FOLIA PARASITOLOGICA (PRAHA) 22: 33—36, 1975.

GYRODACTYLUS (MONOGENOIDEA) FROM SOME RHODEINAE (CYPRINIFORMES)

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Abstract. *Gyrodactylus acanthorhodei* sp. n. and *G. macrorhodei* sp. n. from the fins of *Acanthorhodeus asmussi* (Dybowski) and *Rhodeus sericeus sericeus* (Pallas) are described and figured. A new morphological group, *G. rhodei*, was established from the members of the genus *Gyrodactylus*.

At systematical evaluation of the members of the genus *Gyrodactylus* Nordmann, 1832 from *Rhodeus sericeus sericeus* (Pallas), *Rh. sericeus amarus* (Bloch) and *Acanthorhodeus asmussi* (Dybowski) (Rhodeinae: Cyprinidae) three species of these parasites were identified. One of them is *G. rhodei* Žitňan, 1964, the other two are considered new species. A description and drawings of their main diagnostic characters are given.

MATERIALS AND METHODS

In our studies we used only fixed specimens (embedded in glycerin-gelatine and Canada balsam) obtained from fishes caught in Czechoslovakia, Mongolian People's Republic and the eastern part of the U.S.S.R. Observations were made with a phase-contrast microscope and figures were drawn with the aid of a camera lucida.

RESULTS

Gyrodactylus rhodei Žitňan, 1964 — Fig. 1 c—e

Host and location: *Rhodeus sericeus amarus;* fins and skin. Localities: inundation pool of the river Labe near Čelákovice (east of Prague) and the river Latorica near Leles (eastern Slovakia), Czechoslovakia.

All the 37 specimens examined are fully conformable to *G. rhodei*, both in their morphology and measurements. However, it should be noted that there was a mistake in Žitňan's (1964) original description as regards the absence of lateral processes of the ventral connecting bar of anchors.

Gyrodactylus macrorhodei sp. n. — Fig. 1 a, b

Host and location: *Rhodeus sericeus sericeus;* fins. Type locality: the Amur River near Leninskoye (March 18, 1972). Specimens studied: 5.

The holotype (measurements in parentheses) and paratype are deposited in the collections of the Institute of Parasitology, Czechoslovak Academy of Sciences, Prague (No. Coll. 366).

Overal length of anchors 0.066—0.070 (0.070) mm, shaft 0.053—0.056 (0.054) mm, point 0.024—0.031 (0.026) mm, root 0.019—0.021 (0.021) mm. Ventral connecting bar has well-developed lateral processes and a membranous extension 0.019—0.021 (0.020)

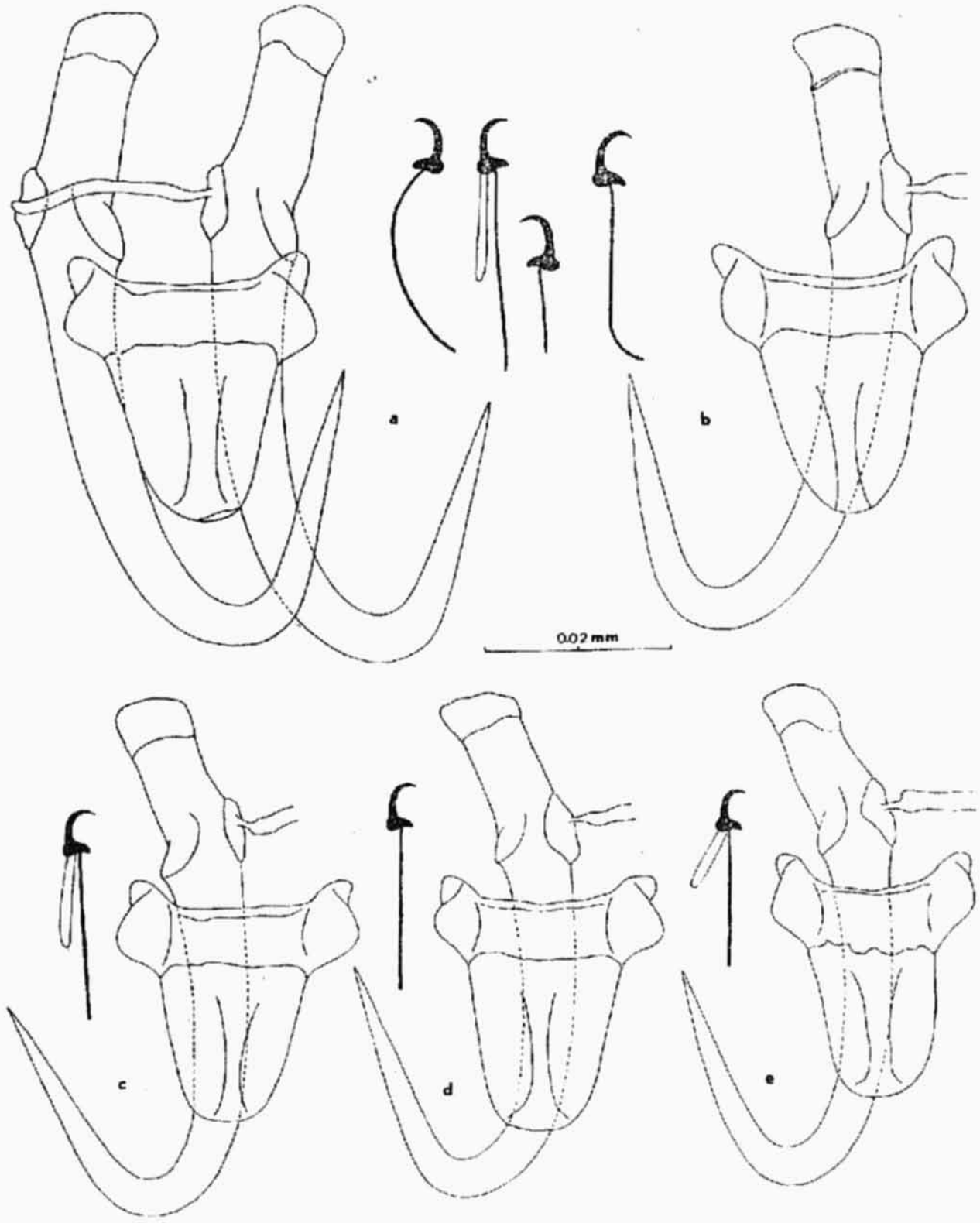

Fig. 1. Anchors, connecting bars and marginal hooks. a, b — *Gyrodactylus macrorhodei* sp. n. (a = holotype); c, d, e — *Gyrodactylus rhodei* Žitňan, 1964.

mm long. Length of this connecting bar 0.006—0.007 (0.007) mm, width 0.027—0.028 (0.028) mm. Dorsal connecting bar measures 0.002—0.003 × 0.018—0.021 (0.002 × 0.020) mm. Overall length of marginal hooks 0.028—0.033 (0.032) mm, the hook proper measures 0.006—0.007 (0.007) mm.

***Gyrodactylus acanthorhodei* sp. n.** **Fig. 2 a—c**

Host and location: *Acanthorhodeus asmussi;* fins. Localities: Lake Buyr nur, eastern Mongolia (type locality), the Amur River near Leninskoye, eastern part of the U.S.S.R. Specimens studied: 6.

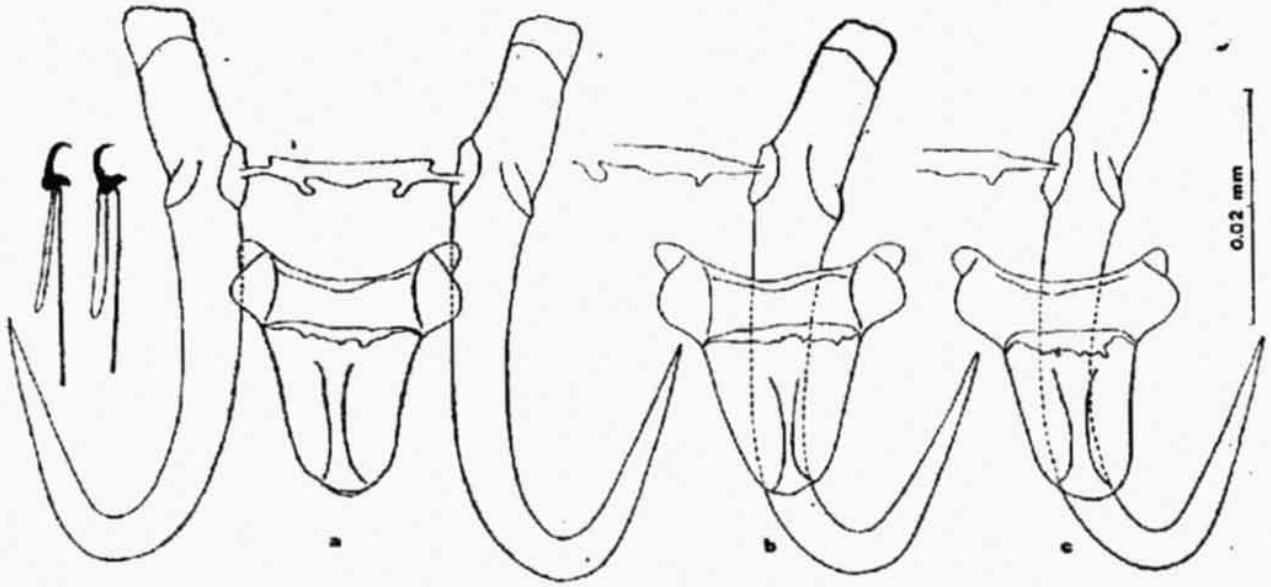

Fig. 2. Anchors, connecting bars and marginal hooks of *Gyrodactylus acanthorhodei* sp. n. a — holotype, b. c — paratypes.

Holotype (measurements in parentheses) was obtained from a fish caught on September 2, 1966. It is deposited, together with the paratypes, in the collections of the Institute of Parasitology, Czechoslovak Academy of Sciences, Prague (No. Coll. 367).

Overall length of anchors 0.045—0.047 (0.047) mm, shaft 0.034—0.036 (0.036) mm, point 0.018—0.021 (0.020) mm, root 0.013—0.015 (0.014) mm. Ventral connecting bar with well-developed lateral processes and a membranous extension measuring 0.013—0.014 (0.014) mm. Length of this connecting bar 0.004—0.005 (0.005) mm, width 0.018—0.022 (0.021) mm. Dorsal connecting bar measures 0.002 × 0.013—0.019 (0.002 × 0.018) mm. Posterior margin of this bar forms two conspicuous processes, especially in older specimens (Fig. 2). Overall length of marginal hooks 0.020—0.021 mm, the hook proper measures 0.004—0.005 mm.

Owing to the lack of material for comparison this species was erroneously identified (Ergens 1971) as *G. rhodei*.

DISCUSSION

The above-mentioned data summarized in Table 1 show that the main differentiating features of the species *G. rhodei*, *G. acanthorhodei* and *G. macrorhodei* are the measurements of hard parts of opisthaptor. A question arises whether the individual species do not represent only three different populations of a single species, in this case *G. rhodei*, whose lower limit of variability would be represented by *G. acanthorhodei* and upper

Table 1. Comparison of measurements (in mm) of some hard parts of opisthaptor of the species *G. rhodei* Žitňan, 1964, *G. acanthorhodei* sp. n. and *G. macrorhodei* sp. n.

	G. acanthorhodei	*G. rhodei*	*G. macrorhodei*
Overall length of anchors	0.045—0.047	0.053—0.059	0.066—0.070
Length of anchor shaft	0.034—0.036	0.042—0.046	0.053—0.056
Overall length of marginal hooks	0.020—0.021	0.022—0.028	0.028—0.033
Length of hook proper	0.004—0.005	0.005—0.006	0.006—0.007

limit by *G. macrorhodei*. Considering, however, the distribution of hosts and the present knowledge of the reasons and range of morphological and metrical variability of some members of the genus *Gyrodactylus*, we come to the conclusion that both *G. acanthorhodei* and *G. macrorhodei* are quite independent species. Together with *G. rhodei* they form a morphological group of phylogenetically relating species for which we propose the name *G. rhodei*-group.

If the species *G. acanthorhodei* and *G. macrorhodei* represent only extreme limits of variability of *G. rhodei*, then it should be supposed that *G. rhodei* occurs in the localities of these two species (as a "transitive form"), whether on *Rhodeus sericeus* or *Acanthorhodeus asmussi*, which occur (according to Berg 1949) only in the easternmost parts of the U.S.S.R., eastern regions of the Mongolian People's Republic and north-eastern part of China. In fact, however, *G. rhodei* is a specific parasite of *Rhodeus sericeus amarus*, whose distribution (Europe, besides Spain, Italy, England, Scandinavia and cost of the Arctic Ocean) is very distant from the area of *Rhodeus sericeus sericeus* and *Acanthorhodeus asmussi* and is separated from it by the territory of the whole Central Asia and Siberia. It may be assumed, therefore, that all the three species originated by the divergence of a single original form whose local populations were gradually isolated both geographically and ecologically.

GYRODACTYLUS (MONOGENOIDEA) ОТ НЕКОТОРЫХ RHODEINAE (CYPRINIFORMES)

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Резюме. Даны описания и рисунки двух новых видов рода *Gyrodactylus: G. acanthorhodei* sp. n. и *G. macrorhodei* sp. n. с плавников *Acanthorhodeus asmussi* (Dybowski) и *Rhodeus sericeus sericeus* (Pallas). Основана новая морфологическая группа представителей рода *Gyrodactylus* — *G. rhodei*.

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Received 11 April 1974.

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