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1964

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Recommended Citation

Bauer, O. N. (1964) On the systematic position of *Ankyrocotyle baicalense* Wlasenko. Translation series (Virginia Institute of Marine Science) ; no. 6. Virginia Institute of Marine Science, William & Mary. <https://scholarworks.wm.edu/reports/55>

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VIRGINIA INSTITUTE OF MARINE SCIENCE
GLOUCESTER POINT, VIRGINIA

ON THE SYSTEMATIC POSITION OF
Ankyrocotyle baicalense Wlasenko

TRANSLATION SERIES NO. 6

July 1964

ON THE SYSTEMATIC POSITION OF
Ankyrocotyle baicalense Wlasenko

by

O. N. Bauer

Edited

by

William J. Hargis, Jr.

Translated

by

Pierre C. Oustinoff

TRANSLATION SERIES NO. 6

VIRGINIA INSTITUTE OF MARINE SCIENCE
Gloucester Point, Virginia
1964

Preface
to Translation¹

Translation of this paper was undertaken as part of a long-term research project on the systematics, host-specificity and zoogeography of monogenetic trematodes.² Translation and editing were accomplished in the following manner:

1. Oustinoff³ read translation on tape.
2. Mrs. Morales transcribed translation from tape to first typescript.
3. Hargis edited typescript .
4. Typescript retyped by Mrs. Morales.
5. Hargis again edited typescript for final corrections.

A conscious effort has been made to keep this translation as near the original as possible. It is probably inevitable, however, that some of the nuances of meaning in the original have been distorted or lost. For this we apologize to the author and the reader.

Certain passages were difficult to translate. Where a different English phrase seems to fit the author's meaning better or serves to clarify the text, it has been inserted in brackets. Certain obvious errors or misspellings in the original text were changed, less obvious ones are noted with (sic).

¹Virginia Institute of Marine Science Translation Series, No. 6

²Translation and editing supported by funds from Grant No. E-2389 of the National Institutes of Health.

³Chairman, Department of Modern Languages, College of William and Mary, Williamsburg.

For convenience in referring to the Russian text the original pagination is given in the margin of the translation opposite the place where the new page begins. Occasionally figures or tables are somewhat displaced from their original page location; however, since they, themselves, are numbered sequentially, no confusion should result.

The citation of numbers for measurements and numbered structures are generally given in the translation as they were in the author's paper. This should further facilitate checking with the Russian. Unless otherwise noted, all measurements are in millimeters.

This translation is intended as a service to researchers. Though effort has been made to make it comprehensible, accurate and useful, it is likely that improvements can be made. Should literary improvements or verification appear desirable it is suggested that the researcher make his own translation. Pagination is arranged to facilitate such activity. We will appreciate constructive suggestions for improvements in this and future translations.

Thanks are due to Mrs. Patricia C. Morales of the Virginia Institute of Marine Science who transcribed, typed and assembled the manuscript, and to Miss Evelyn Wells who assisted with final editing.

William J. Hargis, Jr.

ZOOLOGY

O. N. Bauer

ON THE SYSTEMATIC POSITION OF Ankyrocotyle baicalense Wlasenko

(Presented by Academician L. S. Berg, 17 October 1947)

Until now the parasites of fishes of Lake Baikal have not been studied fully although undoubtedly they offer extremely valuable data for clarification of the manner of formation of Baikal's fauna. In addition, a number of the works on this subject abound in errors which could lead to wrong conclusions. p383

N. M. Wlasenko's very meticulous description of a new genus and species of monogenetic trematodes, Ankyrocotyle baicalense, from the gills of Thymallus from Baikal (3) belongs among such works. Since the appearance of Wlasenko's paper this parasite has been mentioned in all Soviet manuals of fish diseases (4, 8) and in research papers and synopses concerning the fauna of Baikal (2, 6, 7).

In determining the systematic position of the genus Ankyrocotyle, N. M. Wlasenko included it in the family Polystomidae and considered it as being an intermediate form between Polystomidae and Gyrodactylidae. The presence of 6 suckers on the attaching disc of A. baicalense served as a basis for this conclusion. However, including the genus Ankyrocotyle into the system of Monogenoidea proposed by B. E. Bychowsky (1), and following Wlasenko, it would have been necessary to place it in the order Gyrodactyloidea, suborder Polyopisthocotylinea. Ankyrocotyle cannot be attributed to Gyrodactylinea, the primary suborder of this order, because it is an egg-laying form.

In comparing the diagnostic characteristics of Ankyrocotyle with those of the suborder Polyopisthocotylinea, sharp contradictions are encountered immediately. According to Bychowsky (1) this order is characterized by the presence of: 1) a two-branched intestine with anastomoses, 2) a male copulatory organ with a ring of chitinous hooks, and 3) an attaching disc with hooks and 2-6 suckers. According to the description of N. M. Wlasenko, Ankyrocotyle has: 1) a sac-shaped intestine, 2) a copulatory apparatus in the shape of a chitinous tube /cirrus/ with a supporting plate /accessory piece/ and, 3) an attaching disc /posthaptor/ with 4 middle hooks /anchors/ a complexly arranged cross-piece /haptor bar/ (N. M. Wlasenko's term "pinching apparatus" is completely inadequate), and 6 suckers on the lobes of the disc. Furthermore, the anterior end of the worm is equipped with 4 finger-shaped outgrowths and two pairs of eyes.

Thus, only the presence of "suckers" likens Ankyrocotyle to the order Gyrodactylidea. All the remaining characteristics force us to attribute this form to the order Dactylogyridea, the suborder Tetraonchinae.

Let us consider this characteristic in greater detail. In his work N. M. Wlasenko presents a drawing of the attaching apparatus bearing suckers. But, judging from the drawing, they are expressed extremely weakly. They do not show the typical muscular rings that exist among the representatives of Polyopisthocotylinea, in Polystomum integerrimum for instance. On the contrary, the attaching disc on the drawing is shown with weak pit-shaped invaginations. Thus, this characteristic appears very doubtful and if it is recalled that the hosts of Polyopisthocotylinea are Elasmobranchii, Amphibia and Reptilia, whereas those of Tetraonchinae are freshwater fishes and particularly migratory fishes, the systematic position of Ankyrocotyle established by N. M. Wlasenko will appear extremely poorly founded (Table 1). N. M. Wlasenko notices this discrepancy himself, but attempts to explain it by citing the marine origin of the Baikal fauna, which is obviously incorrect. G. U. Vereshchiagin (2), includes Ankyrocotyle in the list of organisms he attributes to the marine element in the population of Baikal.

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In 1940 and 1941 we collected a small amount of monogeneid material from thymallids (Thymallus arcticus) from the Yenisei River and from the Lena River (Th. arcticus pallasii). Comparing these parasites with the Ankyrocotyle described by N. M. Wlasenko we immediately noticed their similarity. The body among all these forms is extended, and "the little neck" mentioned by N. M. Wlasenko, is far from being always noticeable but depends on the degree of contraction of the parasite. The posterior end of the body terminates in a disc /posthaptor/ with 6 lobes. We were unable to detect, on whole mounts or in sections, even weakly expressed pit-shaped suckers on these lobes. The hooked attaching apparatus corresponds to the drawings of N. M. Wlasenko; furthermore, we found the very small lateral hooks typical for the suborder Tetraonchinae on our specimens, which were apparently omitted by N. M. Wlasenko. The copulatory apparatus, which represents the most constant characteristic and systematic sign in Monogenoidea, agrees with the description given by N. M. Wlasenko (Fig. 1).

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If we add to all this the presence in our specimens of 4 finger-shaped outgrowths, 2 pairs of eyes and 1 testis, which is also indicated for A. baicalense we must conclude that the Monogenoidea from the gills of Thymallus from Baikal, Yenisei and Lena are completely identical. The only characteristic distinguishing them, namely "suckers" in A. baicalense, is based on some misunderstanding.

Recently we were able, thanks to the kindness of B. E. Bychowsky, to examine Monogenoidea collected from the gills of the European thymallid (Thymallus thymallus) from the Pinega River (basin of northern Dvina) and from the gills of Thymallus sp. from Baikal. All the samples examined

had been identified by B. E. Bychowsky as Tetraonchus borealis (Olsson, 1893). Comparison of these samples with our Monogenea from the gills of Siberian Thymallus sp. show that we are dealing with the same species of worm (Fig. 1). Inasmuch as this species was first described by Olsson (9), it must be recognized that the genus Ankyrocotyle and species A. baicalense do not exist independently, but that the typically fresh-water paleo-arctic species Tetraonchus borealis parasitizes the gills of fishes the genus Thymallus (Th. thymallus and Th. arcticus with subspecies), and that the range of Tetraonchus borealis includes all north Europe and the whole of Siberia including Biakal. Thus, the monogenetic trematodes from the gills of the Baikal Thymallus sp. cannot in any way be used to support the /supposed/ marine connections of the fauna of Baikal which was envisaged by N. M. Wlasenko (3) and G. U. Vereshchiagin (2).

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In conclusion I express my hearty gratitude to B. E. Bychowsky for the material he placed at my disposal and for his aid, and I also thank L. F. Kashina for the drawings.

All Union Scientific Research
Institute of the Fish Industry
Of Lakes and Rivers

Printed
17 October 1947

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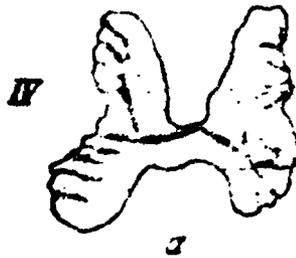
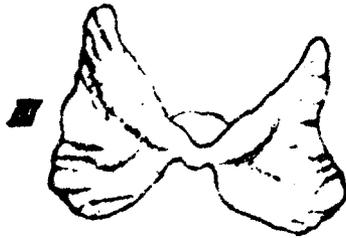
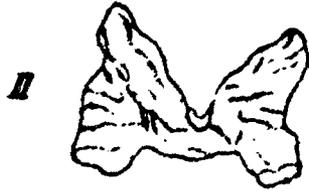
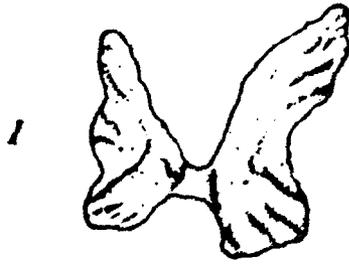
TABLE 1

Table of diagnostic characteristics of Tetraonchus borealis Olsson
(=Ankyrocotyle baicalense Wlasenko)

Diagnostic characteristics	Source or Material			
	<u>A. baicalense</u> according to Wlasenko	Family Polystomidae	Family Tetraonchidae	<u>Tetraonchus borealis</u> from gills of <u>Thymallus</u>
No. of middle hooks	2 pairs + connecting cross piece	1-2 pairs	2 pairs + connecting cross piece	2 pairs + connecting cross piece
No. of lateral hooks	?	-	16	16
Form of copulatory apparatus	Tube-shaped	Ring of chitinous hooks	Chitinous pipe with supporting plate	
Existence and no. of suckers	3 pairs	6 pairs	----- absent -----	
Form of the intestine	Sac-shaped	Bifurcated	----- Sac-shaped -----	
No. of testes	1	1	1	1
Method of reproduction	----- Egg-laying forms -----			
Eyes	2 pairs	Absent	----- 2 pairs -----	
Cephalic outgrowths	4	Absent	4	4
Host	Baikal <u>Thymallus</u>	Elasmobranchii Amphibia, Reptilia	Freshwater and migratory fishes	European and Siberian <u>Thymallus</u> with subspecies

FIG. 1. Connecting plate (a) and copulatory organ (b) of Tetraonchus borealis.

- I--from gills of Thymallus arcticus (Yenisei River),
- II--from gills of Thymallus arcticus pallasi (Lena River),
- III--from gills of Th. arcticus baicalensis (Baikal),
- IV--from gills of Th. thymallus (northern Dvina).



a

b