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Tetraonchoides, a new genus of monogenetic trematode

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TETRAONCHOIDES--A NEW GENUS OF MONOGENETIC TREMATODE

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Preface to Translation[1]

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. Oustinoff[3] 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. H argis 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).

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.

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.

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TETRAONCH OIDES--A NEW GENUS OF MONOGENETIC TREMATODE

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During our work at the Sebastopol Biological Station of the p29
Academy of Sciences USSR in 1935 we found some interesting monogenetic trematodes on the gills of Uranoscopus scaber which differed from all known species in a number of peculiar characteristics. S. U. Osmanov, a graduate student of Leningrad State Pedagogical Institute, who worked with the author at the Sebastopol Station also found this form and referred to it under the name of Monopisthodiscinea sp. in his work on the parasitofauna of fishes of the Black Sea (1940). The author mentioned this species in the list in his work on ontogenesis and phylogenetic inter-relations of parasitic flatworms (1937) but did not give its description, pointing out that it was to be described in the Parasitological Collection of the ZIN /Zoological Institute/ of the Academy of Sciences USSR, No. 8, which, however, was not done for reasons beyond the author's control. Thus, these interesting worms remained undescribed in spite of the number of years which has elapsed since their discovery. In 1949, while examining material from the collections of monogenetic trematodes from the Sea of Japan, the author found another form on Japanese Uranoscopus scaber which was very close to the Black Sea species. The morphological and systematic interest aroused by the structure of these forms prompts us to publish the present material.[1]

Tetraonchoides paradoxus Bychovskii n. gen. n. sp.

Body elongated, with almost parallel sides and a powerful attaching disc /posthaptor/ sharply delimited from the rest of the body. The length, in fixed, unflattened state is 1.0 - 1.3 mm, when the width is 0.16 - 0.18 mm. The attaching disc /posthaptor/ is 0.14 - 0.16 long when the width is 0.20 - 0.24, that is, somewhat wider than the body itself.

[1] In the descriptions of the new species, terminology has been clarified. Terms in brackets after the literal translation follow the useage of W. J. H argis, Jr., (1958. A revised, annotated list of morphological terms useful for morphological studies of monogenetic trematodes. Gloucester Point, Va. Virginia Fisheries Laboratory /Va. Inst. of Marine Sci./Mimeo. 12 p.)

The anterior end of the body has two cephalic lobes into which open rather numerous glands through two groups of efferent ducts. Pigmented eye spots are lacking in all stages of development. The digestive system consists of a rounded pharynx, 0.063 in diameter, and a single intestinal trunk. The latter is located along the medial line of the body, closer to its dorsal surface, and extends posteriorly without forming any outgrowths. It terminates blindly a considerable distance anterior to the posthaptor. The female sex system consists of a round ovary, vitellaria, seminal reservoir and a system of ducts. The ovary lies approximately at the level of the p30
first one-third of the body and to the right of the intestinal trunk. The length of the ovary is 0.054 - 0.060, and the width is 0.050 - 0.056. The short oviduct extends from the anterior edge of the ovary. It receivs a small seminal reservoir which lies close to the upper part of the ovary from the right. The vaginal duct, which opens exteriorly on the right side of the body somewhat closer to the dorsal side, also enters here. The vaginal duct is a chitinous /sclerotized/ tube-like duct whose distal end is widened like a funnel. It forms two spiral twists at the end /proximal end/ which is adjacent to the seminal reservoir. The length of this duct is approximately 0.05. An unpaired vitelline duct which emerges from the anterior portion of the vitellaria enters from the left into the proximal end of the oviduct at about the middle of the body. The vitellaria are of very odd shape, extending from about mid-way between the pharynx and ovary and running toward the posterior end of the intestine. They do not reach the anterior edge of the posthaptor. The vitellaria are clearly subdivided into two parts: 1) the anterior unpaired portion extending along the medial line of the body and changing at the level of the posterior end of the ovary into the 2) posterior paired portion located along the sides of the intestine in the lateral areas of the body. Above the place of confluence of the vitelline duct the anterior portion of the vitellarium forms two small spurs extending anteriorly in a V-shaped arrangement. Both bands of the after portion of the vitellarium merge posteriorly and form a cross piece on the dorsal side of the body behind the posterior end of the testis. The follicles which make up the vitellarium are rather large and coarse. The uterus, which extends anteriorly from the oviduct, is short and usually contains only one egg. It terminates in an aperture /the genital pore/ which is common with the male sex system and is located somewhat behind the pharynx. The eggs are relatively large with a long stalk /terminal filament/. The length of the egg without the terminal filament is 0.10, the width is 0.06, the length of the filament is 0.10. The elongated testis is single lying behind the point of transition of the anterior part of the vitellarium into the posterior part and along the medial line of the body closer to its dorsal side. Its length is approx imately 0.12 when the width is 0.04. The vas deferens extends from the anterior end of the testis. After passing along the dorsal side it curves around the intestine and enters the chitinous copulatory organ on the ventral side, forming, before it does so, an expanded chamber into which prostatic glands discharge. The copulatory organ consists of a thin chitinous tube /cirrus/ and supporting apparatus /accessory piece/. Proximally the cirrus forms a flat spiral consisting of two and a half p31

or three turns; it extends along the accessory piece and then forms a small loop near the genital pore. The length of the cirrus is approximately 0.27 - 0.30 when the width is 0.0012. The accessory piece appears like an elongated plate with a widening at the distal end. This widening is rather complexly arranged forming a special trough, in which part of the cirrus lies, and a couple of small outgrowths which cover and support the latter. The overall length of the accessory piece is approximately 0.05.

The attaching disc /posthaptor/ bears 16 lateral hooks, 2 middle hooks /anchors/, a supporting chitinous plate /haptoral bar/ and 4 sucker-shaped formations. The posthaptor, itself, appears like a rather powerful sucker with indications of subdivision to five sections--three lying in the anterior part and two in the posterior, as is apparent from the drawing (fig.2). It would be exaggerating to consider that these sections correspond to the attaching pits /posthaptoral depressions or loculi/ of the family Monocotylidae because the septa subdividing the attaching disc /in Monocotylidae/ are absent in this species. The lateral hooks are of the usual dactylogyrid form, approximately 0.015 in length. They are located along the edge of the disc as follows: two pairs lie near the median line of the body on the anterior and posterior edges of the disc, and the remaining ones lie along its lateral edges. The anchors lie along the middle of the posterior edge of the disc. They have massive basal parts devoid of upper outgrowths /roots/ and sharply curved rather massive points. The overall length of the anchors is approximately 0.028 - 0.033. A rather large but very thin haptoral bar lies near the anterior edge of the posthaptor. Its dimensions vary considerably, with its width approximately 0.07 - 0.10. This haptoral bar is very odd and can, to a certain degree, be compared with that of Diplectanum; however, there is no basis to speak of any homology between these formations and it would be more correct to consider that the haptoral bar of our species represents a new formation. The sucker-shaped formations are even more interesting. They are located in pairs on the dorsal surface of the posterior part of the posthaptor so that the one member of the anteriormost pair is situated on each side of its longitudinal axis almost p32
in the middle of that axis, whereas the second pair is located in a similar fashion but closer to the posterior edge. As is apparent from the accompanying drawing (fig. 2) these sucker-shaped formations appear like rounded pulvillae extending above the surface of the disc. Each bears a very weakly developed chitinous /cuticularized/ sickle-shaped plate. Usually these plates are the only traces of the anterior pair of sucker-shaped formations noticeable in whole mounts. The diameter of both pairs of these formations is approximately equal, fluctuating between 0.035 - 0.045. We know of no similar formations in any of the groups of monogenetic trematodes.

Host -- Black Sea Uranoscopus scaber Linne.

Localization /Habitat/ -- Gills (gill filaments).

Place of discovery /Locality/ -- Black Sea: Bay of Sebastopol and region of Sukhumi.

Tetraonchoides japonicus Bychowsky n. sp.

Worms with approximately the same body shape as those described above. Their length is approximately 1.1 - 1.4 and their width is 0.12 - 0.17. The length of the posthaptor is 0.13 - 0.15, and the width is 0.21 - 0.25. Internally they are analogous to the preceding species. The diameter of the pharynx is approximately 0.058 and the length of the ovary is 0.063 - 0.068 when the width is 0.054 - 0.057. The length of the testes is the same as in T. paradoxus. The arrangement of the copulatory organ resembles that of the latter species, but the cirrus forms a somewhat larger spiral /proximally/ with three, three and one-half and even four turns. The accessory piece has a different structure than T. paradoxus. In T. japonicus it is considerably shortened so that the widening of its distal end occupies almost the entire anterior half of the accessory piece. Though retaining the same basic structure, the widening of the distal end in T. japonicus is arranged much more complexely than is shown in the accompanying drawing /fig. 3/. The length of the cirrus is approximately 0.30 - 0.33 and that of the accessory piece is approximately 0.047. The vaginal armature is approximately 0.07 long. The eggs have the same form as in M. paradoxus, their length without the terminal filament is approximately 0.12, and their width is 0.04; whereas, the length of the terminal filament is 0.10. The attaching armature of the posthaptor differs from that of the preceding species in the dimensions of the anchors and of the sucker-shaped formations. The length of the anchors is 0.045 - 0.049 and the diameter of the sucker-shaped formations measures up to 0.060. At the same time it should be noted that all the chitinous formations of the posthaptor of this species are more massive than those of the previous species. This is particularly true of the haptoral bar.

Host — Japanese Uranoscopus japonicus Houtt.

Localization /Habitat/— Gills (gill filaments).

Place of discovery /Locality/ -- Sea of Japan, near Lake Honshu in the region of Tsuruga and Obama.

The two species described above differ so sharply from all known monogenetic trematodes that their separation into an independent genus requires no special justification; however, the position of this genus in the system is far from clear. Undoubtedly, it belongs to the order Dactylogyridea, subclass Polyonchoinea, according to the system of monogenetic trematodes proposed by us in 1937, but there is no adequate basis to attribute it to either of the families known at this time. On the one hand, Tetraonchoides resembles Tetraonchidae in the structure of its intestine and number of lateral hooks. On the other hand, certain characteristics connect this genus to Monocotylidae. Bothitrematinae, also possessing a single intestine differ in other characteristics to such an extent that there is no basis whatsoever to connect them to our new species or to Udonellidae, the

systematic position of which, as I have often indicated, is completely unclear. However, importance should not be attached to their similarity with Monocotylidae because it depends mainly on strong development of the attaching disc and on a common level of organization. The similarity with Tetraonchidae is more important; however, it is still insufficient for inclusion of this new genus into this family. Hence, we have to make corresponding conclusions and separate Tetraonchoides into a special family which stands close to Tetraonchidae in the system. The diagnosis of the new family and of the genus which follow are based upon what has been demonstrated above.

Tetraonchoididae Bychovskii n. fam.

Monogenetic trematodes with a sucker-shaped posthaptor with one pair of anchors, four sucker-shaped formations on the dorsal surface of the disc, 16 lateral hooks and an haptoral bar. The intestine is single, There are no eyes. The copulatory organ consists of a cirrus and an accessory piece.

Type genus: Tetraonchoides Bykhovskii n. gen.

Tetraonchoides Bykhovskii n. gen. Diagnosis corresponds to the diagnosis of the family.

Type species: T. paradoxus Bykhovskii n. sp.

In conclusion, it is necessary to note that the discovery of the species described above in the Black Sea and another in the Sea of Japan suggests that the genus Tetraonchoides originated a very long time ago. At the same time, the relatively weak specific divergency, even though they parasitize different species of hosts in the same genus, points to a very slow rate of evolution in the genus Tetraonchoides. Hence, it would have p34 been very interesting to study fishes of other genera from the family of Uranoscopidae, but, unfortunately, it was not within the realm of possibility in this instance.

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FIG. 1. *Tetraonchoides paradoxus* Byk. n. gen. n. sp. ventral view, whole mount.

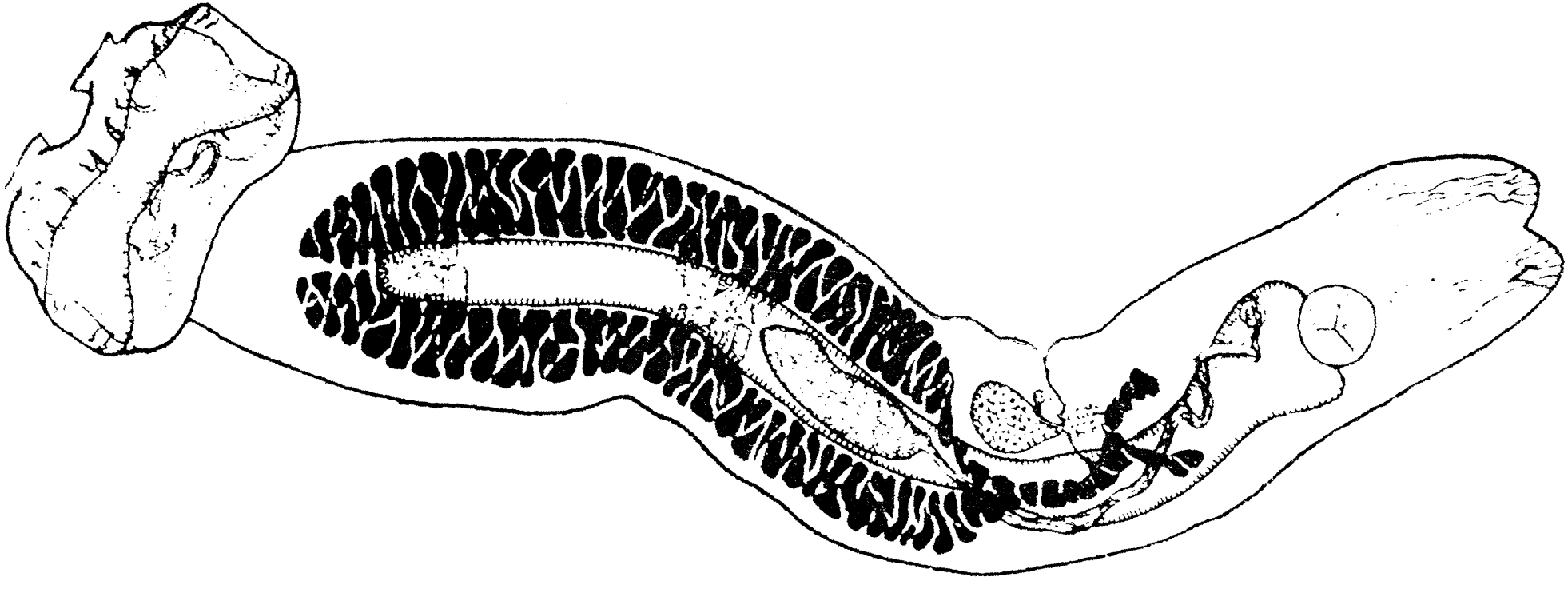

FIG. 2. Tetraonchoides paradoxus Byk. n. gen. n. sp.

1--copulatory apparatus; 2—armature of the vaginal duct; 3—anchor; 4--lateral hook; 5—haptoral bar; 6—egg. In 1-5 the scale is 0.01 mm, in 6 the scale is 0.05 mm.

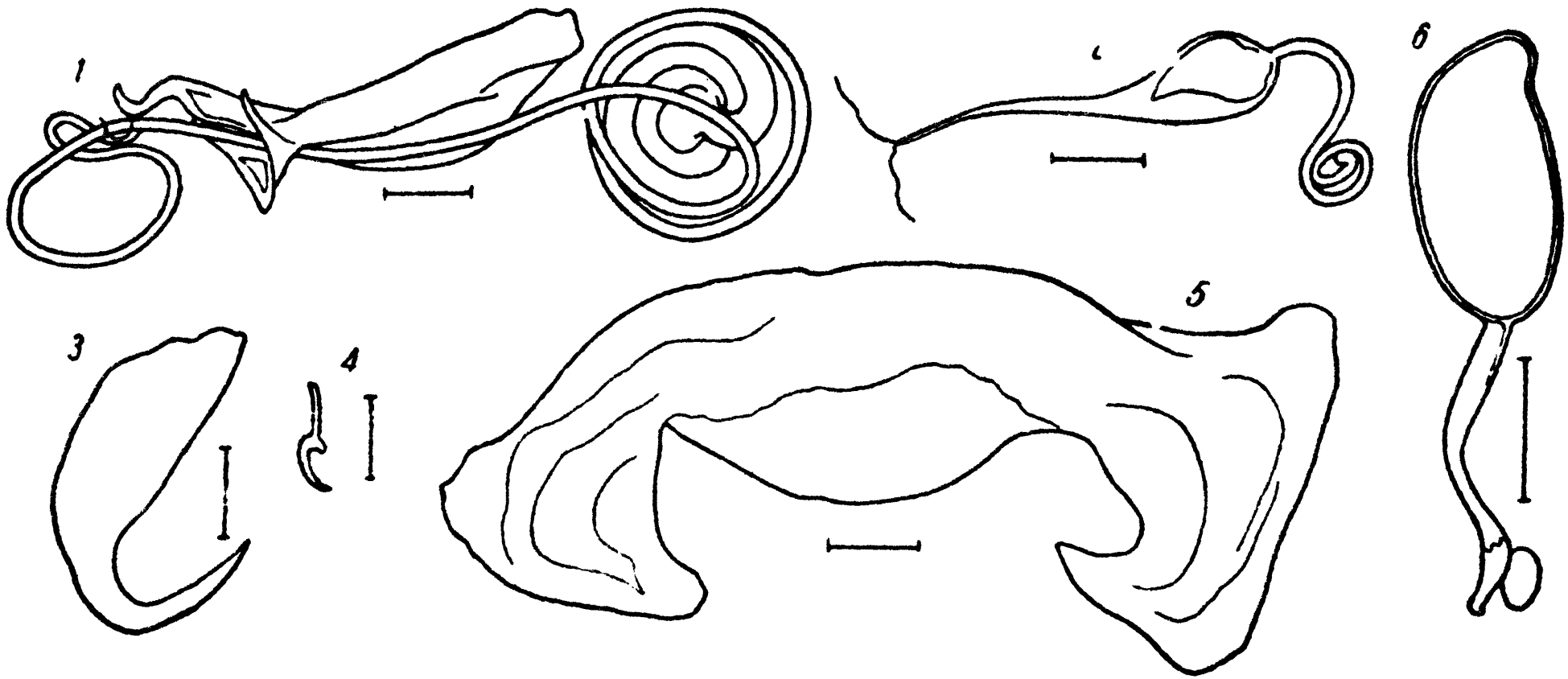
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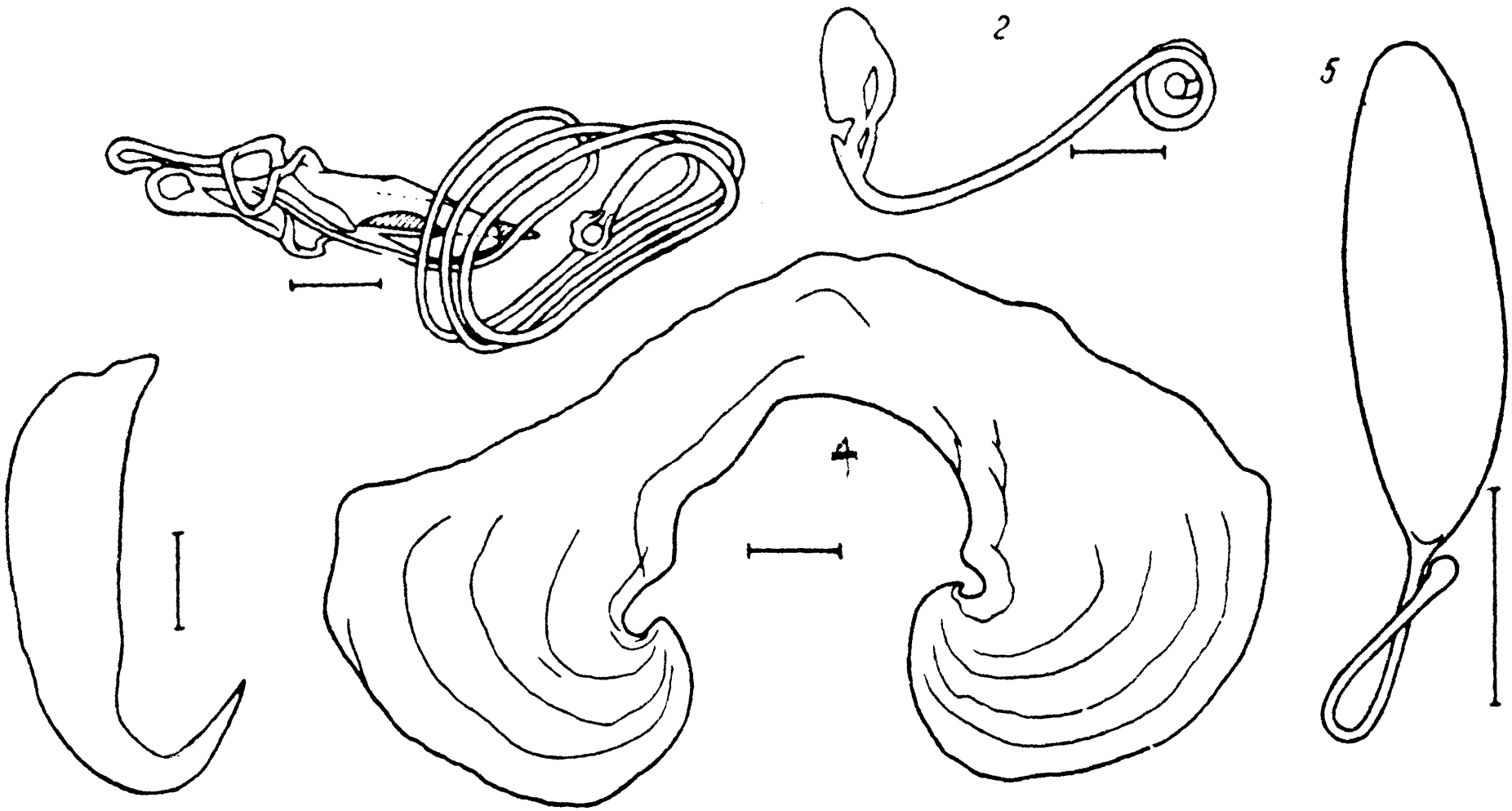
FIG. 3. Tetraonchoides japonicus Byk. n. sp. 1—copulatory apparatus; 2—armature of the vaginal duct; 3—anchor; 4—haptoral bar; 5—egg. The scale in 1–4 is 0.01 mm; in 5 the scale is 0.05 mm.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