

**Redescription of *Dactylogyrus extensus* (Monogenea :
Dactylogyridae) with a Special Reference
to Its Male Terminalia**

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(Received for publication; January 10, 1979)

Imada *et al.* (1976) first reported *Dactylogyrus extensus* from Japan, which was collected from cultured carp at farms in Hiroshima Prefecture. The subsequent survey carried out by the present authors has revealed that it had also been distributed among carp farms in Niigata, Nagano, Gunma, Ibaraki, Chiba and Shizuoka Prefs. and Tokyo Metropolis, and that it was a very common parasite of carp in Japan. In the present study, a redescription is made of *D. extensus* based on the materials obtained in the survey.

Materials and methods

The carp, *Cyprinus carpio* (25-134 g in weight, 11.6-21.2 cm in total length), from which the parasites were obtained, had been cultured at farms in Nagano and Shizuoka Prefs., Japan. The parasite specimens were prepared according to the methods mentioned in a previous paper (Ogawa and Egusa, 1976). The measurements are given in μm , and means are followed in parentheses. The figures were drawn with the aid of a camera lucida.

Description of the species

Dactylogyrus extensus Mueller et Van Cleave, 1932

Host: The carp, *Cyprinus carpio* (0+-2+)

year).

Habitat: Gill filament.

Localities and dates: Shizuoka Pref., Nov. 11, 1975; Nagano Pref., Mar. 23, 1976.

Specimens: Deposited in the Meguro Parasitological Museum, M. P. M. Coll. No. 19270 and in the authors' collection.

Description (13 specimens examined): The body is very large, 951-2043 long by 237-405 wide. The opisthohaptor (Fig. 1) is 88-141 long by 135-195 wide. The pharynx is 67-116 long by 50-92 wide. The esophagus is very short or sometimes absent actually. The bifurcating intestinal branches run on both sides of the body proper, united with its fellow behind the testis. The anchor is stout, 68-78 (72) long, and its internal and external processes are 21-26 and 8-13 long, respectively. The anchor base is 58-70 (64) long and the point is 16-19 long. The bar is almost straight, 40-45 (43) long. The marginal hooks are in seven pairs, 25-34 long. The additional tendon of the marginal hook II was not observed in the stained specimens, though recognized in living materials.

The ovary, which is located approximately in the middle of the body proper, is large and longitudinally elongated. The vagina opens on the right lateral side of the body in front of the ovary, and the muscular vaginal duct is united with the receptaculum seminis which is formed by dilatation of the oviduct. The receptaculum seminis leads

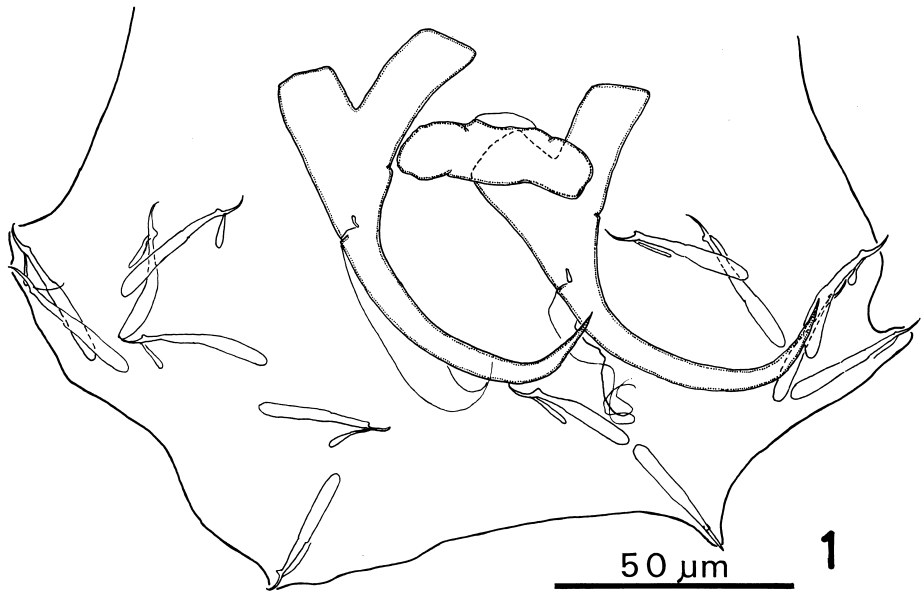


Fig. 1 Opisthohaptor of *Dactylogyrus extensus*, dorsal view.

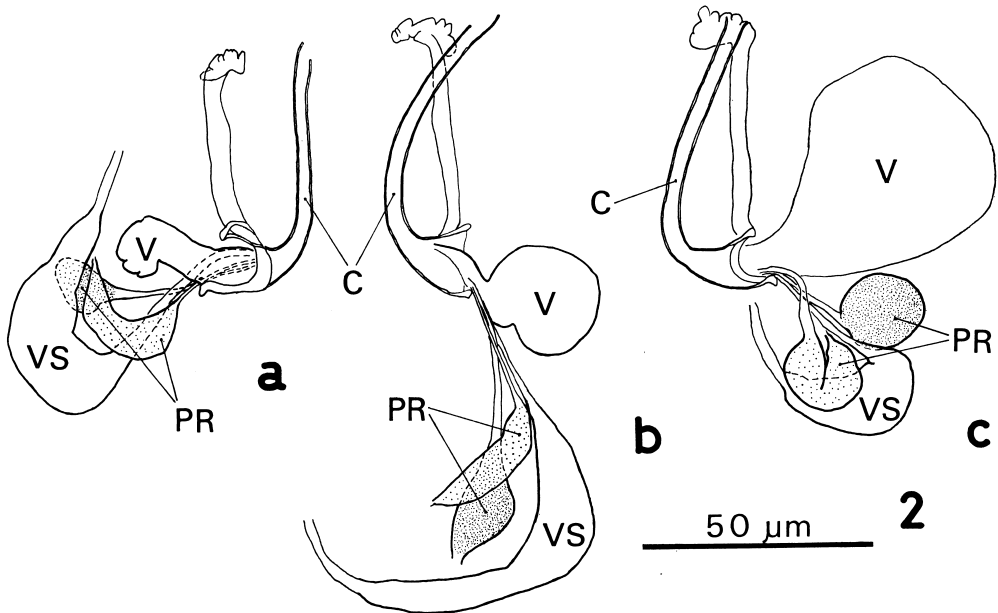


Fig. 2 Male terminalia of *Dactylogyrus extensus* showing different states of the vesicle attaching itself to the cirrus base. a : contracting (dorsal view), b : a little expanding (ventral view), c : expanding almost at its maximum (ventral view). (C : cirrus, PR : prostatic reservoir, V : vesicle of unknown function, VS : vesicula seminalis)

into the ootype, which is connected with the short uterus. The testis is longitudinally elongated and almost co-existent with the

ovary at its dorsal side. The vas deferens starts at the anterior part of the testis, turns its course backward a little behind the in-

testinal bifurcation, and forms the vesicula seminalis (10–20 in diameter) by its mere dilatation, leading into the cirrus base. The cirrus (Fig. 2), 62–68 (65) long in a straight line, is an arched, chitinous tube with a widened, funnel-shaped base. The cirrus accessory piece, 43–50 (47) long, which originates at the cirrus base, is a straight, chitinous rod with a crest-shaped tip. There are two prostatic reservoirs. One, 7–11 in diameter, is usually elongated and curved, and sometimes is constricted in the middle like a guitar, leading into the cirrus base. The other, 10–18 in diameter, is usually rounded, connected with the cirrus base via a long, narrow duct. There is another structure attaching itself to the cirrus base, independently to the prostatic reservoirs and the seminal duct. It is a muscular vesicle, which varies greatly in size (9–44 in diameter); it sometimes expands (Fig. 2c) and contracts (Fig. 2a) by the muscular wall. No gland secretions are involved in the vesicle. Its content is transparent and non-granular. Since the sperms and the prostatic secretions are not observed in the vesicle, they are thought to be directly discharged outside the body through the cirrus tube from the vesicula seminalis and the prostatic reservoirs, respectively.

Discussion

The present specimens of *Dactylogyrus extensus* show no significant differences in the measurements from those of Imada *et al.* (1976) and foreign authors (Mueller and Van Cleave, 1932; Ergens, 1956; Paperna, 1959; Molnár and Németh, 1962). Morphologically, *D. extensus* is fundamentally identical with *D. minutus* (Ogawa and Egusa, 1977). However, a noticeable difference lies in the structure of the male terminalia between *D. extensus* and *D. minutus*. In the former species, a vesicle attaches itself to the cirrus base, which is absent in the latter. The male terminalia of this species has been erroneously described. No structure except the two prostatic reservoirs and the vesicula seminalis leads into the cirrus base according to Imada

et al. (1976) and Guerassev (1977). On the other hand, Paperna (1959) described three prostatic reservoirs, one of which is apparently identical with the vesicle described here.

Yamaguti (1940) described a bulla-like base of the cirrus in *Dactylogyrus apogonis* collected from *Apogon semilineatus*. Since the bulla-like base has a similar appearance to the vesicle in *D. extensus*, an examination was made of the type series of *D. apogonis* in the Yamaguti Collection deposited in the Meguro Parasitological Museum for a comparative study of the structures of the male terminalia between the two species. It has been elucidated that the bulla-like base in *D. apogonis* is filled with a granular substance, doesn't vary greatly in size (17–24, mean 19 μm in diameter; seven specimens measured), and is made up of a much thicker muscle wall. These results may strongly suggest that the bulla-like base of the cirrus in *D. apogonis* is quite different from the vesicle in *D. extensus* in function as well as in structure.

The vesicle is first described here, which is thought to be present only in *D. extensus*, although it is still unknown how it is related to the prostatic reservoirs and the vesicula seminalis functionally. Further investigation is needed to elucidate the exact function and the systematical significance of this structure.

Summary

A redescription is given of a monogenean *Dactylogyrus extensus* (Dactylogyridae) obtained from the gill filament of the carp *Cyprinus carpio* cultured at farms in Nagano and Shizuoka Prefectures, Japan.

The measurements of various body parts of this species are almost the same as those previously reported. Morphologically, *D. extensus* is most characterized by the structure of the male terminalia, which has been erroneously described. It should be noted that a vesicle attaches itself to the cirrus base. The content of the vesicle is transparent and non-granular, suggesting that neither the sperms nor the prostatic secretions enter the

vesicle before discharged outside. This structure is first described in this paper, which is thought to be present only in *D. extensus*. The exact function and its systematical significance remains to be clarified.

Acknowledgements

The present authors wish to express their cordial thanks to Dr. Sh. Kamegai, Meguro Parasitological Museum, Tokyo, for permitting them to examine the type series of *Dactylogyrus apogonis* Yamaguti, 1940 and offering them helpful suggestions. Thanks are also due to Mr. M. Tominaga, the head of Nagano Prefectural Fisheries Experimental Station, and Mr. M. Sorimachi, Laboratory of Fisheries, Faculty of Agriculture, the University of Tokyo, Maisaka, Shizuoka Prefecture, for supplying them the fish.

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単生類 *Dactylogyrus extensus* の再記載、特に雄性生殖器末端構造について

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コイ (*Cyprinus carpio*) の有害鰓寄生虫として知られる単生類 *Dactylogyrus extensus* は日本では、今田ら(1976)によつて広島県から初めて報告されたが、その後の調査で、新潟・長野・群馬・茨城・千葉・静岡の各県と東京都の養殖コイから得られ、日本に広く分布する寄生虫と考えられた。得られた虫体をもとに、再記載を行なつた。

Dactylogyrus の最も重要な分類形質である後固着器と交接器のキチン質構造の形態と測定値は従来の報告とほぼ一致した。形態学的には、雄性生殖器末端構造に最

も特徴がある。即ち、陰茎基部に、貯精囊と2つの前立腺囊からの管の他に、更に1つの囊が付属している。囊には拡張した像と収縮した像が観察され、収縮によつて内容物を陰茎を通して体外に放出すると思われるが、内容物が透明・無顆粒であることから、精子と前立腺分泌物は、この囊を通らずに、独立に放出されると考えられる。こうした囊は *D. extensus* 以外には全く知られていないが、その機能や分類学上の意味については不明である。