

Spargana in a Weasel, *Mustela sibirica manchurica*, and a Wild Boar, *Sus scrofa*, from Gangwon-do, Korea

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Abstract: To know the status of sparganum (plerocercoid of *Spirometra erinacei*) infection in the Korean wild life, several species of wild animals were captured in Gangwon-do and examined for their status of infection with spargana. From February to December 2011, a total of 62 wild boars, 5 badgers, 1 weasel, 1 Siberian chipmunk, and 53 wild rodents were captured, and their whole muscles were examined with naked eyes for the presence of spargana worms. From the weasel and 1 wild boar, a total of 5 spargana specimens were extracted. The weasel was for the first time recorded as an intermediate or paratenic/transport host of *S. erinacei* in Korea, and both the weasel (*Mustela sibirica manchurica*) and wild boar (*Sus scrofa*) were added to the list of wild animals carrying spargana.

Key words: *Spirometra erinacei*, sparganum, wild boar, weasel

Sparganosis is a form of larval tapeworm infection by the sparganum, the plerocercoid larva of the genus *Spirometra*. The definitive hosts are wild canines and felines, and the typical second intermediate hosts are amphibians [1]. However, such plerocercoids can infect a broad range of mammals, wherein they remain at the plerocercoid stage [2]. As for non-human primates, sparganosis has been reported in vervets (*Cercopithecus aethiops*), Sykes monkeys (*Cercopithecus mitis*), and baboons [3-5].

Among humans in Korea, cases of sparganosis have continually been recorded, as seen in breast sparganosis [6]. According to previous reports in Korea, snakes have been the most important source of human sparganosis (59.8% of cases), and spargana were also detected in the tissues of frogs with the infection rate of 4% [7-10]. Other animals are also known to be intermediate hosts of *Spirometra* sp. in Korea. Investigations of wild animals on sparganum infection have confirmed 7 infected mammalian species; *Lutreola sibiricus*, *Charronia flavigula koreana*, *Nyctereutes koreensis*, *Vulpes vulpes*, *Vulpes lupus*, *Erinaceus amurensis koreans*, and *Sus scrofa domesticus* [11-14]. However,

these discoveries were made mostly before 1932, after which no further studies have been conducted. Considering the central role of wild animals in maintaining the life cycle of *Spirometra* sp., surveys to figure out the current infection status are needed. The present study examined various wild animal species in order to know their infection status with spargans.

From February to December 2011, we examined a total of 62 wild boars (*Sus scrofa*), 5 badgers (*Meles meles melanogenys*), 1 weasel (*Mustela sibirica manchurica*), 1 Siberian chipmunk (*Tamias sibiricus*), and 53 wild rodents (*Clethrionomys rufocanus regulus*, *Apodemus agrarius*, and *Apoedmus peninsulae*) for sparganum infection. All were captured in Gangwon-do, but in different areas. The wild boars were caught in Yanggu-gun, the badgers, Siberian chipmunk, and weasel were in Hoengseong-gun, and the wild rodents were in both Yanggu-gun and Inje-gun. The animals were immediately transferred to our laboratory, and examined with naked eyes the whole body musculatures for the presence of spargana. In the cases of the wild boar, however, qualified hunters of Yanggu-gun captured them by shooting, and the examinations were conducted in the field with the assistance of the hunters. The carcasses of wild boars were consumed by the hunters except for the forelegs and hind legs. The legs remained were later examined for the presence of *Trichinella* spp. infection.

The results showed that, in the weasel, 2 living spargana were embedded in both sides of the axillary muscle (Fig. 1A, B). Af-

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Fig. 1. Spargana embedded in the muscle of the weasel (A, B) and the wild boar (C).

ter extraction, the worms moved actively in saline solution. Additionally, 3 spargana were discovered in the axillary muscle of 1 wild boar (Fig. 1C). No worms were discovered in the badgers, Siberian chipmunk, and wild rodents.

The present study added the weasel, *M. sibirica manchurica*, as a new wild animal species infected with spargana. Weasels usually feed on small mammals such as rodents, but they are opportunistic predators of frogs or snakes as well, whereby they become a paratenic host for the sparganum [15]. This is the first report in Korea, and the second in the world after 1 such record from Belarus [16]. However, the weasel does not seem to be a source of human infections in Korea, as raw weasel meat is generally not favored by the Koreans; moreover, spargana in the weasel meat may be easily visible by naked eyes.

Also interesting finding in the present study was the discovery of spargana in a wild boar. Wild boars are omnivorous, and thus can be infected through a variety of routes, for example, consumption of cyclops, small amphibians and reptiles, including frogs and snakes. In fact, sparganosis has been detected in feral hogs (*Sus scrofa*) in Florida, USA, and a 6.9% overall sparganosis prevalence was reported in Florida feral swines [17,18]. The present report is significant as this is the first to offer proof of the wild boar as a reservoir host for spargana in Korea, notwithstanding the fact that the relatively large size of spargana in wild boar meat would make the probability of actual human infection from that source very low. With regard to wild rodents, they may play little role in maintaining the life cycle of *Spirometra* sp. in Korea, since they showed no signs of infection in this study.

In summary, 2 of wild animals examined in this study (1 weasel and 1 wild boar) were found to be infected with spargana. Further investigations involving other animal species are needed in order to broaden the knowledge foundation of spar-

ganum infection in Korea.

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