REDESCRIPTION OF TWO SPECIES OF THE GENUS
GYRODACTYLUS NORDMANN, 1832 (MONOGENOIDEA)
FROM MISGURNUS ANGUILLICAUDATUS

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Abstract. A redescription is given of Gyradactylus macracanthus Hukuda, 1940 and G. micracanthus Hukuda, 1940. G. paralatus Gusev, 1955 was placed in synonymy with the species G. macracanthus. Specimens determined by Ergens and Dulmaa (1968) to be G. paralatus are considered to be identical to G. micracanthus.

Hukuda (1940) described two new species of the genus Gyradactylus, i.e., G. macracanthus and G. micracanthus, collected from the skin and fins of the Corean fish species Misgurnus anguillicaudatus (Cantor) (Cyprinidae: Cypriniformes). The original description contains, in addition to drawings of the anchors and marginal hooks of the opisthaptor (Fig. I), metrical data only on the length and width of the body, on the diameter of the pharynx and cirrus pouch, on the overall length of anchors and marginal hooks, on the width of the two connecting bars and on the length of the ventral connecting bar. According to information obtained from Dr. S. Kamegai, Director of the Meguro Parasitological Museum, Tokyo, the type material of both species was destroyed during World War II.

While attempting to assess data on the measurements of other parts of the anchor complex of G. macracanthus and G. micracanthus by deducing them from the drawings (Hukuda 1940, Plate I, Figs. 4, 5) I found that the total anchor length of both species given in the text of Hukuda’s paper is dissimilar to the anchor length of the figured specimens. Assuming that the total anchor length of G. macracanthus was, in fact, 0.07—0.09 mm as inferred by the author, then the width of the dorsal connecting bar of the figured specimen would have to be approximately 0.02 mm (and not 0.014 mm) and the size of the ventral connecting bar would have to be approximately 0.010×0.030 mm (and not 0.006×0.017 mm). Also the total length of the marginal hooks would have to be almost twice that given in the original description. As regards G. micracanthus: if the total anchor length were actually 0.06 mm, then the width of the dorsal connecting bar could not have been 0.011 mm, but would have to be approximately 0.020 mm. Similarly, the measurements of the ventral connecting bar and those of the marginal hooks would have to be approximately twice the size given in the description.

Should Hukuda’s measuring be considered to be exact then the mentioned discrepancies will have to be explained. In my opinion, the author did not consider the length nowadays understood to cover the distance from the peak of the root to the outer side
of the arch formed by the common shaft and point to be the total anchor length, but
gave as the overall length the sum of lengths of the root, shaft and point. This assump-
tion proves to be correct, if we deduced the length of the individual parts of the anchor
complex from the width given by Hukuda for the ventral or dorsal connecting bar,
or from the overall length of the marginal hooks, and not from the overall anchor
length.

Under consideration of these facts it was possible to identify with relative accuracy
both species described by Hukuda and to redescribe them on the grounds of results
obtained from a comparative study on the material deposited in the Institute of Parasito-
logy, Czechoslovak Academy of Sciences, Prague, and the collection of the Zoological
Institute, U.S.S.R. Academy of Sciences, Leningrad.

G. macracanthus Hukuda, 1940

Host: Misgurnus anguillicaudatus (Cantor); location: fins, skin, gills.

By using Hukuda's original drawing I was able to characterize the individual hard
parts of the opisthaptor of this species: overall length of anchors approximately

Fig. 1. Anchors and marginal hooks of the opisthaptor. a—Gyroactylus macracanthus Hukuda,
1940; b—Gyroactylus micracanthus Hukuda, 1940 (after Hukuda 1940).

Fig. 2. Anchors and marginal hooks of the opisthaptor of Gyroactylus macracanthus Hukuda, 1940
(two individuals representing originally the syntypes of G. paralatus) (orig.).
0.045 mm, length of shaft approximately 0.035 mm, of point approximately 0.025 mm, of root 0.015 mm. Measurement of ventral connecting bar with developed lateral processes and membranous extension (length 0.010 mm) 0.006×0.017 mm. Length of dorsal connecting bar 0.001—0.002 mm, width 0.014 mm. Overall length of marginal hooks 0.02 mm, of hook proper 0.007 mm.

Gussev (1955) described the species G. paralatus (Fig. 3) from the fins and gills of Misgurnus anguillicaudatus caught in the lake Khanka (RSFSR); he gave these metrical values for the hard parts of the opisthothorax: overall anchor length 0.043—0.047 mm, length of shaft 0.033—0.035 mm, of point 0.022—0.024 mm, of root 0.010—0.014 mm. Measurements of ventral connecting bar with lateral processes and membranous extension (0.008—0.011 mm) 0.005—0.006 (laterally 0.007—0.008)×0.012—0.016 mm. Approximate length of dorsal connecting bar 0.001 mm, width 0.007—0.009 mm. Overall length of marginal hooks 0.018—0.020 mm, of hooks proper 0.004—0.005 mm.

A comparison of the measurements of the individual hard parts of the opisthothorax of G. macracanthus and G. paralatus did not disclose any differences between these species and the same applied to morphological values. This suggests that G. paralatus Gussev, 1955 is in synonymy with the species G. macracanthus Hukuda, 1940.

The situation offers an opportunity for a redescription of G. macracanthus. For this purpose I have used the data given by Hukuda (1940), Gussev (1955) and mainly those obtained from my own measurements of the specimens used for the original description of G. paralatus.

Redescription: Overall anchor length 0.041—0.047 mm, of shaft 0.033—0.035 mm, of point 0.019—0.025 mm, of root 0.010—0.015 mm. Ventral connecting bar with small but distinctly developed lateral processes and a membranous extension (on posterior margin length 0.008—0.011). Measurements of this bar 0.005—0.007 (laterally up to 0.008)×0.012—0.017 mm. Measurements of dorsal connecting bar 0.001 to 0.002×0.007—0.014 mm. Overall length of marginal hooks 0.018—0.020 mm, of hook proper with its massive base 0.007—0.008 mm (Gussev's original measurement, i.e., 0.004 to 0.005 mm proved to be incorrect).
G. micracanthus Hukuda, 1940

Hosts: Misgurnus anguillicaudatus (Cantor) and Cobitis granoei olivai Nalbant, Holček et Pivnička; location: fins, skin, gills, nasal cavities.

The individual hard parts of the opisthaptor of specimens used by Hukuda for the description of the species may be characterized in the following way: overall anchor length approximately 0.036 mm, length of their shaft 0.030 mm, of point 0.020 mm, of root 0.009 mm. Ventral connecting bar with lateral processes and a membranous extension (length 0.010 mm) 0.006 mm in length, 0.013 mm in width. Approximate measurements of dorsal connecting bar 0.001 × 0.011 mm. Overall length of marginal hooks 0.018 mm, of their point approximately 0.006 mm.

Fig. 4. Anchors of the opisthaptor of Gyrodactylus micracanthus Hukuda, 1940. a, d, e, f, g, h, i—from Cobitis granoei olivai (orig.); b, c—from Misgurnus anguillicaudatus (after Hukuda 1940).

In view of the thus completed knowledge of G. micracanthus it was possible to compare this species with the remaining species of the genus Gyrodactylus which are analogous in the morphological character of their anchors and marginal hooks. I disclosed thereby that closest to the species G. micracanthus were parasites collected from the fins, skin, gills and nasal cavities of the Mongolian fishes Cobitis granoei olivai originally determined by Ergens and Dulmaa (1968) as G. paralatus (G. macracanthus) with the remark that they differed from the typical G. paralatus in the shape of the ventral connecting bar. It is evident from table 1 that the measurements of the individual parts of the complex of anchors and marginal hooks of G. micracanthus and G. paralatus sensu Ergens and Dulmaa are, in fact, analogous, and that no differences could be observed even in a comparison of the general shape of their anchors and marginal hooks (Fig. 4). The sole difference between G. paralatus sensu Ergens and Dulmaa and G. micracanthus was found in the shape of both connecting bars, although this may have been caused by a certain inaccuracy in Hukuda's drawing of these formations. This is indicated mainly by his illustration of the Y-shaped process on the posterior margin of the dorsal
Table 1. Comparison of measurements of the hard parts of the opisthaptor of *G. micracanthus* Hukuda, 1940 and *G. paralatus* sensu Ergens and Dulmaa, 1968 (in mm).

<table>
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<tr>
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<th><em>G. micracanthus</em></th>
<th><em>G. macracanthus</em></th>
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<tbody>
<tr>
<td></td>
<td>Hukuda, 1940</td>
<td>Ergens and Dulmaa 1968</td>
</tr>
<tr>
<td>Overall anchor length</td>
<td>0.036</td>
<td>0.033 — 0.042</td>
</tr>
<tr>
<td>Length of shaft</td>
<td>0.030</td>
<td>0.028 — 0.034</td>
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<tr>
<td>Length of point</td>
<td>0.020</td>
<td>0.016 — 0.023</td>
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<tr>
<td>Length of root</td>
<td>0.009</td>
<td>0.009 — 0.012</td>
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<tr>
<td>Length of ventral connecting bar</td>
<td>0.006</td>
<td>0.000 — 0.008</td>
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<tr>
<td>Width of ventral connecting bar</td>
<td>0.013</td>
<td>0.012 — 0.016</td>
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<tr>
<td>Length of membranous extension</td>
<td>0.010</td>
<td>0.009 — 0.013</td>
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<tr>
<td>Length of dorsal connecting bar</td>
<td>0.001</td>
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<tr>
<td>Width of dorsal connecting bar</td>
<td>0.011</td>
<td>0.009 — 0.012</td>
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<tr>
<td>Overall length of marginal hooks</td>
<td>0.018</td>
<td>0.018 — 0.020</td>
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<tr>
<td>Length of hook proper</td>
<td>0.006</td>
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connecting bar of *G. macracanthus* (Fig. 1b). It appears that in this case the author mistook one of the muscle fibres of the opisthaptor extending in the direction of the longitudinal axis of the body, and situated at the time of fixation below the central part of the dorsal connecting bar, to be an indivisible part of this bar. In view of the fact that *G. micracanthus* is undoubtedly a member of the morphological group of *C. latus* Bychowsky, 1933, there is little doubt that also its dorsal connecting bar, similar to that of most species of this group, is slightly thickened in its middle part and bears two backwards directed processes on its posterior margin bordering the more or less deep, oval-shaped groove. In view of the massiveness of the ventral connecting bar and mainly that of its lateral margin, it is often difficult to decide for various species of the genus *Gyroactylus*, whether lateral processes are or are not developed. In my opinion, this may have been the case with the specimens used by Hukuda in the description of *G. micracanthus*. My suggestion is supported by the fact that he illustrated symbolically only the shape of these processes which does not answer to their actual shape even in the case of the species *G. macracanthus*.

Fig. 5. Anchors and marginal hooks of the opisthaptor of *Gyroactylus micracanthus* Hukuda, 1940 from *Cobitis granoei olivat* (orig.).
I believe that the results of my comparative study on the diagnostic signs of _G. micracanthus_ and _G. paralatus_ sensu Ergens and Dulmaa may support my suggestion that both these parasites are conspecific, particularly with regard to the destroyed type material of _G. micracanthus_. Under these circumstances it is possible to present a redescription of the species.

**Redescription:** overall length of massive anchors 0.036—0.042 mm, of their shaft 0.028—0.034 mm, their point 0.016—0.023 mm, their conical root 0.009—0.012 mm. Measurements of ventral connecting bar without distinct lateral processes and with a 0.009—0.013 mm long membranous extension are 0.006—0.008 mm in length and 0.012—0.016 mm in width. Measurements of dorsal connecting bar with a posterior margin forming an oval groove limited by two backwards directed processes, are 0.001 × 0.009—0.012 mm. Overall length of marginal hooks 0.018—0.020 mm, of hook proper with its very massive base 0.006—0.007 mm.

In conclusion, it seems necessary to discuss briefly the problem of the fish hosts of _G. micracanthus_. There are, essentially, two possibilities: either the species parasitizes actually both fish hosts, or its sole host is _Cobitis gnauoi olivai_ or any of the closely related members of the genus _Cobitis_. The latter alternative, however, requires the assumption that Hukuda may have misidentified the fish species examined.

**Acknowledgements.** I should like to express my gratitude to Dr. S. Kamogai, Director of the Moguro Parasitological Museum, Tokyo, Japan for his valuable information on the type material of _G. macracanthus_ and _G. micracanthus_. Thanks are extended to Dr. A. V. Gussev, Zoological Institute, U.S.S.R. Academy of Sciences, Leningrad, for making available the comparative material for study.

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**ПЕРЕОПИСАНИЕ ДВУХ ВИДОВ РОДА GYRODACTYLUS NORDMANN, 1832 (MONOGENOIDEA) OT MISGURNUS ANGUILLICAUDATUS**

**Р. Эргенс**


**REFERENCES**


Received 17. 7. 1974.