

Identification of *Stellantchasmus falcatus* Metacercariae Encysted in Mulletts in Korea

Jong-Yil Chai and Woon-Mok Sohn

Department of Parasitology and Institute of Endemic Diseases,
College of Medicine, Seoul National University, Seoul 110-460, Korea

Abstract: A group of metacercariae encysted in the flesh of *Mugil* sp. were identified to be *Stellantchasmus falcatus* by the morphology of adult worms obtained experimentally. It is confirmed that mulletts serve as a second intermediate host of this heterophyid fluke in Korea.

Key words: *Stellantchasmus falcatus*, Heterophyidae, intestinal fluke, mulletts

Stellantchasmus falcatus (Trematoda; Heterophyidae), a small intestinal fluke of fish-eating birds and mammals, is an occasional parasite of humans in Korea (Seo *et al.*, 1984; Hong *et al.*, 1986), Japan (Kagei *et al.*, 1964), Philippines (Africa *et al.*, 1940), Thailand (Tantachamrun and Kliks, 1978) and Hawaii (Alicata and Schattenburg, 1938).

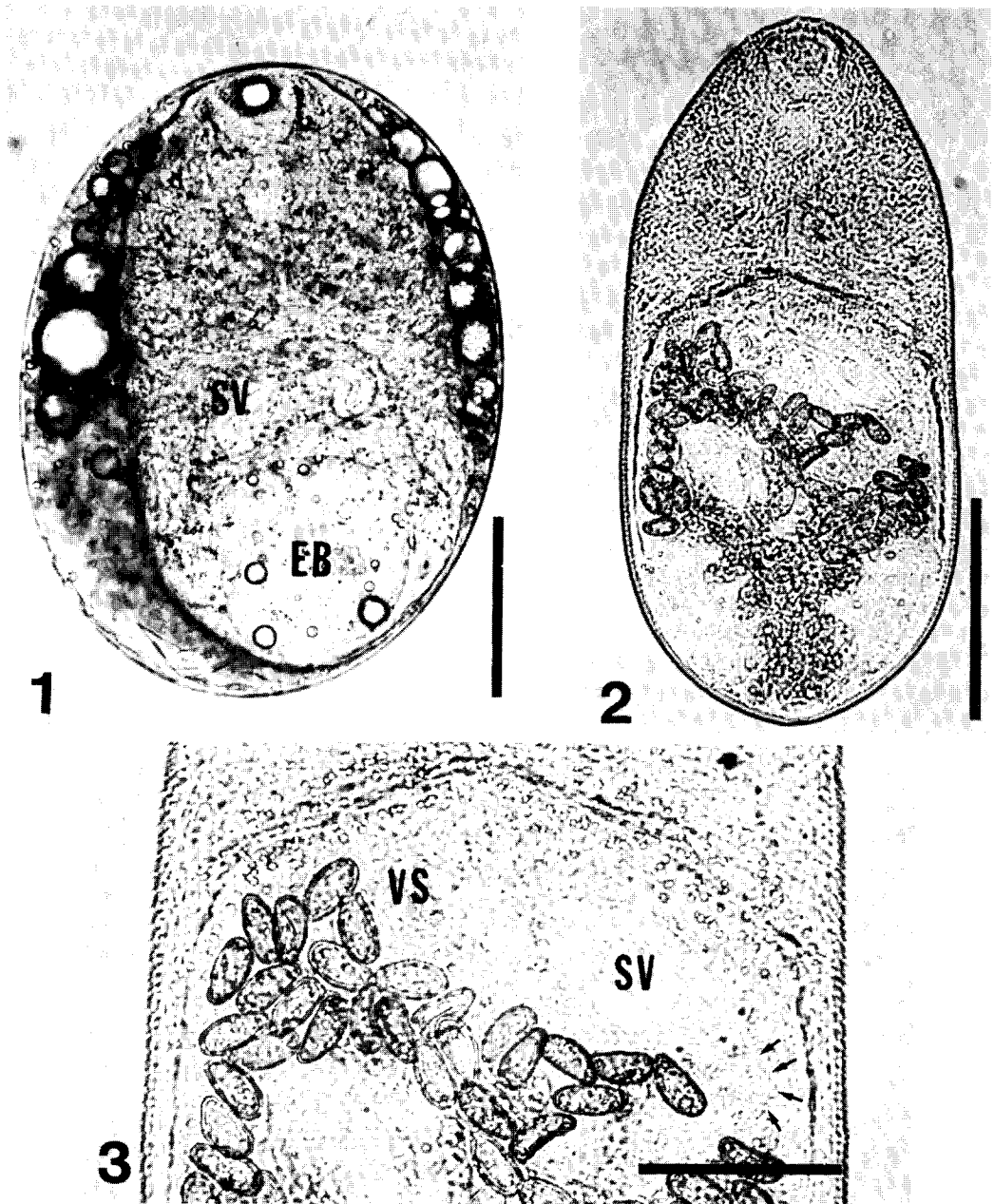
In Hawaii, Japan and China, brackish water snails such as *Stenomelania newcombi* or *Thiara granifera* and brackish water fishes such as mulletts (*Mugil* sp., *Liza menada*) and gobies (*Acanthogobius flavimanus*, *Gobius* sp.) were reported to be its first (Noda, 1959) and second (Onji and Nishio, 1924; Alicata and Schattenburg, 1938; Kobayasi, 1968) intermediate hosts respectively. In Korea, however, intermediate hosts of *S. falcatus* were not extensively studied. Seo *et al.* (1979) discovered *Stellantchasmus* metacercariae from mulletts, but the metacercariae were not definitely identified through obtaining adult worms. In the present study, a group of heterophyid metacercariae encysted in the flesh of *Mugil* sp. was identified to be *S. falcatus* by the morphology of adult worms obtained after experimental infection to albino rats.

In May 1986, total 10 *Mugil* sp., 20~30cm

long, were purchased from a local fisheries market in a southern part of Kyeongsang-namdo (Province). They were brought to the laboratory, and artificially digested to examine heterophyid metacercariae, especially *S. falcatus*. The metacercariae which were morphologically characterized by submedially located ventral sucker and elongated seminal vesicle (expulsor) (Fig. 1) were tentatively diagnosed as *S. falcatus*. Three mulletts were found infected with *S. falcatus*, from which a total of 470 metacercariae were collected. They were 0.15~0.20 mm by 0.13~0.19 mm in size and round to elliptical in shape (Fig. 1). Most of the metacercariae were found from muscles and a few were from the head and gill.

Among them 280 were used to infect 5 rats (Sprague-Dawley), 30~100 to each rat, and 7~10 days later the rats were sacrificed to harvest worms from their intestinal tract. Total 83 adult worms (29.6% of infected) were harvested.

Morphologically the worms were compatible with *S. falcatus*, both in measurements and descriptions (Onji and Nishio, 1924; Seo *et al.*, 1984). They were 0.41~0.70 mm long and 0.32~0.39 mm wide, and beset with minute scale-like spines (Fig. 2). They were characterized by the presence of ventrogenital sac (Fig.



- Fig. 1.** Metacercaria of *S. falcatus* collected from a mullet, dorsal view (Scale: 50 μm). Note the elongated seminal vesicle (SV) and round excretory bladder (EB).
- Fig. 2.** Adult worm of *S. falcatus* recovered from an experimental rat 7 days after infection (Scale: 200 μm).
- Fig. 3.** Magnification of Fig. 2 near the ventrogenital sac (VS) and seminal vesicle (SV), which consists of a muscular expulsor and a vesicular part (arrows) (Scale: 100 μm).

3) containing ventral sucker armed with minute spines (less than $1\mu\text{m}$) on its inner rim, and of seminal vesicle consisted with an elongated muscular expulsor and a round vesicular part (arrows in Fig. 3).

As to the taxonomy of *Stellantchasmus* spp., at least 4 species had been reported before Chen(1951), who reduced them to only one species, *S. falcatus*. The reduction is agreed, or followed, by succeeding authors (Pearson, 1964; Seo *et al.*, 1984). Another species, *S. aspinosus*, was proposed by Pearson(1964), with the differential morphology of unarmed and little modified ventral sucker in *S. aspinosus*.

S. falcatus is, like other heterophyid flukes such as *Haplorchis* spp. and *Procerovum calderoni*, one of the potent pathogenic agents of extraintestinal (cardiac, cerebral and spinal) heterophyidiasis in man (Africa *et al.*, 1940). Nevertheless, host-parasite relationships in heterophyid infections, especially in terms of pathophysiological and immunological aspects of extraintestinal parasitism, have never been studied in detail. Since human infection with *S. falcatus* or other heterophyid flukes seems not uncommon in areas where brackish water fishes are eaten raw and cases are expected to increase, studies on host-parasite relationships are greatly needed.

The present study confirmed that the mullet serves as a second intermediate host of *S. falcatus* in Korea.

REFERENCES

- Africa, C.M., de Leon, W. and Garcia, E.Y.(1940) Visceral complications in intestinal heterophyidiasis of man. *Acta Med. Philippina*, Monogr, Ser. No. 1:1-132.
- Alicata, J.E. and Schattenburg, O.L.(1938) A case of intestinal heterophyidiasis of man in Hawaii. *J. Am. Med. Ass.*, 110(14):1, 100-1, 101.
- Chen, H.T.(1951) *Stictodora manilensis* and *Stellantchasmus falcatus* from Hong Kong with a note on the validity of other species of the two genera (Trematoda: Heterophyidae). *Lingnan Sci. J.*, 23:165-175.
- Hong, S.T., Chai, J.Y. and Lee, S.H.(1986) Ten human cases of *Fibricola seoulensis* infection and mixed one with *Stellantchasmus* and *Metagonimus*. *Korean J. Parasit.*, 24(1):94-96.
- Kagei, N., Oshima, T., Ishikawa, K. and Kihata, M.(1964) Two cases of human infection with *Stellantchasmus falcatus* Onji *et* Nishio, 1915 (Heterophyidae) in Kochi Prefecture. *Jap. J. Parasitol.*, 13(6):472-478 (in Japanese).
- Kobayasi, H.(1968) Studies on trematoda in Hainan Island, South China and Viet-Nam(French Indo-China). Reports of scientific works by H. Kobayasi, pp.155-251.
- Noda, K.(1959) The larval development of *Stellantchasmus falcatus*(Trematoda: Heterophyidae) in the first intermediate host. *J. Parasit.*, 45:635-642.
- Onji, Y. and Nishio, T.(1924) A monograph of intestinal trematodes. *Chiba Igakkai Zasshi*, 2(3): 113-161 (in Japanese).
- Pearson, J.C.(1964) A revision of the subfamily Haplorchinae Loose, 1899(Trematoda: Heterophyidae) I. The *Haplorchis* group. *Parasitology*, 54: 601-676.
- Seo, B.S., Cho, S.Y., Chai, J.Y. and Hong, S.T. (1979) Identification of the metacercariae of *Heterophyes* sp. and *Stellantchasmus* sp. from mullets of Yongsan River and Geoje Do. *Korean J. Parasit.*, 17(2):165-166 (Abstract in Korean).
- Seo, B.S., Lee, S.H., Chai, J.Y. and Hong, S.J. (1984) Studies on intestinal trematodes in Korea XII. Two cases of human infection by *Stellantchasmus falcatus*. *Korean J. Parasit.*, 22(1):43-50.
- Tantachamrun, T. and Kliks, M.(1978) Heterophyid infection in human ileum: Report of three cases. *Southeast Asian J. Trop. Med. Publ. Hlth.*, 9(2): 43-50.

남해산 송어(崇魚)에서 검출된 *Stellantchasmus falcatus* 피낭유충의 동정

서울대학교 의과대학 기생충학교실 및 풍토병연구소
채 종 일 · 손 운 목

경상남도 남해 지방산 송어에서 *Stellantchasmus falcatus*의 피낭유충을 발견하고 흰쥐에 감염시킨 후 성충을 얻어 동정하였다. 검사한 송어는 모두 10마리로서 크기 20~30cm이었고 그중 3마리에서 *S. falcatus*로 생각되는 피낭유충이 470개 검출되었다. 피낭유충은 원형 또는 타원형으로 크기 0.15~0.20×0.13~0.19mm이었고 대부분이 송어의 근육에서 발견되었다.

총 280개의 피낭유충을 흰쥐 5마리에 각각 30~100개씩 나누어 감염시키고 7~10일후에 흰쥐를 희생시켜 소장(小腸) 내용물을 검경한 바 총 83마리의 성충이 회수되었다. 회수된 충체는 길이 0.41~0.70mm, 폭 0.32~0.39mm이었고, 장낭형(長囊型; elongated sac-like)의 expulsor를 가진 저정낭(seminal vesicle) 등 몇가지 형태학적 특징을 근거로 *S. falcatus* Onji et Nishio, 1915로 동정되었다.

이 연구로 우리나라에서도 송어가 *S. falcatus*의 제 2 중간숙주역할을 하고 있음이 확인되었고 이 흡충의 인체 감염원이 되고 있을 것으로 추측되었다.