

Research Note

Natural Infection with *Clinostomum complanatum* (Rud., 1819)
in the Birds of Southern Japan

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Clinostomum complanatum is a cosmopolitan trematode. Fish-eating birds belonging to the families Ardeidae, Accipitridae, Laridae, Fregatidae and Phalacrocoracidae act as final host of the fluke (Yamaguti, 1958). The metacercariae of the fluke encyst under the skin of fresh water fish and are called yellow grub. The metacercariae have been reported in Japanese fresh water fish such as *Carassius carassius*, *Pseudogobio esocinus*, *Acheilognathus lanceolata*, *Misgurnus anguillicaudatus* and *Pseudorasbora parva* (Yamaguti, 1933; 1938). Recently, Kagei *et al.* (1984) reported the presence of the yellow grub in cultured loach, *Misgurnus anguillicaudatus*, from Tanegashima, Kagoshima Prefecture. The natural final host of the fluke, however, has not been found in Japan, though adults were recovered from the pharynx of experimentally infected heron (Yamaguti, 1933; 1958). The present paper reports the first natural infection with *C. complanatum* among birds in Japan and describes the morphology of the fluke.

A total of 34 birds were captured during the period from November, 1981 to January, 1984 in Tanegashima and Miyakojima, Okinawa.

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The species and the number of the examined birds are as follows: *Egretta garzetta* (14), *E. alba* (1), *E. intermedia* (3), *Nycticorax nycticorax* (10), *Demiergetta sacra* (1), *Ixobrychus cinnamomeus* (4) and *Turdus pallidus* (1). Prevalence of the flukes among the birds is shown in Table 1. Among seven examined species, only the night heron, *N. nycticorax*, harbored fluke in the pharynx and the infection rate was 40% (2/5) in Tanegashima and 20% (1/5) in Miyakojima. The number of flukes in the infected birds was 9–13.

Most of the flukes found in the pharynx of the birds were fixed in 10% formaline solution under slight pressure of cover glass and stained with alum-carmin solution. Some specimens were utilized for paraffin sections. The longitudinal and cross sections were stained with haematoxylin-eosin. The stained specimens mounted in balsam were observed and all flukes were recognized as belonging to the same species. The features of a whole fluke are shown in Fig. 1. Flukes were attached in the mucus membrane so firmly that some specimens were partially broken when they were removed. The following descriptions are based on 10 matured complete specimens and all measurements are presented in mm: Body 3.21–5.58 long by 1.94–2.36 wide, elongate, fairly thick, stout and distinctly convex dorsally. Body width sharply expanded laterally from the level of acetabulum with the widest portion around ovary. Anterior extremity

Table 1 Prevalence of *Clinostomum complanatum* among birds in Tanegashima and Miyakojima, southern Japan

Species of birds	No. exam.	No. positive	No. flukes
Tanegashima, Kagoshima prefecture			
<i>Egretta garzetta</i>	12	0	
<i>E. intermedia</i>	1	0	
<i>Nycticorax nycticorax</i>	5	2	9, 10
<i>Demiegretta sacra</i>	1	0	
Miyakojima, Okinawa prefecture			
<i>E. garzetta</i>	2	0	
<i>E. alba</i>	1	0	
<i>E. intermedia</i>	2	0	
<i>N. nycticorax</i>	5	1	13
<i>Ixobrychus cinnamomus</i>	4	0	
<i>Turdus pallidus</i>	1	0	

truncated and posterior extremity rounded. Tegument smooth. Oral sucker 0.24–0.40 × 0.34–0.46, subterminal and surrounded by a wide collar. Pharynx unclear in whole body specimens but distinct in longitudinal sections of the fluke (arrow in Fig. 2). Esophagus 0.12 long and enlarged posteriorly. Intestinal ceca extended antero-laterally from bifurcation and then passed posteriorly along the sides of the body. Ceca diverticulated near posterior end and contained brown pigments. Rounded acetabulum at anterior one fifth of body, 0.45–0.83 × 0.61–0.80 and much larger than oral sucker.

Testes lobed and tandem at posterior one third region. Anterior testis 0.31–0.76 × 0.62–1.04 and posterior one 0.20–0.44 × 0.26–1.21. Cirrus pouch 0.28 × 0.18 with a large internal seminal vesicle at the right side of anterior testis. Ovary oval, intertesticular, submedian, 0.19–0.38 × 0.21–0.87, and touching right intestine. Vitelline glands follicular and occupied free space between acetabulum and intestinal extremity. Uterus coiled between the posterior edge of acetabulum and posterior testis, passing the left of anterior testis. Eggs 0.110–0.124 × 0.062–0.72, elliptical and not embryonated. An operculum of egg 0.020–0.026 in across width (Fig. 3).

All measurements and morphological fea-

tures in the present specimens correspond with the previous descriptions of *C. complanatum* (Yamaguti, 1933; Rietschel and Werding, 1978; Lo *et al.*, 1982).

The first human infection with *C. complanatum* was reported in Japan by Yamashita (1938) and other cases were reported in Israel (Witenberg, 1944) and India (Cameron, 1945). After those reports, some more human cases were found in Japan (Kamo *et al.*, 1962; Sakaguchi *et al.*, 1966; Sano *et al.*, 1980; Kumada *et al.*, 1983; Hirai *et al.*, 1987). Some of the patients showed pharyngeal pain and blood sputum. Brown pigments which seem to derive from blood were observed in the intestinal ceca of the present specimens. It is clear that the fluke sucks the blood of its hosts.

Freid *et al.* (1970) reported that excystation of *C. marginatum* metacercariae was completed within 30 min in 1% or 0.5% Pepsin-Ringer's-HCl solutions (pH 2.3) *in vitro*, and that the excysted metacercariae were found in the mouth cavity of the heron 20 min after ingestion of the encysted metacercariae *in vivo*. The metacercariae of *C. complanatum* takes only five hr to reach sexual maturation in heron (Yamaguti, 1933; 1975). These facts indicate that *C. complanatum* is probably able to infect easily and to grow rapidly in man.

Though only night heron, *N. nycticorax*

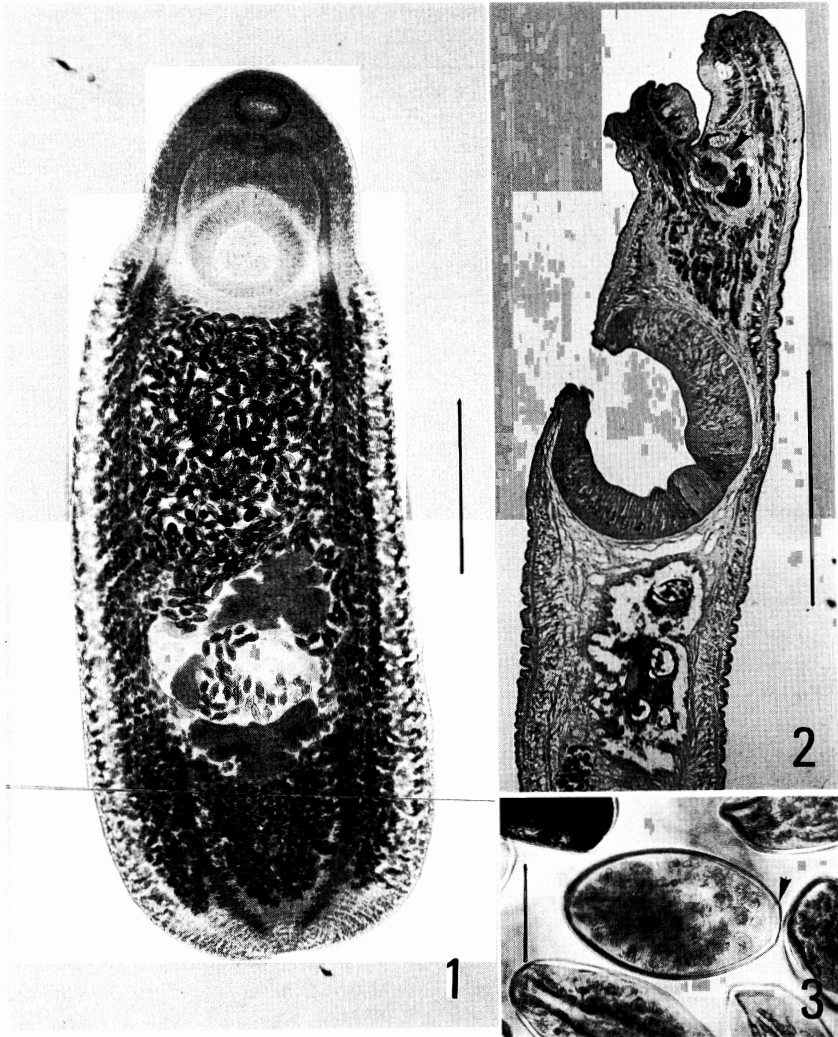


Fig. 1-3 Adult *Clinostomum complanatum* obtained from the pharynx of *Nycticorax nycticorax*.

1: Whole fluke, scale shows 1 mm; 2: longitudinal cross section of anterior part showing the pharynx (arrow), scale shows 0.05 mm; 3: Egg in the uterus showing an operculum (arrow), scale shows 0.05 mm.

harbored *C. complanatum* in the present study, there are many other bird species which seem to be final hosts of the fluke in Japan. Further, it is possible that the fluke will be easily spread by the birds to new areas where the first- and the second-intermediate hosts are distributed. *C. complanatum* infection should be recognized as an important parasitic zoonosis for public health.

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