REPTILES & AMPHIBIANS

Intestinal Obstruction Associated with a Parasitic Infection in a Wild-caught Pope's Green Pitviper, *Trimeresurus popeiorum* Smith 1937

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Fecal impaction, also known as coprostasis, is the inability to pass a large inspissated stool from the lower gastrointestinal (GI) tract (Obokhare 2012). Obstructions of the GI tract and subsequent abdominal distension in snakes may be caused by parasitism, tumors, abscesses, granulomas, foreign bodies, or fecal impaction (Diaz-Figueroa and Mitchell 2006). In both captive and wild snakes, only a few published cases document GI blockage in either captive or wild snakes; these include obstruction by a foreign body in the GI tract of a Black Ratsnake (*Pantherophis obsoletus*) (Souza et al. 2004), a fecalith possibly obstructing the gut of a Pine Snake (*Pituophis melanoleucus*) (Jessup 1980), a malignant tumor causing partial obstruction in a Corn Snake (*Pantherophis guttatus*) (Latimer and Rich 1998), and GI obstructions induced by fecaliths in a Burmese Python (*Python bivittatus*) (Long Beach Animal Hospital, undated) and a Red Diamond Rattlesnake (*Crotalus ruber*) (Corbit et al. 2014). The latter was the first and only existing published record of such a case in a pitviper. Herein, we report the first case of intestinal obstruction associated with a helminth parasitic infection in a wild-caught Pope's Green Pitviper (*Trimeresurus popeiorum*) from Mizoram, India.

An adult male Pope's Green Pitviper (SVL 603 mm, weight 46.6 g) was collected on 27 September 2019 at Durtlang, Mizoram (23°47'12.09"N, 92°43'37.21"E; elev. 1,206 m asl). Because the snake was dehydrated and lethargic, with signs of possible pathology (Jessup 1980; Souza et al. 2004), it was relocated to the Developmental Biology and Herpetology Laboratory, Mizoram University, India.

During our initial examination of the snake, we detected an elongated rigid mass (ca. 9.5 mm in length) by gently palpating the lower abdominal area close to the vent. The snake was quarantined in a glass terrarium at room temperature and, when offered lab mice, did not feed. It occasionally drank some water while being sprayed to maintain humidity. While attempting to allow the animal to recover from transport and handling stress and also avoid possible spreading of disease from the wild, as suggested by Schneller and Pantchev (2008), the snake died of unknown causes at ca. 1100 h on 3 October 2019.

A fecalith (9.16 × 38.8 mm) was carefully expressed (Fig. 1). Because it was firmly encapsulated by the gut lining, it was cut off before performing a necropsy. The visceral organs were dissected and cleansed with an 8.5% saline solution. The intestine looked normal; however, endoparasitic nematodes (two males, four females) were present (the sex of an ascarid nematode can be determined by the bent tail of males or the straight tails of females). The worms were removed, fixed, and stored in 70% ethanol; two individuals were immersed in Lactophenol Cotton Blue and temporarily mounted for light microscopy (Fig. 2).

We dissected and examined the fecalith under a microscope, revealing parasitic worm eggs having a characteristic round shape, a conspicuously pitted shell, and a thick albuminous layer containing an unsegmented embryo. We also found some indigestible hair, possibly from a small rodent, and some plant matter, almost certainly from the viscera of the prey (i.e., Corbit et al. 2014).

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Fig. 1. Wild-captured Pope's Green Pitviper (*Trimeresurus popeiorum*) having fecalith impaction: (A) Postero-ventral view of the snake in life showing the rigid mass close to the vent; (B) the fecalith was removed by gently compressing the area anterior to the vent of the dead snake; (C) dead snake with the removed fecalith. Photographs by Lal Biakzuala.

The nematodes were macroscopically brownish anteriorly and white posteriorly; anterior extremity with three roughly rectangular lips with papillae, well-developed interlabia, and deep postlabials; the posterior portion of male was bent, whereas that of the female was straight; tails of both sexes conical with very small nipple-like tips and anus located near posterior end (Fig. 2). The mean (range) body lengths of the nematodes were 85.7 mm (84.0–87.4 mm) and 123.7 mm (120.5–127 mm) in males and females, respectively. Based on the aforementioned features and published works (Sprent 1988; Li et al. 2016; Suwanti et al. 2018), we identified the eggs and the nematode as a species of *Ophidascaris* Baylis 1921, an ascarid genus of nematodes commonly found in reptiles (Sundar et al. 2016). We also examined 10 additional preserved museum specimens of *T. popeiorum* collected from nature, but found no parasitic worms in their digestive tracts. However, one snake did contain a semi-digested tail of a bent-toed gecko (*Cyrtodactylus* sp.) (Fig. 2F), a prey item which has not been reported (Das 2018).

Ophidascaris infections have been reported from various Asian snakes, including a Burmese Python (*P. bivittatus*), Indian Python (*P. molurus*), King Cobra (*Ophiophagus hannah*), King Ratsnake (*Elaphe carinata*), and Buff-striped Keelback (*Amphiesma stolatum*) (Teixeira de Freitas 1968). In viperids, *Ophidascaris excavata* specifically has been reported in the Short-tailed Mamushi (*Gloydius brevicaudus*) (Li et al. 2014), *O. agkistrodontis* in the Chinese Moccasin (*Deinagkistrodon acutus*) (Wang et al. 1979), and *Ophidascaris* spp. in American rattlesnakes (*Crotalus* spp.) (Carbajal-Márquez et al. 2018). This report represents the first case of an *Ophidascaris* infection in *T. popeiorum*, and the first reported case of fecal impaction in this arboreal crotalid. Although we cannot conclude with certainty that the intestinal obstruction resulted from the *Ophidascaris* infection, we suggest that the endoparasitic helminth infection was linked to the emaciation of the snake.

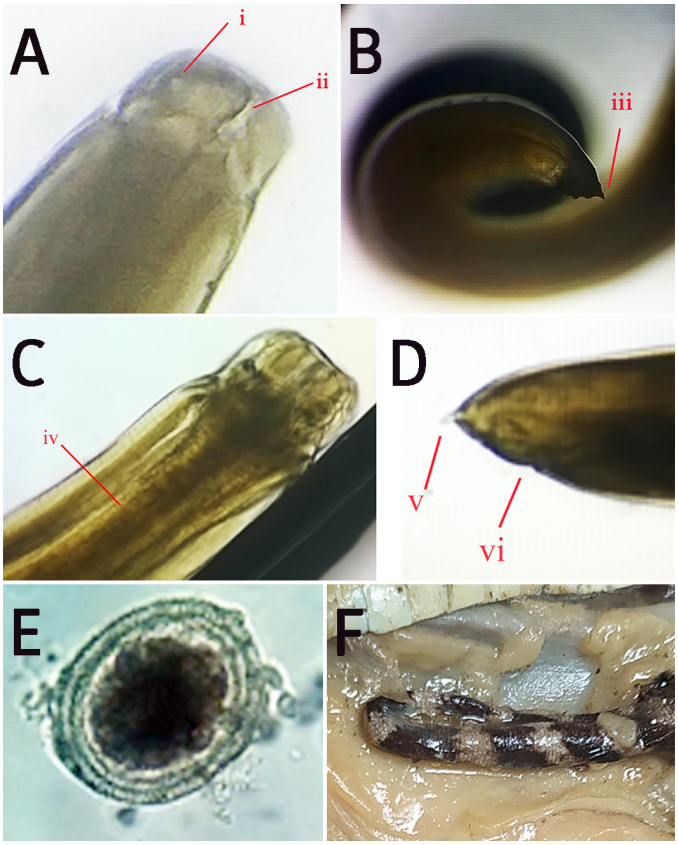

Fig. 2. An ascarid parasite (*Ophidascaris* sp.) recovered from the intestinal tract of a Pope's Green Pitviper (*Trimeresurus popeiorum*): (A) Anterior portion of a male, ventral view, head with lips showing papillae (i), interlabial, and deep postlabial (ii); (B) posterior extremity of a male showing the ventrally bent tail with a nipple-like tip (iii); (C) anterior portion of a female showing the esophagus (iv); (D) lateral view of the straight female posterior extremity with the anus located near the end (v) and a small nipple-like tip (vi); (E) egg of the ascarid parasite with a conspicuously pitted shell; (F) a semi-digested tail of a bent-toed gecko (*Cyrtodactylus* sp.) in the intestinal tract of the preserved *T. popeiorum*. Photographs by Joseph Ramhermawia (nematode) and Lal Biakzuala (tail of bent-toed gecko).

During our observation period, the snake neither defecated nor fed on offered prey items. According to Lillywhite et al. (2002), most arboreal vipers defecate soon after feeding to increase mobility and lower the energy required to counteract gravity. Further, excess mass is unpropitious for arboreal snakes as they often rely on unstable branches and comparatively weak substrata for support (Lillywhite and Henderson 1993).

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