

*Piscicola pojmanskae*, a new leech species from Poland  
(*Hirudinea: Piscicolidae*)

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ABSTRACT. *Piscicola pojmanskae* n. sp. is described from Przemków near Legnica and Żabieniec near Warsaw, Poland. The leeches were collected on carp (*Cyprinus carpio* L.) and grass carp (*Ctenopharyngodon idella* VAL.) from fish ponds.

Key words: Taxonomy, Poland, new species, *Hirudinea*, *Piscicola*.

INTRODUCTION

At present 16 genera are distinguished in the subfamily *Piscicolinae* JOHNSTON, 1865, based on the structure of the reproductive system (CABALLERO 1956, SAWYER 1986, EPSHTEIN 1969, 1987, 1989, DAVIES 1991, BIELECKI 1993). The general structure of the reproductive system of *Piscicola* BLAINVILLE, 1818 is presented in fig. 13. Unfortunately, the diagnosis and, hence, the systematic position of some of the purported members of the genus *Piscicola* BLAINVILLE, 1818 are still debatable.

According to EPSHTEIN (1987) the *Piscicolinae* are leeches of medium or large size. The relative length of body, degree of its flattening, ratio of the largest urosome breadth to the largest trachelosome breadth and the degree of separation of these sections are variable. The anterior sucker is large. The posterior sucker is large or medium-sized, eccentrically connected with the body. Lateral respiratory vesicles are small, there are 11 pairs. There are two pairs of well developed eyes. On the posterior sucker there are numerous eye-like spots. There are 3-14 annuli per mid-body somite. There are no tubercles on the body surface, or they are present only on few mid-body annuli and poorly developed. The mouthpore is centrally located. The proboscis is of medium length, the oesophagus has a diverticulum. Stomach chambers have lateral diverticula or small lateral diverticula. The blind sacs are incom-

pletely fused; five fenestrae at the level of neural ganglia are preserved. There are 6 pairs of testes. Seminal vesicles have a shape of numerous loops. Prostatic glands are present on atrium. The vector tissue and conductive tissue strands are present. Oviducts merge into the vagina anterior to the conductive tissue. The seminal receptacle and copulatory area are present, the latter occupying the entire ventral side of the posterior part of clitellum and extending to the first urosome somite. The genus is transpalaeartic of Holarctic distribution.

Based on the papers of JOHANSSON (1896), BRUMPT (1900), SELENSKY (1907) and MALECHA (1979), SAWYER (1986) gives the following characteristics of the genus *Piscicola* BLAINVILLE, 1818. *Picicolinae*, freshwater, respiratory vesicles small; mid-body somite of 14 annuli, vector tissue and copulatory area with conductive tissue. Vector tissue may pass near the oviduct to the region of male gonopore. Apparently allied to brackish water species of *Caliobdella*.

The type species of the genus is *Piscicola geometra* (LINNAEUS, 1761) of Palaearctic distribution. Its congenitors are: *P. milneri* (VERRILL, 1871), North America, *P. punctata* (VERRILL, 1871), North America, *P. salmositica* MEYER, 1946, western North America, *P. hadzii* SKET, 1985, ?*P. volgensis* ZYKOFF, 1903, ?*P. respirans* TROSCHEL, 1850, ?*P. fasciata* KOLLAR, 1842, ?*P. haranti* JARRY, 1960 and ?*P. pawlowskii* (SKET, 1968) (species of doubtful generic appurtenance or doubtful specific status are marked with a question mark). Thus half of the species included in the genus *Piscicola* in the light of recent studies are classified with other genera or their specific status is doubtful. For example, according to numerous authors (SOOS 1965, EPSHTEIN 1968, 1987, 1989, PAWŁOWSKI 1968, 1970, LUKIN 1976, SAWYER 1986) ?*P. haranti* is a synonym of *P. geometra*, and ?*P. pawlowskii* is a synonym of *P. respirans*. JARRY (1960) described ?*P. haranti* only based on its morphology. The structure of the reproductive and alimentary systems is insufficiently known, the figures of those systems being very imprecise which might suggest that JARRY actually dealt with *P. geometra*. ?*P. pawlowskii* was originally described in the genus *Cystobranchnus*, and then transferred by the same author to the genus *Piscicola*, though with no comment. The species description is insufficient, the same pertains to its later re-descriptions (SKET 1981, SKET and SAPKAREV, 1992). My recent observations on large populations of European "piscicolids" indicate that *P. pawlowskii* is a good species with a much wider distribution than formerly believed. A separate genus *Acipenserobdella* EPSHTEIN, 1969 was erected for ?*P. volgensis*, but according to SAWYER (1986) the diagnosis of this genus is insufficient. The situation of ?*P. respirans* and ?*P. fasciata* is similar. EPSHTEIN (1969), after revising the genera *Piscicola* and *Cystobranchnus* DIESING, transferred them to the genus *Piscicola*. Since ?*P. respirans* and ?*P. fasciata* have little in common with *Piscicola geometra* (the type species), the differences involving first of all somite structure and reproductive system, SAWYER's (1986) opinion on this systematic act was negative. My view is similar, but if with increasing knowledge these species remain in the genus *Piscicola*, a subgeneric division will become necessary.

In spite of all the above problems regarding *Piscicola*, the new species is described below as a member of this genus, especially that it is close to its type species. In 1992 POJMAŃSKA and CHABROS reported on 3 specimens of "*Cystobranchus* sp." found on the carp and grass carp in Żabieniec near Warsaw.

Descriptions of 10 species and specimens representing 4 of them were thoroughly examined in order to exclude the appurtenance of my specimens to one of them. All the evidence, however, is negative and thus the material collected from carp and grass carp is described as a new species.

### *Piscicola pojmanskae* n. sp.

#### DIAGNOSIS

The species is most similar to *P. geometra*. Both have the following characters in common: freshwater, basically 14-annulate, copulatory area extending from clitellum to a part of the first urosome somite, receptaculum seminis present, ovaries reaching the second pair of testes. *P. pojmanskae* n. sp. differs from *P. geometra* in the following characters: 1/ body short, stout, somewhat flattened (in *P. geometra* elongated, cylindrical); 2/ anterior sucker elliptical (in *P. geometra* circular); 3/ posterior sucker elliptical or heart-shaped (in *P. geometra* circular); 4/ copulatory area short; 5/ seminal receptacle short (in *P. geometra* both elongate); 6/ ovaries polylobate, coiled (in *P. geometra* of 1 lobe, not coiled); 7/ conducting strands of vector tissue long (in *P. geometra* short); 8/ vector tissue in shape of a narrow plate perpendicular to the long body axis (broad and parallel in *P. geometra*); 9/ ejaculatory duct tends to form a few half-loops and loops (in *P. geometra* 1 half-loop); 10/ seminal vesicles situated at the level of the first pair of testes (in *P. geometra* half distance between the first and second pair of testes, or reaching the second pair).

#### ETYMOLOGY

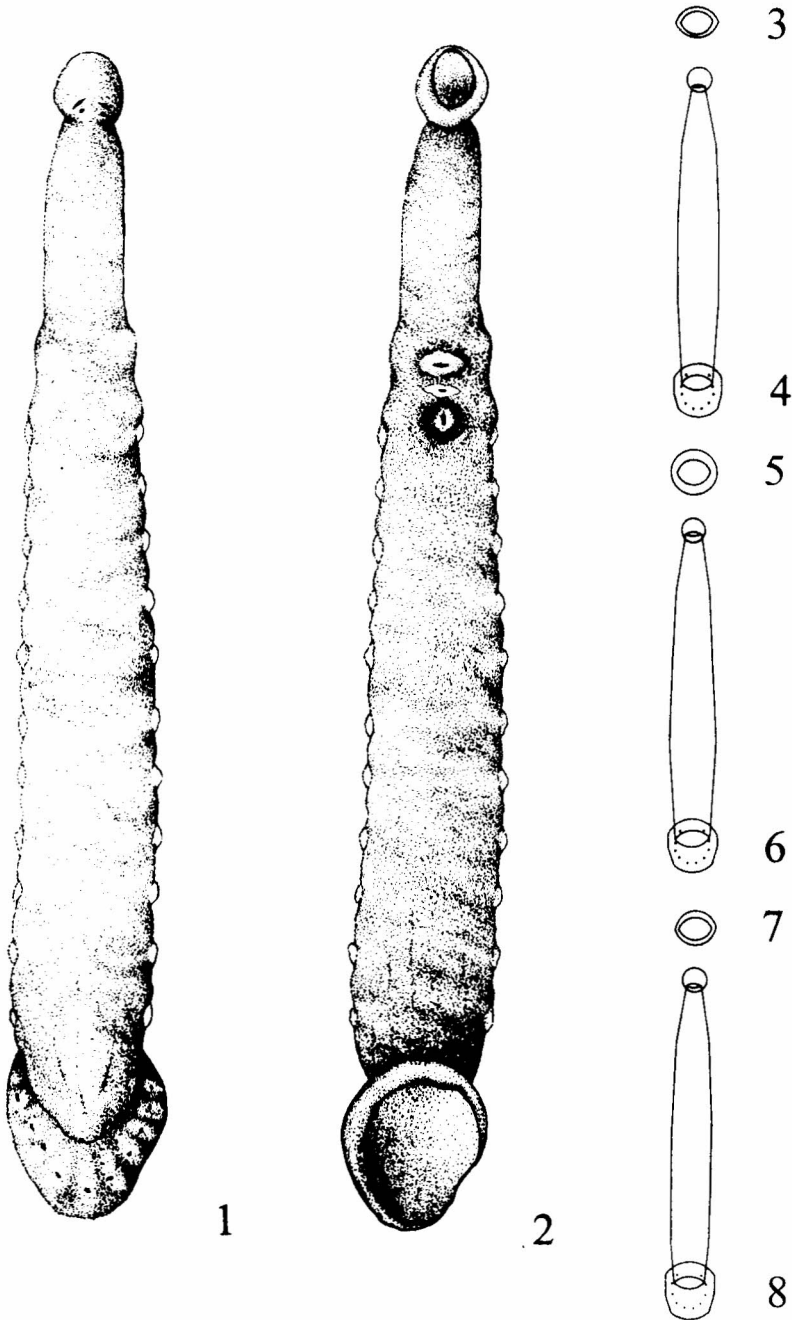
The new species is dedicated to Prof. Teresa POJMAŃSKA, an outstanding parasitologist who, when presenting me with the first three specimens, drew my attention to the fact that they differed in shape from *P. geometra*.

#### MATERIAL

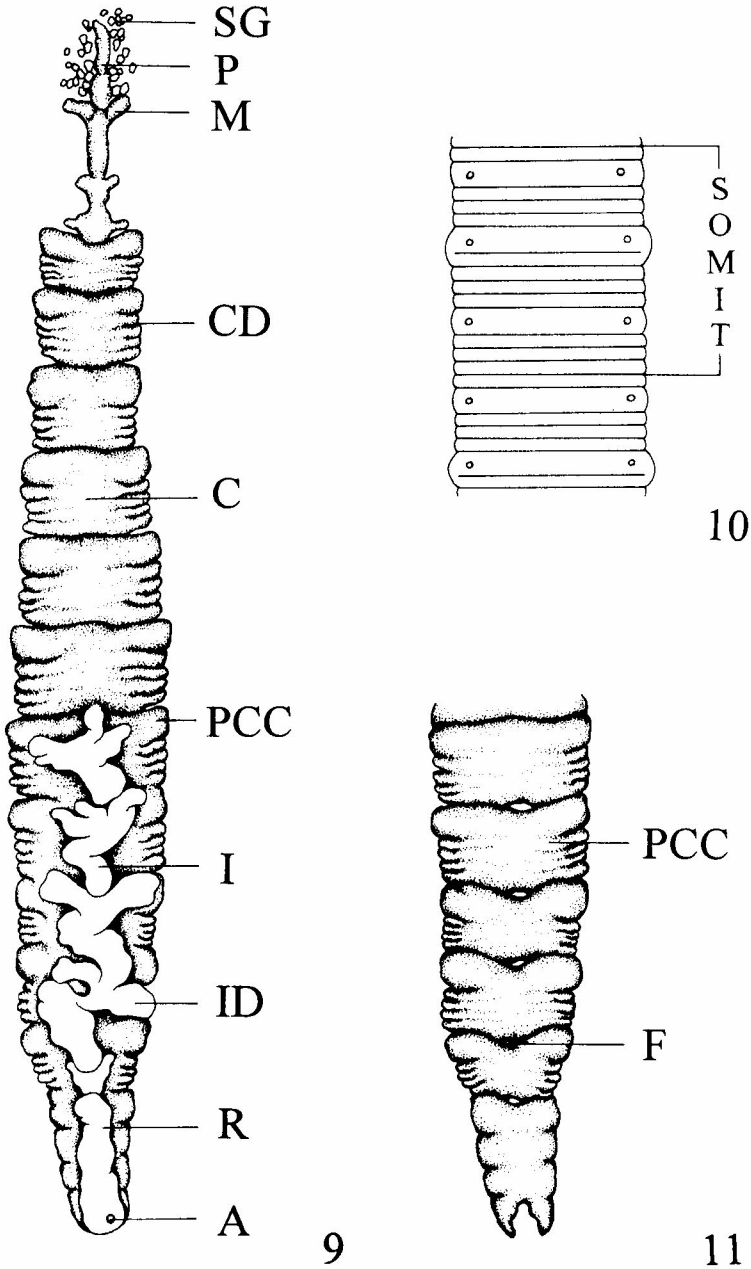
Holotype and 9 paratypes alcohol-preserved: holotype and 6 paratypes Przemków near Legnica, Poland, fish ponds, on fins, body and gills of carp, 14 February 1986, leg. A. BIELECKI; 3 paratypes Żabieniec near Warsaw, Poland, fish ponds, on carps and gills of grass carp, 5 -7 April 1989, leg. T. POJMAŃSKA. Holotype - Museum of Natural History, Wrocław University, paratypes - author's collection.

#### DESCRIPTION

Body size and form are presented in figs 1-3 and tab.1. Because they depend to a considerable degree on many factors (e.g. filling of alimentary canal), the meas-



1-8. *Piscicola pojmanskae* n. sp.: 1 - dorsal view; 2 - ventral view; 3 - 8 specimens generated with the Power Point programme 2.0 using the leech body form model; 3 - 4 based on mean measurements of 7 specimens; 5 - 6 of 3 specimens; 7 - 8 of 10 specimens

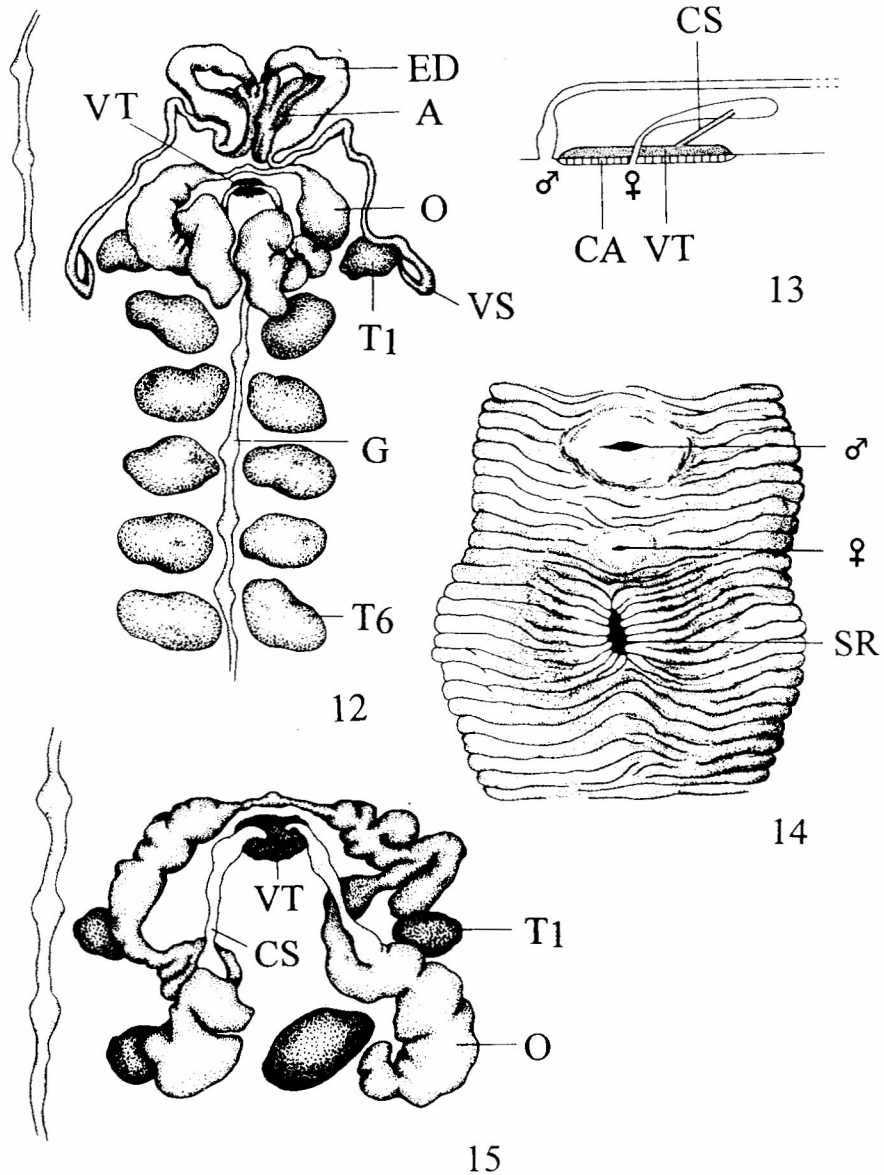


9-11. *Piscicola pojmanskae* n. sp.: 9 - alimentary tract; P - proboscis, M - mycetomes ("oesophageal glands"), SG - salivary gland cell, C - crop, CD - caecal diverticulum, PCC - posterior crop caecum, I - intestine, ID - intestinal diverticulum, R - rectum A - anus; 10 - typical somite (14 - anulate); 11 - posterior portion of digestive system, postcaecum (thin-walled caecum); F - fenestrae

urements were taken using the model of leech body form according to the 25 parameters distinguished (EPSHTEIN 1989, BIELECKI 1993). The ratios of parameters, the so called invariants (19) characterize the shape and form of the body of 10 specimens of *Piscicola pojmanskae* n. sp. Using the computer programme Power Point and the model, images of particular specimens and figures of leeches of mean size (based on the measurements) were generated (figs 10, 11).

Tab. *Piscicola pojmanskae* n. sp. - body measurements and weight in 10 specimens (according to the leech body form model, BIELECKI 1993); No. 7 - holotype,  $L = L_1 + L_2 + R_1 + R_2$ , TR - trachelosoma, UR - urosoma, M - mean, M\* - mean No. 1-10 (cont. on page 418):

No	TL	Width							Length (L1+L2)					
		TR			UR				L1 TR		L2 UR			
		d1	d2	d3	d4	d5	d6	d7	S1	S2	S3	S4	S5	S6
14 February 1986														
1	21.2	0.9	1.6	1.4	2.3	2.2	2.2	2.2	2.5	1.2	4.0	3.0	3.0	4.8
2	19.6	0.8	1.5	1.5	2.3	2.2	2.0	1.3	2.2	1.0	4.0	2.0	4.0	4.0
3	15.6	0.7	1.4	1.6	2.0	1.9	1.9	1.4	2.2	1.0	4.8	2.0	1.8	1.8
4	14.6	0.7	1.5	1.8	2.0	1.8	1.7	1.5	2.0	0.9	4.0	2.2	1.6	1.6
5	18.3	0.9	1.7	1.9	2.6	2.4	2.1	1.6	2.5	0.9	5.2	3.3	2.0	1.7
6	18.1	0.9	1.5	1.8	2.2	2.0	1.9	1.7	2.2	0.9	5.0	1.6	2.5	3.5
7	18.1	0.9	1.5	1.7	2.3	2.1	2.0	1.6	2.2	0.9	5.1	3.2	2.2	1.8
M	17.9	0.8	1.5	1.7	2.2	2.1	2.0	1.6	2.4	1.0	4.6	2.5	2.4	2.7
5-7 April 1989														
1	18.7	0.9	1.6	1.6	2.4	2.3	2.2	1.7	2.1	1.0	6.0	2.0	2.5	2.0
2	18.5	0.9	1.5	1.7	2.1	2.4	2.1	1.7	2.2	1.0	5.8	2.7	2.4	2.0
3	18.4	0.9	1.6	1.8	2.2	2.6	2.3	1.8	2.2	1.0	6.0	2.5	2.6	2.1
M	18.5	0.9	1.5	1.7	2.2	2.4	2.2	1.8	2.2	1.0	5.9	2.4	2.5	2.0
M*	18.5	0.9	1.5	1.7	2.2	2.4	2.2	1.8	2.2	1.0	5.9	2.4	2.5	2.0



12-15. *Piscicola pojmanskae* n. sp.: 12 - reproductive organs; ED - ejaculatory duct, A - atrium, VT - vector tissue, VS - vesicula seminalis, T<sub>1</sub>, T<sub>6</sub> - testes of the 1st and 6th pair, O - ovisac, G - ganglion; 13 - diagrammatic representation of the arrangement of vector tissue (stippled) in *Piscicola geometra* (after Sawyer, 1986); 14 - position of gonopores and seminal receptacle (spermatheca); 15 - female reproductive system, position of vector tissue anterior to oviducts and its connection with the ovary through conducting strands after shifting the oviducts aside

Table (cont. from page 416):

No	L	Suckers								Maximum width and height				Weight
		Anterior				Posterior				TR	UR	TR	UR	
		C1	C11	R1	M1	C2	C12	R2	M2	N1	N2	D1	D2	
14 February 1986														
1	21.2	1.5	1.2	1.0	0.2	3.6	3.3	1.7	0.8	1.3	1.6	1.6	2.3	52
2	19.6	1.2	0.9	0.8	0.3	2.7	2.3	1.6	0.6	1.2	1.7	1.5	2.3	50
3	15.6	1.3	0.8	0.9	0.3	2.6	2.1	1.1	0.6	1.0	1.3	1.4	2.0	30
4	14.6	1.2	0.8	0.8	0.1	2.5	2.3	1.5	0.7	1.2	1.6	1.5	2.0	34
5	18.3	1.2	1.0	0.9	0.2	3.0	2.4	1.7	0.7	1.4	1.9	1.7	2.6	45
6	18.1	1.2	1.0	0.8	0.2	3.2	2.4	1.8	0.8	1.2	1.6	1.5	2.2	33
7	18.1	1.3	1.1	0.9	0.2	3.2	2.3	1.7	0.8	1.2	1.7	1.5	2.3	53
M	17.9	1.3	1.0	0.9	0.2	3.0	2.4	1.5	0.7	1.2	1.6	1.5	2.2	42.4
5-7 April 1989														
1	18.7	1.2	0.9	0.8	0.2	2.6	2.4	1.3	0.6	1.4	2.2	1.6	2.4	42
2	18.5	1.4	1.1	0.9	0.3	3.2	2.6	1.5	0.5	1.4	2.5	1.5	2.4	45
3	18.4	1.3	1.1	0.8	0.3	2.9	2.7	1.2	0.7	1.4	2.2	1.5	2.3	52
M	18.5	1.3	1.0	0.8	0.3	2.8	2.5	1.3	0.6	1.4	2.3	1.5	2.4	46.3
M*	18.1	1.3	1.0	0.6	0.2	2.9	2.5	1.5	0.7	1.2	1.8	1.5	2.3	43.6

Medium-sized leeches. Of the 10 individuals the largest was 21.2 mm long, its maximum width being 2.3 mm; the smallest was 14.6 mm long, its maximum width being 2.0 mm. In the analysis of measurements mean values for all the 10 specimens were used. The relative body length  $L/D_2$  is 7x maximum width. The ratio of maximum width to maximum urosome height  $D_2/N_2$  is 1.2. The ratio of maximum urosome width to maximum trachelosome width  $D_2/D_1$  is 1.2. The ratio of vertical diameter of anterior sucker to maximum trachelosome width  $C_1^1/D_1$  is 0.7. The ratio of vertical diameter of posterior sucker to maximum urosome width  $C_2^1/D_2$  is 1.1. The vertical diameter of posterior sucker considerably exceeds the vertical diameter



of the anterior sucker -  $C_2/C_1 = 2.5$ . The division into trachelosome and urosome is poorly visible, but at a detailed examination it is clearly seen that the first pair of respiratory vesicles is situated just posterior to a slight constriction between the trachelosome and urosome. In all the specimens the trachelosome is slightly but distinctly dilated where on the ventral side there is male gonopore.

The body is short, stout, somewhat flattened; there is no flattening in blood-filled specimens. In the table (tab. 1) it is easily seen that three specimens (nos 8, 9, 10) had a well-filled alimentary tract, while in the remaining seven it was only moderately filled. The anterior sucker is small or very small, the posterior is of medium size, eccentrically connected with the urosome. After preservation only two of the ten specimens had their posterior suckers straightened, i.e. the margins were not curled inwards. The posterior sucker, whether straight or contracted, has a very characteristic form - it is elliptical or heart-shaped. The anterior sucker in all the ten specimens is more or less elliptical, its longer diameter being parallel to the long body axis, and on all the perimeter has its margins curled inwards.

Segmentation. A mid-body somite has 14 annuli. The annulus width is not equal: annuli 2, 6 and 11 are wider than the remaining ones. All the specimens have well distinct tubercles - tangoreceptors, their sequence being repeated in all the mid-body (14-annulate) somites. The largest and best visible tubercles occur on vesicular annuli (6th annulus of each somite), just next to respiratory vesicles; they are also well visible in the anterior and posterior body region, where the number of annuli per somite is reduced.

The respiratory vesicles are white (11 pairs), fairly small but well visible. The body is covered with papillae. Mid-body somites are composed of 14 annuli (fig. 10).

The body colour in live individuals is not known, since all the specimens at my disposal were already preserved and kept in preserving fluid for a long time. The posterior sucker has very narrow, white and wide, brown-black radial bands.

Eyes. On the anterior sucker there are 2 pairs of eyes - the first much larger, linear in shape, arranged obliquely relative to the long body axis; the second pair, arranged perpendicularly, is small, in the form of dots. On the posterior sucker there are 10 eye-like spots, situated in its central part on the edge of dark radial bands (figs 1, 4, 6, 8).

Alimentary tract (figs 9, 11). The mouthpore is situated eccentrically in the posterior part of anterior sucker and opens to the proboscis sheath. The position of proboscis (P) is between the first and the third neural ganglion, beginning with the cephalic ganglionic mass (ganglia 1-6), i.e. it reaches ganglion of somite IX. On the right and left of the proboscis there are salivary glands (SG). The thin-walled oesophagus extends from IX to XII/XIII somite and opens to the crop (C). There is a pair of mycetomes (M) connected with the oesophagus. The crop is built of 7 splanchnomeres pair-wise divided along the right and left margin, each into five caecal diverticula (CD), the first caecal diverticulum being much broader than the remaining ones and further divided into four small parts. In somite XIX/XX below the 7th crop splanchnomere the intestine branches into a thin-walled, blind posterior

crop caecum (PCC) situated ventrally, and a thick-walled intestine (I) laying on the former and dorsally to it. The posterior crop caecum is built of 5 sacs which are not entirely fused. In its dorsal and ventral parts 5 fenestrae (F) remain at the level of neural ganglia. Each sac consists of 5 parts, the first being the broadest, like the crop splanchnomeres. The thick-walled intestine has 5 paired intestinal diverticula (ID) of which the first three pairs are well developed, directed laterally and anterad. The fourth pair is not much smaller, and its branches are shifted to the sagittal plane; the fifth is very small and poorly visible. Posterior to it the intestine passes into rectum (R). The anus (A) is well visible, open, situated in the mid-line of dorsum.

Reproductive system (figs 12-15). The gonopores are well visible, separated by 6 annuli. The male gonopore is very large, the female is much smaller. The seminal receptacle (SR) opening is situated well within the copulatory area (CA). The latter has a shape of a small but deep ellipse and occupies the first four annuli of the urosome. In the male reproductive system there are 6 pairs of testes ( $T_1$ - $T_6$ ) situated between the somites, from XIII/XIV to XVIII/XIX. Efferent ducts connect the testes with the longitudinal vasa deferentia which are often strongly coiled. Anteriorly the vasa deferentia pass into seminal vesicles (VS) at the level of the first pair of testes. Then they form the ejaculatory ducts (ED) which do not reach the fifth neural ganglion and open to the common part of atrium (A) and the seminal receptacle (SR). The ejaculatory ducts are thick and have a tendency to form several loops; their proximal sections are often arranged perpendicularly to the long body axis. The prostatic glands are present on atrium. In the female reproductive system the ovaries are strongly twisted and coiled, not cylindrical but polylobate, with posterior ends touching the second pair of testes in the natural position. When extended during dissection, they reach to the third pair of testes ( $T_3$ ). Anterior ends of ovaries (before passing into oviducts) cover the vector tissue (VT). The oviducts open by the female gonopore anterior to the vector tissue. *Picicola pojmanskae* n. sp. has a characteristic structure of the vector tissue. It has a shape of a narrow plate arranged perpendicularly relative to the long body axis. Conducting strands of vector tissue (CS) have a form of long strands of fibres connecting each ovary with VT. Thus the space between the converging oviducts and the first pair of testes (neural ganglia 6 and 7) is partly unoccupied. The vector tissue and the paired conductive tissue are best visible after shifting the ovaries laterally (fig. 15).

Ecology. Till now known only from fish ponds where it is parasitic on the carp (*Cyprinus carpio* L.) and grass carp (*Ctenopharyngodon idella* VAL.). It was found on the fish body, fins and gills.

Distribution. It is known only from two localities in Poland: Żabieniec near Warsaw in the central part of the country, and Przemków near Legnica in the south-western part of the country.

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