

Research Note

A Case of Human Infection with *Anisakis physeteris* Larvae in Okinawa, Japan

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Anisakiasis is a common parasitic infection in Japan. Most of the cases are due to *Anisakis simplex* (Rudolphi, 1809) (= *Anisakis* type I of Berland, 1961) and *Pseudoterranova decipiens* (Krabbe, 1878) (= *Terranova decipiens*), and there have been only a few reported cases caused by *Anisakis physeteris* (Baylis, 1923) (= *Anisakis* type II of Berland, 1961; cf. Oshima, 1979; Suzuki and Ishida, 1979; Orecchia *et al.*, 1986). Fukushima *et al.* (1976), Kagei *et al.* (1978) and Hoshino *et al.* (1985) recorded each one case due to *A. physeteris* larva. Takada *et al.* (1982) also reported a case caused by *A. physeteris* or *Anisakis* type III larva. Among these reports, only Kagei *et al.* (1978) gave detailed description of the detected worm, which was identified with the fourth-stage larva of *A. physeteris*. Recently we experienced a case due to *A. physeteris* larvae in Okinawa as reported herein.

Case: M. S., 47-year-old male residing in Yonabaru-cho, Okinawa, Japan, admitted to the Yonabaru Central Hospital with complaints of acute epigastric pain on 13 August 1990. The pain began at about 2 a.m., 12 August 1990, and became more and more severe in every several hours accompanying with nausea. Endoscopic observation of the stomach revealed scattered foci of erosion with coagulated blood masses on the

lower part of the greater curvature and 2 small white worms invading the mucosa (Fig. 1). The worms were removed with a biopsy forceps. The clinical symptoms rapidly disappeared after the removal, and the patient was discharged on the next day of admission.

Worms: The worms were fixed in 70% ethanol, cleared in a glycerin-alcohol solution, and mounted on slides with 50% glycerin solution. They are small and taper to both extremities (Fig. 2). The cuticle is thin, transversely striated irregularly and with faint longitudinal striae (Figs. 3, 4, 6). The anterior extremity is ornamented with three rudimentary lips and a prominent boring tooth directing anteriorly (Fig. 3). The excretory pore is situated between the subventral rudimentary lips. The excretory system has a large renette cell at ventral side of the anterior body. The esophagus is cylindrical, and the ventriculus is short (Fig. 5). The ventricular appendix and intestinal cecum are absent. Junction between the ventriculus and intestine is almost transverse (Fig. 5). The tail is long conical, lacking mucron (Fig. 4). Measurements are presented in Table 1. On these morphological characteristics, they are identified as the third-stage larvae of *A. physeteris* (cf. Berland, 1961; Koyama *et al.*, 1969; Shiraki, 1974).

Source of infection: The patient ate mackerel, *Scomber* sp., raw on the evening of 10 August 1990 and raw squid, *Symplectoteuthis oualanicensis*, mixed with vinegar and "miso" (= bean paste) about 6 hours before the onset of symptoms. The squid was also eaten by 4 persons

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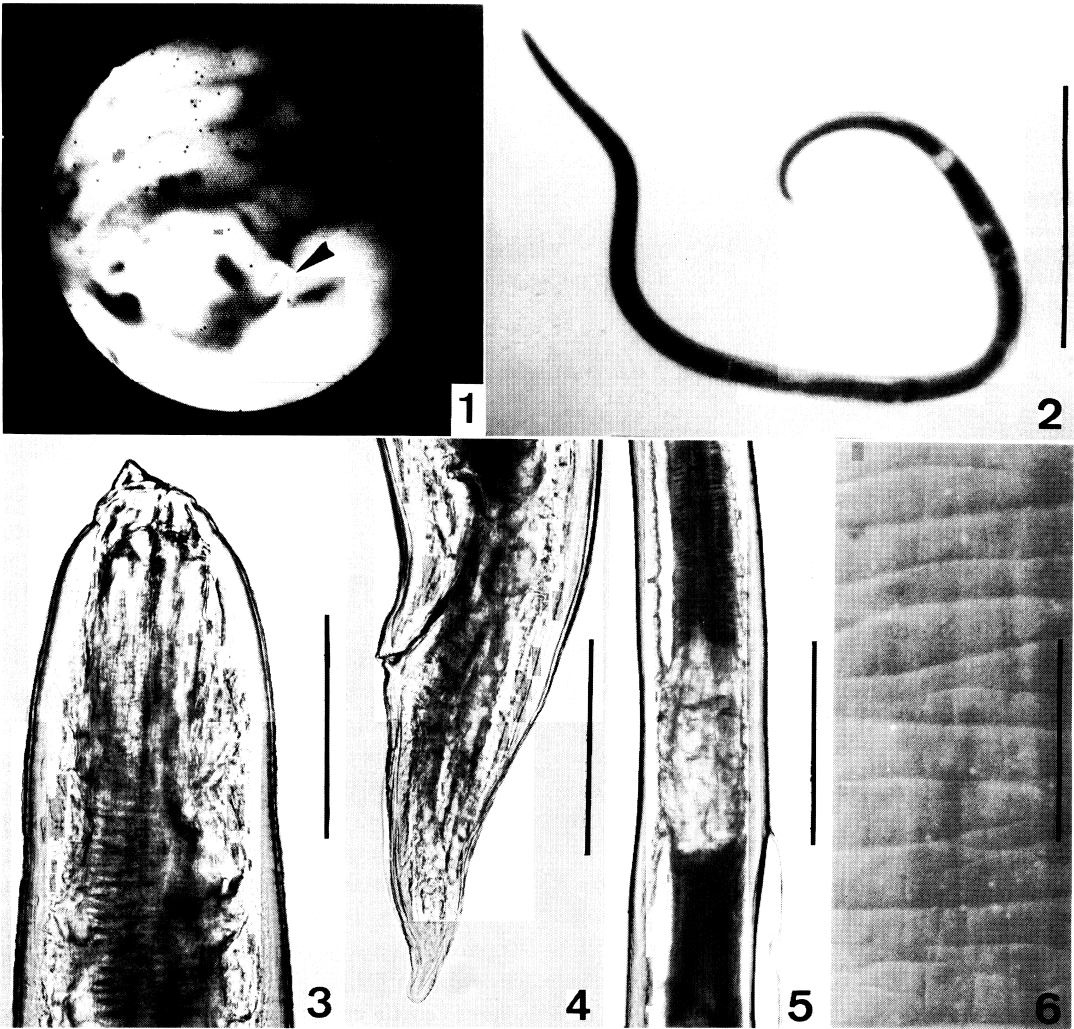


Fig. 1. Endoscopic view of the greater curvature showing scattered blood clots and a nematode larva invading the mucosa (arrow).

Figs. 2–6 *Anisakis physeteris* larva removed from the patients. 2. entire worm (scale: 5 mm); 3. anterior part, left lateral view (scale: 0.2 mm); 4. posterior part, left lateral view (scale: 0.2 mm); 5. ventricular part, left lateral view (scale: 0.5 mm); 6. cuticular surface (scale: 0.03 mm).

of the family, but they showed no symptom. Mackerel is known as the commonest source of infection of anisakiasis in southern Japan including Okinawa (Asato, 1985, 1990). However, it seems unreasonable to consider that the patient acquired the infection from the mackerel because in a fulminant anisakiasis symptom usually occurs within several hours after the ingestion of fish. Moreover, *A. physeteris* larva rarely occurs

in the mackerels, especially in those examined in Okinawa (Asato, 1985).

The squids of the same species that the patient ingested were purchased at a market, and examined for anisakid nematodes. Of the 54 squids examined, 26 (48%) were found to be infected with 1 to 25 (mean 4.6) third-stage larvae of *A. physeteris*, all in the viscera. The morphology of the worms is identical with those

Table 1 Measurements of third-stage larvae of *Anisakis physeteris* collected from an Okinawan man and marine animals of Japan (range, in mm unless otherwise stated)

Hosts	Man	<i>Symplectoteuthis oualaniensis</i>	<i>Lampris & Katsuwonus</i>	<i>Katsuwonus</i> etc.
Reporter (year)	Present authors	Present authors	Koyama <i>et al.</i> (1969)	Shiraki (1974)
No. larvae measured	2	9	11	13
Length	22.1–22.8	24.8–32.0	24.5–32.9	21.6–31.9
Width at midbody	0.52–0.54	0.45–0.68	0.50–0.69	0.53–0.71
Nerve ring*	0.40–0.45	0.37–0.49		
Esophagus length	1.78–1.93	1.80–2.46	2.14–2.67	1.80–2.51
Ventriculus length	0.51–0.53	0.49–0.71	0.54–0.75	0.47–0.71
Ventriculus width	0.17–0.21	0.21–0.28		
Tail length	0.21–0.33	0.19–0.38	0.18–0.32	0.21–0.38
Interval of striations†	7.5–8.5	6.4–12.5		9.5–10.0

* Distance from anterior extremity.

† Average of 10 intervals; in micrometers.

removed from the patient, although they are somewhat larger (Table 1). It is thus estimated that the patient acquired the infection from the squid. However, it is not clear whether the larvae existed in the muscles of the squid the patient ate or he ingested some viscera in addition to the muscular portions.

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