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Occurrence of *Physaloptera praeputialis* in a leopard rescued from Odisha, India

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Abstract

An adult Indian male leopard (*Panthera pardus fusca*) aged 4 years was rescued near a Bungalow in Athmallik Wildlife Division, Odisha during December, 2016 with signs of paraplegia, multiple external skin injuries and contusion at lumbar vertebrae which succumbed 3 days following treatment. Twenty-eight *Physaloptera praeputialis* were recovered from the stomach during post-mortem examination. The average length of females was 3.5 cm as against 2.8 cm in males. Females showed a distinct brown ring around the vulva. Microscopic examination revealed presence of a cuticular sheath resembling a prepucce at the anterior end, two pseudolips over the head and cuticular sheath beyond the tail end of the body as additional characteristic features. The report reflects the first of its kind from the leopard.

Keywords: *Physaloptera praeputialis*, nematode, leopard, *Panthera pardus fusca*, India

Introduction

Physalopterids represent a group of parasitic nematodes, belonging to the order Spirurida and family Physalopteridae, inhabiting the digestive tract of amphibians, reptiles, birds and mammals over the world [1]. *Physaloptera praeputialis*, a member of this family parasitizing domestic canids and felids, has been reported across the world including Japan [2], Laos [3], Iran [4, 5], Mexico [6], India [7], and Brazil [8]. Apart from that, this nematode has also been reported in wild carnivores like Puma [9, 10], jaguar [11] and Tamandua [12]. There is a single scientific report on detection of ova of this nematode from the faeces of tiger (*Panthera tigris*) in India [13]. Present report deals with detection of adult stage of *P. praeputialis* in an Indian leopard (*Panthera pardus fusca*) rescued from the reserve forest in Odisha, India.

Case history/ Materials and methods

Odisha state of India harbors 318 leopards as per 2016 census report by Govt. of Odisha. However, human-wild animal conflict continues to be a concern in many geographical areas including Odisha thereby raising suspicion on the survival of wild animals in coming years. Here is a report of an incident that occurred near Nakchi PWD bungalow premises (84.6°N and 20.97°E) under Athmallik Wildlife Division, Odisha during December, 2016. An adult male leopard aged 4 years was trapped successfully and presented at the Centre for Wildlife Health, OUAT, and Bhubaneswar for health check-up. History, and clinical examination revealed multiple external injuries on body surfaces with signs of paraplegia (Fig1). Necessary therapeutic management was extended to alleviate suffering. However, the leopard failed to sustain the magnitude of physical injuries affecting vertebral column and spinal cord. The leopard succumbed 3 days post therapy. Necropsy was undertaken where 28 parasites of either sex were recovered from the stomach mixed with partially digested food items. Such parasites were collected for further gross as well as microscopic examination following routine parasitological procedures. Subsequent to the gross examination, parasites were cleared in lactophenol and studied in temporary mounts with the aid of an optical microscope to identify the species.

Results and discussion

Morphologically, the parasites were creamy white in colour. The average length of females was 3.5 cm as against 2.8 cm males. Vulva of females were surrounded by a conspicuous ring of brown cementing material (Fig 2).

Microscopically (10X), anterior end of the nematodes possessed an extension of the cuticular sheath forming a prepuce like collar. The worms possessed a bilabiate head projecting beyond the margin of the cuticular sheath (Fig 3). Posterior end of both the sexes presented an extension of the cuticular sheath beyond the caudal end of the body (Fig 4). Based on the gross and microscopic characteristics, the parasites were identified as *Physaloptera praeputialis* [14].



Fig 1: Leopard presented at Centre for Wildlife Health, OUAT



Fig 2: Gross adult female *Physaloptera praeputialis* with ring of brown cementing material around vulva

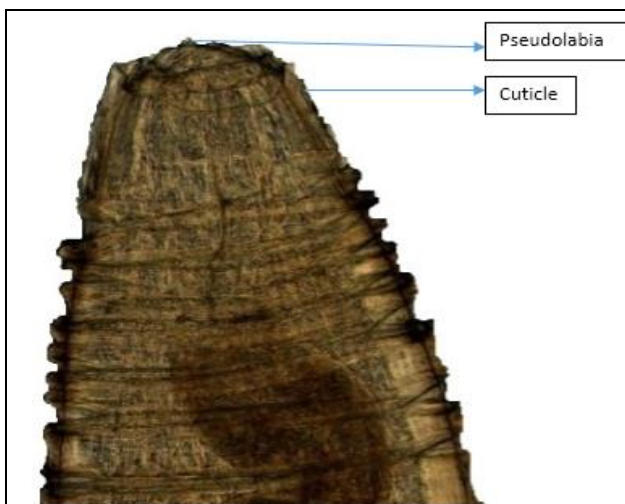


Fig 3: Anterior end of *Physaloptera praeputialis* (10X)

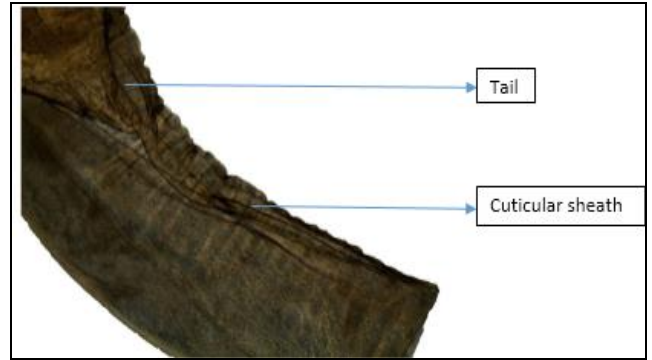


Fig 4: Posterior end of *Physaloptera praeputialis* (10X)

Out of many biotic and abiotic factors regulating the population of wild animals, parasites play a key role in affecting the dynamic and density of host population [15]. Introduction of a parasite in a new environment may give rise to serious threats where suitable hosts are available, which are fully susceptible to these parasites [16]. Present study, first case of *Physaloptera praepucialis* infection in an Indian leopard, reflected existence of this euryxenous nematode infection in this part of the globe.

The nematodes examined in this study presented a clear-cut distinct sexual dimorphism characterized by the presence of a brown coloured ring around the vulva in females which is unique to *Physaloptera praeputialis* [14]. Microscopic examination revealed the presence of a cuticular sheath resembling a prepuce at the anterior end of the nematode as has been previously described [4]. The two pseudolips present over the head confirmed the parasite belonging to the order Spirurida [17]. The extended cuticular sheath beyond the tail end of the body is consistent with previous findings [18].

Intermediate hosts like crickets and beetles play a key role in the lifecycle of *Physaloptera praeputialis*. Larval forms of the parasite stay in the outer intestinal wall and may enter directly into the definitive hosts through feed contaminated with these insects. Paratenic hosts like rodents, lizards and frogs may also ingest these intermediate hosts which in turn may be consumed by the domestic and wild carnivores. The development into the adult form takes place in the definitive host and the worms lodge, preferably, in the esophagus, gastric mucosa, and in the small intestine [19]. These parasites are hematophagous and, after attaching to the gastric mucosa, may cause erosion, leading to congestion, edema, and ulcers [20]. Gastric erosion provoke local inflammatory reaction, causing catarrhal or hemorrhagic gastritis and anemia [4, 20]. Development of the parasite may cause the formation of a fibrous nodule extending into the muscle layer of the stomach causing considerable atrophy of the muscle fibres [21]. A wide range of clinical signs like intermittent vomiting, diarrhea, regurgitation, anorexia, lethargy, weight loss and anaemia may be exhibited. Infection caused by this parasite is difficult to control as a wide range of intermediate hosts comprising orthopterids and coleopterids. In addition, there are many limitations in wild animals to conduct studies on parasitism, such as the study of specimens in their habitat and difficulties in capturing live animals for investigation, as well as in identifying the source of infection and susceptible species. Therefore, this study plays an important role, given the lack of data on *Physaloptera praeputialis* in wild felines, by expanding the reports of occurrence and, describing for the first time, an infection in an Indian leopard.

Conclusion

Physaloptera praeputialis, a gastro-intestinal nematode, parasites were recovered from the stomach of an Indian leopard (*Panthera pardus fusca*) rescued from Athmallik Wildlife Division, Odisha, India. Based on the morphology, both male and female parasites were identified. Though this parasite has been reported in domestic and wild felines across the world, the present report is the first of its kind in leopard.

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