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## Ecto and endoparasites of hedgehog (*Paraechinus micropus*) from Mathura (UP), India

**Pradeep Kumar, Jitendra Tiwari, Alok Kumar Singh and Daya Shankar**

#### Abstract

In the present study occurrence of different ecto and endo parasites of Indian hedgehog are reported. In May 2015 an injured hedgehog was observed in the veterinary college campus of DUVASU, Mathura. The animal was brought to the Department of Parasitology for treatment and care. The animal was found infested with ticks that were further identified morphologically as *Rhipicephalus turanicus* (Acarina: Ixodidae). The coproscopic examination of the faecal samples further revealed the infection of *Capillaria* spp. and *Isospora* spp. in the animal. This is the first report of parasites of Indian hedgehog from this part of the world.

**Keywords:** Indian Hedgehog - *Rhipicephalus turanicus* - *Capillaria* - *Isospora*

#### 1. Introduction

The Indian hedgehog (*Paraechinus micropus*) is small, nocturnal mammal with body covered by spine [17]. There is very little data available about the species, population and geographical distribution of hedgehogs in India; consequently the diseases that occur in this animal are also not well studied. This animal has been reported to be infected with different ectoparasites as well as endoparasites [25].

The Indian hedgehogs are omnivorous mammals seeking invertebrates and small vertebrates as their food [6]. These are found in desert, semi-desert, rocky and grassland areas with small hedges and bushes. They are nocturnal, semi-fossorial and terrestrial in nature [18, 1]. Hedgehogs can play a significant role in the transmission of some zoonotic pathogens as some of their parasites can also infect the human population [15, 21]. Although several reports on parasitic infections of hedgehog are available from other parts of the world, data on this aspect is lacking from India. Ticks play an important role in veterinary by acting as main vectors of different pathogens. *Rhipicephalus turanicus* typically infests cattle, sheep and dog but it has a high tendency to infect the larger carnivores and some ground feeding small animals [8]. Thus, the current study was aimed to report the occurrence of different ecto and endo parasitic infections of hedgehog and as per the available literature this is the first report detailing the parasites of this animal.

#### 2. Material and Methods

Campus of Veterinary University, Mathura is surrounded by conserved area of forest department and thus provides shelter to a wide variety of wild animals. These animals often appear on roads and in the residential areas and gets hurt by other animals like stray dogs and cats. In May 2015 a small spiny injured animal was observed at road side. It was caught and brought to Department of Parasitology for treatment purpose. The animal was identified as Indian hedgehog, *Paraechinus micropus* (Blyth, 1846) on the basis of morphological characters like light grey coloured body with grayish-white hairs on forehead and cheeks; limbs, belly, muzzle and areas around eyes clothed with reddish-brown hairs; spines on the forehead divided by a longitudinal naked furrow and small rounded ears [16]. It was kept safe in large cage and was provided with food (earthworm, poultry egg etc.), water and recommended drugs.

While examining the animal for injuries, some fully engorged ticks (Fig. 1) were found attached over it. The ticks were removed with the help of forceps and kept in a beaker. For further identification a fully engorged female tick was washed with tap water, transferred to a glass test-tube with cotton bedding in a dessicator and the assembly was transferred to BOD incubator at 36 °C to provide it a comfortable environment for egg laying.

Within seven days female tick laid hundreds of eggs which were grown to larvae in next 15 days. The developed larvae were kept in clove oil for five days for making them clear for microscopic examination. The cleared specimens were further mounted in DPX for detailed morphological study. Identification of tick was made as per the available key<sup>[8]</sup>.



**Fig 1:** Female *Rhipicephalus turanicus* (Pomerantsev, 1936) (Acarina: Ixodidae) feeding over Indian Hedgehog.

During stay in our lab, the animal voided faeces several times. The faecal sample was collected and coproscopic examination was conducted for any parasitic stage. Both direct and concentration method of coproscopic examination was conducted. In direct method of faecal examination small amount of sample (about half of the head of matchstick) was taken on clean glass slide and mixed properly with a drop of saline. The sample was examined under microscope at 100X magnification after putting a glass coverslip. The concentration method of faecal examination was also performed as per the standard protocol<sup>[24]</sup>. The animal recovered in seven days after that it was left again into its natural habitat.

### 3. Result and Discussion

On gross examination of engorged ticks and the microscopic examination of larvae confirmed the presence of *Rhipicephalus turanicus* (Pomerantsev 1936) tick on hedgehog. Female engorged tick was gray colour in appearance, cervical fields having a large and curved shaped with no wrinkles. Genital pore formed a 'U' shaped structure. It is a three host tick and the adults generally are abundant in spring and summer season. Larva of *Rhipicephalus turanicus* (Fig. 2) clearly showed hexagonal basis capituli, three pair of legs and presence of festoon. On seeing from dorsal side mouthpart observed in anterior parts, palps and hypostome were short, basis capituli distinctly appeared hexagonal shape and length of palp was nearly equal to basis capituli. Several studies have been conducted worldwide which showed high prevalence of this ectoparasite on hedgehog<sup>[10, 9, 19]</sup>. This tick had high tendency to infect wild host and immature stages generally infest hedgehogs, gerbils and rodents<sup>[3]</sup>. It can act as vector for *Rickettsia*, *Anaplasma*, *Theileria*, *Babesia*, and Arboviruses<sup>[21]</sup>.



**Fig 2:** Larva of *Rhipicephalus turanicus* (Pomerantsev, 1936) (Acarina: Ixodidae).

In coproscopic examination eggs of *Capillaria* spp. and oocyst of *Isoospora* spp. were found in this study. Previously three species of *Capillaria* are reported which are infect the European hedgehog<sup>[11]</sup>. *C. aerophila*, *C. erinacei* and *C. ovoreticulata*, in which *C. aerophila* is a common parasite of the lung. Distinguishing between these species are very difficult due to the strong phenotypic resemblance, therefore they are generically referred to as *Capillaria* spp.<sup>[13]</sup>. An infection of *C. aerophila* occurs when hedgehogs ingest infested organisms such as earthworms which are the primary host<sup>[23]</sup>.

*C. aerophila* is not much harmful to the respiratory tract of Hedgehog. But secondary bacterial infections commonly arise increasing the risk of pneumonia and further development of parasite burden<sup>[22]</sup>. *C. erinacei* and *C. ovoreticulata* is known to affect the intestinal tract of Hedgehog and adult worms can develop intestinal lesion<sup>[13]</sup>. In severe infection of *C. erinacei* or *C. ovoreticulata* may include chronic enteritis, diarrhoea, weight loss, anemia and ultimately death<sup>[2]</sup>.

*Isoospora* is a coccidian parasite having direct life cycle. Infection of this parasite occurs through contaminated feed and water. In the present study the animal was of wild origin feeding over vast sources therefore chances of getting infected with *Isoospora* spp. are higher. Hedgehogs infected with *Isoospora* spp. generally appear asymptomatic, although heavy burdens can cause clinical disease<sup>[7]</sup>. In the present study no characteristic intestinal symptoms appeared in the animal suggested the sub-clinical status of the parasite. Infection of *Isoospora* oocysts has also been reported previously in the European hedgehog by previous studies<sup>[7]</sup>.

### 4. Conclusion

In India, Hedgehog has been listed in Red List of Threatened Species Version 2015.2 as Least Concern species<sup>[4]</sup>. Being a wild animal of shy nature not many studies has been undertaken worldwide for the parasitic infections of this animal. This is the first report of parasites of hedgehog from this part of the world suggesting the wide distribution of these parasites. However, further studies are required to increase knowledge about epidemiology of these infections and possible zoonotic threat poses by them.

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