

endopodite has a spiny middle longitudinal carina, its middle part is ornamented with small spines and its internal margin is fringed. The telson has an elongated subtrapezoidal shape; the lateral margins bear two lateral teeth in their central portion; its dorsal surface has two rows of small central and distally converging spines, each paralleled by an internal row of smaller diverging spines; other longitudinal rows of even smaller spines cover the surface of the telson, which external edge is fringed.

Cephalic appendages. The antennae have a thin and ringed flagellum that is slightly longer than the whole body of the animal; the antennal peduncle (MSNM i10866, i10747) is made of three articular densely ornamented by spines. The antennulae are preserved in the specimen MSNM i10866; the antennular peduncle is made of three thin and elongated articular (see Figs. 30, 31).

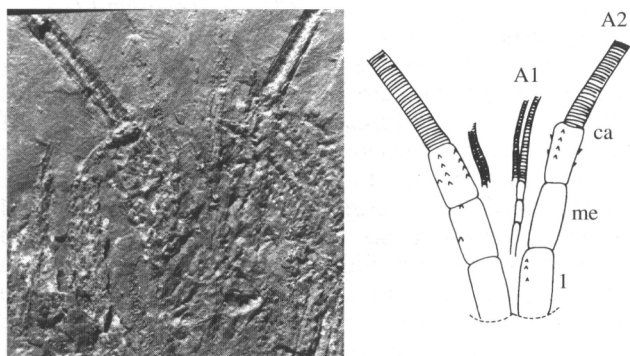


Fig. 30 - *Archaeopalininurus levis* Pinna, 1974, n. cat. MSNM i10866 cephalic appendages, photo and reconstruction (x 2,5)

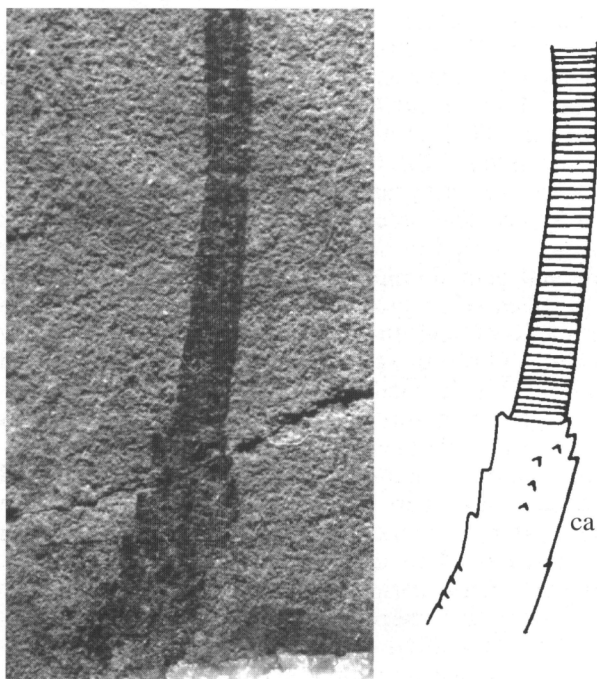


Fig. 31 - *Archaeopalininurus levis* Pinna, 1974, n. cat. MSNM i12484 antennae, photo and reconstruction, (Piani di Rest) (x 4)

Thoracic appendages. They are always partly preserved; they all are thin and elongated, with a terminal dactylus, and their surface is densely ornamented with spiny tubercles; the II-IV pereopods are the longest (see Fig. 32).

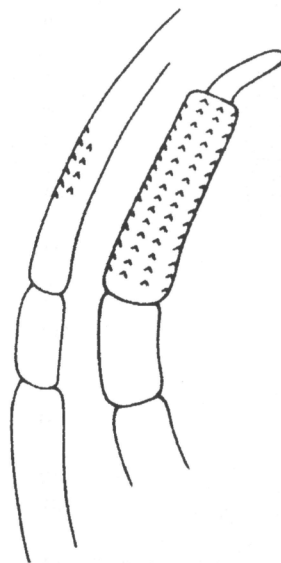


Fig. 32 - *Archaeopalininurus levis* Pinna, 1974, n. cat. MSNM i10747 I-II pair of pereopods, line drawing (x 4)

#### Observations

For the general morphology of the body the specimens certainly belong to the Palinuridae. The family Palinuridae is known from Upper Triassic with the species *Archaeopalininurus levis* Pinna, 1974 from the Norian of Cene (see Fig. 33). In the Jurassic the family is represented by the genus *Palinurina* Münster, 1839, from the Upper Jurassic of Solnhofen, Bavaria, the Sinemurian of Lyme Regis and the Toarcian of Ilminster, England. Together with this genus other two genera are known from the Jurassic: the genus *Astacodes* Bell, 1863 and the genus *Paleopalininurus* Bachmayer, 1954, both found in terrains that are not older than the Malm.

For the general shape of its body, *Archaeopalininurus* strongly resembles the genus *Palinurina* Münster, 1839. Nevertheless, if examined more deeply and as much as it is possible for carrying out accurate comparisons, some differences stand out that lead us to justify the splitting of the forms of the subalpine Triassic into the separate genus created by Pinna, 1974. By comparing our forms with the reconstructions available in the literature, particularly those concerning the species *Palinurina longipes* Münster, 1839 from the German Kimmeridgian (Oppel, 1862, table 24, fig. 1 a, b and Förster, 1973, fig. 4, 5, 6, 7) we can notice remarkable differences in the shape and in the ornamentation of the tail fan, in the length of pereopods (the II and the IV are longer with respect to the others in *A. levis*, while last three pereopods are almost equal in length in *P. longipes*), in the length of the antennae, which is double of the body length in the German species; other differences appear to be seen in the morphology and ornamentation of the antennal peduncle and of the

Superfamily Eryonoidea de Haan, 1841  
Family Coleiidae Van Straelen, 1924

Gen. *Pseudocoleia* nov.

Derivatio nominis: from the apparent resemblance in general aspect with the genus *Coleia* Broderip, 1835  
Type species: *Pseudocoleia mazzolenii* n. sp.  
Description: coinciding with that of the type species

*Pseudocoleia mazzolenii* n. sp.  
Tab. IV: figs. 3,4

Derivatio nominis: dedicated to Mr. A. Mazzoleni, who found most of the specimens

Holotype: MSNM i12467

Paratypes: MSNB 7560; 8184; 8185; 8186; 8188

Type locality: Ponte Giurino, Imagna Valley (Bergamo)

Geological age: U. Norian (?) - L. Rhaetian (?)

Diagnosis: Body dorsoventrally depressed. Subrectangular carapace with a middle carina running from the posterior margin and terminating anteriorad with a V-shaped bifurcation at the posterior third of the carapace. An anterior middle carina follows on the extension of the previous one and continues till the anterior third of the carapace. Two well marked lateral carinae are present too: they run from the anterior to the posterior margin with a slightly sinuous trend. In the anterior third of the carapace the lateral carinae are joint by a transversal overturned W-shaped carina, whose central concavity coincides with the anterior ending of the middle carina. Petaloid-shaped scaphocerite with rounded distal extremity and spiny margin; first pereopod chelate with external dactylus longer than the index and distally bent; decreasingly long abdominal I-VI somites, supplied with posterior middle carina; roughly triangular telson with two well pronounced lateral carinae ornamented with tubercles, and rounded apex with spines; exopodite of the uropodite with diaeresis.

Material: 36 small-sized, well preserved specimens are ascribed to the new species; their total length ranges between 0.8 mm and 3 cm.

Description. It is a small stocky eryonoid (the biggest specimen, MSNB 8186, has a length of 3 cm), with thin and very granulate exoskeleton.

Carapace. The carapace (see Figs. 35, 36), that is always preserved in dorsal view, has a subrectangular shape and gets slightly narrower near the insertion of the first pair of pereopods. The anterior margin is almost straight and the ocular incisions are slightly marked. The lateral margins are rounded and ornamented with small spines, while the posterior margin is slightly bent forward. Dorsally the carapace shows a complex development of carinae. A longitudinal posterior middle carina runs from the posterior margin and bifurcates with a very open V shape at the level of the posterior third. An anterior middle carina develops from the second third to the first fourth of the carapace. Also two lateral carinae develop from the posterior margin up to the anterior fourth with a slightly sinuous trend; here they join by an overturned W-shaped transversal carina, whose central concavity coincides with the anterior ending of the middle carina. The carapace does not show very marked grooves; only at the V-shaped opening of the posterior middle carina there is a slight hollow.

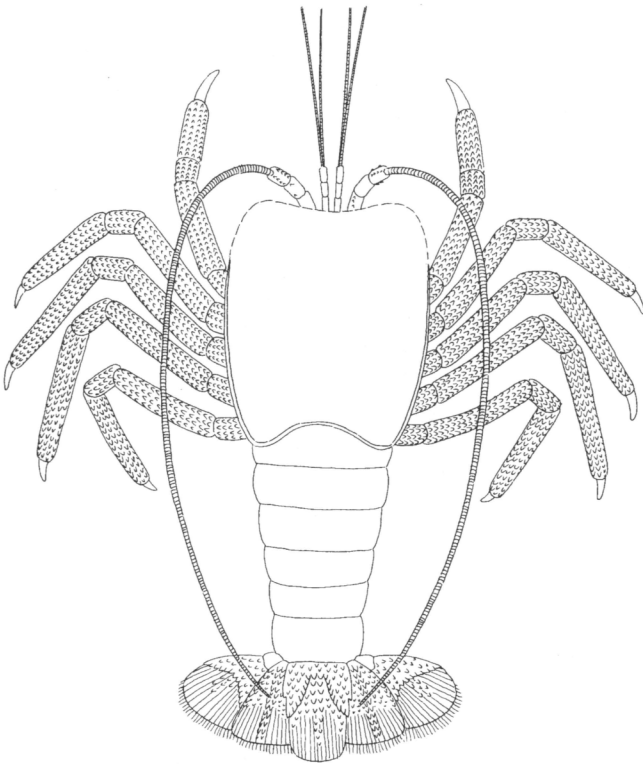


Fig. 33 - *Archaeopalininurus levis* Pinna, 1974, reconstruction

carapace, but the latter is too poorly preserved in the known specimens of *A. levis* to be sure about that.

The specimens of Ponte Giurino have no such features to be distinguished from those of the Norian of Cene; also the specimens found from the Norian of Valvestino (Brescia Province) and ascribed by Pinna, 1976 to the same species *A. levis* Pinna, 1974 typical of Cene, do not show any difference with the specimens in our possession; the comparison was rather accurate particularly with the specimens of Valvestino, because of the finding during our excavations of some specimens that are better preserved than those of Cene (see Fig. 34). Therefore we believe that the specimens of Ponte Giurino must be ascribed to the species *A. levis*, already known from the Norian of Cene and Valvestino.

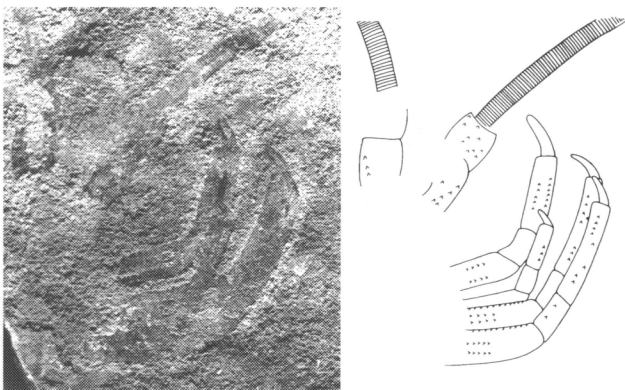


Fig. 34 - *Archaeopalininurus levis* Pinna, 1974, n. cat. MSNM i12485, photo and reconstruction (Piani di Rest) (x 1,6)

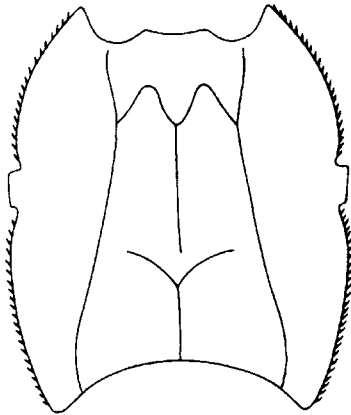


Fig. 35 - *Pseudocoleia mazzolenii* n. gen. n. sp., carapace reconstruction, line drawing

Abdomen. Well preserved in almost all the specimens. It is stocky, about as long as the carapace, anteriorly larger and posteriorly narrower. All the somites have a middle carina. The pleurae have a slightly rounded outline. The telson is roughly triangular, with a rounded apex with marginal spines, and two longitudinal carinae ornamented with tubercles. The uropods are well developed, petaloid in shape. Both the endopodite and the exopodite exhibit a thin middle carina. The external margin of the endopodite bears a row of small marginal spines. The exopodite has a slightly bent diaeresis (see Fig. 37).

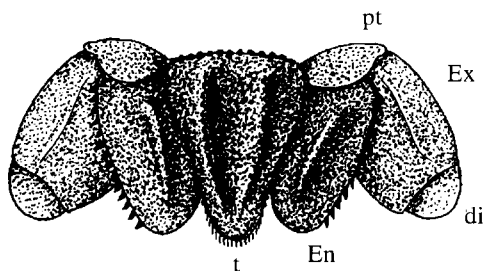


Fig. 37 - *Pseudocoleia mazzolenii* n. gen. n. sp., tail fan without ornamentation, line drawing

Cephalic appendages. All the specimens well preserve the petaloid-shaped scaphocerite, supplied with spines along the external margin and rounded at the distal extremity; it is also possible in some specimens to observe the flagella of the antennae, which are articulated to a small basicerite. The antennulae are not preserved in any specimen. The 3rd maxilliped is partly preserved on several specimens, within the scaphocerite and the antennae; its exact shape cannot be detected because of its bad preservation state (see Fig. 38).

Thoracic appendages. The first pair of pereiopods is well preserved in all the specimens (see Fig. 39). It shows an elongated merus, while the carpus is stocky and short and roughly subrectangular. The propodus is elongated and strong; the dactylus is external, longer

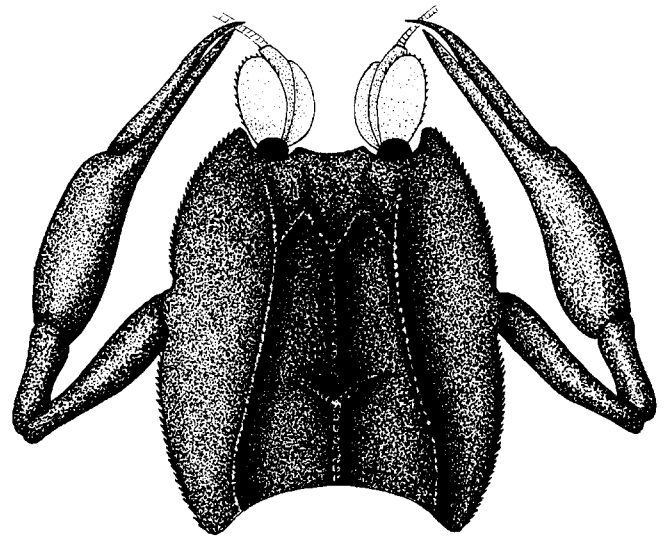


Fig. 36 - *Pseudocoleia mazzolenii* n. gen. n. sp., carapace reconstruction without ornamentation, line drawing

than the index and distally bent. The remaining II-V pereiopods are always fragmentarily preserved; their reconstruction in Fig. 40 is highly hypothetical, based on comparison with other better known Jurassic eryonoids.

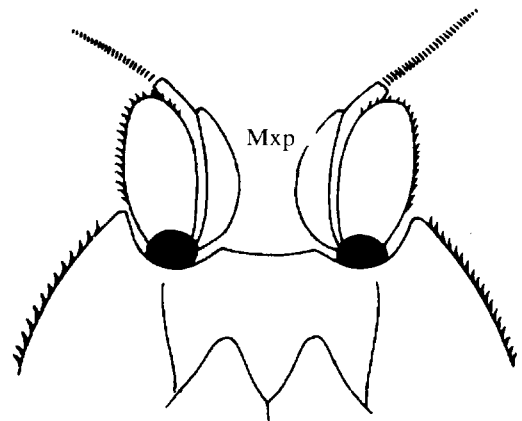


Fig. 38 - *Pseudocoleia mazzolenii* n. gen. n. sp., n. cat. MSNM i12467 cephalic appendages, line drawing

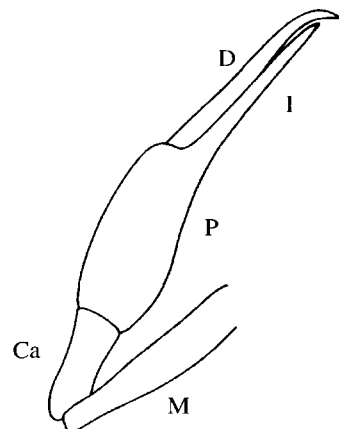


Fig. 39 - *Pseudocoleia mazzolenii* n. gen. n. sp., n. cat. MSNM i12467 first pereiopod, line drawing (x 7)

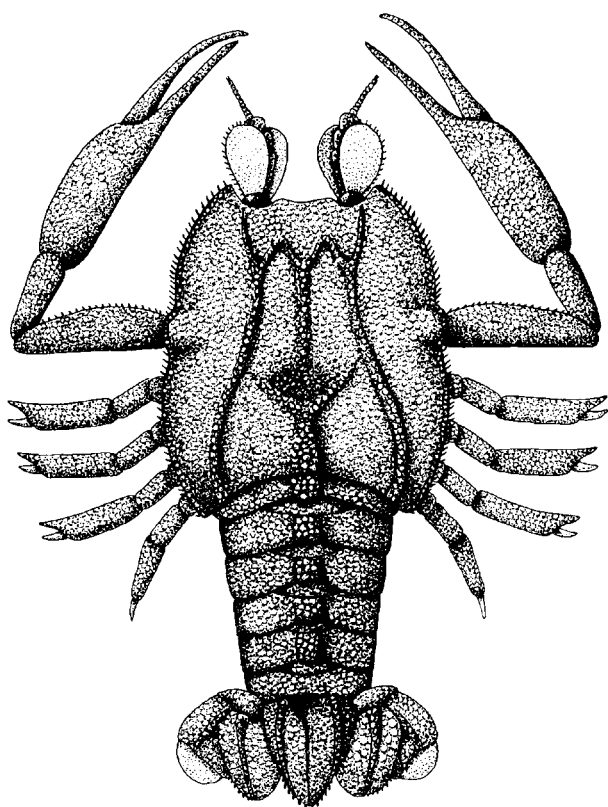


Fig. 40 - *Pseudocoleia mazzolenii* n. gen. n. sp., reconstruction

#### Observations

The first representatives of the superfamily Eryonoidea are known from the Alpine Carnian (Upper Triassic; Glaessner, 1931); they are ascribed to the family Tetrachelidae Beurlen, 1930, which includes the single genus and species *Tetrachela raiblana* (Bronn, 1858). The studied specimens do not belong to this family because of the general shape of the body, the different morphology of the carapace and the abdomen, the different structure of the first pair of pereiopods. On the contrary the gross morphology of the examined specimens fits enough at first glance with that of the genus *Coleia* Broderip, 1835, family Coleiidae, whose representatives were known only starting from the Lower Jurassic (Hettangian).

The general morphological features of *P. mazzolenii* n. gen. n. sp. (see Fig. 40) are closer to those of several species of Lower Jurassic, particularly the Hettangian and Sinemurian ones, from which they nevertheless differ in many morphological details. Particularly the trend of the carinae seems to be completely peculiar in the new species. All the Jurassic *Coleia* have at least one rather marked groove (the cervical), while in several species the branchiocardiac groove is very light. In *P. mazzolenii* n. gen. n. sp. the lateral longitudinal carinae are not interrupted by grooves and they continue forward, by exceeding the branchial and cervical incisions. The first pair of pereiopods is also slightly different from that of Jurassic *Coleia*; in the latter forms the carpus can indeed be short and subtriangular, almost a simple articulation element between merus and propodus, like in the Sinemurian species *C. antiqua* Broderip, 1835 of Lyme Regis and *C. viallii* Pinna, 1969

of Osteno, or the carpus can be much more developed than the merus and the propodus, like in the Sinemurian species *C. mediterranea* Pinna, 1969 and *C. pinnai* Teruzzi, 1990; on the contrary in *P. mazzolenii* n. gen. n. sp. the carpus is somewhat intermediate, slightly elongated and subrectangular.

Infraorder Astacidea Latreille, 1803  
Family Platychelidae Glaessner, 1931

Diagnosis: carapace supplied with three grooves (cervical, postcervical, branchiocardiac); I-IV pereiopods chelate; abdominal somites of uneven length; exopodite of the uropodite with diaeresis.

Gen. *Glaessnericaris* nov.

Derivatio nominis: dedicated to Prof. Martin F. Glaessner, who much contributed to the study of fossil decapods.

Type species: *Glaessnericaris macrochela* n. sp.

Description: coinciding with that of the type species

*Glaessnericaris macrochela* n. sp.

Tab. V: figs. 1,2,3,4

Derivatio nominis: for the very developed chelae of the first pair of pereiopods

Holotype: MSNB 4202

Paratypes: MSNM i10727; i10730-i10731 (part and counterpart); i10732 a-b; i10733; i10736; MSNB 7572; 7627-7583 (part and counterpart)

Type locality: Ponte Giurino, Imagna Valley (Bergamo)

Geological age: U. Norian (?) - L. Rhaetian (?)

Diagnosis: subrectangular carapace getting slightly narrower toward the anterior margin; long rostrum supplied with three suprarostal identical teeth; in the anterior third of the dorsal margin there are spines arranged in two longitudinal parallel rows; carapace with cervical, postcervical and branchiocardiac grooves; elongate scaphocerite with pointed distal extremity; I-IV pereiopods chelate; abdominal somites of even length and rectangular shape; rectangular telson with rounded distal extremity; exopodite of the uropodite with diaeresis.

Material: 310 specimens in different preservation state are ascribed to the new species; their total length ranges between 3 and 6 cm. The description is based mostly on the following specimens:

MSNB 4202, 4205, 7564, 7556-7553 (part and counterpart), 7591, 7701, 7583-7627 (part and counterpart), 7679, 7642, 7640, 7652, 7732, 7672, 7557, 7572, 7559 a-b, 7622, 7708-7710 (part and counterpart), 4208, 8214, 8315, 8249, 8237

MSNM i10732, i10727, i10736, i10731

Description. Elongated, rather big astacidean (the biggest specimen, MSNB 7591, has a maximum length of 6 cm), with a thin and granulate exoskeleton.

Carapace. The carapace (see Fig. 41), preserved in lateral view in most specimens (MSNB 7622, 7583, 7679, 7572, 7640, 4205, 7564, 7557, 7672; MSNM i10727) and in dorsolateral view in the holotype (MSNB 4202) and in few other specimens (e.g. MNSM i10732 a-b) has a subrectangular shape, getting narrower to-

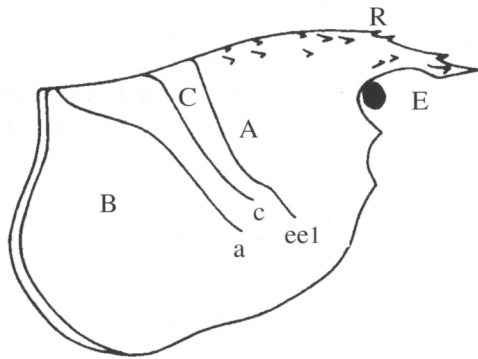


Fig. 41 - *Glaessnericaris macrochela* n. gen. n. sp., carapace reconstruction, line drawing

ward the anterior margin. The posterior margin is sinuous: concave in the upper third, it creates a marked convexity in the lower third, thus covering part of the first abdominal somite (MSNB 7583). The posterior margin is delimited by a marginal carina (MSNB 7583, 4202, 7622; MSNM i10736). The dorsal margin prolongates in a rostrum that can be clearly observed in the specimens MSNB 7679, 7572, 7732, 7640, 4208, 8214, 8249; MSNM i10727. The rostrum is well developed, slightly bent upwards, with three suprarostrual teeth, two of which are located at the base of the rostrum and one on the anterior third. Two rows of at least four relatively gross spines anteriorad directed run from the first third of the antennal region to the whole rostrum. Below the rostrum there is a narrow and shallow ocular incision, whose lower part is delimited by an acute and not too pronounced antennal angle. The antennal incision is long and just slightly concave; the pterigostomial angle is almost as slightly pronounced as the antennal one. On the surface of the carapace there are three grooves (MSNB 4202, 7559a-b, 7624, 4205, 7701, 7583, 7642, 7679, 7652, 7640, 7732, 7572, 7557, 7672; MSNM i10732). The cervical groove is placed at half length of the carapace; in lateral view it is slightly directed forward, almost straight dorsally, then at half of the carapace height a little more bent forward. The postcervical groove is almost parallel to the cervical groove, but ends at about one half of carapace height. The branchiocardiac groove originates just before the posterior margin of the carapace, and it is more anteriorad bent if compared with the other grooves, and spans for about half the length of the carapace, with a slightly sinuous trend; in the median region of the carapace it approaches the postcervical groove. The arrangement of the three grooves leads us to think that the antennal region is rather wide if compared to the branchial region and particularly to the cardiac region, which is particularly narrow.

**Abdomen.** It is well preserved in almost all the specimens. The somites are deep, with height decreasing posteriorad. The first somite is narrow. The II-V somites get wider in the lower third with subround pleurae overlapping those of the following somite (MSNB 7622, 4205); the pleurae are subrounded and more or less pointed. The VI somite has the same length as the others and is more subrectangular in lateral view. The telson (see Fig. 42), run by a middle carina, has a subtrapezoidal shape and gets slightly narrower toward the rounded distal extremity, which has thin marginal

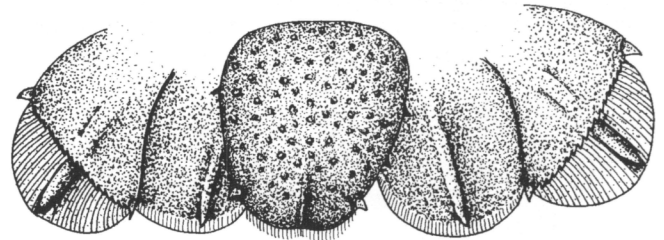


Fig. 42 - *Glaessnericaris macrochela* n. gen. n. sp., n. cat. MSNM i10731 tail fan with ornamentation, photo and reconstruction (x 3, 4)

filaments (MSNB 7708, 7710; MSNM i10731). The lateral margins of the telson have three spines (see Fig. 42): the proximal and the middle ones originate in the margin and are upward protruded, while the distal one, more developed, is articulated with the margin itself. The exopodite and the endopodite are not longer than the telson (MSNB 7533; MSNM i10727, i10736). The exopodite has a straight diaeresis fringed by a row of small spines; there are also two light and straight middle longitudinal carinae. The diaeresis is supplied on the external and on the internal margins. The endopodite is covered by a small middle carina (MSNM i10731) and has fringed margins.

**Cephalic appendages.** They are at least partially preserved in almost all the specimens (MSNB 4202, 7591, 7553, 7679, 7732, 7640, 7652, 7557, 7572, 7672, 8327; MSNM i10732, i10727, i10736) (see Fig. 43). The ovoidal-shaped eyes are preserved only in one specimen (MSNM i10727). Only fragments of the flagella of the antennules are preserved. The antennae are very strong: the carpocerite is large and articulated to a long and thin flagellum, which is 3/4 as long as the whole body. Specimen i10727 preserves also the scaphocerite, elongated in shape, with a pointed apex.

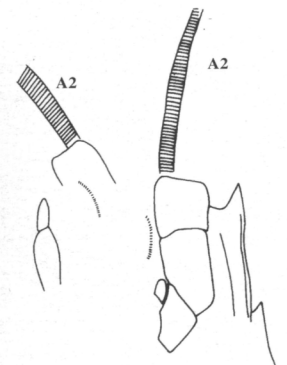


Fig. 43 - *Glaessnericaris macrochela* n. gen. n. sp., n. cat. MSNB 8237 cephalic appendages, photo and reconstruction (x 0,6)