



## 東部北海道産淡水魚類の二生吸虫類

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# Some Digenetic Trematodes of Freshwater Fishes from Eastern Hokkaido, Japan

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The digenetic trematodes described below were found in freshwater fishes collected near Kushiro, eastern Hokkaido, Japan. The fishes examined were fresh raw, frozen or formalin-preserved ones: 15 *Hucho perryi* (Salmonidae), 275 to 600 mm in fork length, from the Kushiro river water system (the Ashibetsu, Hororo, Kottaro; Kushiro, Ninishibetsu, Numahoro and Settsuri rivers) and the Bekaubeushi river water system (the Bekaubeushi and Toraihetsu rivers) during April 1966 to May 1977; 5 *Salvelinus leucomaenis* (Salmonidae), 270 to 540 mm in fork length, from the Ashibetsu and Numahoro rivers and a river belonging to the Kushiro river water system in April and May 1977; 7 *Tribolodon hakonensis* (Cyprinidae), not measured, from the Kushiro River near Toro in May 1977; 4 *T. ezoe*, 155 to 249 mm in fork length, from the Kushiro River near Toro in May 1977; and 2 *Cottus nozawae* (Cottidae), 139 to 146 mm in fork length, from the Ashibetsu River in May 1977.

Most of the flukes obtained were flattened, fixed in SCHAUDINN'S solution or 70% ethanol, stained with HEIDENHAIN'S iron hematoxylin or alum carmine, and mounted in Canada balsam. Some were mounted in balsam after being killed in hot 10% formalin and stained with alum carmine. Serial paraffin sections were also made of some others and stained with hematoxylin and eosin. The parasite specimens dealt with here are all deposited in the collection of the National Science Museum, Tokyo.

## DIGENEA

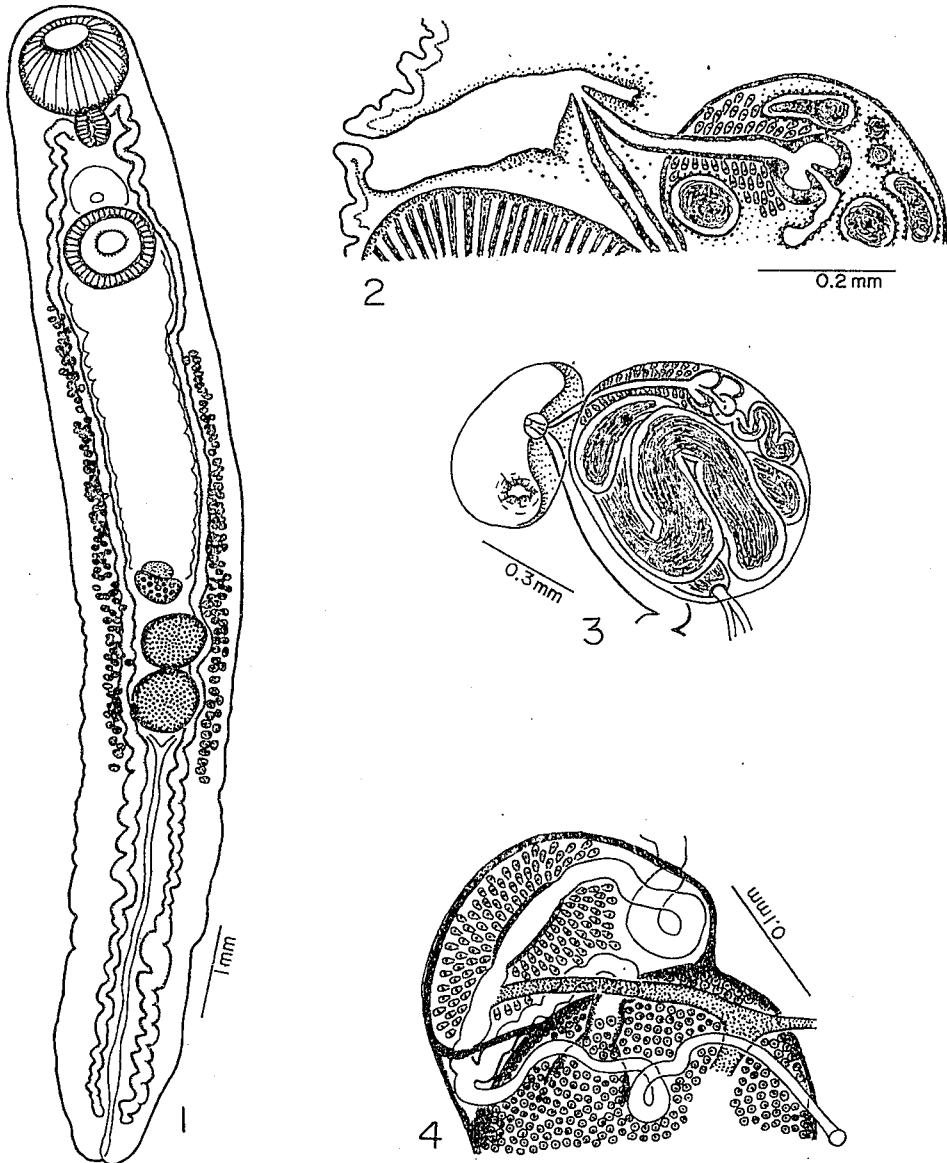
### Azygiidae

#### *Azygia perryi* FUJITA, 1918

(Figs. 1-4)

*Hosts.* *Hucho perryi*, from the stomach, esophagus, buccal cavity and branchial cavity; and *Salvelinus leucomaenis*, from the buccal cavity. This parasite was found in *H. perryi* from the Ashibetsu (May 10, 1977), Hororo (June 17, 1969), Kottaro (February 15, 1976), Kushiro (April 24, 1966), Numahoro (April 24, 1977), Settsuri (April 10, 1976), Bekaubeushi (December 1, 1968) and Toraihetsu (May 30, 1976) rivers. The number of worms in each fish was not always counted. A single *H. perryi* from the Bekaubeushi River harbored 40 flukes in the stomach and 6 in the buccal cavity. One *S. leucomaenis* from the Ashibetsu River (May 10, 1977) contained two worms only in the buccal cavity. Trematode specimens which were recovered from frozen fish and fixed in ethanol were liable to melt

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Figs. 1-4. *Azygia perryii*. 1: entire body, ventral view. 2: sagittal section through terminal genitalia. 3: terminal genitalia, ventral view. 4: ootype complex, dorsal view.

into shapeless masses while being stained with carmine, and so such useless ones were thrown away before observation.

*Specimens.* NSMT—Pl 2177-2185 from *H. perryi*; and 2186 from *S. leucomaenis*.

*Description.* Measurements based on 10 unflattened oviferous specimens in balsam from *H. perryi*. Body large, elongate-cylindrical, bluntly rounded at both ends, nonspinose, very extensible and contractile and reddish in life, 6.02-14.28 mm long by 1.63-2.10 mm wide. Oral sucker subterminal, 0.73-1.22 mm long by 0.90-1.43 mm wide. Ventral sucker smaller than oral sucker, situated about one-fifth of body length from anterior extremity, 0.69-1.02 mm long by 0.79-1.22 mm wide; sucker width ratio 1: 0.81-0.89. Prepharynx practically lacking. Pharynx ellipsoidal, 0.38-0.49 mm long by 0.26-0.37 mm wide, with ratio of length to width being 1: 1.04-1.35; ratio of oral sucker length to pharynx length 1:2.00-2.50. Esophagus very short, inverted T-shaped. Intestinal ceca sinuous, terminating a little apart from posterior end of body. Ovary usually reniform, near middle of body, 0.20-0.47 mm long by 0.41-0.61 mm wide. A thin muscular capsule just preovarian, enclosing distal portion of oviduct, distal portion of common vitelline duct, ootype complex and proximalmost coils of uterus, connected to ovary. LAURER'S canal long, opening through a single pore. Seminal receptacle absent. Uterus folding transversely in intercecal field from capsule to ventral sucker; metraterm well developed. Eggs operculate, fully embryonated when laid, 50-57 by 28-32  $\mu\text{m}$  in formalin. Testes spheroidal, almost tandem, slightly postovarian, 0.31-0.92 mm long by 0.49-0.82 mm wide. Cirrus pouch globular, thin-walled, in front of ventral sucker or a little overlapping it, containing long voluminous convoluted tubular seminal vesicle and prostatic complex; pars prostatica thick-walled, dilated at its proximal end to divide into 4 to 6 compartments. Ejaculatory duct and metraterm running side by side through a low conical genital cone to open on its top; hermaphroditic duct almost lacking. Genital atrium very spacious. Genital pore median, anterior to ventral sucker. Vitelline follicles extracecal in hindbody, extending between level of posterior edge of ventral sucker or slightly behind it and anterior third to half of distance from hind testis to posterior end of body in unflattened specimens. Excretory vesicle Y-shaped, divided just posterior to hind testis.

*Notes.* Some of sexually mature worms, when flattened and mounted in balsam, measured up to 40 mm long by 3.3 mm wide; their eggs, 42 to 51 by 25 to 28  $\mu\text{m}$ . The vitelline glands always began some distance posterior to the ventral sucker. The parasite proved to tend, as does *A. sebago* WARD, 1910<sup>1)</sup>, to leave the host's stomach, its primary habitat, soon after the death of the host, to migrate actively up the esophagus into the buccal or branchial cavity, and at times even to the exterior to crawl on the skin. This may be the reason why FUJITA'S material came from unusual sites, such as the buccal and branchial cavities and pectoral fin(s), of *H. perryi*<sup>2)</sup>.

*Discussion.* *A. perryi* was described by FUJITA<sup>2)</sup> in 1918 as a new species from formalin-preserved flukes obtained from *H. perryi* taken in Lake Kussharo, from which the Kushiro River originates. No trematodes have since been recorded under the name of *A. perryi* in Japan. FUJITA'S specific description with scanty measurements given is not completely adequate. I was unable to locate any of FUJITA'S original specimens in Japan. Available

to me were two cotypes of the species in a vial (USNM Helm. Coll. No. 50017) loaned from the National Parasite Collection, U. S. D. A., Beltsville, Maryland, U. S. A. However, they were tinged too dark gray to permit detailed studies of their morphology, which therefore must rest on the previous brief observations of them by MANTER<sup>3)</sup>. Comparison of the present specimens from *H. perryi* and *S. leucomaenis* and FUJITA's and MANTER's descriptions, as combined with considerations of the host fish species and localities, leads to the conclusion that they should be *A. perryii*. They also agree substantially with the form of the same species, as seen in БУКHOVСКАЯ<sup>4)</sup>, from *H. perryi* in Sakhalin Island, U. S. S. R. The present observations suggest that FUJITA's specific diagnosis should be partly emended as follows: (1) the ootype is present; (2) a thin muscular capsule encloses the distal portion of the oviduct, distal portion of the common vitelline duct, ootype complex and proximalmost coils of the uterus; and (3) the cluster of Mehlis' glands within the capsule is just anterior to the ovary. MANTER<sup>3)</sup> observed an elongate pharynx (0.24 mm long by 0.11 mm wide) in the smaller one (5.6 mm long) of the above-mentioned cotypes. I failed to ascertain this. The present specimens all had an ellipsoidal pharynx.

SEKI<sup>5)</sup> reported trematodes, which he assigned to *A. lucii* (MÜLLER, 1776) LÜHE, 1909, from *S. leucomaenis* caught in Panketo, near Kushiro. I reexamined some of his whole-mounted (No. 373) and sectioned specimens borrowed from the collection of the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University, Sapporo. His parasite with a round pharynx is identical in morphology with the present one, *A. perryii*. SEKI's identification seems to have based largely on the egg size of his material (44 to 56 by 20 to 28  $\mu\text{m}$ , most frequently 44 by 24  $\mu\text{m}$ <sup>5)</sup>), which is smaller than that (58 by 33  $\mu\text{m}$ ) given by FUJITA<sup>2)</sup> for *A. perryii*. However, the present study shows wide variation in egg size of *A. perryii* (50 to 57 by 28 to 32  $\mu\text{m}$  in formalin, and 42 to 51 by 25 to 28  $\mu\text{m}$  in balsam), and the range of variation includes SEKI's measurements in it. Presumably *A. perryii* can be readily separated from *A. lucii* by a combination of an ellipsoidal pharynx (the ratio of length to width being 1: 1.04 to 1.35) and a larger sucker width ratio (1: 0.81 to 0.89); *A. lucii* has an oblong pharynx (the ratio, 1: 1.4 to 2.1) and a smaller sucker width ratio (1: 0.71 to 0.77)<sup>6)</sup>. The ratio of oral sucker length to pharynx length may constitute one of other differences. The ratio was 1: 2.00 to 2.50 in the present *A. perryii*, but it was 1: 1.25 to 1.78 in nine flattened adult whole-mounts of *A. lucii* about 8 to 22 mm long (NSMT—PI 2190) from natural infection of *Esox lucius* in the G. D. R., identified and sent to me by Dr. ODENING.

#### Allocreadiidae

*Allocreadium isoporum* (Looss, 1894) ODHNER, 1901

(Figs. 5-7)

*Host.* *Tribolodon ezoe*, from the small intestine. Out of the four fish examined, from the Kushiro River near Toro on May 10, 1977, one contained 22 worms.

*Specimens.* NSMT—PI 1838-1844.

*Description.* Measurements based on 10 adult whole-mounts. Body elongate-oval, aspinose,

nonocellated, 2.14-3.02 mm long by 0.82-1.02 mm wide, with gland cells scattered in cervical region. Oral sucker subterminal, 0.23-0.32 mm long by 0.26-0.31 mm wide. Ventral sucker at about anterior third of body, 0.31-0.39 mm long by 0.31-0.42 mm wide; sucker width ratio 1: 1.07-1.40. Prepharynx very short. Pharynx barrel-shaped, 0.13-0.14 mm long by 0.11-0.14 mm wide. Esophagus fairly long, 0.42-0.60 mm long, bifurcating posterior or posterodorsal to ventral sucker. Intestinal ceca terminating at midlevel of posttesticular portion of body. Ovary globular to reniform, median, posterior to ventral sucker, 0.17-0.34 mm long by 0.23-0.34 mm wide. LAURER's canal, seminal receptacle measuring 0.06-0.08 mm long by 0.14-0.21 mm wide and ootype complex located between ovary and anterior testis. Uterus with a few folds confined pretesticular, or occasionally entering intertesticular field; metraterm well developed. Eggs 64-73 by 47-52  $\mu$ m in balsam, nonembryonated when laid. Testes tandem, median, in middle third of hindbody, rounded or ellipsoidal, 0.22-0.47 mm long by 0.34-0.47 mm wide. Cirrus pouch elongate-obovoidal, curved or not, small, anterolateral to ventral sucker, containing sinuous or tripartite seminal vesicle, prostatic complex and cirrus; pars prostatica small. Genital atrium inconspicuous. Genital pore median, at about midlevel between two suckers. Vitelline follicles restricted posterior to ventral sucker. Excretory vesicle I-shaped, extending anteriorly to near hind testis.

*Discussion.* This Hokkaido form of *A. isoporum* is slightly different from European ones of the same species as described by LOOSS<sup>7)</sup> and ŠLUSARSKI<sup>8)</sup>, in having the intestinal bifurcation being almost posterior, instead of anterior, to the ventral sucker, and the eggs being smaller than 80  $\mu$ m long. In these respects it seems closer to *A. isoporum* of LAYMAN<sup>9)</sup> from Siberia, U. S. S. R., and *A. isoporum isoporum* of ERGENS<sup>10)</sup> from Czechoslovakia. LAYMAN's parasite was found in *Leuciscus idus* and *L. leuciscus baicalensis* from Lake Baikal. BYKHOVSKAYA<sup>4)</sup> proposed for it a new species, *A. laymani*, which however has been synonymized with *A. isoporum* by SKRJABIN and KOVAL'<sup>11)</sup>.

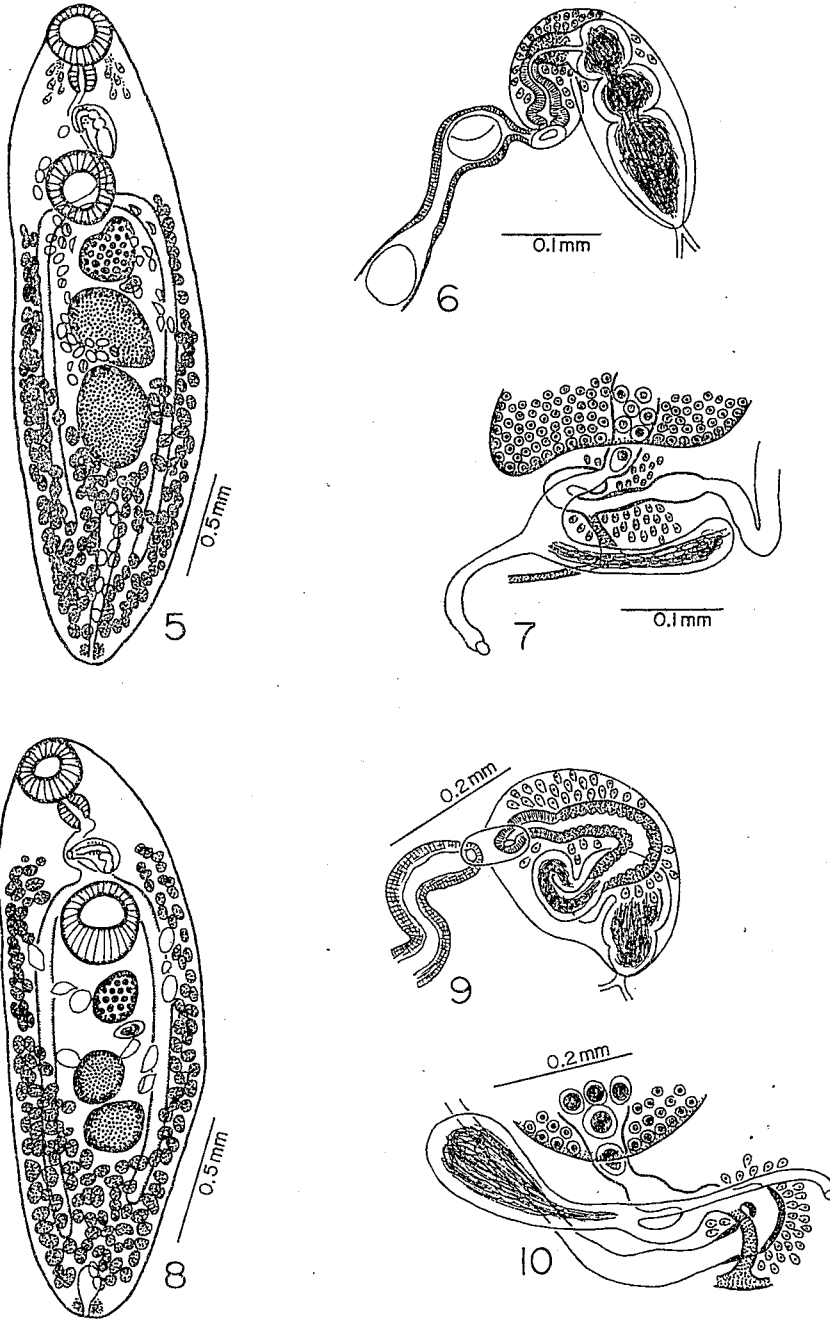
*Allocreadium transversale* (RUDOLPHI, 1802) ODHNER, 1901

(Figs. 8-10)

*Host.* *Tribolodon ezoe*, from the small intestine. The fish was infected with four flukes, together with the foregoing *A. isoporum*.

*Specimens.* NSMT—Pl 1843-1844.

*Description.* Based on 4 adult whole-mounts. Body elongate-oval, unarmed, nonoculate, 1.80-2.14 mm long by 0.73-0.90 mm wide. Oral sucker subterminal, 0.22-0.26 mm long by 0.23-0.26 mm wide. Ventral sucker at about one-third of body length from anterior extremity, 0.28-0.31 mm long by 0.32-0.40 mm wide; sucker width ratio 1: 1.23-1.62. Prepharynx very short. Pharynx oval, 0.11-0.13 mm in diameter. Esophagus winding, bifurcating just anterior or anterodorsal to ventral sucker. Intestinal ceca terminating about midway from hind testis to posterior end of body. Ovary globular, submedian, behind ventral sucker, 0.18-0.21 mm long by 0.19-0.28 mm wide. Ootype complex, LAURER's canal and seminal receptacle measuring 0.10-0.13 mm long by 0.06-0.08 mm wide situated be-



Figs. 5-7. *Allocreadium isoporum*. 5: entire body, ventral view.  
6: terminal genitalia, ventral view. 7: ootype complex, dorsal view.  
Figs. 8-10. *Allocreadium transversale*. 8: entire body, ventral view.  
9: terminal genitalia, ventral view. 10: ootype complex, dorsal view.

tween ovary and anterior testis. Uterus coiling a few times between ventral sucker and hind testis; metraterm well developed. Eggs a few in uterus, 88-105 by 67-73  $\mu\text{m}$  in balsam. Testes somewhat oblique in middle third of hindbody, relatively small, 0.18-0.26 mm long by 0.17-0.28 mm wide. Cirrus pouch plump, anterior or anterolateral to ventral sucker, small, about 0.17 mm long by 0.11 mm wide, enclosing convoluted tubular seminal vesicle, prostatic complex and short cirrus; pars prostatica fairly long. Genital atrium small. Genital pore opening medianly some distance in front of ventral sucker. Vitelline follicles passing into forebody but only slightly beyond bifurcal level. Excretory vesicle saccular, small, extending forward at most halfway from posterior extremity to hind testis.

*Discussion.* This trematode is referred to *A. transversale*. Morphologically it is closely similar to European forms of the same species as described by ERGENS<sup>10)</sup> and SZIDAT<sup>12)</sup>, in all essential features except that it has a short cirrus pouch and small eggs as compared with SZIDAT's material, and a small ventral sucker as compared with ERGENS' one.

SEKI<sup>9)</sup> found two unidentified specimens of a species of the genus *Allocreadium* Looss, 1900, in the intestine of *S. leucomaenis* from Panketo. I reexamined them (No. 379) borrowed from the collection of the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University. They seemed to belong to *A. transversale* or a closely related species.

***Bunodera luciopercae* (MÜLLER, 1776) LÜHE, 1909**

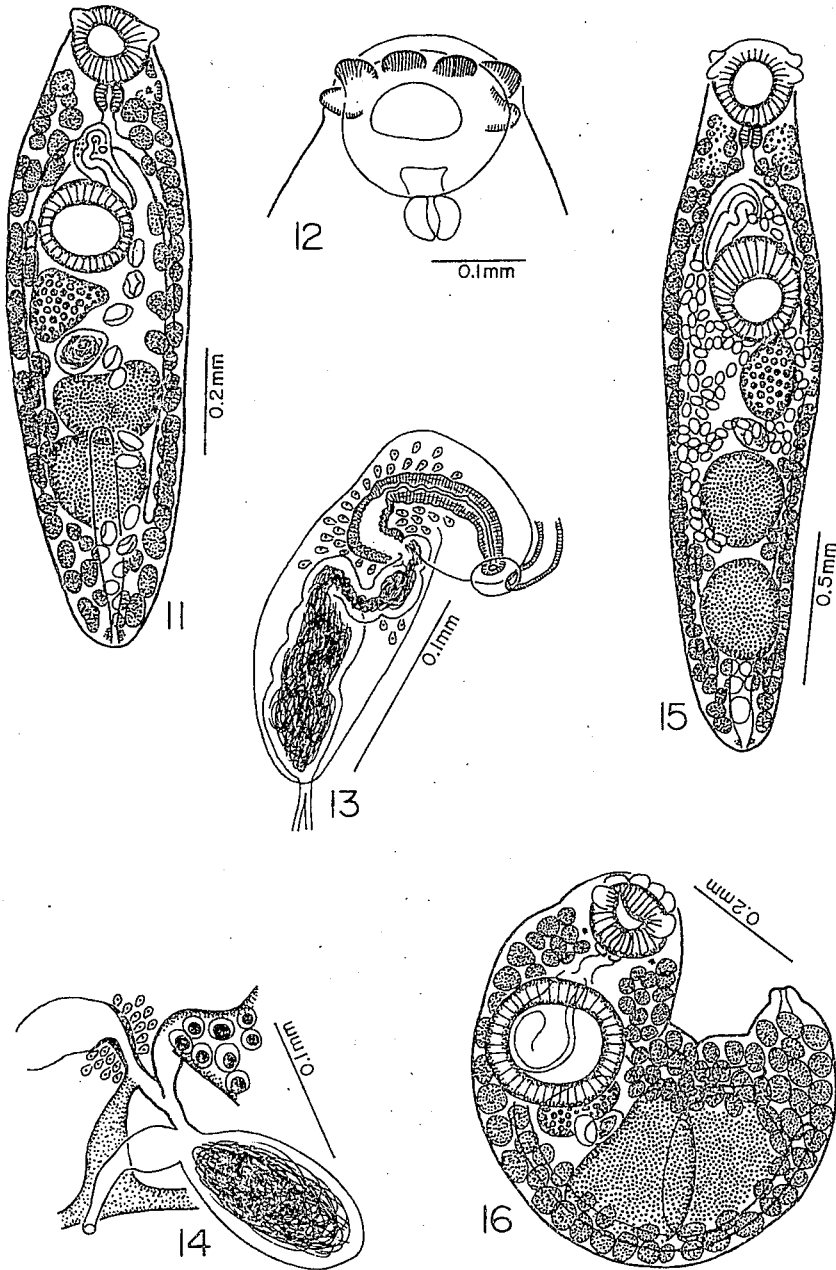
(Figs. 11-15)

*Host.* *Salvelinus leucomaenis*, from the pyloric ceca and small intestine; and *Cottus nozawae*, from the small intestine. Out of the five *S. leucomaenis* examined, two from the Ashibetsu River on May 10, 1977, were parasitized with 7 and 27 flukes respectively. One of the two *C. nozawae* examined from the same locality on the same day harbored more than 30 worms.

*Specimens.* NSMT—Pl 2175 from *S. leucomaenis*; and 1846-1849 from *C. nozawae*.

*Description.* Based on specimens (Figs. 11-14) from *S. leucomaenis*; 10 balsam-mounted adults measured. Body elongate, unspined, 0.95-1.87 mm long by 0.34-0.51 mm wide. Eyespots solid or dispersed. Gland cells present in cervical region. Oral sucker ventro-terminal, 0.13-0.19 mm long by 0.15-0.20 mm wide; anterior papillae (2 ventrolateral and 4 dorsal) small, of nearly equal in size. Ventral sucker located at junction of anterior with middle third of body, 0.17-0.28 mm in diameter; sucker width ratio 1: 1.11-1.40. Prepharynx very short. Pharynx oval, 0.04-0.08 mm in diameter; ratio of pharynx width to oral sucker width 1: 0.29-0.40. Esophagus short, bifurcating about midway between two suckers. Intestinal ceca ending a short distance behind posterior testis. Ovary usually triangular, displaced posterolateral to ventral sucker, pretesticular, 0.11-0.17 mm long by 0.09-0.13 mm wide. LAURER's canal short. Seminal receptacle ovate, submedian, between ovary and anterior testis, 0.10-0.15 mm long by 0.06-0.09 mm wide. Ootype complex median, side by side with ovary. Uterus entering inter- or post-testicular space, or at times restricted pretesticular. Eggs 55-65 by 33-44  $\mu\text{m}$  in balsam. Testes round, tandem





Figs. 11-15. *Bunodera luciopercae*. 11: specimen from *Salvelinus leucomaenis*, entire body, ventral view. 12: anterior end of body, dorsal view. 13: terminal genitalia, ventral view. 14: ootype complex. 15: specimen from *Cottus nozawae*, entire body, ventral view.

Fig. 16. Specimen from *Hucho perryi*, possibly *B. luciopercae*, entire body, ventral view.

in middle of hindbody, large, 0.13-0.21 mm long by 0.17-0.24 mm wide. Cirrus pouch claviform, curved or not, short, reaching midlevel of ventral sucker when fully extended, including winding tubular seminal vesicle, short pars prostatica accompanied with prostatic cells, and fairly long cirrus. Genital atrium small. Genital pore median, just at intestinal bifurcation or a little behind it. Vitelline follicles distributed from pharyngeal level to posterior end of body. Excretory vesicle tubular, extending to midlevel of anterior testis.

Specimens (Fig. 15) from *C. nozawae* resembled the above-described ones from *S. leucomaenis*. The uterus was folded intertesticular in some of them but pretesticular in others. Ten adults in balsam measured: body 0.85-2.12 mm long by 0.34-0.42 mm wide; oral sucker 0.11-0.22 mm long by 0.15-0.24 mm wide; ventral sucker 0.14-0.31 mm long by 0.20-0.28 mm wide; sucker width ratio 1: 1.20-1.33; pharynx 0.05-0.08 mm in diameter; ratio of pharynx width to oral sucker width 1: 0.30-0.36; ovary 0.13-0.25 mm long by 0.12-0.21 mm wide; testes 0.17-0.30 mm long by 0.17-0.34 mm wide; and eggs 55-65 by 36-42  $\mu\text{m}$ .

*Discussion.* These two trematodes from *S. leucomaenis* and *C. nozawae* seem to show no significant differences in morphology between them except one in body size. They are considered members of a single species, *B. luciopercae*. However, this identification is rather tentative, because (1) specimens with the uterus confined entirely pretesticular may suggest some species of the genus *Crepidostomum* BRAUN, 1900; (2) the excretory vesicle ends dorsal to the anterior testis unlike that of European and North American specimens, in which it extends forward as far as the seminal receptacle<sup>8,13</sup>; and (3) the egg size is smaller than those of the European and North American specimens (77 to 86 by 38 to 48  $\mu\text{m}$ <sup>8</sup>, and 63 to 82 by 38 to 51  $\mu\text{m}$ <sup>13</sup>), respectively).

Thirty-one trematodes with eyespots (Fig. 16; NSMT—Pl 2176) were obtained from the small intestine of a formalin-preserved *H. perryi* taken in the Settsuri River on April 10, 1976. Adults of them contained only a few eggs measuring 63 to 73 by 42 to 51  $\mu\text{m}$  in the uterus. Although strongly contracted, they bore some morphological resemblance to *B. luciopercae*.

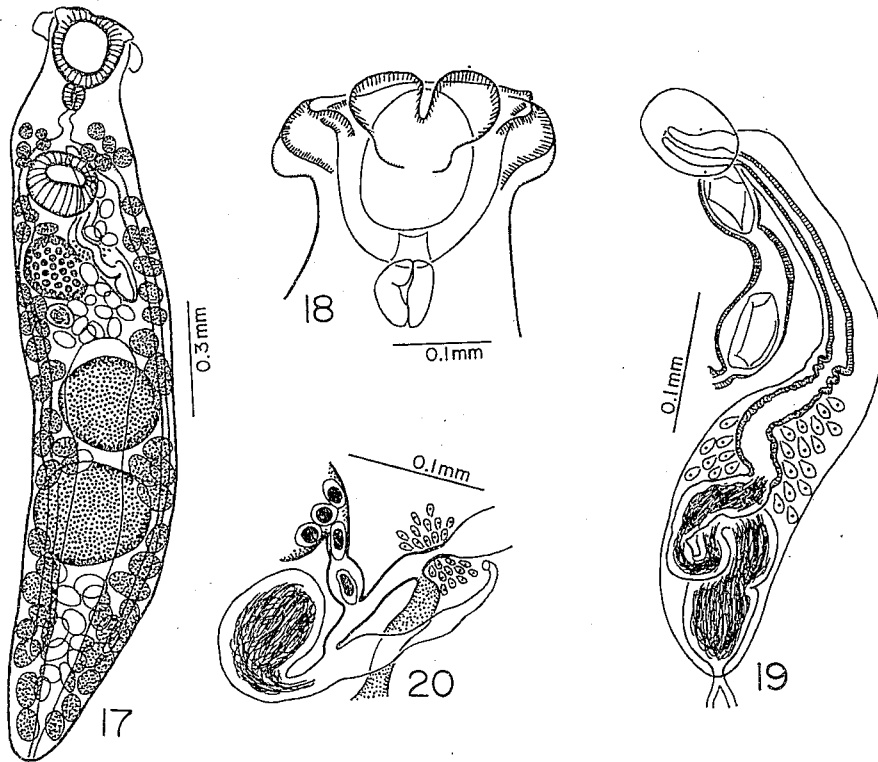
***Crepidostomum chaenogobii* YAMAGUTI et MATSUMURA, 1942**

(Figs. 17-20)

*Host.* *Cottus nozawae*, from the small intestine. The two fish examined, from the Ashibetsu River on May 10, 1977, harbored 45 and 34 flukes respectively.

*Specimens.* NSMT—Pl 1846-1852.

*Description and Discussion.* This species was sufficiently described by YAMAGUTI and MATSUMURA<sup>14</sup>) from two sexually mature specimens found in the small intestine of *Chaenogobius annularis wrotaenia* taken in Sapporo, Hokkaido. The present form (Fig. 17-20) agreed well with their description in every essential characteristic except for a slightly smaller oral sucker and more elongated pars prostatica. Ten of adult whole-mounts measured: body 0.91-1.55 mm long by 0.34-0.42 mm wide; oral sucker 0.16-0.19 mm long by 0.14-0.17 mm wide; ventral sucker 0.14-0.17 mm long by 0.15-0.19 mm wide; sucker width

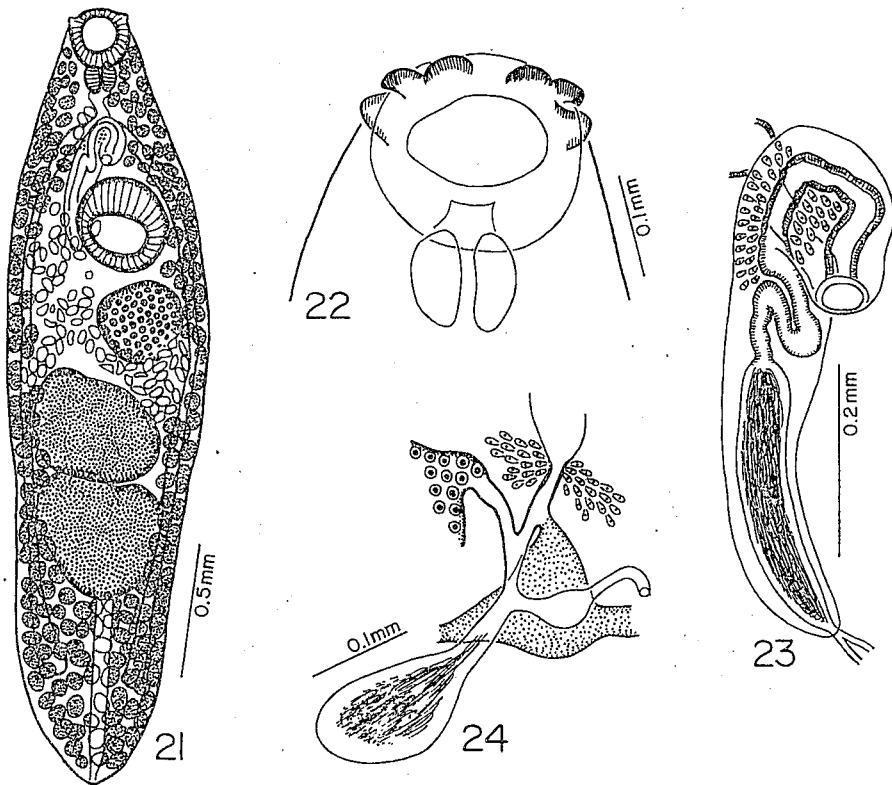


Figs. 17-20. *Crepidostomum chaenogobii*. 17: entire body, ventral view. 18: anterior end of body, dorsal view. 19: terminal genitalia, ventral view. 20: ootype complex, dorsal view.

ratio 1: 0.85-1.10; pharynx 0.06-0.07 mm long by 0.04-0.06 mm wide; ratio of pharynx width to oral sucker width 1: 0.29-0.35; ovary 0.11-0.17 mm long by 0.10-0.14 mm wide; seminal receptacle 0.08-0.10 mm long by 0.06-0.07 mm wide; testes 0.17-0.30 mm in diameter, anterior one being usually smaller than posterior one; and eggs 63-67 by 42-44  $\mu\text{m}$ .

*Crepidostomum farionis* (MÜLLER, 1784) LÜHE, 1909  
(Figs. 21-24)

*Host.* *Salvelinus leucomaenis*, from the pyloric ceca. Out of the five fish examined, one from the Ashibetsu River on May 10, 1977, contained three worms together with *B. lucio-percae* described above.



Figs. 21-24. *Crepidostomum farionis*. 21: entire body, ventral view. 22: anterior end of body, dorsal view. 23: terminal genitalia, ventral view. 24: ootype complex, dorsal view.

*Specimens.* NSMT—P1 2174.

*Description.* Measurements based on 3 adult whole-mounts. Body fusiform, 1.70-3.06 mm long by 0.72-0.76 mm wide in ovarian region. Eyespots dispersed or not seen. Cuticle smooth. Oral sucker ventroterminal, 0.17-0.23 mm long by 0.22-0.33 mm wide; anterior papillae small, low, 2 ventrolateral ones a little larger than 4 dorsal ones. Ventral sucker located in front of anterior third of body, 0.31-0.34 mm in diameter; sucker width ratio 1: 1.42-1.45. Prepharynx very short. Pharynx ellipsoidal, comparatively large, 0.09 mm long by 0.11-0.12 mm wide; ratio of pharynx width to oral sucker width 1: 0.46-0.50. Intestinal caeca terminating at a short distance from posterior end of body. Ovary round, posterolateral to ventral sucker, pretesticular, 0.26-0.30 mm long by 0.25-0.32 mm wide. Ootype complex median, side by side with ovary. Seminal receptacle feebly pronounced,

between ovary and anterior testis. LAURER's canal short. Uterine coils running slightly into fields anterolateral to anterior testis, containing fairly many eggs measuring 52-63 by 36-48  $\mu\text{m}$  in balsam. Testes entire or irregular in outline, tandem in middle third of hind-body, large, 0.34-0.51 mm long by 0.40 mm wide. Cirrus pouch elongated sausage-shaped, extending backward only slightly beyond posterior margin of ventral sucker when well extended, enclosing long sinuate seminal vesicle, prostatic complex and long cirrus. Genital atrium fairly large, shallow. Genital pore median, about bifurcal. Vitelline follicles distributed between oral sucker and posterior end of body. Excretory vesicle I-shaped, ending dorsal to anterior testis.

*Discussion.* The excretory vesicle ends dorsal to the anterior testis in this Hokkaido form of *C. farionis*, while that of European and North American ones of the same species extends anteriorly farther to reach the seminal receptacle or ovary<sup>8,13</sup>. According to BROWN<sup>15</sup> (Plate VII, Fig. 12), on the other hand, it terminates dorsal to the anterior testis in England specimens. The organ is very likely variable in extent.

SEKI<sup>5</sup>) reported trematodes, which he identified with *C. farionis*, from the intestine of *S. leucomaenis* from Panketo and *Salmo gairdneri iridens* from Lake Shikaribetsu, eastern Hokkaido. I reexamined his material (No. 374, 5 slides containing 20 specimens) borrowed from the collection of the Department of Parasitology, Faculty of Veterinary Medicine, Hokkaido University. The material proved to consist of at least two distinct species. One (one specimen from *S. gairdneri iridens*) is most presumably *C. farionis*. It measured: body 1.19 mm long by 0.38 mm wide; oral sucker 0.10 mm long by 0.13 mm wide; ventral sucker 0.15 mm long by 0.17 mm wide; sucker width ratio 1: 1.31; pharynx 0.07 mm wide; ratio of pharynx width to oral sucker width 1: 0.54. The excretory vesicle terminates level with the seminal receptacle. The other (19 specimens including the figured one, Plate I, Fig. 2) is similar to the species that SEKI found in *Salvelinus malma* from Lake Shikaribetsu and regarded as *C. metoecus* (BRAUN, 1900) BRAUN, 1900.

My reexamination suggested that SEKI's unidentified fluke (No. 376) found in *S. malma* from Lake Shikaribetsu resembled the above-mentioned *C. farionis* from *S. gairdneri iridens* in having the small and low oral papillae, relatively large pharynx and long cirrus pouch. It is noteworthy that this worm has the uterus descending to the intertesticular space as indicated by SEKI (pp. 11-12; Plate I, Fig. 4).

There have been known two other species of the genus *Crepidostomum* in Hokkaido: *C. uchimii* FUJITA, 1920, from *Oncorhynchus masou* (Salmonidae) from the Nishibetsu River, Kushiro; and *C. salmonis* FUJITA, 1921, from *O. keta* from Sapporo<sup>16,17</sup>. FUJITA's descriptions and figures are inadequate to compare them with the present species of the genus. His original specimens need to be restudied before everything else. They have not yet been available to me.

#### Other helminth parasites

Helminth parasites obtained, other than the above-described digenetic trematodes, were as follows:

## Digenea of Freshwater Fishes from Hokkaido

- (1) Microcotylid monogenetic trematodes, which may possibly represent an undescribed genus and species, from the gills of *H. perryi*.
- (2) Cestodes of the genus *Bothriocephalus* RUDOLPHI, 1808, from the pyloric ceca of *H. perryi* (NSMT—P1 2187-2188).
- (3) A plerocercoid of the genus *Tentacularia* Bosc, 1797, from the ventral lateral muscle of *S. leucomaenis* (NSMT—P1 2189).
- (4) A monozootic cestode from the small intestine of *T. ezoe* (NSMT—P1 1845).
- (5) Acanthocephalans from the small intestine of *H. perryi*.
- (6) Camallanid and rhabdochoniid nematodes from the digestive tract of *H. perryi*, *S. leucomaenis* and *T. ezoe* (NSMT—As 1506-1509).
- (7) Philometrid nematodes from the body cavity of *H. perryi* and *S. leucomaenis* (NSMT—As 1510-1511).

## Summary

A small collection of freshwater fishes taken near Kushiro, eastern Hokkaido, Japan, was examined for digenetic trematodes. The flukes obtained were: *Azygia perryi* FUJITA, 1918 (Azygiidae), from *Hucho perryi* and *Salvelinus leucomaenis*; *Allocreadium isoporum* (Looss, 1894) ODHNER, 1901 (Allocreadiidae), from *Tribolodon ezoe*; *A. transversale* (DUDOLPHI, 1802) ODHNER, 1901, from *T. ezoe*; *Bunodera lucio-percae* (MÜLLER, 1776) LÜHE, 1909 (Allocreadiidae) (tentative identification), from *S. leucomaenis* and *Cottus nozawae*; *Crepidostomum chaenogobii* YAMAGUTI et MATSUMURA, 1942 (Allocreadiidae), from *C. nozawae*; and *C. farionis* (MÜLLER, 1784) LÜHE, 1909, from *S. leucomaenis*. The morphology of each species is described, and related records from Hokkaido are discussed. A list of other helminth parasites found is appended.

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