

## Detection of Spargana on *Ptyas korros* in Sidoarjo

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### Abstract

*Ptyas korros* or Indo-China Rat Snake is one of the snakes that are commonly hunted in Indonesia. This study aimed to identify *Spirometra sp.* on *P. korros* in Sidoarjo. A total of 18 snakes were collected within 3 months. Identification of *Spirometra sp.* was done using a native method, Semichen Acetic Carmine, and HE staining. As a results, 8 (44.4%) of 18 samples showed positive infection with *Spirometra sp.* The results of this study indicate the presence of spargana in *P. korros* in Sidoarjo and no adult *Spirometra sp.* was found.

Keywords: *Ptyas korros*, sparganum, *Spirometra sp.*, zoonosis

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### INTRODUCTION

Reptiles are one kind of animal that is widely traded. One of the reasons behind this phenomenon is economic factors to meet daily needs. Reptiles were hunted down on small and large scale. Snakes, monitor lizards, and geckos are the most commonly hunted down for meat and skin. Reptile meat was consumed because it is believed to have medicinal properties. Reptile skin was preserved and further utilized as a raw material (Heningsih *et al.*, 2018).

*P. korros* is one of the snakes that is commonly hunted down for human consumption. Other than for the meat and skin, the bones are also believed to have medicinal properties to cure lower back pain. The bone is processed by burning and pounded into powder, then mixed with water to drink (Heningsih *et al.*, 2018). Despite the believed medicinal properties, consuming snake products also has many dangerous threats. Consuming raw meats, drinking blood, and swallowing snake bile possessed the risk of contagious diseases from the snakes or zoonotic diseases. In addition, cooking errors and utensils contamination can also increase the risk (Wang *et al.*, 2014).

Sparganum is a zoonotic disease caused by cestoda larvae of the genus *Spirometra sp.* Snake is one of the important intermediate hosts for spargana (Jongthawin, 2014). Three hosts play a role in the life cycle of *Spirometra sp.*, two as intermediate hosts and one as a definitive host (Panjaitan *et al.*, 2021). Crustaceans act as the first host intermediates. Frogs, fish, and snakes become the second intermediate host before finally, *Spirometra sp.* infects carnivores such as birds, dogs, and cats as definitive hosts (Wang *et al.*, 2014). Adult worms can live up to 9 years in mammalian bodies and produce many eggs that are excreted with feces (Liu *et al.*, 2015).

Identification is important in studying the epidemiology and control of diseases caused by cestoda (Zhu *et al.*, 2002). The unpredictable occurrence of sparganum in humans puts humans between the second host intermediate and the definitive host (Wang *et al.*, 2014). It is reported that more than 1600 cases of sparganum have occurred worldwide, mostly originating from Southeast Asia and some from South America, Europe, and Africa. Most people infected with sparganum are travelers that returning from endemic areas (Liu *et al.*, 2015). According to study conducted by Wiwanitkit (2005), cases of

sparganum in humans can be found in the eye, central nervous system, ears, intraosseous, intraperitoneal, lung, and subcutaneous.

## MATERIALS AND METHODS

### Ethical Approval

The current study did not require animal ethics approval. However, this study was carried out according to standard operating procedures.

### Study Period and Location

This type of study was an exploratory study that aimed to determine the spargana of the *Spirometra sp.* tapeworm genus on *P. korros* collected in Sidoarjo during 3 months. The examination was carried out in the Laboratory of Parasitology, Faculty of Veterinary Medicine, Universitas Airlangga.

### Sample Identification

The sample used in this study was the snake collected in Sidoarjo, which has been stored and will be distributed for consumption. In this study 18 samples of snakes were collected by collectors. Sampling was done by necropsy. Worms were immediately put into a pot containing a solution of NaCl as a preservative. Samples were then labeled by number and date of collection, marking was also carried out for different predilections in one snake. The stool was examined by three methods, i.e. native, Semichen-Acetic Carmine staining, and HE staining under a microscope at 40x magnification.

### Data Analysis

Data were presented descriptively.

## RESULTS AND DISCUSSION

Based on investigation, 8 (44.4%) of 18 samples showed positive infection with *Spirometra sp.* This study was reported tapeworms predilected in the subcutaneous tissue of *P. korros*. Based on its location and morphological characteristics, the tapeworms found were identified as plerocercoid of *Spirometra sp.*

Macroscopically *Spirometra sp.* larvae have a flat body shape, white color, and wider anterior parts. The anterior portion of the spargana can shrink and widen when moving. The length of *Spirometra sp.* larvae ranged from 6 to 12 cm with an average length of  $\pm 10$  cm and a body width of  $\pm 0.3$  cm. The characteristics of larvae found in this study were similar to observations made by Kavitha (2012). Plerocercoids originate from proceroids phase in the first host intermediates, which are ingested by snakes and then penetrate the walls of the digestive tract and migrate to the subcutaneous or musculus tissue.



**Figure 1.** Scolex spargana under Semichen Acetic Carmine staining.



**Figure 2.** Strobila spargana under HE staining.

Microscopic identification of *Spirometra sp.* larvae using 40x magnification and stained by semiche-acetic carmine and HE shows an anterior part that has a size larger than the body, a concave mouth formation, and segmented (Figure 1 and 2),

as stated by Kutcha *et al.* (2015). The length of the segment of spargana found was  $\pm 0.09$  mm. The plerocercoids in corous snakes do not yet have reproductive organs that can be used as a benchmark for differentiation between species.

Sparganum is found in many countries but mostly in East Asia. Thailand as one of the countries in Southeast Asia has reported cases of sparganum in humans. Patients experience swelling of the eyelids so it needs to be lifted directly (Wiwanitkit, 2005). Not only the eyes, spargana can migrate to other vital organs such as breasts, lungs, heart, and abdominal cavity which can damage the function of these organs (Kusuma *et al.*, 2020).

Larvae from *Spirometra sp.* cause sparganum not only in snakes but also in mammals and humans. Sparganum in humans is caused by consuming raw or undercooked meat. During the life cycle, *Spirometra sp.* requires three intermediate hosts. The first intermediate host is the copepod in which coracidia is ingested and develops in the digestive tract (Prameswari *et al.*, 2020). Proceroid will develop into a plerocercoid if the first host intermediate before consumed by the second host intermediate (Fransiska *et al.*, 2020). The life cycle of *Spirometra sp.* is different from some of the other cestodes, especially in the second host intermediates which also become the paratenic host (Sari *et al.*, 2022). In the plerocercoid phase, *Spirometra sp.* not only involves fish as the second intermediate but also frogs, other amphibians, reptiles, birds, and mammals. The definitive host of *Spirometra sp.* is not just a fish-eating vertebrate but other predatory mammals such as cats, dogs, and not infrequently humans (Kuchta *et al.*, 2015).

In a study conducted by Scioscia *et al.*, 2014, the pampas fox (*Lycalopex gymnocercus*) was known as a new definitive host after the discovery of adult *Spirometra erinacei* in the digestive tract. The main reinforcing characteristic is the presence of anterior and posterior uterine coils in the longitudinal line of the proglottid. In the *P. korros* ecosystem in Sidoarjo, it is suspected that adult *Spirometra sp.* worms can be found in the corpus snake predator mammal.

## CONCLUSION

A total of 8 (44.4%) positive samples were infected with plerocercoid of *Spirometra sp.* and no adult worms were found. Predilection from spargana resides in subcutaneous tissue.

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## AUTHORS' CONTRIBUTIONS

BSL: Conceptualization and drafted the manuscript. RB, APR, and EDP: Performed sample evaluation. SK and M: Validation, supervision, and formal analysis. M: Prepared figures. All authors have read, reviewed, and approved the final manuscript.

## COMPETING INTERESTS

The authors declare that they have no competing interests.

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