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## Description of *Batracobdelloides moogi* n. sp., a leech genus and species new to the European fauna with notes on the identity of *Hirudo paludosa* CARENA 1824 (Hirudinea: Glossiphoniidae)

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With 11 Figures

**Schlagwörter:** *Batracobdelloides*, Glossiphoniidae, Hirudinea, Parasiten, Bithynia, Planorbarius, Mollusca, Donau, Rhein, Österreich, Italien, Slowakei, Ungarn, Europa, Morphologie, Taxonomie, Nomenklatur, Erstbeschreibung, Verbreitung, Habitat, Brutpflege

Two species of leeches of Glossiphoniidae were confused under the name *paludosa* CARENA 1824. They have greenish dorsal colour, seven pairs of crop caeca and no papillae. Material collected from the central Danubian basin was investigated and compared with the possibly original descriptions. There exist two species of two different subfamilies, the Glossiphoniinae and Haementeriinae as well. Carena's *Hirudo paludosa* is a member of the Genus *Glossiphonia* (Subfam. Glossiphoniinae), the taxon *Batracobdella slovacica* is a younger synonym. The second species, which was often named as *Batracobdella paludosa*, is a member of the Subfamily Haementeriinae and belongs to the afroasiatic genus *Batracobdelloides*. It is described here as a new species *B. moogi* n. sp. and it is closely related to the Indian *B. reticulatus*. The Genus *Batracobdella* is absent from Central Europe, if the generic descriptions of SAWYER (1986) and OOSTHUIZEN (1986) are consequently used.

Unter dem Artnamen *paludosa* CARENA 1824, wurden irrtümlich zwei Egelarten der Glossiphoniidae vereinigt. Beide haben sieben Paar Darmdivertikel, sind im Leben grünlich gefärbt und besitzen keine Papillierung. Die Bearbeitung von umfangreichem Material aus dem Donaugebiet und die Überprüfungen der Beschreibungen aller hierzu aufgestellter Taxa ergab, daß zwei Arten verschiedener Unterfamilien vorliegen. *Hirudo paludosa* ist ein Vertreter der Unterfamilie Glossiphoniinae und gehört zur Gattung *Glossiphonia*. Die Art ist mit *Batracobdella slovacica* identisch. Die zweite, häufig als *Batracobdella paludosa* bezeichnete Art ist ein Vertreter der Haementeriinae (sensu SAWYER 1986) und gehört zur afroasiatischen Gattung *Batracobdelloides*. Sie wird hier als *B. moogi* n. sp. beschrieben und steht der indischen Art *B. reticulatus* nahe. Die Gattung *Batracobdella* kommt nur im Mittelmeerraum vor und fehlt in Mitteleuropa, wenn man die Gattungsdiagnosen von SAWYER (1986) und OOSTHUIZEN (1986) konsequent anwendet.

### 1 Introduction

Since the most important summarizing papers about systematics of the family Glossiphoniidae VAILLANT 1890, (SOOS 1966, 1967, 1969, 1970), several new taxonomical characters have been worked out mainly by OOSTHUIZEN (1979, 1982) and SAWYER (1986). Therefore, it is necessary to review the European members of this family. Thus, the generic position and the value of some well known species is discussed. The authors wish to present their results concerning some species which had an unclear taxonomic position for several decades. The synonymy adds to the major lists of SOOS (1966, 1967).

Based on the results of AUTRUM (1939) SAWYER (1986) divided up the family Glossiphoniidae into three subfamilies according to their breeding behaviour. The taxonomical position of several so-called well known species were changed. The definition of the genera *Glossiphonia* JOHNSON 1816, and *Batracobdella* VIRRGUIER 1879, was redefined and *Batracobdella* and *Batracobdelliodes* OOSTHUIZEN 1986, were clearly defined by SAWYER and OOSTHUIZEN (1986).

## 2 Results

A number of similar species, originally fused under the genus name *Batracobdella* now belong to different subfamilies. Based on new records of this genus, we are now able to distinguish several species, which were regarded as "*B. paludosa*" or "*B. algira*". They all are characterized by seven pairs of crop caeca, greenish colour, the number of eyes (usually 1-2 pairs) and the absence of prominent rows of papillae. They can be distinguished easily by breeding behaviour, body shape, papillae, number and position of eyes, head region and oral sucker. In general, glossiphoniid leech species feed on aquatic molluscs bearing a small and ring-shaped sucker disc (*Glossiphonia*, *Alboglossiphonia*). The other group of Glossiphoniidae, feeding on "higher" vertebrates (amphibians, reptiles, birds), and has an enlarged sucker disc with often subdivided rim (*Theromyzon*, *Placobdella*, *Batracobdella*). This morphological feature is developed independently in all three subfamilies of Glossiphoniidae. Regarding systematics, it is of specific as well as generic importance.

### 2.1 *Hirudo paludosa* CARENA 1824 = *Batracobdella slovacica* KOSEL 1973

For a long period, the name *paludosa* CARENA 1824 was used mistakenly for two different species. According to SAWYER (1986: 654), the taxon *paludosa* belongs to the Subfamily Glossiphoniinae VAILLANT 1890, because the egg sacks are fixed on substrate. The identity of *Hirudo paludosa* was clearly explained in the description by CARENA (1824: 333-334):

"Cette sangsue est ovipare: les oeufs qu'elle m'a fait étaient ronds, jaunâtres, n'adhérant que faiblement à l'abdomen vers la partie postérieure de l'animal; je dis que l'adhésion était faible, car toute le fois que je déplaçais la sangsue avec un pinceau, à fin de mieux l'observer, il y avait toujours quelques oeufs qui se détachaient, et coulaient au fond de l'eau, ce qui prouve que ces oeufs étaient alors déjà pondus, et que par conséquent ils n'éclosent pas dans le ventre de la mère. Quelque jours après la ponte, les oeufs ont pris une figure oblongue, réniforme: les petits sont éclos au bout de trois semaines environs: ils sont restés long-tems adhérents au ventre de la mère par leur ventouse postérieure."

Until 1986, the number of crop caeca (seven pairs) had been regarded as a significant character, to consider the two species *Hirudo paludosa* CARENA 1824, and *Glossosiphonia algira* MOQUIN-TANDON 1846, in the genus *Batracobdella* VIRGUIER 1879. Because of the common use of the combination "*Batracobdella paludosa* (CARENA 1824)", this name also was used for a similar true species of

the genus *Batracobdelloides* (Subfamily Haementeriinae AUTRUM 1939). The Slovakian hirudinologist V Kosel was the first to recognize the confusion of two different species under the name "*B. paludosa*" Additionally "*Batrachobdella paludosa*" (sensu ONDERIKOVA 1957, 1958, SOOS 1967), in 1973 he described the second species as *Batracobdella slovacica* KOSEL 1973, but did not notice its identity with *Hirudo paludosa* CARENA 1824. Later, the confusion was continued by SAWYER (1986). He placed the taxa *paludosa* and *slovaca* into the genus *Glossiphonia* JOHNSON 1816, based on their original descriptions.

Finally SAWYER (1986) considered that true members of the genus *Batrachobdella* were absent from Central Europe. His opinion is right. The data of the older literature are based on the misunderstanding of the former use of "*Batrachobdella paludosa* CARENA 1824" Thus, there is now a problematical situation. There exist two descriptions of one species *Glossiphonia paludosa* (CARENA 1824 KOSEL 1973), while no name is available for the similar Haementeriinae species, which belong to the genus *Batracobdelloides* (= "*B. paludosa* (CARENA 1824)" sensu ONDERIKOVA, SOOS 1964, KOSEL 1973 and SLADCEK & KOSEL 1984).

These two discussed species are described below. Morphological characters for determination are presented. Synonymy lists are given for all records, which can be clearly determined. The material of SOOS (1964, 1967) was checked.

Hence the redefinition of *Batrachobdella* (type species *B. algira*) and the description of *Batracobdelloides* (type species *B. reticulatus*), the number and position of eyes (NEUBERT & NESEMANN 1995) became an important feature to distinguish the members of these two genera.

## 2.2 *Glossiphonia paludosa* (CARENA 1824)

1824 *Hirudo paludosa* - CARENA, Mem. Real. Accad. Sci. Torino 28: 331-334 (Torino).

1973 *Batrachobdella slovacica* KOSEL, Biologia Bratislava 28 (2): 87-90, figs. 1-8 (Danube near Bratislava).

1977 *Batrachobdella paludosa* - CRISTEA & MANOLELI, Trav. Mus. Hist. Nat. "Grigore Antipa" 18: 28-33, Fig. 8.

1986 *Glossiphonia paludosa* - SAWYER, Leech Biology and Behavior, Oxford, Vol. 2, pp. 654, 711.

1986 *Glossiphonia slovacica* SAWYER, Leech Biology and Behavior, Oxford, Vol. 2, pp. 654, 711.

1989 *Glossiphonia paludosa* - NESEMANN, Lauterbornia 2: 42, Fig. 5., non *Glossiphonia paludosa*, - NESEMANN 1989, - Hess. faun. Briefe Darmstadt 2(9): 20-36, (confusion with *Glossiphonia concolor* (Apáthy 1888)).

1990 *Glossiphonia paludosa* - NESEMANN, Annl. hist.-nat. Mus. natn. hung 82: 65-66.

1991 *Glossiphonia paludosa* - NESEMANN, Miscnea zool. hung. 6: 36-38.

1992 *Glossiphonia paludosa*, - NESEMANN, Miscnea zool. hung. 7: 29.

1993 *Glossiphonia paludosa*, - NESEMANN & CSANYI, Lauterbornia 14: 47-48.

Locus typicus: Italy, upper Po river basin, stagnant waters near Torini.

Material see NESEMANN 1990-1993, NESEMANN & CSANYI (1993)

Description (Figs. 1-3): Leeches small to medium sized, preserved specimens up to 18 mm body length. The head is bulbous and stretched forward. Colour greenish or greyish, redish with filled crop caeca. Body cartilaginous, living animals are usually not very active and move slowly, like *Glossiphonia complana-*

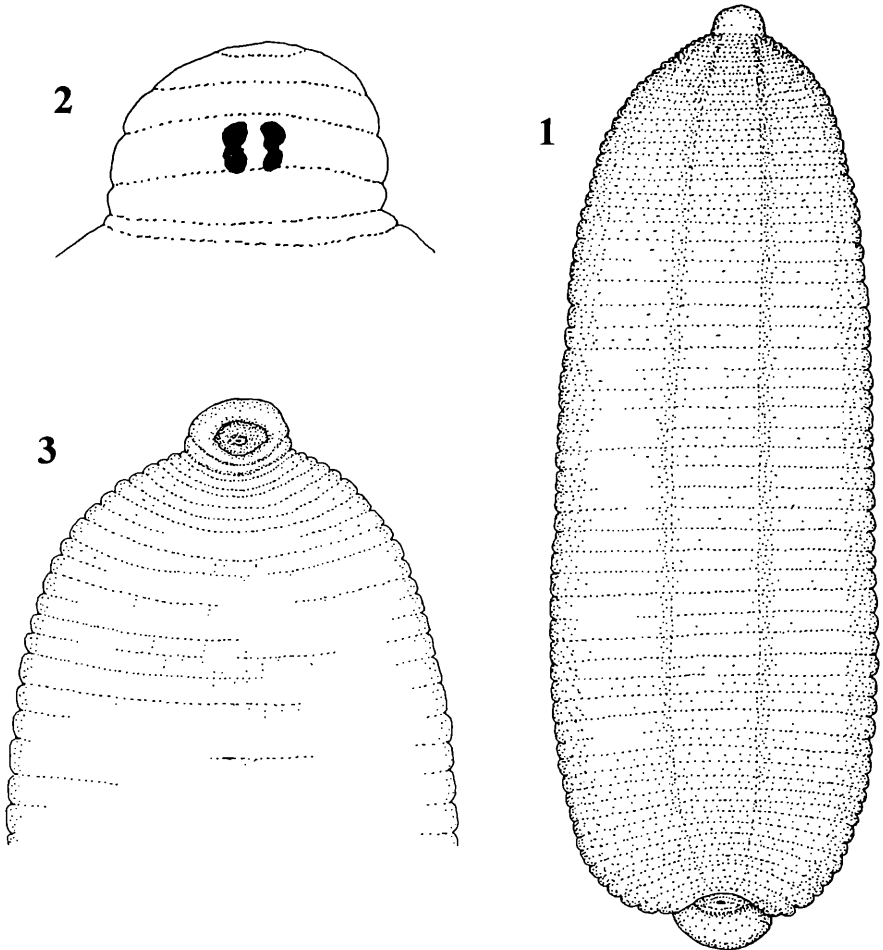


Fig. 1-3: *Glossiphonia paludosa*, Hungary: Rábca river basin, Hansági föcsatorna, 1 dorsal ( 9 mm body length), 2 head with eye position, 3 ventral with mouth porus and genital pores

*ta.* Ventral surface of preserved specimens flattened. Midbody segments basically three-annulate. The head region consists of segments I-VI. The posterior rim of the oral sucker disc is formed by segment IV. The oral sucker is usually small and ring-shaped, prominent folds are lacking. Dorsally, the head originally bears three pairs of eyes. The first pair is very small or absent (see KOSEL 1973: 88, figs. 2-5) on segment III. The two posterior pairs are larger and always compound, appearing as one pair on segment IV. Mouth pore is central in the middle of the oral sucker. Seven pairs of crop caeca, ten pairs of testisacs. Male

genital porus in the furrow XI/XII, female in XII a2/a3, genital pores separated by two primary annuli. Two postanal annuli, caudal sucker unicoloured. Each annulus of the dorsum may display one row of very small papillae.

Breeding behaviour: *G. paludosa* belongs to the Subfamily Glossiphoniidae. The yellowish egg sacks attached directly onto substrate and covered by the body of the parent until eggs hatch. Only upon hatching do embryos attach to venter.

Distribution: Certain records are known for the Po river basin in Italy and Switzerland, Rhine river basin in France (Elsaß), Danube river basin in Austria, Slovakia, Czech, Hungary, Roumania, tributaries of the Black Sea and adjacent regions (LUKIN 1976, MINELLI 1977, CRISTEA & MANOLELI 1977, CHIAUDANI & MARCHETTI 1984).

Habitat: see CARENA (1824), KOSEL (1973), NESEMANN (1991), NESEMANN & CSANYI (1993). *G. paludosa* feeds on aquatic molluscs, mainly *Bithynia tentaculata*.

### 2.3 *Batracobdelloides moogi* n. sp.

1947 ? *Batrachobdella paludosa* - EPURE, Ann. Sei. Univ. Jassy 30: 29-37.

1957 *Batrachobdella paludosa* - ONDERIKOVA, Biologia Bratislava 12: 776-779.

1958 *Batrachobdella paludosa* - ONDERIKOVA, Biologia Bratislava 13: 628-631.

1964 *Batrachobdella paludosa* - SOOS, Opusc. zool. Budapest 5(1): 109.

1967 *Batrachobdella paludosa* (? partim) - SOOS, Annl. hist.-nat. Mus. natn. hung. 59: 249.

1991 *Batrachobdella algira* - NESEMANN, Miscnea zool. hung. 6: 40, Fig. 5.

1993 *Batrachobdella algira* - NESEMANN & CSANYI, Lauterbornia 14: 64.

1994 *Batrachobdella algira* - NESEMANN, Limnol. aktuell 2 (Biologie der Donau), Stuttgart.

Locus typicus: Hungary, Kisbalaton near the river Zala.

Type material: Holotypus, 1 specimen from the type locality, body length 16 mm, body wide 9 mm, 23 paratypes from the same collection, June 1994, leg. Csányi & Nesemann, Collection of the Hungarian Natural History Museum, Budapest, Zoological Department.

Additional records: Austria, Danube, Wien-Leopoldstadt, Prater, temporary pond in the west of the deadwater reach Mauthner Wasser-Krebsenwasser, 12. November 1989, leg. H. Nesemann; Hungary, Strém near Tarkas (Tó-rét), 1 specimen 17. July 1992, leg. G. Woschitz & H. Nesemann, Jamai-patak near Boglárlelle, 2 specimens May 1992, leg. B. Csányi, in Coll. H. Nesemann; 1. terelőtöltés vége; Zalavári viz, from *Stratiodes aloides*; Vörsi viz, entering channel, all June-August 1994, leg. B. Csányi; Zalavári viz, open water in the reed vegetation, 15./16. August 1992, 22. September 1993, leg. B. Csányi; Zalavári viz, northern region of the reed, from *Stratiodes aloides* and *Ceratophyllum demersum*, 5. August 1993, all leg. B. Csányi; Szigetköz region: Bagoméri Duna, 14. November 1992; Mosoni Duna near Mecsér, 9. November 1993; Mosoni Duna near Györ, 30. November 1993; Mosoni Duna near Vének, 30. November 1993; Asványi Duna, Shipyard, 9. November 1993; Asványi Duna, Arvaizárás, 30. November 1993; Novaki csatorna near Püski, 30. November 1993; Novaki csatorna near Arak, 26. April 1994; Zatonyi Duna, 26. April 1994; all leg. B. Csányi.

**Derivatio nominis:** This species is named in honour of the Austrian Hydrobiologist Dr. Otto Moog, who provided the possibility to study Asian freshwaters as well as the habitat and material of *Batracobdelloides reticulatus* (KABURAKI 1922) from Nepal.

**Description (Figs. 4-8):** Small leeches, preserved specimens up to 6-10 (-16) mm total body length, living animals extended up to 18-22 mm. Colour of the dorsum dark greenish brown with rows of paramedian and paramarginal light spots on annulus a2. Body consistence soft. Living animals are very active and move quickly like the young of *Theromyzon tessulatum* (O. F. MÜLLER 1774). Ventral side of preserved specimens concave. Midbody segments basically three-annulate. The head region is not stretched forward from the outline of the body. Head region consists of segments I-VI. The oral sucker is usually large. The posterior rim of the sucker disc is formed by segment V. The anterior rim bears ventrally one median and one pair of marginal deep folds. The first pair of eyes is always located on segment III. *B. moogi* n. sp. bears the second pair of round eyes on the first ring of segment IV. Mouth pore central in the oral sucker, placed in the anterior half. Seven pairs of crop caeca, six pairs of testisacs. Male genital porus in the furrow XI/XII, female in XII a2/a3, genital pores separated by two primary annuli. Two postanal annuli. The caudal sucker displays radially arranged stripes. Dorsum of the body smooth, papillae lacking.

**Breeding behaviour:** Until yet, *B. moogi* was not observed in laying egg sacks. Nevertheless the morphological features clearly show, that this species belongs to the genus *Batracobdelloides* within the subfamily Haementariinae. They are characterized by a more or less smooth body. The egg sacks attached directly to ventral surface. The ventrum of parent is always concave, the egg sacks are covered by the folded up lateral sides. In *Marsupiobdella africana* GODDARD & MALAN 1912, and *Maiabdella batracophila* RINGUELET 1980, eggs and newly hatched young contained in an internal brood pouch.

**Distribution:** Certain records exist only from the western part of the Pannonian lowlands in Austria, Slovakia and Hungary. Probably, a number of localities, published under the collective name "*paludosa* CARENA 1824" from Poland might belong to *B. moogi* n. sp. (PAWLOWSKI 1936). This species was until nowadays never observed in the Rhine river basin or elsewhere in West Germany.

**Habitat:** *B. moogi* n. sp. is a temporary ectoparasit of pulmonate freshwater-snails. It feeds mainly on the blood of *Planorbarius corneus*. In the Kisbalaton this snail was parasitized by one to seven leeches. *B. moogi* is very rare and occurs sporadically in stagnant or slowly running waters, even in temporary flooded ponds of the lowlands and riverine forests.

*B. moogi* is more closely related to the Asian *B. reticulatus* (Figs. 9-11) than to the African *B. tricarinatus*. It differs from the two hitherto known species of this genus by the absence of papillae.

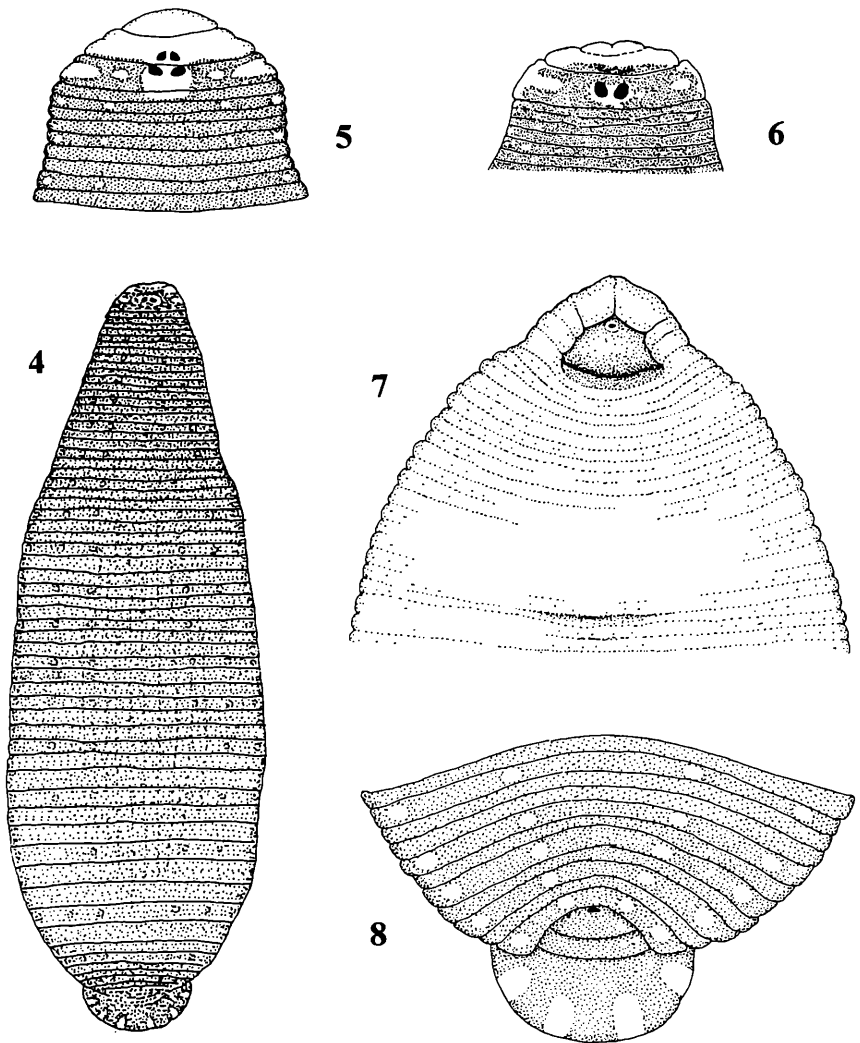


Fig. 4-8: *Batracobdelloides moogi* n. sp., 4 dorsal ( 7 mm body length), 5-6 head with eye position, 7 ventral with mouth pore and genital pores, 8 dorsal with anus and caudal sucker. Figs. 4, 6 Austria, Vienna, Mauthner Wasser, Prater: 5, 8 Type material from Hungary, Kisbalaton, 7 Jamai-patak

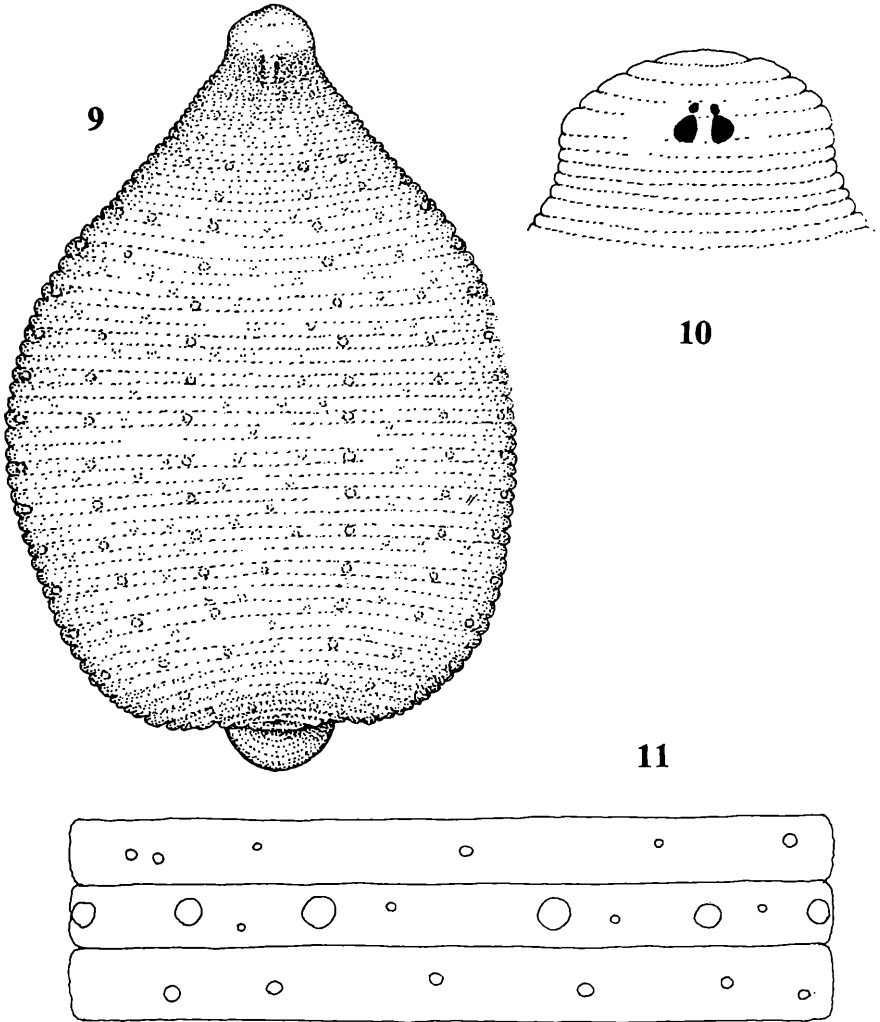


Fig. 9-11: *Batracobdelloides reticulatus*, Nepal, Pokhara, effluent of the Phewa Lake, 9 dorsal ( 5 mm body length), 10 head with eye position, 11 one somite of the midbody region with dorsal papillae



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