Bull. Natn. Sci. Mus., Tokyo, Ser. A, **25**(1), pp. 27–31, March 23, 1999

A New Species of the Genus *Allocreadium* (Digenea, Allocreadiidae) from Freshwater Fishes of Japan

Takeshi Shimazu[1] and Ken-ichi Hashimoto[2]

[1]Nagano Prefectural College, 8–49–7 Miwa, Nagano, 380–8525 Japan
[2]Graduate School of Fisheries, Kitasato University, Sanriku, Iwate, 022–0101 Japan
(Present address: Nishinihon Institute of Technology, 9–30 Wakamatsu, Kochi, 780–0812 Japan)

Abstract *Allocreadium tribolodontis* sp. n. (Digenea, Allocreadiidae) is described on the basis of the specimens that were reported by Shimazu (1981, 1988) as *A. isoporum* (Looss, 1894) from the intestine of rosyface dace, *Tribolodon ezoe* Okada et Ikeda (Teleostei, Cyprinidae, Leuciscinae), from the River Kushiro at Toro, Shibecha, Hokkaido, and additional specimens found in the intestine of Japanese dace, *T. hakonensis* (Günther), from the River Hei at Kanioka, Kawai, Iwate Prefecture, both in Japan. The new species is most closely similar to *A. isoporum* but different from the latter in having a larger sucker width ratio, a larger ovary and smaller eggs.

Key words: *Allocreadium tribolodontis* sp. n., Digenea, freshwater fishes, Japan.

Shimazu (1981) found digeneans in the intestine of rosyface dace, *Tribolodon ezoe* Okada et Ikeda, from Hokkaido, Japan, and reported them under the name *Allocreadium isoporum* (Looss, 1894) (Allocreadiidae). Shimazu (1988) redescribed them under the same species name. Recently, one (K. H.) of us obtained digeneans from Japanese dace, *T. hakonensis* (Günther), in Iwate Prefecture, Japan. The specimens from these two hosts have proved to belong to the same species and to represent a new species of the genus *Allocreadium* Looss, 1900.

Materials and Methods

Seventeen gravid and 5 immature whole-mounted specimens of *A. isoporum* of Shimazu (1981) deposited in the collection of the National Science Museum, Tokyo (NSMT-Pl 1838–1844). These were obtained from the intestine of one of four specimens of rosyface dace, *Tribolodon ezoe* (Teleostei, Cyprinidae, Leuciscinae), collected in the River Kushiro at Toro, Shibecha, Hokkaido, on 10 May 1977 (see also Shimazu, 1981, 1988).

Twenty-seven gravid and 3 immature whole-mounted specimens. A total of 48 digeneans of an *Allocreadium* species were found in the intestine of 2 (16 April and 5 June 1997, 47 and 1 parasites per fish, respectively) of 148 specimens of Japanese dace, *T. hakonensis*, collected in the upper reaches of the River Hei at Kanioka, Kawai,

Iwate Prefecture, Japan, during April to September in 1997 (Hashimoto, 1998, unpubl. Master's thesis submitted to the Graduate School of Fisheries, Kitasato University, Sanriku, Iwate Prefecture). These were flattened, fixed in 70% ethanol, stained either with alum carmine or Heidenhain's iron haematoxylin and mounted in Canada balsam. Out of the 48 whole-mounts, 27 gravid and 3 immature ones were used for this study. The rest were too poorly prepared to be used.

Three gravid and eight immature whole-mounted specimens of *A. isoporum* of Moravec (1992) borrowed from the collection of the Institute of Parasitology, Academy of Sciences of the Czech Republic, Branišovská, České Budějovice, Czech Republic (IPCAS D-40) were used for comparison. These were found in the intestine of chub, *Leuciscus cephalus* (Linnaeus), from the River Rokytná in Czechoslovakia on 21 January and 18 February 1986 (Moravec, 1992).

Drawings were made with the aid of a drawing tube. Measurements are given in millimetres unless otherwise stated. The new specimens have been deposited in the collections of the NSMT and IPCAS.

Results

Allocreadium tribolodontis sp. n.

(Figs. 1–4)

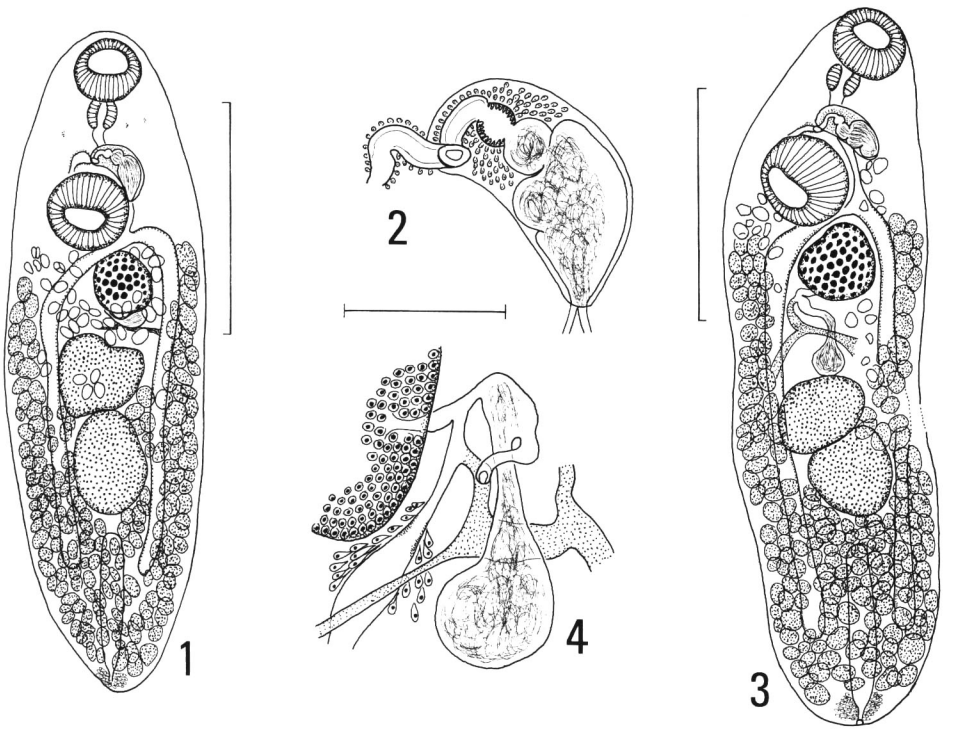
Allocreadium isoporum: Shimazu, 1981, pp. 16–17, figs. 5–7; 1988, pp. 10–12, figs. 6–8.

Description.

For the descriptions and figures of the specimens from rosyface dace, see Shimazu (1981, 1988). The seminal vesicle was bipartite, with the posterior part being usually larger than the anterior, instead of "usually tripartite with a stronger anterior constriction, or rarely tubular and sigmoid" (Shimazu, 1988).

Figures 1 and 2 illustrate the holotype. Measurements of the holotype were as follows: body 3.00 long by 0.90 wide; forebody 0.84 long, occupying 28% of total body length; oral sucker 0.29 in diameter; pharynx 0.14 long by 0.12 wide; oesophagus 0.45 long; ventral sucker 0.35 in diameter, with sucker width ratio being 1 : 1.22; anterior testis 0.28 long by 0.37 wide, posterior 0.47 long by 0.31 wide; cirrus pouch 0.26 long by 0.12 wide; ovary 0.28 long by 0.26 wide; seminal receptacle 0.24 long by 0.06 wide; and eggs 64–72 by 50–54 μm.

Specimens from Japanese dace (measurements based on ten gravid specimens). Body elongate, 2.20–3.10 long by 0.62–0.82; forebody 0.54–0.80 long, occupying 22–27% of total body length (Fig. 3). Tegument smooth. Eyespot pigment scattered in forebody in some specimens. Oral sucker subterminal, 0.19–0.27 long by 0.23–0.32 wide. Prepharynx absent. Pharynx elliptical, 0.09–0.14 long by 0.11–0.15 wide. Oesophagus 0.27–0.47 long, bifurcating at about level of posterior border of ventral



Figs. 1–4. *Allocreadium tribolodontis* sp. n. 1. Holotype from rosyface dace, *Tribolodon ezoe*, of the River Kushiro, entire worm, ventral view. Scale bar=1 mm. 2. Holotype, terminal genitalia, ventral view. Scale bar=0.2 mm. 3. Paratype from Japanese dace, *T. hakonensis*, of the River Hei, entire worm, ventral view. Scale bar=1 mm. 4. Paratype from Japanese dace of the River Hei, ovarian complex, dorsal view. Scale bar=0.2 mm.

sucker. Intestinal caeca terminating some distance from posterior end of body. Ventral sucker located slightly anterior to junction of anterior and middle thirds of body, 0.29–0.41 long by 0.29–0.41 wide; sucker width ratio 1 : 1.05–1.30. Testes tandem, contiguous, at about junction of middle and posterior thirds of body; anterior testis 0.23–0.29 long by 0.19–0.39 wide; posterior 0.25–0.48 long by 0.26–0.35. Cirrus pouch clavate, 0.19–0.39 long by 0.08–0.19 wide; seminal vesicle bipartite, posterior part usually larger than anterior; pars prostatica globular, accompanied with numerous prostatic cells around it; ejaculatory duct thick, lined with numerous gland cells around it. Genital atrium small. Genital pore almost median, in front of ventral sucker. Ovary globular or very slightly trilobate, located posterior to intestinal bifurcation, 0.34–0.35 long by 0.23–0.33 wide. Seminal receptacle retort-shaped, slightly dilated anteriorly, 0.35–0.43 long by 0.08–0.15 wide. Laurer's canal short, running backwards. Ootype posterolateral to ovary (Fig. 4). Uterus coiled pretesticularly or extending into testicular region. Uterine eggs not numerous, 68–80 by 48–62 μm, each

with a small operculum. Vitelline follicles large, distributed from level of intestinal bifurcation to posterior end of body, present ventral and dorsal to caeca, confluent in post-testicular region of body. Excretory vesicle I-shaped, ending anteriorly short distance from posterior testis; excretory pore terminal, surrounded by mass of gland cells.

Hosts. Rosyface dace, *Tribolodon ezoe* Okada et Ikeda (type hosts); and Japanese dace, *T. hakonensis* (Günther) (Teleostei, Cyprinidae, Leuciscinae).

Site of infection. Intestine.

Localities. River Kushiro at Toro (type locality), Shibecha, Hokkaido; and the River Hei at Kanioka, Kawai, Iwate Prefecture, both in Japan.

Specimens. Holotype (NSMT-Pl 1842); 44 paratypes (NSMT-Pl 1838–1844, 4576) and 7 paratypes (IPCAS D-418).

Discussion

The specimens from the two hosts are regarded as conspecific because they agree well in morphology and measurements. Shimazu (1981, 1988) identified the specimens from rosyface dace as *A. isoporum* on the basis of the descriptions for this species by Looss (1894), Ślusarski (1958) and Moravec (1984): (1) the body is elongate, (2) the ventral sucker is located at about the level of the intestinal bifurcation, and (3) the vitelline follicles are distributed anteriorly to the level of the intestinal bifurcation. However, the ventral sucker was larger than the oral in the specimens from rosyface dace: the sucker width ratio was 1 : 1.08–1.51 (Shimazu, 1988; present re-examination). This was observed also in the specimens from Japanese dace (1 : 1.05–1.30) (this paper). On the other hand, the two suckers are approximately equal in size in *A. isoporum* from Europe (Moravec, 1984). The sucker width ratio was 1 : 0.87–1.08 in Moravec's (1992) specimens of *A. isoporum* (present re-examination). Further, the ovary was almost as large as or slightly smaller than the ventral sucker in the Japanese specimens (Shimazu, 1981, 1988; this paper); but, in *A. isoporum* from Europe, it is definitely smaller (Looss, 1894; Ślusarski, 1958; Moravec, 1984; present re-examination). Furthermore, the Japanese specimens had smaller eggs: 60–80 by 50–60 μm in the specimens from rosyface dace (Shimazu, 1988; present re-examination) and 68–80 by 48–62 μm in those from Japanese dace (this paper) instead of 90 by 60 μm (Looss, 1894), 93–98 by 54–60 μm (Ślusarski, 1958), 90–105 by 51–63 μm (Moravec, 1984) and 70–90 by 44–52 μm (present re-examination) in *A. isoporum* from Europe. Consequently, the Japanese specimens can be distinguished from those of *A. isoporum* from Europe by having a larger sucker width ratio, a larger ovary and smaller eggs; and accordingly a new species, *A. tribolodontis* sp. n., is proposed for them.

Acknowledgements

We are grateful to Dr. T. Kuramochi, NSMT, and Dr. F. Moravec, IPCAS, for the loan of the specimens. K. H. is greatly indebted to Prof. H. Ida, Graduate School of Fisheries, Kitasato University, Sanriku, Iwate Prefecture, for his helpful advice rendered during the course of the ecological studies of the host fish.

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