FOLIA PARASITOLOGICA (PRAHA) 16: 201–206, 1969.

Monogenoidea from *Cyprinus carpio haematopterus* and *Carassius auratus gibelio* (Cyprinidae) from Mongolia*)

R. ERGENS and A. DULMAA

Institute of Parasitology, Czechoslovak Academy of Sciences, Prague and Biological Institute of the Academy of Science of the Mongolian People's Republic, Ulan Bator

Abstract. The paper presents the results of systematic studies on Monogenoidea from the hosts *Cyprinus carpio haematopterus* and *Carassius auratus gibelio* from Mongolia. Of the 11 species collected 8 are members of the genus *Dactylogyrus*, two of the genus *Gyrodactylus* and one of the genus *Diplozoon*. Also studied and described are the two new species — *D. molnari* and *D. mrazeki*.

This is the third paper of a series presenting the results of the Mongolian-Czechoslovak ichthyoparasitological expedition to Mongolia in 1966 (ERGENS and DULMAA 1967, 1968). It deals specifically with the systematic evaluation of Monogenoidea from *Cyprinus carpio haematopterus* Temninck et Schlegel and *Carassius auratus gibelio* (Bloch) collected in Mongolia. The type material is deposited in the collection of the Institute of Parasitology, ČSAV, Prague.

MATERIAL AND METHODS

Four specimens of *C. carpio haematopterus*, two captured in the River Kherulen near Bajandelger, two in the Lake Bujr nur (eastern Mongolia) and three specimens of *C. auratus gibelio* from the Lake Ugij nur (central Mongolia) were examined helminthologically. The parasites obtained were fixed either in ammonium-picrate (*Dactylogyrus*, *Gyrodactylus*) or in formalin (*Diplozoon*).

RESULTS

A total of 11 species of Monogenoidea were found to parasitize the two fish species under consideration. These are listed and several of them described and figured in the following text.

*) Parasitological results of the Mongolian-Czechoslovak ichthyoparasitological expedition to Mongolia, 1966. Communication no. 3.

1. *D. achmerowi* Gussev, 1955

Host and location: *Cyprinus carpio haematopterus*, gills. Locality: River Kherulen near Bajandelger, Lake Bujr nur.

No differences were observed in the shape and size of the chitinoid portions of the haptor and the copulatory complex of our specimens and the typical *D. achmerowi*. It seems important, however, to draw attention to the finding of a vaginal support in these parasites and, therefore, we have changed the original description in this respect.

2. *D. baueri* Gussev, 1955

Host and location: *Carassius auratus gibelio*; gills. Locality: Lake Ugij nur.

All specimens obtained are in complete accord with the typical *D. baueri* both in their morphology and measurements.

3. *D. dulkeiti* Bychowsky, 1936

Host and location: *Carassius auratus gibelio;* gills. Locality: Lake Ugij nur.

Apart from a slightly longer copulatory complex (0.030 to 0.032 mm) all other measurement and morphological features of our specimens are identical with those of the typical *D. dulkeiti*.

4. *D. extensus* Mueller et van Cleave, 1932

Host and location: *Cyprinus carpio haematopterus;* gills. Locality: River Kherulen near Bajandelger, Lake Bujr nur.

All morphological and metrical data obtained from our material are within the range of variability of this species.

5. *D. falciformis* Achmerow, 1952

Host and location: *Cyprinus carpio haematopterus;* gills. Locality: River Kherulen near Bajandelger.

No differences have been found in size and shape of the principal characteristic signs of our specimens and the typical *D. falciformis*.

6. *D. inexpecatuts* Isjumova, 1955

Host and locality: *Carassius auratus gibelio;* gills. Locality: Lake Ugij nur.

No differences were observed in the morphology and measurements of our specimens and the species described until now.

7. *D. molnari* sp. n. Fig. 1b

Host and location: *Cyprinus carpio haematopterus;* gills. Locality: River Kherulen near Bajandelger. The holotype was obtained from a fish caught on April 24, 1966. The measurements of its principal determining characters are given in brackets in the following description.

Overall size of the 9 worms under consideration ca. 0.5 to 0.12 mm, length of marginal hooks 0.026—0.029 mm. Total length of anchors of the *D. minutus* Kulwiec, 1927—type within the range of 0.052—0.054 (0.053) mm, size of basal part 0.004—0.045 (0.045) mm, of the point 0.014—0.015 (0.014) mm. Length of inner

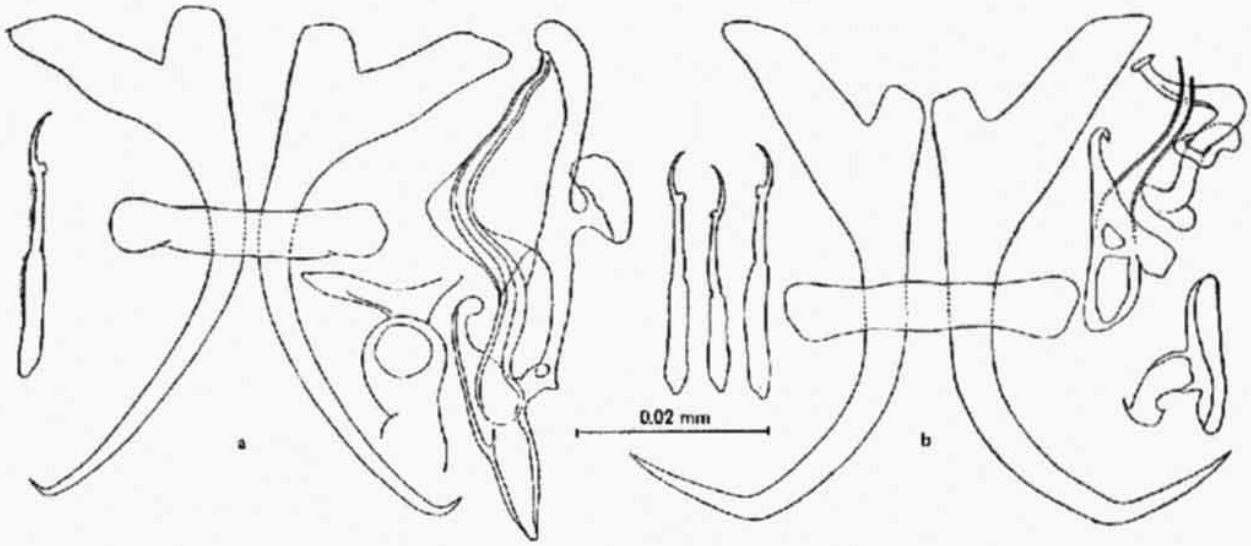

Fig. 1. Chitinoid part of haptor, vaginal support and copulatory complex. a — *Dactylogyrus achmerowi* Gussev, 1955 b; b — *D. molnari* sp. n.

root of these anchors 0.018 to 0.020 (0.020) mm, length of outer root 0.004—0.006 (0.006) mm. Size of the sole connecting bar 0.006—0.007 by 0.030 to 0.032 (0.007 by 0.031) mm.

The copulatory complex consists of a massive basal part, of a slightly S-shaped copulatory tube with a moderately, funnel-like enlarged base and of rod-like accessory piece bent into a right angle and not connected with the basal part. Overal, length of the copulatory complex 0.030—0.032 (0.030) mm. Vaginal support tube-shaped, 0.012 mm long, bearing an oval disk of up to 0.016 mm in diameter at one of its ends.

This parasite named in honour of the Hungarian parasitologist Dr. K. Molnár, is most similar to the species *D. minutus*, but differs from it in the presence of a vaginal support and in the structure of the copulatory complex.

8. *D. mrazeki* sp. n. Fig. 2a

Host and location: *Cyprinus carpio haematopterus;* gills. Locality: River Kherulen near Bajandelger. The holotype was obtained from a fish caught on April 24, 1966. The measurements of its principal determining characters are given in brackets in the following description.

Overall length of the 12 worms examined up to 1.2 mm, maximum width 0.27 mm. Length of marginal hooks from 0.036 to 0.049 mm. Overall length of anchors of the *D. macracanthus* Wegener, 1909—type 0.074—0.077 (0.075) mm, length of their basal part 0.063—0.064 (0.063) mm, size of point 0.037—0.040 (0.040) mm. Length of inner root of these anchors 0.030—0.033 (0.032) mm, of outer roots 0.014—0.017 (0.016) mm. Sole connecting bar, mostly straight or only moderately arched, is 0.010—0.017 (0.011) mm long and 0.055—0.057 (0.055) mm wide.

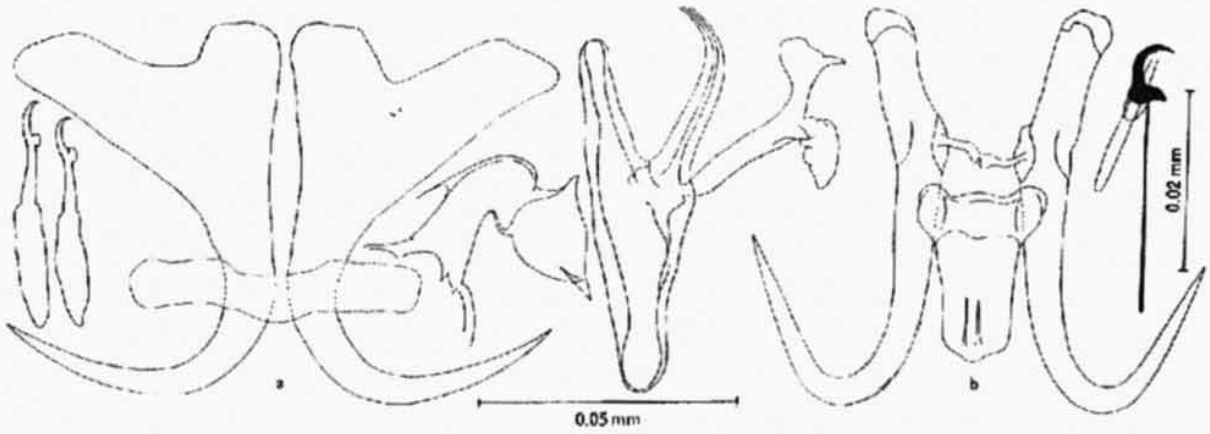

Fig. 2. a — chitinoid parts of the haptor, vaginal support and copulatory complex of *Dactylogyrus mrazeki* sp. n.; b — anchors and one of the marginal hooks of *Gyrodactylus osoblahensis* Ergens, 1963 (?).

The copulatory complex consists of a highly developed basal part, of a curved copulatory tube with thick walls and a slightly enlarged base and of a massive, rod-like accessory piece, bifurcating at the unattached end into two wide processes. Overall length of copulatory complex 0.077—0.079 (0.077) mm. Vaginal support forming a wide tube extended at both ends, length 0.028—0.041 (0.035) mm.

Table 1. Comparison of measurements (in mm) of the chitinoid parts of the haptor of *Gyrodactylus sprostonae* Ling Mo-en, 1962

	Ling Mo-en 1962	Gussev in Bychowsky et al. 1962	Our materials
Overall length of anchors	0.0408—0.0513	0.040—0.051	0.056—0.062
Length of basal part	0.0361—0.0399	—	0.041—0.045
Length of point	0.0171—0.0228	—	0.022—0.025
Length of root	0.0133—0.0209	—	0.021—0.023
Length of principal connect. bar	—	0.003—0.004	0.005—0.007
Width of principal connect. bar	0.0142—0.0209	0.013—0.020	0.018—0.026
Length of auxiliary connect. bar	—	0.001	0.001—0.002
Width of auxiliary connect. bar	0.0095—0.019	0.013—0.019	0.017—0.020
Overall length of marginal hooks	0.019—0.0247	0.024	0.024—0.027
Length of the hook proper	—	—	0.006

This parasite, named in honour of the prominent Czech zoologist professor A. Mrázek, resembles the species *D. macracanthus* in the shape of its anchors, and the species *D. minutus* in the structure of its copulatory complex.

GENUS *GYRODACTYLUS* NORDMANN, 1832

9. *G. sprostonae* Ling Mo-en, 1962

Host and location: *Carassius auratus gibelio;* gills. Locality: Lake Ugij nur.

No differences were observed in the shape of the chitinoid parts of the haptor between our specimens and those described up to the presence (Ling Mo-en 1962, Gussev: in Bychowsky et al. 1962, etc.). The metrical differences are shown in Table 1.

10. *G. osoblahensis* Ergens, 1963 (?) Fig. 2b

Host and location: *Cyprinus carpio haematopterus;* gills. Locality: River Kherulen near Bajandelger.

In view of the scarcity of material of *G. osoblahensis*, the morphological and metrical variability of this worm has not yet been established and there is also no exact information available on its specificity (until the present this species has been

Table 2. Comparison of measurements (in mm) of the chitinoid parts of the haptor of *Gyrodactylus osoblahensis* Ergens, 1963 and *G. osoblahensis* (?)

	Gyrodactylus osoblahensis — holotype	*G. osoblahensis* (?)
Overall length of anchors	0.088	0.078
Length of basal part	0.058	0.056
Length of point	0.036	0.033
Length of root	0.033	0.030
Length of principal connect. bar	0.014	0.010
Width of principal connect. bar	0.030	0.026
Length of auxiliary connect. bar	0.003	0.003
Width of auxiliary connect. bar	0.023	0.017
Overall length of marginal hooks	0.034 0.036	0.031
Length of the hook proper	0.007	0.007

recorded from two species of the genus *Leuciscus* from the basins of the river Oder and Danube). Therefore, we had to designate our solitary finding of a worm, whose separate chitinoid parts of the haptor are smaller than those of the typical *G. osoblahensis* (see Table 2), only as *G. osoblahensis* (?).

11. *D. nipponicum* Goto, 1891

Host and location: *Cyprinus carpio haematopterus;* gills. Locality: River Kherulen near Bajandelger, Lake Bujr nur.

None of the morphological and metrical data obtained from the two specimens examined surpassed the range of variability known from this worm species.

CONCLUSION

All parasites discussed, with the exception of *G. osoblahensis* (?), form a major part of the palearctic specific monogenoidean fauna of *Cyprinus carpio haematopterus and Carassius auratus gibelio*, now enriched by the two new species *Dactylogyrus molnari* sp. n. and *D. mrazeki* sp. n. It seems very likely that species such as *Dactylogyrus anchoratus* (Dujardin, 1845), *D. wegeneri* Kulwiec, 1927 or *Gyrodactylus shulmani* Ling Mo-en, 1962 will be recorded from Mongolian fishes in the course of further investigations into their parasite fauna.

REFERENCES

Akhmerov A. Kh., New species of monogenetic trematodes of fishes from the river Amur. Parazitol. Sb. Zool. Inst. AN SSSR, 14: 181—212, 1952. (In Russian.)

Bykhovskiy B. E. et al., Key to parasites of freshwater fishes of the U.S.S.R. Publ. House Acad. Sci. U.S.S.R., Moscow-Leningrad, 1962. (In Russian.)

Ergens R., Vier neue Arten des Genus *Gyrodactylus* Nordmann, 1832 (Monogenoidea) aus Fischen der Tschechoslowakei. Z. Fischerei und deren Hilfswissenschaften 11: 735—741, 1963.

—, Dulmaa A., Monogenoidea from the genus *Phoxinus* (Cyprinidae) from Mongolia. Folia parasit. (Praha) 14: 321—333, 1967.

—, —, Monogenoidea in *Cobitis taenia sibirica* from Mongolia. Folia parasit. (Praha) 15: 317—321, 1968.

Gussev A. V., Monogenetic trematodes of fishes of the Amur basin. Tr. Zool. Inst. AN SSSR, 19: 171—398, 1955. (In Russian.)

Ling Mo-en, Notes on seven new parasitic species of Monogenetic trematodes—*Gyrodactylus* from freshwater fishes of China. Acta Hydrobiologica Sinica 2: 67—78, 1962.

Received 5 August 1968.

R. E., Parasitologický ústav ČSAV, Flemingovo n. 2, Praha 6, ČSSR