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KUNGL. BOKTRYCKERIET. P. A. NORSTEDT & SÖNER  
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# ARKIV FÖR ZOOLOGI.

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## Two new species of the genus *Euconaxius*.

By

FILIP TRYBOM.

With 2 plates (Pl. 20, 21).

Communicated December 9th 1903 by Hj. Théel and Chr. Aurivillius.

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Since the description by LEACH of the genus *Axius* together with the species *stirynchus*,<sup>1</sup> and since BELL<sup>2</sup> delineated and fully characterized the former, there has been described — as far as I know — only one new species from northern European waters. FR. MEINERT described a specimen, from Nymindégab on the west coast of Denmark, as *Axius nodulosus*, in "Naturhistorisk Tidsskrift", 3dje Række, 11te Bind (Kjøbenhavn 1877—78) p. 212. In the meantime many species of the genus *Axius* LEACH and of the allied genus *Calocaris* BELL have been discovered in other regions. Of the characteristics mentioned by BELL as distinguishing *Axius* and *Calocaris* from each other, hardly more than one can be said to survive as peculiar to *Calocaris*, and that is the greatly diminished size of the eyes ("rudimentary, subglobose, without any pigment or corneæ" BELL, p. 231).

In his work: "Report on the Crustacea Macr." etc. ("The Voyage of H. M. Challenger, Zool., Vol. XXIV 1888) C.

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<sup>1</sup> W. E. LEACH: "A tab. view of the external Characters of four classes of Animals, which Linné arranged under *Insecta*" etc. The Trans. of the Lin. Soc. of London. Vol. XI. Part the First. 1813, p. 343.

<sup>2</sup> TH. BELL: "A History of the British stalk-eyed crustacea". London 1853, p. 227—230.



SPENCE BATE established the genus *Euconaxius* for the three species with a "stylocerite" (a long spine) on the second joint of the external antennæ and a "scaphocerite" ("movable acicle", or a long movable scale) inside of the stylocerite. To this genus belongs, among others, as a real typical species, *Axius* (*Euconaxius*) *plectorhyncus* STRAHL, as is clearly shown by his fig. 4<sup>1</sup>, and it is now my intention to add two species to the genus *Euconaxius*.

It seems to be a very remarkable fact, that, on the whole, the said shape of the external antennæ is also a characteristic which marks *Calastacus* FAXON, as a different genus from *Calocaris*. If it were not for the rudimentary eyes of *Calastacus*, this genus would somewhat closely resemble *Euconaxius*.

### ***Euconaxius coronatus* n. sp.**

The two specimens, belonging to the Swedish National Museum of Natural History and mentioned below, were distinguished on their label by the name *Calocaris coronata*. I therefore think it proper to retain this specific name.

The carapace (Pl. 21, fig. 2) laterally compressed, its dorsal side with the rostrum about twice as long as high on the line of greatest height, terminating forwards in an acute triangular, narrowed rostrum, being spiniform and slightly turned upwards at the tip (Pl. 21, fig. 3), armed along each side with from 4 to 6 small acute teeth. From each of these rows of teeth a lateral carina runs backwards, furnished with from 4 to 6 teeth, considerably larger than those on the rostrum. Between the said carinæ a dorsal carina extends for about two-thirds of the length to the cervical suture, armed with one or two spiniform teeth just behind the base of the rostrum. Between the dorsal and the lateral carinæ there is to be found on each side a trace of a subdorsal carina, armed posteriorly with 2 or 3 teeth resembling those on the above-mentioned carinæ.

<sup>1</sup> STRAHL: "Ueber einige neue von Hrn F. JAGOR eingesandte Thalassiden" etc. "Monatsbericht d. Königl. Preuss. Akad. d. Wiss. zu Berlin 1861", 2te Hälfte, Juli—Dec., S. 1060—1062, Fig. 2—4.



The eyes are a little more than half as long as the rostrum; their visible stalk or cylindrical basal part of about the same length as their rounded extremity with the cornea. This latter part is either broader than, or of about the same breadth as, the part first mentioned.

The internal antennæ (Pl. 20, fig. 3) have the two setæ of subequal length. The peduncle ["the basal segment of the stem" of *Astacus*, according to HUXLEY<sup>1</sup>], which constitutes the bearer of the eyes, forming a convexity exteriorly (Pl. 20, fig. 3 and 4) and bearing a spine at the distal end of this convexity. The distal end of the segment is itself narrowed to nearly the same breadth as the other two joints of these antennæ, which joints are about equal in length and are together about as long as the peduncle. On its upper side the peduncle is furnished with a comparatively broad, longitudinal furrow, which is covered with a row of hairs springing from each side (Pl. 20 fig. 3 a).

External antennæ (Pl. 20 fig. 1 and 2) with the second segment ["the armiger", STRAHL<sup>2</sup>] produced into a long and thick spine (fig. 2 a) ("stylocerite", FAXON and other authors) at the base of the "scaphocerite" (fig. 2 b) [the movable acicle or squama<sup>3</sup>], which former spine (stylocerite) attains to about one third of the length of the scaphocerite. On the lower side of the distal end of the third segment there is a strong but short spine (fig. 2 c). The style-shaped movable scaphocerite is slender and pointed, nearly as long as, and even a little longer than, the fourth segment, which is a little longer than the second segment with the stylocerite. The last segment is about one quarter as long as the fourth. The second and third segments are compressed laterally. The single flagellum is more than twice as long as the carapace, measured along its sides.

The "ischiopodite" (HUXLEY) of the external or third maxillipeds (Pl. 20, fig. 5 a) bears a very nicely serrated "crista dentata" (fig. 6), and the meropodite (b) (merus) is furnished with two or three strong spines, in addition to some small ones, at its lower edge.

<sup>1</sup> T. H. HUXLEY: "The Crayfish" (London 1880), p. 172.

<sup>2</sup> STRAHL: p. 1061, fig. 4.

<sup>3</sup> Confer W. FAXON: "The Stalk-eyed Crustacea". Mem. of the Mus of Comp. Zoology at Harvard College. Vol. XVIII. XV (Cambridge U. S. A. 1895) p. 103.



The chelæ on the first pair of legs are of a distinctly unequal size (Pl. 20 fig. 7—10); the larger one being more than half as long again as the dorsal side of the carapace, including the rostrum. The length of the smaller chela is about three-fourths of the larger one, which is between two or three (the smaller chela three) times as long as it is broad. Both of these chelæ are strongly compressed. The two sides of the basal portion of the propodite are nearly parallel, and are furnished with an edge, which on the upper side is provided with small saw-like teeth, directed forward. The digital portion of the larger chela, not half as long as the entire propodite, is armed with a large tooth or a protuberance on the granulated prehensile edge. The dactylus is not as long as the basal portion of the propodite, and is provided with either two teeth, or one tooth, or is destitute of teeth on the edge I have mentioned; the outer or opposite edge is serrated. It is but a little curved toward the tip. The smaller chela with the digital part of about the same length as the basal portion.<sup>1</sup>)

On the upper side of the meropodite (merus), not far from its distal end, there are to be found on the first chelipeds from one to three strong, sharp, and in some individuals behind these, some smaller spines. On the opposite side of the merus we see one or two spines, situated more posteriorly and, in addition (but not in all individuals) one spine nearer to the distal end.

The ischiopodite bears a spine on the under side near its distal end and, behind this spine, a row of smaller spines or teeth.

The slender second pair of legs (Pl. 21, fig. 1) are of about the same length as the dorsal side of the carapace, their merus being about as long as the carpus and chela taken together. In the middle — and in the case of one individual, near the distal end too — of the under side of the merus there is to be found a spine, resembling that on the same side near the distal end of the ischiopodite. The chela is distinctly longer than the carpus; its digitus and the digital portion of the propodus are of about the

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<sup>1</sup> It was in two individuals only, that both chelipeds were available; the left chela being the longer in the one specimen and the right being the longer in the second.



same length as the basal portion. Both edges of the chelæ and the carpus, and the under side of the merus, are provided with long hairs.

Of the non-chelate legs, the third and fourth pairs are slenderer and longer than the second pair; the fifth pair are still more slender and are of about the same length as the second pair.

In the eggbearing female, the genital openings on the bases of the third pair of thoracic legs (Pl. 20, fig. 13) were very plainly to be seen. In the other females these openings, like the genital pores (the apertures of the vasa deferentia) on the bases of the fifth pair of feet in the males (Pl. 20 fig. 14) require to be very well lighted to be observed.

The abdomen is nearly as broad as the carapace; its first segment being much narrower than the following ones. The posterior margin of the sixth segment is considerably shorter than the broadest part of the segment. The abdomen with the telson is much longer than the dorsal side of the carapace including the rostrum. The pleuræ of the second, third, fourth and fifth abdominal segments are rounded<sup>1</sup>, that of the second segment (Pl. 21 fig. 4) being much longer (in the direction of the length of the corpus) than the other pleuræ.

As regards the shape of the lamellæ of the flapper and of the telson see Pl. 21 fig. 8. The telson is from one-fourth to nearly one-third longer than the sixth abdominal segment, and about as broad as the posterior margin of this segment. The sides of the telson are nearly parallel. Where the first third of the sides ends, there is an impression from beneath, which gives the said part of the sides of the telson, seen from above, the shape nearly of a long lobe. Between the said impression and the posterior margin of the telson each side is armed with about four small spines. The said margin is rounded and is usually provided with a little spine in the middle, where the longitudinal central furrow on the dorsal side ends. This furrow extends over about two-thirds — or a little more — of the length of the telson. On the

<sup>1</sup> As regards the abdominal pleuræ there is a large difference for instance between *Axius crista-galli* FAXON (plate XXVIII, fig. 1) on the one and *Euconaxius coronatus*, *Axius stirhynchus* LEACH and other species on the other side.



distal part of the low ridges which, one on each side, run backwards and outwards from the beginning of the said furrow, there is a row of small tubercles which, in the case of some individuals, are each armed with a small spine.

The hinder edge of the lamellæ and the telson are furnished with a row of plume-shaped hairs, which seem to be jointed; or it may be that they are only marked with transverse streaks. Hairs of the same shape, but with shorter joints or shorter distances between the transverse streaks, are also to be found on the swimmerets (Pl. 21, fig. 6). Intermixed with some comparatively very long hairs there is, at the said edge of the telson and the lamellæ, a second row of hairs, these being very short, like small spines. The latter row does not reach to the corners of the lamellæ or of the telson.

As will be seen from the following tabular scheme, which has been compiled by Mr. G. LILLJEVALL, the drawer of the plates, the telson seems to be narrower in the male than in the female:

Sex.	Length of the telson m. m.	Breadth of the telson m. m.	Breadth in percentage of the length.
♀	6	4,7	78,3 %
♀	5	4	80 %
♂	7	5	71,4 %
♂	6	4,4	73,3 %

It seems to be likely too, that a larger individual of the same sex has a comparatively narrower telson than a smaller (younger) one.

The first abdominal segment is, in the case of the egg-bearing and the medium-sized female, provided with a pair of one-jointed, rudimentary feet (Pl. 21, fig. 4 a) which are not found in the other specimens.

The two branches of the second pair of abdominal limbs seem to be multi-articulated (Pl. 21, fig. 5, 6 and 7), but I am not quite sure if these are real joints or a wall running, perhaps, in a spiral-form (cf. fig. 6). The hairs are plume-shaped and seemingly articulated (fig. 6). Where the inner branch becomes abruptly narrower, we find, in the case of



the female (fig. 7) one, and, in the male (fig. 5) two<sup>1</sup> minute blunt processes ("appendices internæ"); one of them, in the male, furnished with hairs, the other in the male, like the single process in the female, is seemingly two-jointed and provided with very small hooks or papillæ at the apex.

The general colour resembles that of *Calocaris Macandreeæ* BELL, but without the tinge of rose. When dried, the specimens are glabrous.

This species, being nearly related to *Axius armatus* S. I. SMITH<sup>2</sup>, is always to be distinguished from the latter by the armour of the ventral part of the carapace. In *Axius armatus*, the lateral and the sub-dorsal carinæ are destitute of spines.

A female (ex. n:o 1), bearing 11 eggs when brought on board the steamer, together with another much smaller female (ex. n:o 2), was dredged during the expedition of the Swedish gunboat "Gunhild" in the summer of 1879, from a depth of about 410 meters in the Skager Rack. The bottom consisted of "fine brown clay".

Of these two specimens, which have been kindly lent to me from the Swedish National Museum of Natural History for examination by Prof. HJ. THÉEL, the larger had a length of 47, and the younger individual of 21 millimeters; the carapace including the rostrum and measured on the dorsal side, 18 and 8 mm. respectively, the abdomen with the telson 29 and 13 mm. The eggs had a diameter of 1,5 mm., after having been a long time in spirit.

During the expedition of the Swedish Hydrographic-biological Commission on the gunboat "Skäggald" I obtained, on the 6th of July 1902, two specimens from a depth of about 230 meters and from a bottom, consisting of clay, in the Kosterfjord (Bohuslän). The larger specimen — a male — (ex. n:o 3) was of the same length as the larger female mentioned, the smaller — a female — (ex. n:o 4) was a little shorter. The same day I succeeded in catching a third individual — a male — (ex. n:o 5) which was 52 mm. in length (carapace

<sup>1</sup> When drawing the figures, Mr. LILLJEVALL found, that the difference between the sexes is constant.

<sup>2</sup> S. I. SMITH "Preliminary notice of the crustacea dredged in 64 to 325 fathoms off the south coast of New England by the United States Fish Commission in 1880". — Proceedings of the U. S. National Museum. Vol. III 1880. p. 433.



20, abdomen 32 mm.). This specimen was brought up from a depth of about 500 meters in the Skager Rack. From the bottom at this place there were dredged clay, mud and some dead algæ (*Laminaria* and *Fucus*).

### ***Euconaxius crassipes* n. sp.**

While closely resembling *Euconaxius coronatus*, this species differs from the latter by having the larger fore-foot, and the claw especially, of great strength, (this leg being on the right side in the only specimen which has yet been found) (Pl. 20 fig. 11 and 12).

*Male.* The claw or chela mentioned, is about as long as the dorsal side of the carapace to the base of the rostrum and is not compressed as is the case with *Euconaxius coronatus*; its thickness or largest section from the outer to the inner side is about two-thirds of its greatest breadth (the largest section from above to beneath). The digital portion is about half as long as the basal part of the propodus. The digitus is also comparatively short, being only a little longer than the said digital portion and strongly curved toward the tip, and consequently, more resembling *Euconaxius armatus* than *coronatus*. The prehensile edge is furnished with a tooth or protuberance on its distal third, and a second tooth, not quite as large, near the base. At the middle of the same edge of the digital portion of the propodus there is a strong tooth also, and on the inside of this are some smaller teeth. Seen from the inner or outer side, the basal portion of the propodus is a little broader at the distal end than at the base. Except the central part of the inner side, the claw is roughly granulated. The upper side of the propodus is provided with comparatively strong, uneven spines directed forwards. The same side of the digitus, like the under side of the propodus, is roughly serrated.

The carpus and the merus are very thick; the greatest breadth of the former being quite as much as its length.

The smaller chela of the first pair resembles that of *Euconaxius coronatus*, but the saw-like teeth on the under edge are stronger.

There is one strong spine at the centre of the under side of the merus of both the first chelipeds.



The chelate second pair of legs closely resembles that of *Euconaxius coronatus*.

On the first abdominal segment is a pair of rudimentary one-jointed feet, without "terminal plates". The presence of these feet does not constitute any sexual difference.

The second pair of abdominal feet resembles that of the males of *Euconaxius coronatus*.

Judging from other species of the genera *Axius* and *Euconaxius*, and from the nearly allied genera *Calocaridis* and *Calastacus* — as for instance from *Axius (Euconaxius) cristagalli* FAXON — the very different shape of the larger foot of the first pair should be sufficient to constitute *Euconaxius crassipes* as a species, distinct from *Euconaxius coronatus*.

The male specimen mentioned I obtained from a depth of about 220 meters in the Kosterfjord (Bohuslän) Aug. 12th 1901. It has a length of 46 mm. (the dorsal side of the carapace including the rostrum 17 mm., abdomen with the telson 29 mm.).

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*Axius nodulosus* MEINERT, which — as I have already mentioned — belongs to Scandinavian waters, differs according to the description made by MEINERT from the two species described in this paper in not having any spines on the ventral part of the carapace; in the shape and the position of the spines on the telson etc. MEINERT does not mention the antennæ, and therefore it seems probable, that *Axius nodulosus* should not be included in the genus *Euconaxius*.

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## Explanation of the plates.

### Plate 20.

#### *Euconaxius coronatus.*

Fig. 1. The right external antenna with the flagellum, viewed from the outside and half from beneath.  $\frac{3}{1}$ .

Specimen n:o 5.

» 2. The same antenna without flagellum and viewed as fig. 1.  $\frac{6}{1}$ .

Specimen n:o 1.

*a* stylocerite, *b* scaphocerite, *c* the spine on the third segment.

» 3. The right internal antenna, viewed from above.  $\frac{6}{1}$ .

Specimen n:o 4.

*a* the furrow of the peduncle.

» 4. The peduncle of the same antenna. The hairs covering the furrow have been removed.  $\frac{6}{1}$ .

» 5. The left third maxilliped, viewed from the outside.  $\frac{6}{1}$ .

Specimen n:o 4.

*a* ischiopodite, *b* meropodite.

» 6. "Crista dentata" of the same ischiopodite.  $\frac{6}{1}$ .

» 7. The right leg of the first thoracic pair, viewed from the outside.  $\frac{4}{1}$ .

Specimen n:o 1.

» 8. The same leg from beneath.  $\frac{4}{1}$ .

» 9. The left chela of the first pair of thoracic legs, from the outside.  $\frac{4}{1}$ .

Specimen n:o 1.

» 10. The same chela, viewed from beneath.  $\frac{4}{1}$ .

#### *Euconaxius crassipes.*

Fig. 11. The right foot of the first thoracic pair, viewed from the outside.  $\frac{4}{1}$ .

» 12. The same foot from beneath.

#### *Euconaxius coronatus.*

Fig. 13. The base of the left foot of the third thoracic pair from the inside, showing the female genital opening.  $\frac{6}{1}$ .

Specimen n:o 1.

» 14. The base of the right foot of the fifth thoracic pair from the inside, showing the male genital pore.  $\frac{6}{1}$ .

Specimen n:o 5.



Plate 21.

*Euconaxius coronatus.*

- Fig. 1. The right thoracic foot of the second pair, viewed from the outside.  $\frac{6}{1}$ . Specimen n:o 1.
- » 2. The carapace, viewed from above.  $\frac{4}{1}$ . Specimen n:o 1.
- » 3. The anterior part of the carapace, viewed from the left side.  $\frac{4}{1}$ . Specimen n:o 4.
- » 4. The anterior part of the abdomen, viewed from the left side.  $\frac{4}{1}$ . Specimen n:o 1.  
*a* the rudimentary feet on the first segment.
- » 5. The left foot on the second abdominal segment with the inner side turned to the right (on the figure).  $\frac{8}{1}$ . Specimen n:o 5, ♂.  
*a* the two "appendices internæ".
- » 6. The tip of the inner branch of the same foot. Only one of the plume-shaped hairs is drawn in its entirety.  $\frac{50}{1}$ .
- » 7. The left foot of the second abdominal segment with the inner side turned to the right. Most likely there have been a great number of plume-shaped hairs on the two striated branches.  $\frac{8}{1}$ . Specimen n:o 1, ♀.  
*a* "appendix interna".  
*bb* small bundles of hairs, to which eggs have been attached.
- » 8. The two left branches of the swimmerets with the telson and the outlines of the sixth abdominal segment.  $\frac{4}{1}$ . Specimen n:o 5.

Tryckt den 17 februari 1904.

Stockholm 1904. Kungl. Boktryckeriet.



Fig. 1. The right thoracic foot of the second pair, viewed from the outside. Specimen no. 1.

Fig. 2. The carapace, viewed from above. Specimen no. 1.

Fig. 3. The anterior part of the carapace, viewed from the left side. Specimen no. 4.

Fig. 4. The anterior part of the abdomen, viewed from the left side. Specimen no. 4.

Fig. 5. The rudimentary feet on the first segment with the left foot and the second abdominal segment with the inner side turned to the right (on the figure). Specimen no. 5.

Fig. 6. The tip of the lower branch of the same foot. Only one of the phallos-shaped parts is drawn in its entirety. Specimen no. 5.

Fig. 7. The left foot of the second abdominal segment with the inner side turned to the right. Most likely there have been a great number of phallos-shaped parts on the two rudimentary feet. Specimen no. 1.

Fig. 8. The two left branches of the rudimentary feet with the telson and the ventral part of the sixth abdominal segment. Specimen no. 5.

Fig. 9. The telson and the ventral part of the sixth abdominal segment. Specimen no. 5.

Fig. 10. The telson and the ventral part of the sixth abdominal segment. Specimen no. 5.

Fig. 11. The telson and the ventral part of the sixth abdominal segment. Specimen no. 5.

Fig. 12. The telson and the ventral part of the sixth abdominal segment. Specimen no. 5.

Fig. 13. The telson and the ventral part of the sixth abdominal segment. Specimen no. 5.

Tyret den 17 februari 1901

Stockholm, K. K. K. K.















