on inferior margin; carpus with row of setal tufts on superior margin; chela with long setae on superior and inferior margins, and with some tufts of short setae on exterior surface; both fingers with smooth prehensile margins, terminating distally in thickened corneous tips; dactylus with long marginal setae on superior margin. P/3 (fig. 2e) simple; coxa, basis and ischium unarmed; merus rectangular, length 3 times height; carpus broadest distally, twice as long as high; propodus subquadrate, superior and inferior margins parallel and with long setae, exterior surface with scattered, small tufts of short setae on dorsal half; dactylus triangular, hooked outwards, terminating in two corneous spinules. P/4 (fig. 2f) simple; coxa, basis and ischium unarmed; merus four times as long as high; carpus shorter than merus; propodus rectangular, not protruded at inferodistal corner, lateral surface with scattered tufts of setae; dactylus triangular, hooked outwards. P/5 (fig. 2g) subchelate; propodus forming a broad fixed finger inferodistally, distointerior surface with dense setae, dactylus hooked towards external side of fixed finger, tip deflexed.

Male Plp1 (fig. 3a) uniramous, composed of four segments; two proximal segments flattened. Female Plp1 (fig. 3e) three segmented, distal segment weakly segmented. Male Plp2 (fig. 3b) biramous, exopod oval and shorter than endopod; endopod with appendix interna and appendix masculina on distal part of mesial margin (fig. 3c); appendix interna about one third length of endopod, 6 times as long as wide, appendix masculina longer than appendix interna, spoon-shaped with many stiff simple setae. Female Plp2 (fig. 3f) biramous, exopod ovoid in form, smaller than endopod; endopod with appendix interna on mesial margin. In males and females Plp3-5 (fig. 3d, g) biramous, larger than Plp2, each bearing appendix interna on mesial margin of endopod; appendix interna one sixth the length of endopod, and 6 times as long as wide.
Remarks. — Mxp2 was re-examined and a small exopod and podobranch were found to be present. Matsuzawa & Hayashi (1997) stated that neither an exopod nor epipod were present.

Suzuki (1979) reported the present species from Nezumigaseki, Yamagata Prefecture, at 300 m depth on mud, however the depth must be questioned, because the only muddy bottom is in 76-91 m according to the geographical map of this locality (Suzuki: 4-5, fig. 271).

Doflein (1906: 521) had two specimens of what he considered to be Thaumastocheles: (1) a single chela from Okinosë Bank which he collected during his Japan trip, and (2) a complete specimen from “one of the deep sea banks at the entrance of Sagami Bay”, which was sent to him by Mr. A. Owston after
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Fig. 3. a-g, Ctenocheles balssi Kishinouye, 1926; a-d, male; e-g, female. h, i, Paracalliax bollorei De Saint Laurent, 1979, female. a, male Plp1; b, male Plp2; c, appendix interna and appendix masculina on male Plp2; d, male Plp3; e, female Plp1; f, female Plp2; g, female Plp3; h, female Plp2; i, female Plp3. a-g. Scale 1 mm; h-i, scale 2 mm.

Doflein’s return to Germany. The first specimen was thought by him to belong to “a species of Thaumastocheles”, it was later studied by Balss (1914: 75) and identified as “Pentacheles nov. sp.”; finally it was recognized by Kishinouye (1926) as belonging to his new species Ctenocheles balssi. Doflein’s second specimen, which he identified as Thaumastocheles zaleucus, was later identified by Balss (1914: 82) as T. japonicus Calman, 1913.

Holthuis (1937: 377) pointed out that Doflein’s first specimen (i.e., the loose chela from Okinose Bank, identified as Thaumastocheles sp.), belonged to Ctenocheles balssi. The specimen actually is a syntype of Kishinouye’s species, as Balss (1914) described it and Kishinouye mentioned that description in his original account of the species.

Type locality. — Ohsu near Kashiwasaki, Niigata Prefecture, Japan Sea.
Range. — Japan Sea: Nezumigaseki, Yamagata Pref., 76-91 m (see above), mud; Ohsu near Kashiwazaki, Niigata Pref. (Kishinouye, 1926); Wakasa Bay, 119 m (Yokoya, 1933). Pacific Ocean: Off None, Muroto Peninsula, Shikoku Island, 70-200 m, mud.

Paracalliax De Saint Laurent, 1979

*Paracalliax* De Saint Laurent, 1979: 1396; De Saint Laurent & Le Loeuff, 1979: 84; Manning & Felder, 1991: 785, figs. 1, 7; Poore, 1994: 103.

Diagnosis. — Carapace with low rostral carina, lacking dorsal oval and rostral spine. Dorsal surface of eye concave. Mxp3 exopod present; endopod pediform, ischium more than three times and merus less than twice as long as broad; merus with a distal spine; dactylus more than twice as long as broad. Left and right P/1 dissimilar in shape and size; larger cheliped lacking proximal meral hook; palm of larger cheliped compressed, and chela edged on the prehensile margins. Abdominal somite 6 with rounded lateral projection. Uropodal exopod lacking lateral notch or incision.

Type species. — *Paracalliax bollorei* De Saint Laurent, 1979, by original designation and monotypy.

Remarks. — Manning & Felder (1991: 785-786) included the present genus in the Ctenochelidae. The characters assigning it to that family are the elongate P/3 propodus, the presence of the rostral carina and the cardiac prominence. However, it is different from *Ctenocheles* in the P/1 chela, and in the Plp2 appendage. In *Paracalliax* the P/1 chela shows a compressed form of chela, and Plp2 is only exceptionally as large as Plp3-5, while in *Ctenocheles* the chela is comb-shaped on the prehensile margins, and Plp2 is smaller than Plp3-5.

*Paracalliax bollorei* De Saint Laurent, 1979 (fig. 3h-i)

*Paracalliax bollorei* De Saint Laurent, 1979: 1396; De Saint Laurent & Le Loeuff, 1979: 86, figs. 26a-i, 27a-c, 28a-h; Manning & Felder, 1991: 785 (list).

Material examined. — MNHNTh 404, female [examined by Dr. Nguyen Ngoc-Ho, Muséum National d’Histoire Naturelle, Paris].

Remarks. — The holotype was not accessible, but the characters of the female Plp2-3 were examined by Dr. Nguyen Ngoc-Ho. Her drawings are reproduced here.

Type locality. — Banc d’Arguin, Mauritania, 20-100 m.

Range. — Mauritania, Banc d’Arguin (De Saint Laurent, 1979); 20-100 m.
Gourretiinae n. subfam.

Definition. — Carapace lacking dorsal oval. Rostral carina not present. Cardiac prominence with a mid-pit present or absent. Linea thalassinica entire. Mxp3 with or without exopod, distal margin of merus with or without distal spine. Larger cheliped with proximal meral hook, and smaller cheliped with elongate chela. P/3 propodus broadened in a heeled form. Uropodal exopod with or without lateral notch or incision. Male Plp1 uniramous, male Plp2 biramous and foliaceous with appendix interna and appendix masculina. Female Plp1 uniramous, and female Plp2 biramous and foliaceous, with appendix interna. Plp3-5 biramous and foliaceous with appendix interna, larger than Plp2 in size.


Remarks. — Dawsonius and Gourretia are excluded from the Ctenochelinae, but included in the Callianassidae by Poore (1994). However, they should be combined as a new subfamily, because their characters are inconsistent with those in other known subfamilies. In this new subfamily, the rostral carina is absent; the cardiac prominence with a mid-pit is present or absent; P/3 propodus is broadened in a heeled shape; Mxp3 dactylus is elongate as in Ctenochelinae and Anacalliacinae, though in Eucalliacinae and Callianopsinae the Mxp3 dactylus is rounded, while in the Ctenochelinae the rostral carina is typically distinct or weakly present; the cardiac prominence is present; and the P/3 propodus is elongate.

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