

<증례보고>

First record of *Prosthogonimus cuneatus* (Prosthogonimidae) from the Little Grebe, *Tachybaptus ruficollis*, in Korea

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Abstract : A trematode species belonging to the genus *Prosthogonimus* (family: Prosthogonimidae) was collected in August, 2004 from the bursa of Fabricius of a single Little Grebe, *Tachybaptus ruficollis*, caught in Chuncheon, Korea. Five specimens were collected in total and fluke morphology was examined under using a light microscope. The average parasite size was 5.6 × 3.2 mm (length × width; based on 4 specimens). The genital pore was located on the anterior right margin of the oral sucker. The cirrus sac was strongly sinuous and extended beyond the intestinal bifurcation to the ventral sucker. The prepharynx was extremely short and the pharynx was small. The vitellaria consisted of 6 follicle bunches and extended from the ventral sucker to the posterior of the testes. Finally, the uterus filled the body cavity posterior to the testes. In addition, there were no heavy slings occurred anterior to the testes. Based on these morphological characteristics, the parasites were identified as *P. cuneatus*. The discovery of *P. cuneatus* within a Little Grebe constitutes a new host identification and a new geographical record. This is the first reported case of *Prosthogonimus* infection within wild birds in Korea.

Keywords : bursa of Fabricius, *Prosthogonimus cuneatus*, *Tachybaptus ruficollis*

Introduction

The little grebe, *Tachybaptus ruficollis*, is an excellent swimmer and diver, and pursues its fish and aquatic invertebrate prey underwater [4]. It is found across Korea. In winter it can be found on more exposed lakes [3, 5, 11]. Parasites are considered to be very important part in the lives of their hosts. Although behavior, ecology and physiology are well known [3, 5, 11], relatively little information is available on the infection status of those parasites in Korea. The only six species of intestinal trematodes have been found in Korean wild birds [2]. Especially, they are reported that *Echinoparyphium koizumi* and *Notocotylus attenuatus* found from intestine of the Great Crested Grebe (*Podiceps cristatus*) [2].

Prosthogonimus infection occurs mainly in the bursa of Fabricius and oviduct of fowl, duck, and various

wild birds. Species in this genus are distributed worldwide and are considered to be the most pathogenic poultry trematode parasite in Europe, Asia, and South America [8, 14]. Although numerous *Prosthogonimus* species and hosts have been recorded worldwide [1, 8, 10, 12-14], the genus has not been previously recorded in Korea. Birds infected with *Prosthogonimus* spp. tend to sit and stay on the nest. Furthermore, a milky discharge may occur from the cloaca, and they may lay eggs with soft shells or without any shell, so the parasite could have an economic impact in some instances [13]. The parasites of Prosthogonimidae were cylindrical shaped and medium sized. The cirrus sac was sinuous, extending beyond the intestinal bifurcation to the ventral sucker. Vitellaria forming large bunches, dorsally and dorso-laterally, in hind body. Uterus much coiled, occupying most of hindbody posterior to testes [1, 12]. In the

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present study, we received the oviduct fluke of the bursa of Fabricius in a single Little Grebe. Morphological features were examined without staining, using a light microscope.

Case report

On August 8, 2004, a single Little Grebe, *Tachybaptus ruficollis*, was captured in Chuncheon, Korea, and brought to the teaching veterinary hospital at Kangwon National University due to weakness and emaciation. However, despite medical treatment, the bird died 5 days later and the body was examined for parasites. Upon dissection, 5 parasite specimens were located in the bursa of Fabricius, one of which was damaged during the collection process. Therefore, 4 samples were collected in good condition, thus permitting a fairly accurate description. Parasites were preserved in 10 % formalin. Morphological features were examined without staining, using a light microscope. Identifications were performed based on the descriptions of Schell [12], McDonald [10], and Tkach *et al.* [15].

The parasites (Fig. 1) were an average size of 5.6×3.2 mm (length \times width; based on 4 specimens). The genital pore was located on the anterior right margin of the oral sucker. The cirrus sac was strongly sinuous and extended beyond the intestinal bifurcation to the ventral sucker. The prepharynx was rudimentary and the pharynx was extremely small (166.7×133.3 μ m). The lobulated ovary (608.3×605.0 μ m in diameter) was located posterior to the ventral sucker and immediately left of the mid-longitudinal body axis. The oval or nearly spherical testes (right: 741.7×566.7 , left: 808.3×558.3 μ m) were situated posterior to the ovary on both sides. The uterus was well developed and greatly

coiled, and extended to the distal end of the body. However, heavy uterine coils were not located anterior to the ventral sucker. The cirrus sac did not pass beyond the ovary. The oval eggs within the uterus were numerous and yellow to brown in color (22.4×12.0 μ m) (Table 1). The vitellaria consisted of 6 follicle bunches and extended from the ventral sucker to the posterior of the testes. Based on these morphological characteristics, the parasite was identified as *P. cuneatus*.

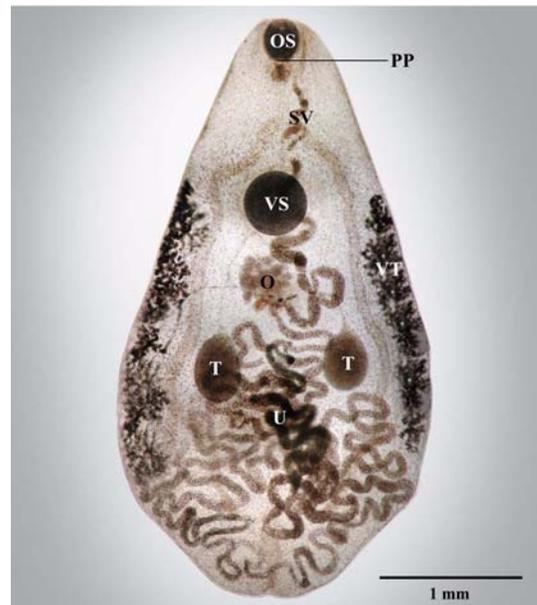


Fig. 1. Morphology of *Prosthogonimus cuneatus*, an adult worm recovered from the Little Grebe, *Tachybaptus ruficollis*. Note the positions of the vitellaria and preacetabular uterine loops and the presence of prepharynx. OS: oral sucker, PP: prepharynx, SV: seminal vesicle, VS: ventral sucker, O: ovary, VT: vitellaria, T: testes, U: uterus.

Table 1. Comparative measurements* of *Prosthogonimus* spp. by different authors

	Present study	<i>P. cuneatus</i>	<i>P. ovatus</i>	<i>P. machrochis</i>
Body length	$5,637 \pm 85.6 \times 3,231 \pm 633.2$	$4,950 \times 2,375$	$4,200 \times 3,200$	$7,560 \times 5,260$
Oral sucker	$475 \pm 45.6 \times 400 \pm 45.6$	200×250	$62.5 \times 56.3^\dagger$	520×490
Ventral sucker	$750 \pm 45.6 \times 769 \pm 47.3$	1,800	$225 \times 175^\dagger$	920×850
Pharynx	$167 \pm 28.9 \times 133 \pm 57.7$	175×100		23×22
Ovary	$608.3 \pm 38.2 \times 605.0 \pm 31.9$	600×400		$1,100 \times 850$
Right testis	$741.7 \pm 14.4 \times 566.7 \pm 28.9$	750×400		$1,660 \times 1,350$
Left testis	$808 \pm 62.9 \times 558 \pm 28.9$			$1,780 \times 1,620$
Eggs	$22.4 \pm 3.2 \times 12.0 \pm 1.0$		21.6×12.7	28×16
Reference		[6]	[7]	[9]

*Mean (range) in μ m. † Measurements under the scanning electron microscope.

Table 2. Comparative data gathered from specimens reported to be *Prosthogonimus* species

	Present	<i>P. cuneatus</i>	<i>P. ovatus</i>	<i>P. macrochis</i>
Body size (mm)	5.6 × 3.2	4.6 × 2.2	3.8 × 1.9	7.56 × 5.26
Cirrus sac	Extending beyond the intestinal bifurcation	Extending beyond the intestinal bifurcation	Extending to the intestinal bifurcation	Extending to the intestinal bifurcation
Prepharynx	○	○	×	×
Vitellaria	Begin at the level of the VS* and extends posterior to the testes	Originates at the level of the VS	Originates at the level of the anterior VS	Begins at the level of the VS and does not extend posterior to the testes
Uterus	In an area posterior of the VS	In an area posterior of the VS	In areas anterior and posterior of the VS	In an area posterior of the VS
Distribution		Cosmopolitan	Cosmopolitan	North America, Asia
Reference		[10, 15]	[10, 13]	[9, 10]

*VS: ventral sucker.

Discussion

The family Prosthogonimidae includes seven genera: *Prosthogonimus*, *Schistogonimus*, *Mediogonimus*, *Ophthalmogonimus*, *Praeuterogonimus*, *Coelomotrema*, and *Cephalotrema*. Of these, *Prosthogonimus* includes the largest number of species [16]. The most common morphological characteristics of the genus *Prosthogonimus* include a spindle-shaped flat body, a ventral sucker in the anterior half of the body, the presence of a pharynx, long caecae, testes opposite in the hindbody, a cirrus sac anterior to the ventral sucker, genital pore either ventral to the pharynx or lateral to the oral sucker, ovary lobed close to the ventral sucker, vitelline follicles within lateral clusters in the fore- or hindbody, and a uterus that fills the post- and intertesticular areas of the hindbody [1, 12]. However, trematode phylogenies based on characters derived from morphology and life cycles have been controversial. McDonald [10] reported that this genus contains only three definite recognized species: *P. cuneatus*, *P. ovatus*, and *P. macrochis*. Since these species are morphologically very similar, considerable confusion has occurred in identifying the characters of these species.

The presence of heavy uterine coils of *P. cuneatus* and *P. macrochis* are not found anterior to the ventral sucker, this is the separates them from *P. ovatus*. Until now, this feature was used for differentiation among different *Prosthogonimus* species [15]. Macy [9] reported that the vitelline glands of *P. machrochis* begin at the ventral sucker and do not extend posterior to the testes. However, the vitelline glands of *P. cuneatus* extend

from the ventral sucker to the posterior of the testes (Table 2). There is confusion in the literature over the identity of *P. cuneatus* and other species of the genus.

Conclusion

The morphological characters of our specimens are the ovary definitely posterior to the ventral sucker, the short prepharynx, and the vitelline glands begin at the level of the ventral sucker and extends posterior to the testes. Based on these morphological characteristics, the parasites were identified as *P. cuneatus*. To the best our knowledge, this is the first record of *P. cuneatus* reported of Little Grebe in Korea.

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