

**Studies on the Amphibian Helminths in Japan**  
**IV. Redescription of *Haematoloechus lobatus* (Seno, 1907)**  
**Walton, 1948 (Trematoda, Haematoloechidae) from**  
**Bull-Frogs, *Rana catesbiana***

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*Haematoloechus lobatus* was first described by Seno in 1907 on the specimens from *Rana nigromaculata* of Japan, but his description was insufficient to the morphology and locality of the species. An attempt was made to redescribe *H. lobatus* based on the specimens collected from bull-frogs, *Rana catesbiana*.

**Materials and Methods**

Twenty one mature and 5 immature specimens of a species of trematode belonging to the genus *Haematoloechus* were obtained from 15 bull-frogs, *Rana catesbiana*, captured in Chiba prefecture and at Takamatsu city in Kagawa prefecture, Japan. Morphological examination was made on the mounted specimens after fixed with 70% alcohol and stained with Heidenhain's haematoxylin or carmine. All figures were drawn with the aid of the camera lucida.

**Description of the species**

*Haematoloechus lobatus* (Seno, 1907)  
Walton, 1948

Host: Bull-frog, *Rana catesbiana*

Habitat: Lung

Locality: Chiba prefecture and Takamatsu city in Kagawa prefecture, Japan

Specimens: Neotype deposited in the Meguro Parasitological Museum; Coll. No. 19176; Paratype in the author's collections

Body is ellipsoid in shape and measures 11.3-13.5 mm in length and 3.1-4.0 mm in breadth, with a maximum body width at the level of anterior testis. Cuticle has no spines on all the surface of body. Oral sucker is large, 0.4-0.7 mm in diameter and is about four times the width of acetabulum, being the ratio of pharynx to acetabulum 1.2-1.4:1. Acetabulum is situated at the junction of ovary and seminal receptacle at the level of anterior body, measuring 0.14-0.25 mm in diameter. Pharynx is usually round, 0.2-0.3 mm in diameter. Esophagus is short and bifurcates at the level of the anterior one-seventh of body. Caeca extend to the posterior end of body. (Figs. 1, 2, 3)

Testes are oval or elongated in shape, larger than ovary, and they are unlobed but may be slightly irregular in outline. Anterior testis is 0.88-1.25×0.58-2.5 mm in size and is smaller than posterior one being 1.5-1.68×0.57-0.75 mm in size; its distance from the posterior end of body is about one half of its own length. (Figs. 4, 7)

Ovary is situated at the side of acetabulum and the major portion of the former lies posterior to the latter. Ovary measuring 1.5-1.68×0.75 mm in diameter, is deeply and irregularly lobed with a distinctly "knobby" appearance; it is elongated and longer than the seminal receptacle which lies beside it. The long axis of seminal receptacle is parallel to that of the body, or only slightly oblique. The very voluminous

seminal receptacle lies ventral to shell gland and beside ovary. (Figs. 5, 6)

Vitelline rosettes, being 16 to 19 in number, are arranged at irregular intervals along intestines from a short distance posterior to the intestinal bifurcation to the caecal termination. After running laterally for a short distance from ovary, uterus proceeds in the ventral side of body, twisting in the intercaecal region to the posterior end of body. Then uterus goes anterolaterally along the posterior margin of body to form an anterolateral loop of uterus on each side and backs again to the posterior extremity of body, from which it runs anteriorly in the dorsal side of body along the midline to form a series of the transverse loops winding up to the genital pore.

Embryonated eggs are very small, 17 to 20  $\mu$  long by 13 to 16  $\mu$  wide, elongated oval in shape and light brown in color.

#### Specific Diagnosis

The genus *Haematoloechus* Looss, 1899 (Syns. *Pneumonoeces* Looss, 1902; *Ostiolum* Pratt, 1903; *Pneumbites* Ward, 1917): Body 11.3-13.5 mm in length and 3.1-4.0 mm in breadth; more or less pointed posteriorly. Spine absent. Oral sucker 0.4-0.7 mm. Acetabulum very small, 0.14-0.25 mm in diameter. The ratio of oral sucker to acetabulum is 2.7-2.9:1, that of body to acetabulum is 3.4-3.6:1 and that of pharynx to acetabulum is 0.7-0.8:1. Ovary is lobed, 1.5-1.68 $\times$ 0.57-0.75 mm; receptaculum very voluminous; testes very prominent, the anterior one 0.88-1.25 $\times$ 0.58-2.5 mm and the posterior 1.25-3.13 $\times$ 0.58-1.68 mm in size. Eggs are oval, light brown, embryonated, 17-20 $\times$ 13-16  $\mu$  in size.

Host: Bull-frog, *Rana catesbiana*

Habitat: Lung

Locality: Chiba prefecture and Takamatsu city, Kagawa prefecture, Japan.

#### Discussion

The genus *Haematoloechus* was created by Rudolphi in 1819 based on the type species

*H. variegatus* and is characteristic in the following features: the body is elongate, spinose or not; acetabulum small, situated in the anterior or middle third of body; genital pore ventral to pharynx or esophagus; ovary lobed or not, situated close to acetabulum; seminal receptacle is large and Laurer's canal is absent; uterus occupies all available space of the hind body as well as intercaecal field of the fore body and excretory vesicle is Y-shaped; eggs are very numerous, brown and embryonated. The species of the genus are parasitic in the lungs of amphibians.

*H. lobatus* is provided with these generic features and its related species can be discriminated from each other in the ratios of oral sucker to acetabulum and pharynx to acetabulum, in egg size, and in the morphology of the vitellaria, ovary, cuticular spine and uterus. *H. lobatus* was first described by Seno in 1907 and he distinguished it from *H. variegatus* only based on the morphology of the ovary, but he did not compare his species with the other related species of the genus.

The present examination revealed that the characteristics which distinguished *H. lobatus* from *H. variegatus* were found in the oral sucker-acetabulum and pharynx-acetabulum ratios, in egg size, and in the morphology of the vitellaria, cuticular spine, and uterus, in addition to the morphological feature of the ovary. Furthermore, *H. lobatus* was different from *H. sibiricus japonicus* in the size of the body, ovary, testis, egg, and vitellaria. Another related species, *H. nanchangensis major*, could be discriminated from *H. lobatus* in the ratio of oral sucker to acetabulum (Table 1) and in the morphology of the ovary, this organ being lobed in *H. lobatus*.

*H. lobatus* had been missed by most of previous authors because Seno (1907) described it briefly in Japanese.

The original figures of *H. lobatus* are shown in Figs. 7 and 8 of Plate 9 of his paper but Seno wrongly indicated that the figures were presented in Fig. 7 of Plate 1.

Table 1 Comparison of the measurements (mm) of *Haematoloechus lobatus* with those of the related species

Species of fluke	<i>H. lobatus</i>	<i>H. lobatus</i>	<i>H. nanchangensis major</i>	<i>H. variegatus</i>	<i>H. variegatus</i>	<i>H. sibiricus japonicus</i>
Authors	Seno (1907)	The present authors	Yamaguti (1936)	Looss (1894)	Odening (1958)	Yamaguti (1936)
Body length (BL)	10.8	11.3 - 13.5	3.7 - 4.7	4.0	1.7	6.0 - 8.7
breadth	3.7	3.1 - 4.0	1.2 - 2.0	1.0 - 1.8	1.0	1.0 - 2.4
Oral sucker (O)	—	0.4 - 0.7	0.3 - 0.4	—	0.4 - 0.8	0.3 - 0.5
Acetabulum (A)	—	0.14 - 0.25	0.3 - 0.38	—	0.34	0.4 - 0.8
Pharynx (P)	—	0.2 - 0.3	0.1 - 0.17	—	0.22-0.23	0.15-0.23
O/A	—	2.7-2.9 : 1	4 : 1	—	1.2 -2.4 : 1	0.56-0.75 : 1
A/P	—	0.7-0.8 : 1	2.2-3.0 : 1	—	1.5 : 1	2.7 - 3.5 : 1
BL/A	—	3.4-3.6 : 1	2.4-4.9 : 1	(2.2 -4.0 : 1)	1.7 : 1	3.6 - 6.0 : 1
Testis anterior	—	0.88 - 1.25 × 0.58 - 2.5	0.22-0.53 × 0.28-0.58	—	0.34 × 1.19	0.3 - 0.7 × 0.9 - 1.7
posterior	—	0.58 - 1.68 × 1.25 - 3.13	—	—	0.58 × 1.13	—
Ovary	—	0.57 - 0.75 × 1.5 - 1.68	0.27 - 0.38 × 0.5 - 0.65	0.18 - 0.22	—	0.28-0.57 × 0.65-1.0
Vitellaria	—	16-19	8-12	10-12	8-14	16-20
Eggs	—	0.017-0.020 × 0.013-0.016	0.020-0.024 × 0.036-0.039	0.015-0.017 × 0.035-0.040	0.012-0.015 × 0.025-0.028	0.015-0.021 × 0.026-0.033
Spine	—	absent	absent	present	present	absent
Host	<i>R. nigromaculata</i>	<i>R. catesbiana</i>	<i>R. nigromaculata</i>	<i>R. esculenta</i>	<i>R. esculenta</i>	<i>R. nigromaculata</i>
Reported locality	Japan	Japan	Japan	Asia, U.S.A., Europe, Africa, (except Japan)	"	Japan

An attempt was therefore made to redescribe the species based on the specimens collected from bull frogs and to assign these specimens as the neotype of *H. lobatus* because the type specimen would be lost. *H. lobatus* was obtained by Seno from the lungs of frogs *Rana nigromaculata* and no other hosts have been recorded, so the bullfrog, *Rana catesbiana*, is added as a new host.

**Acknowledgement**

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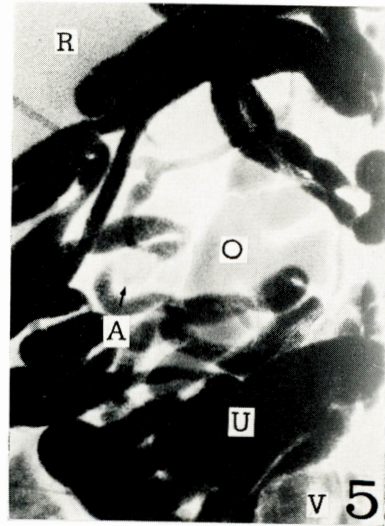
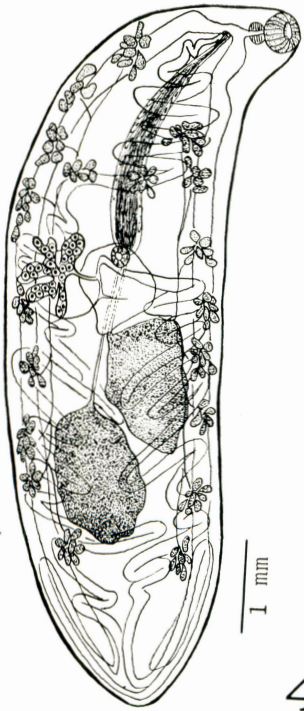
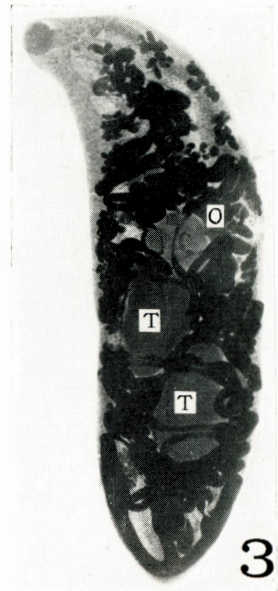
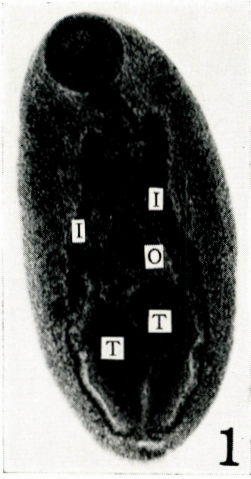
日本産両生類の寄生虫相  
 (第4報) ウシガエル *Rana catesbiana* より得た *Haematoloechus lobatus* (Seno, 1907) Walton, 1948 の再記載

内田明彦 板垣 博

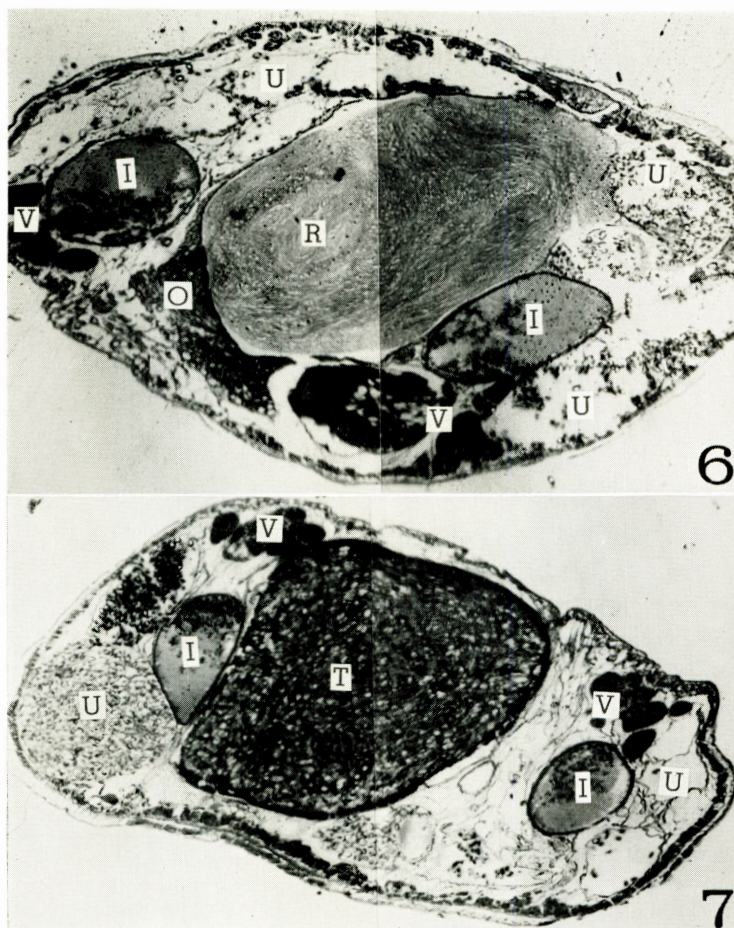
(麻布獣医科大学寄生虫学教室)

千葉県および香川県内より採取されたウシガエル *Rana catesbiana* の肺より得た多数の吸虫は、精査の結果 Haematoloechidae 科 *Haematoloechus* 属の *Haematoloechus lobatus* (Seno, 1907) Walton, 1948 と同定されたが、本種の実記載は不完全で、しかも、今まで形態について十分な記載がなされていないため、著者らは今回得られた虫体をもとに再記載を行ない、新模式

種を設定し、種の再検討を行った。妹尾 (1907) は本種を *H. variegatus* のみと比較し、卵巣の形態の差異をもとに新種記載を行ったが、今回の観察により本種は、皮棘の有無、口吸盤・腹吸盤径比、子宮の形態、虫卵の大きさなどの点で近似種と異なることが判明した。本吸虫はトノサマガエルから報告されているが、著者らはここにウシガエルを新宿主として追加する。







#### Explanation of Figures

1-7 *Haematoloechus lobatus* (Seno, 1907)

Figs. 1 & 2 Young adult worm.

Figs. 3 & 4 Adult worm (Ventral view).

Fig. 5 Ovarian complex.

Figs. 6 & 7 Transverse sections of *H. lobatus* (Seno, 1907).

Fig. 6 Section through seminal receptacle.

Fig. 7 Section through anterior testis.

A: Acetabulum, I: Intestine, O: Ovary, R: Receptaculum seminis,  
T: Testis, U: Uterus, V: Vitellaria.