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PŘÍSPĚVEK K POZNÁNÍ MORFOLOGIE LARVY ORECTOCHILUS VILLOSUS MÜLL. (COL. GYRINIDAE)

A CONTRIBUTION TO THE KNOWLEDGE OF THE MORPHOLOGY OF THE LARVA ORECTOCHILUS VILLOSUS MÜLL. (COL. GYRINIDAE)

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Larva vírníka *Orectochilus villosus* MÜLL. byla popsána SCHIØDTEM v roce 1864. Mimo výstižného latinského popisu podává tento autor vyobrazení celé larvy a některých morfologických detailů, jako na příklad její hlavy, maxilly, přední nohy a drápků s empodiem. Z pozdějších autorů se zmiňuje o larvě tohoto druhu RÉGIMBART roku 1882 ve své klasické monografii čeledě Gyrinidae a připojuje vyobrazení larvy a její maxilly. GANGLBAUER v díle Käfer von Mitteleuropa (1892) v úvodu k čeledi Gyrinidae cituje SCHIODTA a uvádí velmi stručný popis larvy bez vyobrazení. V novější literatuře nalézáme zmínku o vzhledu larvy *Orectochilus villosus* MÜLL. v díle HANSENA (1930), WESENBERG-LUNDA (1943) a v GUIGNOTOVĚ knize o vodních broucích Francie (1947), kde je připojen klíč k určení larev čeledi Gyrinidae.

Žádný z uvedených autorů však tuto larvu podrobně morfologicky nepopisuje. Poněvadž mám ve své sbírce několik exemplářů těchto larev, podávám v anglické části textu podrobný morfologický popis larvy *Orectochilus villosus* MÜLL. na základě studia tohoto materiálu. Mimo to je v dalších řádcích řešena otázka přijímání potravy této larvy. Podle některých autorů vyssává larva kořist dutými mandibulami stejně jako larvy Dytiscidů. Podle WESENBERG-LUNDOVY domněnky je však mandibulární kanálek vývodem jedové žlázy. Podle mého morfologického studia mandibul a celého ústního ústrojí je tato domněnka správná, poněvadž vyústění mandibulárního kanálku u larvy *Orectochilus villosus* MÜLL. je zcela jiné než u larev Dytiscidů a dutina tohoto kanálku zřejmě není spojena s cibariem a nemůže tedy sloužit při extraorálním zažívání. Také stavba maxilly larev Gyrinidů a Dytiscidů je naprosto rozdílná.

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The body of the larva *Orectochilus villosus* MÜLL. is narrow, elongated, with a small elongated head, well developed legs, ending on the tenth abdominal article with four strong hooks. The larva is of apneustic type — it breathes by means of ten pairs of tracheal gills. The colour of the body is white, only the sclerotised parts are yellowish.

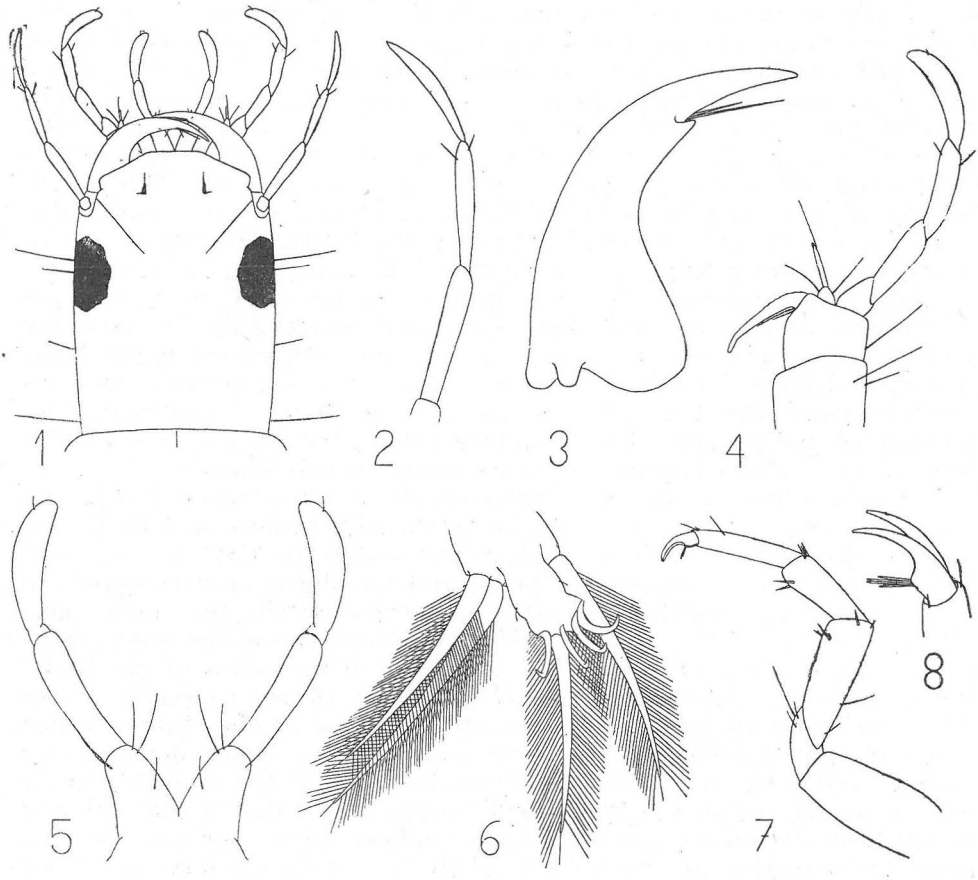
The head-capsule as seen from above is rectangular, subparallel, considerably longer than broad, strongly flattened dorsoventrally. In a side view it is moderately bent so that its dorsal side is concave while the ventral side is convex. The epicranial suture is visible on the dorsal side, but it is not fully developed in any of the specimens I inspected. Its posterior median part is not visible at all, and only a part is visible of the lateral pairy arms so that these two arms do not connect at all. Clypeus and frons are not divided by a suture, and thus they form a sclerite in one piece, which is straight truncated anteriorly. Two dark spots are well visible on its plane in the places where the dorsal branches of the tentorium attach themselves from the inside to the head-capsule. On the sides of this sclerite, in the anterior corners of the head-capsule, there are two minute antennal sclerites. On the ventral side of the capsule a median gular suture is developed; this reaches from the occipital foramen in an anterior direction to slightly beyond the middle of the underside of the head; here it divides at the end into two quite short branches, which by no means reach the anterior margin of the head. In front the trophi attach themselves to the head-capsule, which behind is provided with an oval occipital foramen. On the sides of the anterior half of the head there are two large pigmented spots each of which carries six ocelli. These ocelli are moderately oval, arranged roughly in a circle. Two of them are placed on the dorsal side of the head, two laterally, and two more or less ventrally. On the sides of the head distant setae are also well visible: two pairs grow from the epicranium and two from the ocellar region.

The antennae have four articles. The basal article is very short, slightly longer than broad. The following article is roughly cylindrical, long. The third article is a little shorter and thinner than the preceding one, is spindle-shaped, and carries in its distal part two setae, one at the inner and one at the outer side, nearer the distal end of the article. The fourth, terminal, article of the antenna is pointed, asymmetrical; its inner side is concave, its outer side convex.

The mandibles are sickle-shaped and terminated by a sharp point. On the inner side they are provided with a tooth — retinaculum — directed obliquely downwards and forwards. This tooth is well visible from below, while in a view from above it is partly hidden. In its neighbourhood two strong tough setae grow from the inner margin of the mandible, one of which is almost shorter by one half than the other. In the basal part the mandible is terminated by four rounded processes, two of which are on the dorsal side; below these there are two ventral ones which are longer, and which thus when seen from below, cover the two dorsal processes. The basal part of the mandible is deepened between these two pairs of processes. The inner dorsal and the inner ventral process of the mandible are broadly rounded and much larger than the two outer ones. On the

dorsal side of the base of the mandible in the indentation between the larger inner and the smaller outer dorsal process a dorsal condylus is developed. Similarly a ventral condylus is developed also on the ventral side of the base of the mandible. A narrow canal penetrates the mandible, situated near its inner margin; it opens at the tip with a microscopic aperture, and at the other end it opens into the depression between the inner dorsal and ventral processus at the base of the mandible. This mandibular canal is developed also in the other larvae of the family *Gyrinidae*. Some authors (e. g. SCHIØDTE, RÉGIMBART, BOTT, OMER-COOPER) regarded this canal as functioning in the extraoral digestion and as serving for sucking in the liquefied food, similarly as in the larvae of the *Dytiscidae*. WESENBERG-LUND quotes MEINERT's paper and corrects this opinion in the sense that the canal does not serve for the intake of food but is the outlet of the poison gland. Nevertheless the old incorrect interpretation is repeated also in recent works. Thus IMMS writes in his textbook: "... the mandibles are pointed and perforated by a sucking canal". Similarly GUIGNOT in his book on the aquatic beetles of France writes in this sense of the larvae of the *Gyrinidae:* "... les mandibules falciformes sont traversées par un canal de succion". Also in GRASSÉ's comprehensive modern zoological compendium, whose part on the Coleoptera was written by PAULIAN, we read: "Les larves ... sont carnassières, présentant une digestion extraorale". In my opinion WESENBERG-LUND is right as morphologically the mouth-parts of the larvae of the *Gyrinidae* are entirely different from the mouth-parts of the larvae of the *Dytiscidae*. The mandibles of the larvae of the family *Dytiscidae* (except those of the genus *Cybister*) are not pierced by a true closed canal, but are provided on the inner side with an open furrow which ends before it reaches the tip of the mandible, and which opens at the opposite end with an aperture on the dorsal side of the mandible at its base. It is only when the two mandibles are closed that a connection is established between the hollow of the mandibular furrow and the cibarium. In contradistinction to this the mandibula is e. g. in the larva described of the species *Orectochilus villosus* MÜLL. pierced by a closed canal running from its tip to its base where it opens in the axis of this mandible and not on its dorsal side. It is very improbable, that this canal should serve in sucking liquid food. Another striking difference between the mouth-parts of the larvae of the two families lies in the shape of the lacinia of the maxilla. In the larvae of the *Dytiscidae* the lacinia is rudimentary as it has lost its function in the intake of food. In the larvae of *Orectochilus villosus* MÜLL. and of the other Gyrinidae it is on the contrary strongly developed, is sclerotised, hook-shaped, and evidently serves in conveying the food into the buccal cavity.

The basal article of the maxilla — cardo — is strong and very short, provided on the outer side with two unequally long setae. The following article — stipes — is slightly thinner, very short, of irregular shape, with a long seta on the outer side and with two strong setae on its inner side; it carries the three further parts of the maxilla: lacinia, galea, maxillary palpus. The lacinia attaches itself to the stipes on the inner side at the distal end. It is sclerotised, hook-shaped, at the base thicker than in its



Orectochilus villosus MÜLL. — larva: 1. head (dorsal), 2. right antenna, 3 right mandible (ventral), 4 right maxilla, 5 labium, 6 ventral aspect of last two abdominal segments, 7 left leg of second pair, 8 claws with empodium.

distal part, terminated by a blunt point. At the anterior margin it is provided with several low teeth, and is more strongly curved anterior to the distal end. On the distal surface of the stipes, roughly in the middle, is a short, strongly narrowing costipes of conical shape; on the inner and on the outer side one long seta grows from it. Attached to this article is the thin, cylindrical galea, pointed at the distal end, formed by one article and provided with a very small appendage. On the outer side, very near to its distal end, is a seta, which is roughly as long as this galea. The short conical palpifer carrying a maxillary palpus of three articles attaches itself to the stipes next to the costipes. The first article of this palpus is elongated, narrower in the basal part, obliquely truncate at the end. It is followed by the second article of cylindrical shape, carrying near the distal end one short seta on the inner side and on the outer side. The terminal article of

the maxillary palpus is strongly asymmetrical, on the inner side concave, on the outer side convex, with a very short seta on the outer side near the blunt point.

The labium grows in front into two strong, conical palpigera, rounded at the end, each of which is provided with three setae. One grows in about the middle of its lenght near the inner margin. The other two setae, of about equal length, are placed on the inner side, very near the distal end of the palpiger. The labial palpus has two articles. The first article is strong, roughly cylindrical. The second, terminal article is asymmetrical, concave on the inner side, convex on the outer side, at the end bluntly rounded, with a short seta on the outer side near the tip. Ligula is wanting.

The thorax is distinctly divided into three separate parts, in the pro-, meso- and metathorax. The first of these segments — the prothorax — is longer and at the same time also narrower than the following two thoracic segments. On the dorsal side it is hidden by the sclerotised scutum covering almost its whole tergal surface and divided by the median longitudinal suture into two symmetrical sclerites. The shape of this sclerotised scutum is roughly quadrilateral; its anterior margin is straight, the lateral margins are rounded, and the posterior margin is shallowly indented. The colour of the sclerotised scutum is light yellowish brown. The pleural surface of the prothorax is almost entirely membranous, episternum and epimeron is not developed at all. The only sclerite of this pleural part is the tiny, longitudinally placed coxopleurit, which has the shape of a very low triangle, turned with the hypothenuse to the dorsal side. On the underside it is strongly sclerotised, and here it runs out into a blunt point to which the pleural articular process of the coxa attaches itself. The ventral side of the prothorax is in the anterior half before the coxae partly covered by the presternum, which is yellowish, slightly sclerotised, and thus passes at the anterior and lateral margins imperceptibly into the membranous integument; only its posterior margin is more strongly sclerotised and thus distinctly delimited. Laterally this sclerotised posterior margin runs out into minute pointed processes touching the anterior end of the coxopleurit. Meso- and metathorax are roughly of equal size and shape; they are broader and shorter and much less sclerotised than the prothorax. A narrow, transversally placed, sclerotised acrotergite of a yellowish colour is developed at the anterior margin on the dorsal side of the mesothorax. It is divided by a short median suture into two symmetrical parts. Most of the tergal surface of the mesothorax is white, membranous. On the pleural side lies the sclerotised coxopleurite, which is placed longitudinally and is broader and shorter than the coxopleurite of the prothorax. At the ventral margin it is blackish and runs out into a blunt point to which the pleural articular process of the coxa attaches itself. The ventral part of the mesothorax is covered with a membranous integument and is not provided with any sclerites. The metathorax equals in size and shape, just as in the sclerites, the mesothorax; the only difference is that its dorsal side is completely soft, membranous, without any sclerite. On the pleural surface a coxopleurite is again developed, equalling in shape and position the coxopleurite of the mesothorax. No sternal sclerites occur.

The legs are rather strong, the first pair is shorter than the second and third. The coxae are jointed far from each other, do not touch each other, and have only one pleural condylus attaching itself to the coxopleurite, as said above. They are considerably long, more than twice as long as broad, flattened, and do not carry any characteristic spines. Behind the coxa follows immediately the short trochanter, convex on the ventral side and provided with setae of which one is strikingly long, reaching beyond the middle of the femur. The femur is elongated, a little more than twice as long as broad, in the proximal part thinner than in the distal part, at the distal end approximately terminated straight. The arrangement of the spines placed near the distal end is characteristic for it. There are five such spines: one of them is thinner and shorter than the other four and is placed unpaired on the dorsal side of the femur near its distal end. Two further spines grow laterally from the apical end of the femur and are directed forwards; they are thicker and longer than the dorsal unpaired spine. The last pair of spines is placed lateroventrally, considerably far from the distal margin of the femur. The following article of the leg — the medius — is much shorter than the femur; in its basal part it is strikingly thinner than in the apical part, and it is armed with five spines similarly as the femur. One thinner and shorter unpaired spine sits on the dorsal side, and in its neighbourhood grow two further, thicker lateral spines. Two further spines are placed lateroventrally; they are the longest of all and considerably far from the distal end of the medius. The tibia is long, in its whole length approximately equally thick, cylindrical, and unlike the two preceding articles of the leg it is not armed with strong spines but only with setae in the distal half. The last article of the leg is the tarsus, formed of two equal claws and a characteristic empodium. The unguiculi are equally long, slightly curved, in the basal part broad, subparallel; then they narrow strongly and run finally out into a sharp point. Their concave margin is smooth, without any teeth. Between the two claws a considerably big empodium is developed, composed of rod-shaped, pointed bodies, the two marginal ones of which are a little shorter than the middle pair.

The abdomen is elongated, composed of ten roughly cylindrical segments gradually narrowing posteriorly and carrying ten pairs of tracheal gills; the ninth and tenth segments are strikingly narrower and shorter than the preceding ones. The first eight abdominal segments are provided in their posterior half with one pair of pleurally placed tracheal gills; the ninth segments carries two pairs of gills arranged so that one pair is placed at the posterior margin of this segment while the other pair is pushed to the dorsal side. The tenth segment of the abdomen has no tracheal appendages, but is armed at the end with four sclerotised hooks in the shape of the lettre C. These hooks are with the basal part firmly attached to the end of the tenth segment; their convex side is turned to the dorsal side, and their free points are thus turned to the ventral side and are directed obliquely forwards.

The tracheal appendages consist in ten pairs placed on the first nine segments as described above. These tracheal gills are plumose, very indistinctly articulated, and movably attached to the abdomen. Their length

exceeds considerably the length of the abdominal segment to which they are attached. Their axial part is narrow, long, of elongated conical shape, and carries on each side a row of long, hair-like processes. A fairly thick trachea splitting off from the main longitudinal tracheal trunk penetrates each tracheal appendage.

The length of the larvae described is 9 mm.

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