

**A New Species of the Genus *Discogastroides*  
(Digenea: Fellodistomidae)  
from the Boxfish *Ostracion immaculatus* in Japan**

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**Abstract**

A new species, *Discogastroides macrostomus* sp. n. (Digenea: Fellodistomidae), is described and figured from the intestine of the boxfish *Ostracion immaculatus* (Teleostei: Ostraciidae) off the Pacific coast of central Japan. It differs from the three previously known species of the genus in a larger oral sucker, a smaller ventral sucker and a smaller sucker width ratio. *D. minor* (Yamaguti, 1934) Strand, 1934, is considered synonymous with *D. ostracionis* (Yamaguti, 1934) Strand, 1934.

**Key words:** *Discogastroides macrostomus* sp. n., digeneans, synonyms, boxfish, Japan

Digeneans of the fellodistomid genus *Discogastroides* Strand, 1934, are intestinal parasites of marine fishes as adults. Three species have been placed in the genus as discussed below. This paper reports a new species from a Japanese boxfish.

**Materials and Methods**

A total of 79 gravid specimens of the trematode were obtained from the intestine of the boxfish *Ostracion immaculatus* (Teleostei: Ostraciidae) taken off Jogashima and Kuruwa (Sagami Bay) and Misaki (Moroiso Bay, which opens into Sagami Bay), all in Kanagawa Prefecture, from October 1984 to July 1987. Most of them were flattened, fixed in AFA, stained with Heidenhain's iron hematoxylin, Delafield's hematoxylin or alum carmine, and mounted in Canada balsam. Some were fixed in AFA, made into serial paraffin sections (10 or 15  $\mu$ m) and stained with Delafield's hematoxylin and eosin. The specimens are deposited at the Meguro Parasitological Museum (MPM), Tokyo, and the

National Science Museum, Tokyo (NSMT). Related museum specimens from them were also studied. Measurements (length by width) of ten better-prepared whole-mounts are given in millimeters unless otherwise stated.

Digenea: Fellodistomidae  
*Discogastroides macrostomus* sp. n.  
(Figs. 1-6)

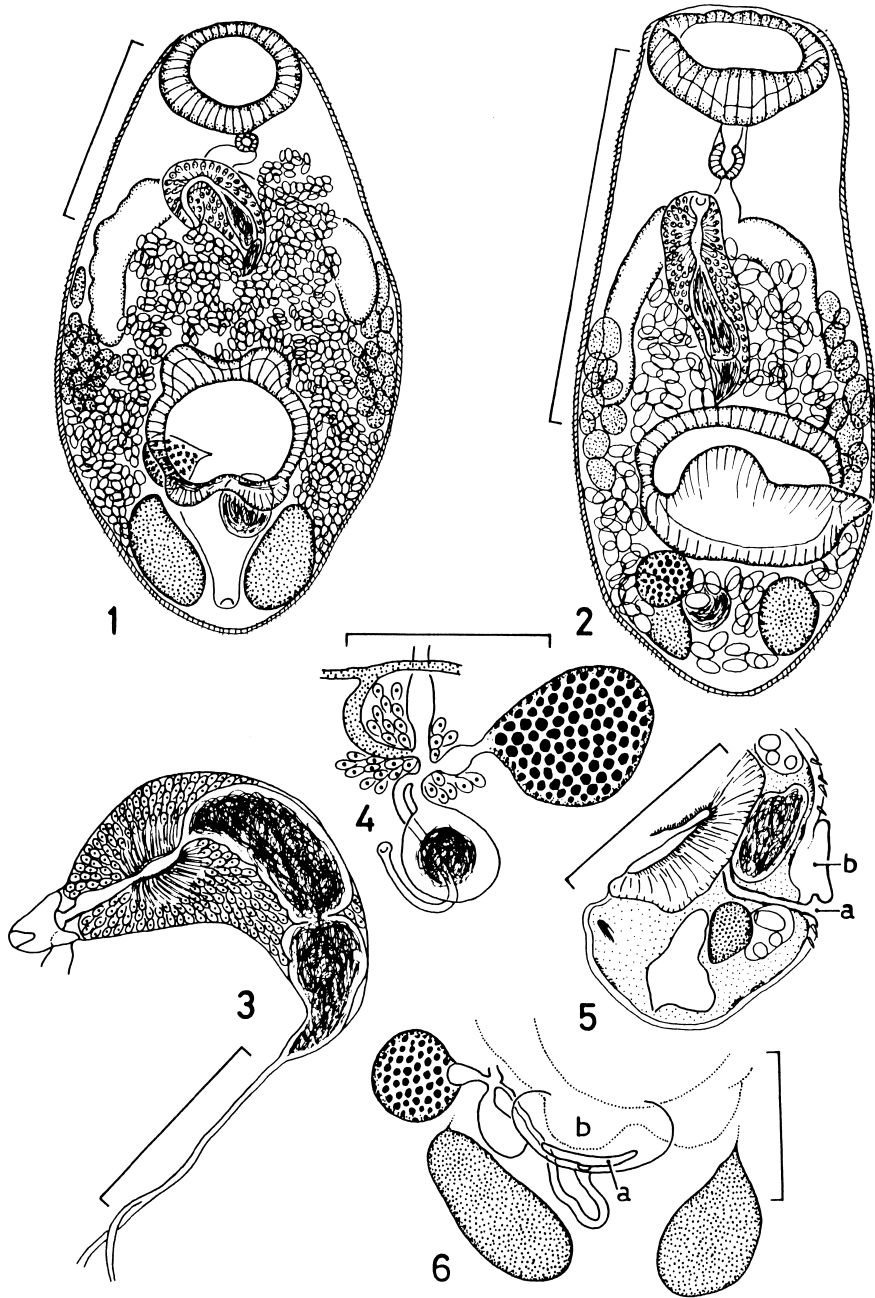
*Discogasteroides* sp. of Kamegai, 1988, p. 20.

*Description.* Body pyriform, broadest at level of ventral sucker, heavily spinose, 0.79-1.78 by 0.35-0.95; forebody 0.55-1.10 long, 60-70% of total body length. Oral sucker transversely spherical to triangular in shape, subterminal, large, 0.12-0.32 by 0.17-0.37, bearing one median and two lateral thickenings in posterior wall; orifice large. Prepharynx present. Pharynx small, 0.04-0.08 by 0.04-0.06, with four small anterior protuberances. Esophagus short, bifurcating at about anterior one-third of body, 0.08-0.19 long; intestinal ceca short, ending at about midlevel of body. Ventral sucker just postequatorial, rather small, 0.20-0.43 by 0.21-0.49, with one pair of anterolateral pouches and one pair of posterolateral flaplike thickenings of wall; sucker width ratio 1: 1.00-1.38. One pair of long, parallel muscle

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Figs. 1-6. *Discogastroides macrostomus* sp. n.

Fig. 1. Holotype, entire worm, ventral view.

Fig. 2. Paratype, slightly flattened entire worm, ventral view.

Fig. 3. Paratype, terminal genitalia, ventral view.

Fig. 4. Paratype, ovarian complex, dorsal view.

Fig. 5. Paratype, sagittal section of hindbody, showing transverse dorsal slit (a) and tegumental thickening (b).

Fig. 6. Paratype, genital organs, dorsal view, a and b as in Fig. 5.

(Scale bars: 0.5 mm in Figs. 1 and 2; 0.2 mm in Figs. 3-6).

bundles lying transversely in parenchyma behind ventral sucker.

Testes elliptical, almost opposite, separated, near posterior extremity of body, 0.12–0.32 by 0.08–0.15. Cirrus pouch club-shaped, thin-walled, 0.20–0.63 by 0.10–0.16, overlapping ventral sucker posteriorly, often dislodged more anteriorly by ventral sucker and uterus; internal seminal vesicle bipartite, distal part about twice as long as proximal; pars prostatica elongated; prostatic cells well developed; ejaculatory duct short; cirrus or genital papilla small, permanent on bottom of a short, tubular genital atrium or hermaphroditic duct. Genital pore slightly to right of median line, usually just postbifurcal, rarely bifurcal or prebifurcal. Vas deferens long, thin. Ovary globular, pretesticular, usually dextro-submedian, rarely median or sinistrosubmedian, at level of, or posterior to, ventral sucker, 0.08–0.14 by 0.08–0.16. Seminal receptacle oval, postovarian, submedian, overlapping or posterior to ventral sucker, 0.08–0.16 by 0.05–0.16. Laurer's canal long, running backward to open to outside, or first running backward and then making a U-turn before opening to outside, sometimes opening on posterior lip of transverse slit (Figs. 5 and 6, a) of dorsal body surface, rarely containing vitelline cells; anterior lip of this slit sometimes forming an elliptical tegumental thickening (Figs. 5 and 6, b) with no spines on it. Ootype-complex in front of seminal receptacle. Uterus folding between intestinal ceca and vitellaria, dorsal and lateral to ventral sucker, and lateral to testes, sometimes extending forward beyond left intestine and into intertesticular space; metraterm weakly formed, emptying into base of genital atrium. Uterine eggs operculate, embryonated, 32–40 by 18–20  $\mu\text{m}$  in balsam. Vitelline follicles lateral, distributed between midlevel of intestine and midlevel of ventral sucker. Excretory vesicle Y-shaped, reaching ventral sucker anteriorly; excretory pore usually posterodorsal.

*Type and only host.* Boxfish *Ostracion immaculatus* (Teleostei: Ostraciidae).

*Site of infection.* Intestine.

*Localities.* Kuruwa (type locality), Jogashima and Misaki, Kanagawa Prefecture, Japan.

*Type specimens.* Holotype, MPM Coll. No. 20496 from Kuruwa; 78 paratypes, MPM Coll. Nos. 20456, 20464, 20485, 20493, 20496, 20503 and 20507 from Kuruwa, 20489 and 20500 from Jogashima, and NSMT-P1 3145–3147 from Misaki.

*Discussion.* The genus *Discogastroides* has *Discogaster* Yamaguti, 1934 (preoccupied), and *Discogasteroides* Srivastava, 1939, as synonyms (Srivastava, 1939; Strand, 1934; Yamaguti, 1934). Previously known species of the genus are: *D. ostracionis* (Yamaguti, 1934) Strand, 1934 (= *Discogaster ostracionis*, type species), and *D. minor* (Yamaguti, 1934) Strand, 1934 (= *Discogaster minor*), both from *Ostracion diaphanum* [= *Lactoria diaphana*] of Kuki, Mie Prefecture (Yamaguti, 1934); *Discogasteroides* [= *Discogastroides*] *hawaiensis* [sic] Hanson, 1955, from *O. sebae* of Hawaii (Hanson, 1955); and *Discogasteroides* [= *Discogastroides*] *australiensis* Kurochkin, 1970, from *Sphaeroides armilla* of Australia (Kurochkin, 1970).

*Discogasteroides ostracionis* and *D. minor* are very similar in morphology and host species. Yamaguti (1934) separated them from each other mainly by egg size and position of cecal termination (0.048–0.057 by 0.024–0.027 and not reaching midlevel of body in *D. ostracionis* vs. 0.033–0.036 by 0.018–0.021 and reaching to midlevel in *D. minor*). These features have been confirmed by our reexamination of one (holotype) gravid specimen of *D. ostracionis* and two (holotype and paratype) gravid specimens of *D. minor* on one slide (MPM Coll. No. 22214), which is the only slide of the two species left in Dr. Yamaguti's collection at the MPM. (He actually collected many others as well.) Machida (1971) obtained 18 specimens from an individual of the boxfish (= *O. tuberculatus*) off the Tsushima Islands and tentatively identified them as *D. ostracionis*. According to him, (1) the specimens are divided into two types by egg size (*ostracionis* type, 0.0448–0.0494 by 0.0212–0.0242; and *minor* type, 0.0288–0.0374 by 0.0165–0.02); (2) *D. ostracionis* may be an immature [or just matured] form of *D. minor*; and (3) the position of cecal termination is so variable that it cannot be used as a criterion for

distinguishing them. Kamegai (1985) and Shimazu and Nagasawa (1985) recorded *D. minor* from the boxfish at Jogashima and Kuruwa and Misaki, respectively. (Shimazu and Nagasawa gave the host scientific name as *Lactoria cubicus* in error.) Shimazu obtained many specimens (NSMT-P1 3148–3150, 3603 and 3604) from the boxfish at Misaki in July 1987 and 1988 (unpublished data). The eggs measured less than 40 by 20  $\mu\text{m}$  in balsam in these specimens. We agree with Machida in position of cecal termination. Dr. Ozaki's collection at the MPM includes 17 gravid whole-mounted and 6 gravid serially-sectioned specimens (MPM Coll. No. 30021) found in the boxfish at Goza, Mie Prefecture (date not given). He neither identified nor reported them. Our examination of them has shown that (1) they resemble both *D. ostracionis* and *D. minor*; (2) the egg size varies slightly from specimen to specimen regardless of maturity of worms; and (3) in five fully-matured representatives, it is 34–38 by 16–18, 34–40 by 18–20, 38–42 by 16–22, 46–50 by 22–26 and 50–54 by 22–26  $\mu\text{m}$  in balsam. The difference in egg size between the two species pointed out by Yamaguti is probably nothing but a difference between the extremes in egg size in a single species with a wide variation in egg size. We conclude that *D. minor* is a junior synonym of *D. ostracionis*.

*Discogasteroides macrostomus* sp. n. differs from *D. ostracionis*, *D. hawaiiensis* and *D. australiensis* in a larger oral sucker, a smaller ventral sucker and accordingly a smaller sucker width ratio (1: < 1.5 vs. 1: > 2.0 from the original descriptions for them and the present examination of the specimens of *D. ostracionis*).

A protrusible pouch opening to the dorsal outside in front of the aperture of Laurer's canal is present in *D. ostracionis* (Kamegai, 1985; Shimazu and Nagasawa, 1985; the present examination of the above-mentioned specimens). Yamaguti (1934) mistook this pouch for the opening of Laurer's canal. The present new species lacks such a pouch but sometimes possesses a transverse dorsal slit instead. The rela-

tion between the slit and the pouch is uncertain. The presence or absence of these structures is unknown for *D. hawaiiensis* and *D. australiensis*. The opening of Laurer's canal is inconspicuous and simple in them (Hanson, 1955; Kurochkin, 1970).

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