***Cobboldia elephantis* (Cobbold, 1866) larval infestation in an Indian elephant (*Elephas maximus*)**

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Abstract In the present study, post-mortem was conducted on a female elephant aged about 37 years died at Rajeev Gandhi National Park, Hunsur, Mathigoodu Elephant Camp, Karnataka state. The animal suffered with diarrhoea, anorexia, dehydration and was unable to walk for about one week before death and was treated with antibiotics and fluid therapy for three days. The post-mortem examination revealed that, the gastric mucosa was severely congested, hyperaemic and numerous stomach bots attached to the mucosa. The bots were recovered from the gastric mucosa and processed for species identification. The posterior spiracles of the bots showed three longitudinal parallel slits in each spiracle, the abdominal segments had a row of belt like triangular shaped spines and the anterior end had two powerful oral hooks with cephalopharyngeal skeleton. Based on the above said morphological characters, the bots were identified as *Cobboldia elephantis*. This seems to be the first report of *C. elephantis* in free range wild elephant from Karnataka state.

Keywords Elephant · *Cobboldia elephantis* · Stomach bots · Karnataka

Introduction

The utility of domesticated elephants to man as a source of animal energy, tourism promotion activity and for conventional festivities is on the increase. *Elephas maximus* is classified as endangered according to the IUCN (International Union for Conservation of Nature) red list of threatened species. Western Ghats, a biodiversity hotspot enriched with a wide variety of flora and fauna on the peninsular India is one of the natural habitats of the species. Habitat shrinkage and defragmentation of elephant corridors are major threat for the survival of the species. Also, the management of this species has become more important since they are susceptible to various injuries and diseases particularly parasitic diseases (Fowler and Mikota 2006).

Cobboldia is a genus of parasitic flies in the family Oestridae named after Thomas Spencer Cobbold (1828–1886) who described the first species as *Gastrophilus elephantis* (Cobbold 1882). Adult flies of *Cobboldia elephantis* lay their eggs near the mouth or base of the tusks of Asian elephant while the related *Cobboldia loxodontis* (*Platycobboldia loxodontis*) parasitizes the African elephants. The larvae hatch and develop in the mouth cavity and later move to the stomach causing gastric myiasis. All three stages of larvae may be observed on stomach wall and the matured third stage larvae exit from the mouth and drop to the ground to pupate (Fowler and Mikota 2006).

The occurrence of stomach bots in Asian elephants (*Cobboldia elephantis*) have been reported by several

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authors from different parts of India viz., Venu et al. (2013) from Andhra Pradesh, Panda et al. (2005) from Orissa, Joseph et al. (1987) from Tamil Nadu, Chakraborty et al. (1994) from Assam, Kakkassery et al. (2011) from Kerala. Further, Sanyathitiseree et al. (2009) reported the occurrence stomach bot flies larvae in the stomach of a female Asian elephant from Kanchanaburi Province and Matsuo and Suprahman (1997) from Indonesia. The present paper reports the occurrence of *C. elephantis* larvae from the stomach of a free range Indian elephant (*Elephas maximus*) for the first time from Karnataka state, India.

Materials and methods

In the present study, post-mortem was conducted on a female elephant aged about 37 years died at Rajeev Gandhi National Park, Hunsur, Mathigoodu Elephant Camp. The history revealed that, the animal suffered with diarrhoea, anorexia, dehydration and was unable to walk for about one week before death. The detail post-mortem examination was conducted by standard procedure and the gross examination revealed severely congested gastric mucosa with numerous stomach bots attached to the mucosa. The bots were recovered from the gastric mucosa, collected in normal saline and brought to the laboratory for further processing and identification. The stomach bots were processed as per Zumpt (1965) and species was identified based on the morphological characters described by Soulsby (1982).

The intestinal contents were collected in dry, clean polythene zipped cover and brought to the laboratory. The contents were examined grossly for the presence of mucus, blood or any parasitic segments and then processed by direct and sedimentation method as per standard procedure (Bowman 2009) for the detection of parasitic eggs/ova.

Results and discussion

It is well understood that, almost all species of wild animals living in free range harbour variety of parasites naturally, but severity of the infection depends on the body status of the animals (Gaur et al. 1979). Asian elephants have been observed to be susceptible to various parasitic diseases. The detail post-mortem examination of the female elephant was conducted (Fig. 1) and revealed severely congested, hyperaemic gastric mucosa, studded with 2–3 cm sized numerous bots on the gastric mucosa (Fig. 2). Almost more than 400 bots were recovered from the stomach, among them some were smaller measuring about 2–2.5 cm and majority of them were larger measuring about 3 cm in size. There were small pin point

Fig. 1 Post-mortem examination of the elephant

Fig. 2 Congested gastric mucosa studded with numerous bots

Fig. 3 Posterior spiracles of *C. elephantis* showing three longitudinal parallel slits (×40)

Fig. 4 Anterior end of *C. elephantis* showing two oral hooks with cephalo-pharyngeal skeleton (×40)

Fig. 5 The abdominal segments of *C. elephantis* bots showing a row of belt like triangular shaped spines

ulcers noticed on the gastric mucosa after removal of bots. Similar observations were reported by many workers Venu et al. (2013), Panda et al. (2005), Sanyathitiseree et al. (2009) where as Kakkassery et al. (2011) recorded fewer number of stomach bots during post-mortem examination of the elephant.

In the present study, the bots recovered from the elephant stomach were identified as *Cobboldia elephantis* based on the morphological characters of posterior spiracles, anterior end and body spines as per the descriptions (Zumpt 1965). The posterior spiracles of the processed bots showed three longitudinal parallel slits in each spiracle (Fig. 3). The abdominal segments of the bots had

a row of belt like triangular shaped spines (Fig. 4) and the anterior end had two powerful oral hooks with cephalo-pharyngeal skeleton (Fig. 5). This is in accordance with Venu et al. (2013), Panda et al. (2005), Sanyathitiseree et al. (2009) who reported the larvae of *C. elephantis* from the stomach of a free range wild elephant from various parts of country.

The examination of the intestinal contents didn't show any parasitic eggs/ova. The clinical symptoms recorded before death of elephant included, diarrhoea, anorexia, dehydration and unable to walk for about one week. Similar observations were reported by Raquib (1970), Panda et al. (2005), Venu et al. (2013). This seems to be the first report of *C. elephantis* infection in free range wild elephant from Karnataka state.

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