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Himasthla kusasigi (Trematoda, Echinostomatidae) recovered from the Intestine of the Dunlin, *Calidris alpina sakhalina*, in Korea

Jong Phil Chu, Yoo Jung Cho, Jeong Chil Yoo* and Sung Gyun Park**
(Korea Institute of Ornithology and Department of Parasitology, College of Medicine;
*Korea Institute of Ornithology and Department of Biology, Kyunghee University, Seoul 130-701;
**Clinical Pathology, Daegu Public Health University, Daegu 702-260, Republic of Korea)

ABSTRACT

This paper deals with the morphology and taxonomy of the first reported species of echinostome belonging to the genus *Himasthla* Dietz, 1909, found from dunlins (*Calidris alpina sakhalina*) in Korea. Birds were captured with mist-nets at the tidal flat of Yeochari, Kanghwa-gun, Kyunggi-do, Korea. The worms were removed from avian intestines in physiological saline, fixed, acetocarmine stained and observed. *Himasthla kusasigi* Yamaguti, which was found in 1939, was characterized morphologically by a long and slender body (5.27 mm in length), besetting with spines and reniform head collar (0.27 mm) in a form of a single and uninterrupted row of 31 spines. The oral sucker (0.057 × 0.0684 mm) is smaller than the ventral sucker (0.35 × 0.29 mm). The ventral sucker was close to the anterior extremity of the body. The worm had two elliptical testes (anterior 0.47 × 0.30 mm, posterior 0.59 × 0.27 mm). The testes were close to the posterior end of the body. The uterus was very long, winding and extending through at least two thirds of the body length. The ovary (0.13 × 0.14 mm) was round and small. Below the ovary, a round and small seminal receptacle was found.

Key words: Trematoda, *Himasthla kusasigi*, *Calidris alpina sakhalina*, Echinostomatidae

INTRODUCTION

As people can recognize that animals play an important role as intermediate or reservoir hosts, carrying parasites to man, many studies have been made on such organisms among the parasite studies. Although a number of studies have also been conducted widely on animals in Korea, studies on parasites dwelling wild birds were still very few.

In Korea, Chu *et al.* (1973) found *Notocotylus* in wild ducks and pheasants. Ryang *et al.* (1991) identified *Metagonimus* sp., *Centrocestus armatus, Echinochasmus japonicus, Strigea falconis*, and *Diplostomida* sp. in 12 *Egretta Alba*. Joung (1997) also reported in his study on wading birds that *Levinseniella* sp., *Matritrema eroliae, Echinostoma* sp. were observed in *Calidris ruficollis, Cleophora* sp. in *Calidris canutus*. In Japan, *Gynaecotyla* sp., *Himasthla* sp., *Maritrema* sp., *Spelotrema* sp. were found in *Calidris alpina sakhalina*, *Strigea* sp. in *Calidris ruficollis*, and *Corpopyrum* sp. in *Tringa cinereus* (Ishii, 1933a, b; Ishii and Masuoka, 1935; Kamegai *et al.*, 1957, 1959, 1987). Others were listed in Uchida *et al.* (1991).

MATERIALS AND METHODS

Dunlins (*Calidris alpina sakhalina*) were captured from Kanghwa island between August - September, 1997 with mist nets and were autopsied immediately at the collecting sites. Their alimentary canals were cut open to reveal any endoparasites as soon as possible. The worms were removed from intestines in physiological saline, fixed in 10% neutral formalin, stained with acetocarmine (Sigma, USA), and mounted in Polymount (Polyscience, USA).

The specimens were measured with an ocular micrometer (Olympus, Japan). Drawings were made with the aid of a drawing attachment (Olympus, Japan). The specimens were kept in Dept. of Parasitology, College of Medicine, Kyunghee University, Korea.

The description was based on the measurements of 15 mature specimens. Each value was the mean with the range in parentheses.

RESULTS

Himasthla kusasigi Yamaguti, 1939 (Figs. 1, 2)

Himasthla kusasigi Yamaguti, 1939, p. 145; 1958, p. 650.

Description. Body very long, slender, 5.27 (3.92-6.10) mm in length, with maximum width of 0.48 (0.33-0.60) mm in front of ovary (Fig. 1). So it is tapered posteriorly into a blunt point. Tegument thick, serrate especially on hindbody and beset with small spines in maximum length of 0.01 mm in the postventral sucker region. Head collar 0.27 (0.23-0.30) mm broad, with a row of 31 spines (Figs. 1, 2); end group spines in two tandem pairs, 41.0 (35.0-45.0) × 11.1 (10.0-14.0) mm, the inner one of anterior pair being smallest, outer one of posterior pair largest; marginal

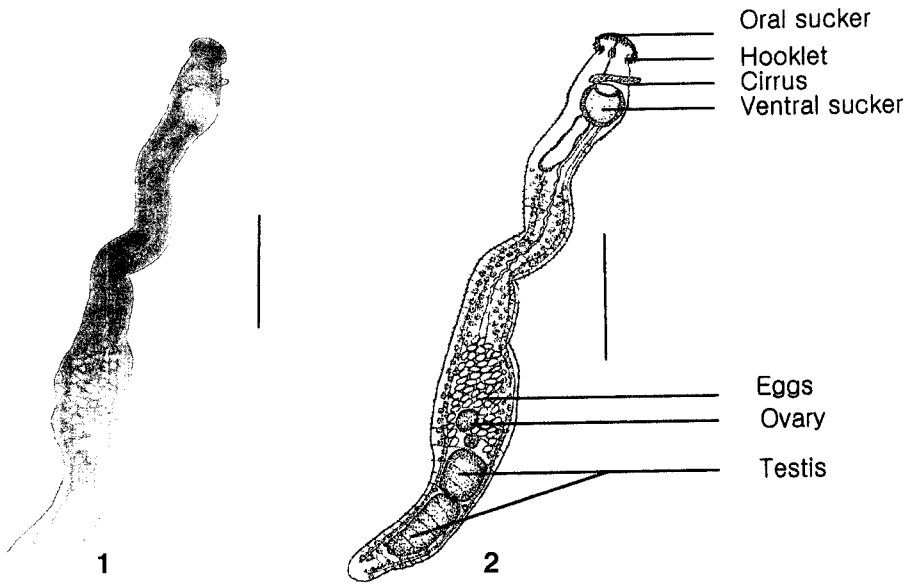

Fig. 1. *Himasthla kusasigi*. 1. Photograph of whole body; 2. Schematic figure of whole body. Bar = 0.1 mm.

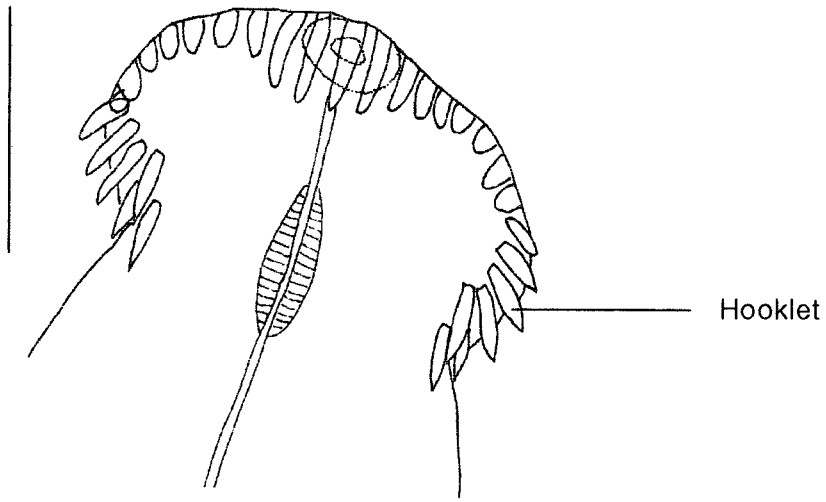

Fig. 2. *Himasthla kusasigi*. Schematic figure of head collar of the body. Bar = 0.1 mm.

spines 0.0432 (0.04-0.052) × 0.015 mm in length (Fig. 2). Oral sucker 0.0572 (0.05-0.075) mm long, 0.0684 (0.05-0.075) mm wide. Ventral sucker 0.35 (0.32-0.38) mm long, 0.29 (0.26-0.32) mm wide. Prepharynx short. Pharynx well developed, 0.0725 (0.06-0.08) × 0.0389 (0.025-0.05) mm in length. Intestinal caeca simple, extending to the level of the posterior border of posterior testis. Excreting pore located at terminal portion. Testes oval to elliptical, contiguous; the anterior 0.47 (0.42-0.52) mm long by 0.30 (0.24-0.35) mm wide; the posterior 0.59 (0.52-0.64) mm long, 0.27 (0.23-0.30) mm wide, about 0.47 mm away from posterior extremity. Cirrus long,

Table 1. Measurements of *Himasthla kusasigi* and its related species (mm)

	H. kusasigi		*H. alincia* Chen *et al.* (1985)	*H. numenii* Chen *et al.* (1985)	Present specimen
	Yamaguti (1939)	Chen *et al.* (1985)			
Body	5.75 × 0.43-0.56	7.74-8.10 × 1.04-0.42	5.12-6.4 × 0.62-0.24	6.88 × 0.256-0.352	3.92-6.1 × 0.33-0.6
Oral sucker	0.06-0.07 × 0.063-0.066	0.13-0.14 × 0.14-0.16	0.064-0.068	0.080 × 0.082	0.05-0.075 × 0.05-0.075
Head collar (spines)	0.24-0.25(31)	0.045-0.048 × 0.021-0.024	0.035-0.038 × 10(31)	(31)	0.23-0.30(31)
Ventral sucker	0.25 in diameter	0.42-0.466 × 0.432-0.450	0.25-0.27 × 0.24-0.26	0.288 × 0.320	0.26-0.32 in diameter
Pharynx	0.066-0.07 × 0.054-0.057	0.104-0.128 × 0.112-0.115	0.06-0.07 × 0.058-0.07	0.078 × 0.053	0.06-0.08 × 0.025-0.05
Anterior testis	0.44 × 0.33	0.65-0.780 × 0.43-0.58	0.26-0.28 × 0.28-0.32	0.32 × 0.208	0.42-0.52 × 0.24-0.35
Posterior testis	0.51 × 0.31	0.75-0.84 × 0.45-0.52	0.32-0.38 × 0.27-0.31	0.416 × 0.176	0.52-0.64 × 0.23-0.30
Ovary	0.16 × 0.18	0.192-0.270 × 0.176-0.21	0.136-0.144 × 0.128-0.16	0.112 × 0.114	0.11-0.20 × 0.12-0.2
Cirrus pouch	0.075 mm in diameter	1.60-1.68 × 0.112-0.160	0.96-1.2 × 0.064-0.08	0.96 × 0.07	0.115 mm in diameter
Egg	0.087-0.096 × 0.057-0.060	0.102-0.106 × 0.074-0.077	0.085-0.087 × 0.052-0.06	0.085-0.088 × 0.06-0.062	0.085-0.1 × 0.055-0.07
Host	*Tringa ochlropus*	*Tringa ochlropus (Japan) Haematopus ostralegus sculens* (China)	*Numenius variegatus, Tringa cinclus*	*Numeniscus arquata Orientalis*	*Calidris alpina sakhlina*
Geographic location	Japan	China, Japan	China, Europe, U.S.A.	China	Korea

eversible. Cirrus pouch slender, sinuous, 0.0115 (0.009-0.013) mm in diameter, extending about 0.51 (0.43-0.62) mm further posterior of ventral sucker. Seminal vesicle surrounded by prostatic cells at its twisted anterior portion. Genital pore immediately anterior to ventral sucker. Ovary round 0.13 (0.11-0.20) mm long, 0.14 (0.12-0.20) mm, a little in front of anterior testes. Uterus closely coiled at its proximal portion. Seminal receptacle small round 0.1 (0.08-0.11) mm, below the ovary. Eggs oval, thin-shelled, 0.931 (0.085-0.10) mm long, 0.061 (0.055-0.070) mm wide. Vitelline follicles commencing on either side of posterior part of cirrus pouch, interrupted at the middle portion of each testis.

DISCUSSION

The genus *Himasthla* is characterized by their long, filamentous body, spiny head collar with a single, uninterrupted row of spines, and extensive vitellaria (Didyk and Burt, 1997). Most of the measurements performed by Yamaguti (1939) and by us were overlapped (Table 1). Oral sucker, ventral sucker, Head collar spines number, end group spines in two tandem pairs, pharynx, testes, ovary, eggs size, shape and location were similar to our results. But the description of the *H. kusasigi* that we measured could be distinguished from that of Yamaguti (1939) in body length, diameter of cirrus pouch and host. That might be caused by the number of specimens. Because Yamaguti (1939) measured two specimens, and we measured fifteen specimens. Compared with the description of Chen *et al.* (1985), body length, oral sucker, ventral sucker, head collar, egg size were larger (more than 2 times) than ours. As our results were consistent with Yamaguti's (1939), we followed his identification.

This species resembles *H. alincia* Dietz, 1909, and *H. numenii* in the number of the collar spines, size of oral and ventral suckers, but differ from it notably in the anterior extent of the vitellaria, size of body, size of testes and eggs (Table 1).

The host of *H. kusasigi* reported by Yamaguti (1939) and Chen *et al.* (1985) was the green sandpiper (*Tringa ochrpus*), but in this study the host was dunlin. As the migratory pathways of the two hosts were similar, the difference may be due to the geographical phenotypic or host specific variation of the worm.

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한국산 민물도요(*Calidris alpina sakhalina*)의 장에서 발견된 흡충류 1미기록종(*Himasthla kusasigi*)

주 종 필·조 유 정·유 정 칠*·박 성 균**
(경희대학교 한국조류연구소, 의과대학 기생충학교실;
*경희대학교 한국조류연구소, 문리과대학 생물학과; **대구보건대학 임상병리과)

요 약

민물도요(*Calidris alpina sakhalina*)의 장에서 echinostome에 속하는 *Himasthla* (Dietz, 1909) 속의 국내 미기록종을 발견하고 형태 및 분류학적 연구를 시도하였다. 새들은 경기도 강화군 여차리 일대에서 새 그물을 사용하여 포획하였다. 잡은 새들의 장에서 기생충을 분리하여 생리 식염수로 씻고 고정한 후, acetocarmine으로 염색한 후 현미경으로 관찰하였다. 발견된 *Himasthla kusasigi* (Yamaguti, 1939)는 작고, 길쭉한 형태로 전장 5.27 mm 정도 였으며 31개의 가시가 달린 두관(0.27 mm)을 갖고 있었다. 구흡반(0.057×0.0684 mm)은 복흡반 보다 작았다. 복흡반(0.35×0.29 mm)은 몸쪽 앞부분에 가깝게 위치하였다. 충체는 타원형의 전고환(0.47×0.30 mm), 후고환(0.59×0.27 mm) 두개의 고환을 갖고 있었다. 고환들은 충체 뒤쪽에 가깝게 위치하였다. 자궁은 길고 구불구불하였으며 충체 길이의 2/3 정도를 차지하였다. 난소(0.13×0.14 mm)는 작고 둥글었다. 난소 아래에는 작고 둥근 수정낭이 보였다.