**Stictodora** sp. (Trematoda: Heterophyidae) Recovered from a Man in Korea

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**Abstract:** Two adult specimens of heterophyid fluke, which belong to the genus *Stictodora*, were collected from the stool of a 24-year old man after chemotherapy. The flukes were morphologically characterized by their small body size (0.90–0.98 mm long and 0.38 mm wide) and peculiar structure of ventrogenital sac with armed gonotyl (with about 12–15 spines) not enveloping genital pore. Species identification is deferred until more worms are obtained, although they closely resemble *Stictodora fuscatum* (Onji and Nishio, 1916). The patient used to eat raw flesh of mullets and gobies, which are regarded as the infection source of *Stictodora* sp., together with 3 other kinds of heterophyids described elsewhere. This is the first record of human *Stictodora* infection in the literature.

**Key words:** *Stictodora* sp., Heterophyidae, intestinal trematode, intestinal fluke

**INTRODUCTION**

Heterophyid flukes (family Heterophyidae), which are small in body size and inhabit in the intestinal tract of vertebrate hosts (Yamaguti, 1958), are not uncommon parasites of humans in various parts of the world (Beaver et al., 1984). At least 20 species belonging to 8 genera (*Heterophyes, Heterophyopsis, Metagonimus, Stellantchasmus, Centrocestus, Pygidiopsis, Haplorchis* and *Procerovum*) are known to occur in human intestine (Ito, 1964; Seo et al., 1984 b).

*Stictodora* sp., another group that belong to the family Heterophyidae, have been recorded from fish-eating birds and mammals (Yamaguti, 1958), but had never been described from human. In August 1983, the authors collected a few hundred specimens of 4 different kinds of heterophyid trematodes, from the stool of a young man who used to eat raw flesh of brackish water fishes, after chemotherapy with praziquantel. Among them, two specimens were classified to belong to the genus *Stictodora*, with which the present paper mainly concerns.

**CASE RECORD**

The patient is Han, K-J, 24-year old man whose residence before moving to Seoul in April 1983 was at a coastal village in Koheung-gun, Jeonnam-do (Province). He is the identical person with Case 1 of Seo et al. (1984 a & b) and Case 2 of Chai et al. (1984).

For convenience, brief case description is also given here. He consulted a physician because of easy fatiguability and general weakness,
indigestion and occasional diarrhea, and palpitation. At stool examination, eggs of heterophyids and *Diphyllobothrium latum* were found. He stated he used to eat raw flesh of various kinds of brackish water fishes such as mullets, perchs and gobies. Praziquantel 15 mg/kg in single dose was orally given and purgation was done with magnesium salt. The watery stool was collected to search for expelled parasites. Together with a tapeworm, total 259 adult specimens of heterophyid trematodes were recovered and classified into 4 species; *Stellantchasmus falcatus* (Seo et al., 1984a), *Heterophyopsis continua* (Seo et al., 1984b), *Heterophyes nocens* (Chai et al., 1984) and *Stictodora* sp. (present paper).

**Fig. 1~4. Stictodora* sp. recovered from a man after chemotherapy.**
1. Whole specimen. Lateral margins are a little distorted due to anthelmintic treatment (see details of organs in Fig. 5).
2. Ventrogenital sac of the worm in Fig. 1. Note the number and arrangement of gonotyl spines (left) and the genital atrium (right).
3. Intrauterine eggs, with thick-shell.
4. Ventrogenital sac of the other worm.
DESCRIPTION OF WORMS

*Stictodora* sp.

Measurements were done after formalin-fixation under pressure. Body small, pyriform or ovoid (Figs. 1 & 5), 0.90–0.98 mm long and 0.38 mm wide. Oral sucker round, 0.08 mm in diameter. Prepharynx short. Pharynx 0.06–0.07 mm in diameter. Esophagus slender, 0.07 mm long. Ceca wide, thick-walled, and a little convoluted just after bifurcation, and extended to posterior end of body. Ventral sucker slightly embedded in parenchyma, under gonotyl. Gonotyl ovoid, not enveloping genital sinus. 0.08 mm in diameter and armed with 12–15 spines (Figs. 2 & 4).

Testes obliquely tandem, 0.12–0.17 mm by 0.07–0.11 mm in size, and located in anterior part of posterior body. Seminal vesicle constricted into 3 or 4 sacs, thin-walled, and lying between acetabulum and ovary. Ejaculatory duct short, opened into genital atrium separately from metraterm. Metraterm short, ventral to ejaculatory duct. Ovary oval, 0.09–0.11 mm by 0.04–0.05 mm in size, immediately in front of right testis. Seminal receptacle spherical and median to right testis. Laurer's canal and egg shell gland present. Uterus long, distributed in posterior half of body, with many windings. Eggs oval (Fig. 3), dark brown, thick-shelled without muskmelon pattern, and 0.034–0.038 mm by 0.020–0.023 mm. Vitellaria distributed in peripheral area of post-testicular region. Excretory vesicle Y-shaped.

**DISCUSSION**

Morphologically the genus *Stictodora* is closely related to the genus *Galactosomum*. Yamaguti (1939) differentiated *Stictodora* from *Galactosomum* with following characters; constricted and thin-walled seminal vesicle, post-testicular distribution of vitellaria, absence of muscular bulb in genital atrium, separate opening of ejaculatory duct and metraterm, and Y-shape excretory vesicle. Our specimens unquestionably belong to the genus *Stictodora*.

The genus *Stictodora* was originally established by Looss (1899) with the type species, *S. sawakinensis*. Since then more than 20 species have been reported in the world literature (Yamaguti, 1958; Velasquez, 1973; Kinsella and Heard, 1974), although several of them may be synonym of the other. In southeast Asia, 12 species have been described so far; 7 in Japan (Onji and Nishio, 1916; Yamaguti, 1939), 4 in the Philippines (Africa and Garcia,
Table 1. *Stictodora* spp. reported from southeast Asia

<table>
<thead>
<tr>
<th>Species</th>
<th>Host</th>
<th>Reporter (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. adulescentium</em></td>
<td>sea-gull</td>
<td>Onji and Nishio (1916)*</td>
</tr>
<tr>
<td><em>S. pusillum</em></td>
<td>sea-gull</td>
<td>Onji and Nishio (1916)*</td>
</tr>
<tr>
<td><em>S. perpendiculum</em></td>
<td>sea-gull, dog, cat</td>
<td>Onji and Nishio (1916)*</td>
</tr>
<tr>
<td><em>S. fuscatum</em></td>
<td>cat</td>
<td>Onji and Nishio (1916)*</td>
</tr>
<tr>
<td><em>S. mergi</em></td>
<td>sea-gull</td>
<td>Yamaguti (1939)*</td>
</tr>
<tr>
<td><em>S. japonica</em></td>
<td>sea-gull</td>
<td>Yamaguti (1939)*</td>
</tr>
<tr>
<td><em>S. lari</em></td>
<td>sea-gull</td>
<td>Yamaguti (1939)*</td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>S. sawakinensis</em></td>
<td>dog, cat</td>
<td>Africa <em>et al.</em> (1940)</td>
</tr>
<tr>
<td><em>S. manilensis</em></td>
<td>dog</td>
<td>Africa and Garcia (1935)*</td>
</tr>
<tr>
<td></td>
<td>sea-gull, dog, cat</td>
<td>Africa <em>et al.</em> (1940)</td>
</tr>
<tr>
<td><em>S. guerreroi</em></td>
<td>sea-gull, dog</td>
<td>Garcia and Refuerzo (1936)*</td>
</tr>
<tr>
<td><em>S. tanayensis</em></td>
<td>kitten</td>
<td>Velasquez (1973)*</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>S. hainanensis</em>*</td>
<td>dog</td>
<td>Kobayasi (1942)*</td>
</tr>
<tr>
<td><em>S. manilensis</em>*</td>
<td>dog, cat</td>
<td>Chen (1951)</td>
</tr>
</tbody>
</table>

* Reported as a new species
** Synonym of *S. manilensis* (Chen, 1951; Velasquez, 1973)

1935; Garcia and Refuerzo, 1936; Velasquez, 1973) and 1 in China (Kobayasi, 1942) (Table 1). No report is available on *Stictodora* species in Korea.

Differential points of each species are one or more of followings; body size, egg size, comparative size and position of organs, morphology of the ventro genital sac, and so on. Among them, the ventro genital sac, especially the number and arrangement of chitinous spines on its gonotyl, is regarded a most important key for the species differentiation (Chen, 1951; Bearup, 1961).

Both of the present two specimens reveal a common feature of genital sac, which appear as 2 partially overlapping rings, gonotyl and genital sinus (Figs. 2 & 4). The spines on gonotyl are one group near its apex, radially arranged, and 12~15 in number. *Stictodora manilensis* Africa and Garcia, 1935 (syn. *S. hainanensis* Kobayasi, 1942; Table 1) can be a candidate for the present specimens, considered the morphology of genital sac and number of gonotyl spines. *S. fuscatum* (Onji and Nishio, 1916 & 1924) also appears to be a possible species to identify our specimens with, although in this species exact number of gonotyl spines is not known.

*S. fuscatum* was originally described as *Cornatrum fuscatum* in Japan with 3 other new species (Onji and Nishio, 1961 & 1924). Later Yamaguti(1939) transferred them into the genus *Stictodora* Looss, 1889. In the meantime *S. manilensis* was described as a new species in Manila, Philippines (Africa and Garcia, 1935). Morozov(1952) considered *S. manilensis* a synonym of *S. sawakinensis*. However, they appear to be distinct from each other in their gonotyl structure; armed with numerous, up to 78, spines arranged in 6~10 rows in *S. sawakinensis* (Witenberg, 1929; Kobayasi, 1968) while armed with 12~15 long triangular hook-like spines in *S. manilensis* (Africa and Garcia, 1935; Chen, 1951).

Reviewing the literatures on *Stictodora* spp., the present authors came to a strong impression that *S. manilensis* should have been the same species as *S. fuscatum*. They each other reveal very similar morphology, especially in the appearance of ventro genital sac and other genital
organs, in spite that the number of gonotyl spines is not known in *S. fuscatum*. It seems likely that Africa and Garcia (1935) were not aware of the pre-existence of *S. fuscatum* under a different genus when they described *S. manilenis* as a new species. Appreciable difference between the two species is only in the size of eggs; 25~26 by 14~15 µm for *S. manilenis* (Africa and Garcia, 1935) and 35~37 by 22~24 µm for *S. fuscatum* (Onji and Nishio, 1924). Larger eggs of *S. manilenis*, however, have also been reported; 25.0~32.5 by 17.5~20.0 µm in the Philippines (Velasquez, 1973) and 38 by 26 µm in Hong Kong (Chen, 1951). These discrepancy may have been due to different status of specimens measured; fresh, fixed or stained.

In our specimens measured under fixation the egg size was 34~38 by 20~23 µm, by which they are more compatible with *S. fuscatum* than any other species. Final identification is, however, deferred until more worms are obtained. Observation of further specimens would make the diagnosis clear and provide informations on the validity of *Stictodora* species.

It is noteworthy that *Stictodora* sp. can infect human host. Of 22 ever-reported species (Yamaguti, 1958; Velasquez, 1973; Kinsella and Heard, 1974), 11 were found only from birds, 5 were from birds and mammals, and 6 were from mammals excluding man. Hereafter *Stictodora* sp. (*S. fuscatum*) is included in the list of flukes that can occur in human intestine. Brackish water fishes are known to harbour the metacercariae of *Stictodora* sp. (reviewed by Yamaguti, 1958), but no report is available on intermediate hosts in Korea. Clinical details of this patient were described in other papers (Seo *et al.*, 1984 a & b; Chai *et al.*, 1984).

**REFERENCES**


Stictodora sp. (Trematoda; Heterophyidae)의 인체기생 1례

이형흡충류의 하나인 Stictodora속 흉충 2마리가 구충제 및 하체를 투여한 24세 남자환자의 설사변에서 검출되었다. 충체는 길이 0.90~0.98 mm, 폭 0.38 mm로 소형이며 독이한 부품관-생식관(ventrogenital) 장치가 있고 생식구와 별개인 gonotyl(12~15개의 미소한 긴고리 보유)을 가지고 있었다. 충체는 형태학적으로 Stictodora fuscatum(Onji and Nishio, 1916)과 매우 비슷하였으나 다수의 충체를 획득할 때까지 확정적인 종 동정은 보류하였다. 환자는 설사, 농어 등 반염수혈 이유를 주로 생식한다고 하였다. 이들이 Stictodora sp.는 물론 따로 보고한 3종류 이형흡충의 감염원이었을 것으로 추측된다. 이 중에는 문헌상 Stictodora속 흉충의 최초 인체기생례에 해당된다.