

SHORT COMMUNICATION**PENTASTOMID (*Armillifer moniliformis*) INFECTION IN MALAYSIAN BLOOD PYTHON (*Python curtus*)****WITCHAYA TONGTAKO^{2*}, CHANDRAWATHANI P.¹, PREMALATHA B.¹, SHAFARIN M.S.¹ AND AZIZAH D.¹**¹ Veterinary Research Institute, 54 Jalan Sultan Azlan Shah, 31400 Ipoh, Malaysia² Faculty of Veterinary Science, Prince of Songkla University, Hat-Yai, Thailand

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SUMMARY

Carcasses of the Malaysian blood python (*Python curtus*) was postmortemed in the Veterinary Research Institute, Ipoh. Three worms belonging to the genus *Armillifer* sp. (larval stage) was identified based on morphological examination. This pentostomid worm has zoonotic implications and is a risk to exotic meat connoisseurs.

INTRODUCTION

Pentastomids are a subclass of parasites grouped under the Phylum Arthropoda and occur as internal parasites in the respiratory organs of vertebrates (Soulsby, 1968; Riley *et al.*, 1978 and Abele *et al.*, 1989). The genus *Armillifer* (Sambon, 1922) is from the Family Porocephalidae; which have an elongate vermiform body, usually strongly united with a rounded cephalothorax, a sucking mouth flanked by two pairs of clawed legs at anterior end and conspicuously annulated abdomen (Riley, 1986).

Pentastomids have worldwide distribution; in South-east Asia, the Pentastomids species that have been reported as being parasites of snakes are *Armillifer moniliformis* (Hett 1924; Riley and Self, 1981^b), *Kiricephalus pattoni* (Keegan *et al.*, 1969, Riley; Self, 1980 and Paré, 2008), *Raillietiella orientalis* (Keegan *et al.*, 1969) and *Waddycephalus komodoensis* (Riley and Self, 1981^a and Paré, 2008).

Armillifer moniliformis are important parasites of snakes in Malaysia and is of zoonotic importance especially in aboriginal communities who consume snake meat as a delicacy (Krishnasamy *et al.*, 1981, and Cheah *et al.*, 1989). In the life cycle of *Armillifer moniliformis*, the adult worm uses the anterior hooks to attach to the epithelium in the lungs or air sac in the distal portion of snakes such as the Reticulated python (*Python reticulatus*) (Riley and Self, 1981^b) and Malaysian blood python (*Python curtus*), and may migrate to the coelom (Owen *et al.*, 1973 and Self, 1969). The female adults lay ova that are coughed up, sneezed, or ingested

and passed with feces. The life cycle of *Armillifer moniliformis* is completed through prey species (usually a rodent), but accidental infection of non-prey species including human may take place. The arthropod-like larva hatch from eggs and migrates, sometimes extensively, across the abdomen or coelom, mature from several moults to become an infective nymph, encysts and often attaches to visceral tissues of the intermediate host example a rat. Once ingested by the definitive host, example a snake, the nymph excysts in the intestine, migrate up to the esophagus and respiratory tract and matures to an adult which produces eggs that are passed in the faeces (Riley, 1983,1986 and Paré, 2008). Diagnosis is made from the clinical signs of breathing difficulties and restlessness in snakes and by finding the eggs in the faeces or nasal discharge (Soulsby, 1968).

A total of 3 short Malaysian blood pythons (*Python curtus*) were sent to Veterinary Research Institute, Ipoh, Perak, Malaysia by the Forestry Department, Negeri Sembilan, Peninsular Malaysia. The caretakers of the snakes noted that the 3 snakes respiratory symptoms and mucus in oral cavity. The snakes were undergoing skin moult and usually do not consume food during this period making them weak and susceptible to infections. The general body condition of the python carcasses were fair but slightly pale, with no fat accumulation and some sloughing of the skin. In the 3 snakes necropsied, the trachea was normal but all had moderate to severe lung lesions such as necrosis. In

one snake, the lung contained 3 brownish necrotic foci about 2-3 mm. Two yellowish elongate endoparasites (each about 2 cm long) were found near one necrotic foci in the distal part of the lung whereas one parasite was attached to the abdominal wall. The gastrointestinal tract was empty as the snakes were not eating but the stomach wall had one white tubercle. The appearance of the brain, heart, liver, spleen and kidney were normal when observed grossly. Histopathology of the lungs revealed widespread pulmonary congestion, plasma cell accumulation in blood vessels and presence of fibrosis in the lung. In one of the snakes, the submucosa of the stomach wall had three unidentified cysts in one tubercle.

The worms were sent to the Parasitology Section for clearing with lactophenol and identification. Worms were photographed and referred to Dr Krishnasamy (Taxonomist from Institute of Medical Research, Kuala Lumpur) for confirmation. The 2 worms were identified as *Armillifer moniliformis*, nymphal stage of the pentostome. It had a cylindrical vermiform body with annular thickenings and cuticle that tapers posteriorly to a bluntly pointed cone (Figures 1 and 2). Report by Krishnasamy *et al.* (1981) indicates that the pentostomid *Armillifer moniliformis* is found to be widespread in various Malaysian animals. His study involved 5209 animals from 33 species which were examined to reveal 92 animals harboured nymphs of *Armillifer moniliformis*. Adult worms were found in *Python reticulatus*



Figure 1. Worm found in the lung of python



Figure 2. *Armillifer moniliformis* – a pentostomid worm recovered from blood python

and man can acquire the infection by eating insufficiently cooked python meat or drinking contaminated water.

Armillifer sp. can produce chronic respiratory disease in python. Adult worms cause tracheal obstruction, hypersecretion and pulmonary haemorrhage that are associated with the parasite feeding behavior at the lung mucosa. Lung perforations were found in some cases (Fantham and Porter, 1950; Slocombe and Budd, 1973). Scars and plaques from feeding wounds that cover the reticular and membranous regions of the lung can impair the lung function (Riley, 1986). Secondary bacterial infection such as *Pseudomonas aeruginosa* at feeding wounds could be the cause of death in pythons (Ayinmode *et al.*, 2010)

Armillifer sp. are zoonotic parasites that can be transmitted to humans through direct contamination from handling or ingestion of inadequately cleaned

and undercooked snake meat and also through consumption of food and water contaminated by faeces or secretion from the respiratory tracts of infected snakes and other hosts (Ayinmode *et al.* 2010 and Paré, 2008; Riley, 1986). Humans are accidental intermediate hosts. The infective larva which hatch from the egg migrate and usually develop in the liver, intestinal wall and mesentery. The annulated coiled larva are found in a transparent thin-walled cyst (Paré, 2008 and Riley, 1986). Humans are usually tolerant to infection, however, some patients have pyrexia, abdominal symptom such as colic and intestinal obstruction (Paré, 2008). Humans are dead-end hosts; where long term infective larva died, and the cyst calcifies and are often incidental findings by radiograph, laparotomy and post mortem examination (Ayinmode *et al.* 2010 and Paré, 2008; Riley, 1986). In Malaysia, Prathap *et al.* (1969) found a relatively high prevalence

(45%) in Malaysian aborigines, who consume snake meat as a delicacy. This infection poses a threat to exotic meat connoisseurs. With the advancement of snake farming for its skin, this infection can limit the productivity causing losses to the industry.

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