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# A Report on the Infestation of *Ctenocephalides felis orientis* in Goats of West Bengal, India

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**Abstract:** Ctenocephalides are one of the most pugnacious fleas that are commonly found in dogs and cats, and in a few cases in humans also. The prevalence of fleas in a specific geographical area is a matter of great concern, as they act as vectors for transmitting zoonotic pathogens like *Rickettsia felis* and *Bartonella* bacteria. A survey was carried out for recognizing the presence of specific ectoparasites in ruminants in the Jalpaiguri district of West Bengal, India. Cases of severe itching in two less than one-year aged goats were identified at Jakhaikona village in the Dhupguri block of the Jalpaiguri district. On closer examination, the goats were found to be infested with fleas. The fleas from the goat were collected in 70% ethanol and the samples were studied for morpho-taxonomic keys using a microscopic observation procedure. Based on the findings the fleas were identified as *Ctenocephalides felis orientis*.

**Keywords:** Flea, Goat, Infestation, Pathogens, *Ctenocephalides felis orientis*

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## Introduction

Fleas are known as causative agents for dermatitis, exorbitant anaemia, and itching, and in heavy infestations may also cause death in young animals (Yeruham *et al.*, 1989). Biting of flea results in allergic dermatitis in animals due to presence of a specific component in their saliva which is administered at the time of feeding (Alsaad and Ghazarian, 2005). The prevalence of fleas in a specific geographical area is also a matter of concern, as they may act as vectors in the transfer of zoonotic pathogens like *Rickettsia*

*felis* and *Bartonella* bacteria (Lawrence *et al.*, 2014). Ctenocephalides are one of the most pugnacious fleas that are usually found in dogs and cats, and sometimes in humans also. *Ctenocephalides felis orientis* have shown an orientation to infest small ruminants as well and has been reported from some of the Indian states (Ashwini *et al.*, 2017; Shakya *et al.*, 2018). India has one of the largest goat populations (148.88 million in 2019) in the world (NDDDB, India). With a 16.28 million goat populations, West Bengal

ranks second among all states in India (20<sup>th</sup> Livestock Census, DAHD, Government of India). A large part of the animal husbandry economy in West Bengal is influenced by meat producing animals, to which chevon (goat meat) contributes to a major chunk. Previously, *Ctenocephalides felis* consisted of four subspecies including *C. felis felis*, *C. felis orientis*, *C. felis strongylus* and *C. felis damarensis* (Dryden and Rust, 1994). But after re-evaluation of the morphology of the male reproductive organ, the phallosome and molecular studies, *C. felis orientis* has now been recorded as an isolated species (Lawrence *et al.*, 2014). *C. felis orientis* has been reported from few southern states of India to infest dog, human as well as small ruminants (Ashwini *et al.*, 2017; Shakya *et al.*, 2018; Fular *et al.*, 2020). But no reports from West Bengal (lying between the Great Himalayas and the Bay of Bengal) are available for infestation of *C. felis orientis* in any animals or human. The present study identifies the occurrence of *C. felis orientis* in goats in Northern part of West Bengal.

## Materials and Methods

### Study area and Sample:

A survey was carried out during May 2022 to October 2022 for recognizing the presence of specific ectoparasites in large as well as small ruminants in the Jalpaiguri district of West Bengal, India. During the survey, case of severe itching in two goats which were less than one-year old were identified at Jakhaikona village (Latitude: 26.548397°; Longitude: 88.967363°) in the Dhupguri block of the Jalpaiguri district (Fig. 1). On closer examination, the goats were found to be infested with fleas. Later fleas were collected from goats using fine toothed metal comb and kept in a plastic vial containing 70% ethanol. The collected fleas were brought to the laboratory for identification.

### Identification:

Collected fleas were treated in 10% KOH and later were followed with 30%, 50%, 70%, 90%, and 100% of ethyl alcohol for 20 min each for dehydration. The dehydrated samples were

transferred to xylene and was finally mounted in phenol balsam. Fleas were observed under stereomicroscope according to a standard protocol (Shakya *et al.*, 2018) and the species was identified based on morphology as described by Taylor *et al.* (2007) and Ashwini *et al.* (2017).

## Results and Discussion

Male fleas (Fig. 2) were smaller than females (Fig. 3). Microscopic examination revealed both genal and pronotal combs (Fig. 5) on adult specimens. First genal spine was shorter than second (Fig. 4) and the rest of the spines. Length of the head was almost double than its height. Frons was elongated and broadly rounded anteriorly. Dorsal margin of hind tibia showed seven with stout and single bristles on third and sixth notches (Fig. 6). Chaetotaxy formula of metatibial bristles of adult fleas was 2-2-1-2-2-1-3. In case of female, dorsal and ventral surfaces of the abdomen were convex. In case of male, dorsal surface of abdomen was not convex, rather it was more or less flat while ventral surface was deeply curved. Manubrium of the clasper was wide at the apex in males (Fig. 7).

In the present study, young goats were found to be hosting *C. felis orientis*. Similar findings were observed by Joseph (1981) who recorded goats and sheep as hosts of *C. felis orientis* from Tamil Nadu. Thilkan and Karunanithi (2001) reported the infestation of *C. felis orientis* and *C. canis* in sheep and goats from Tamil Nadu. From Karnataka, infestations of *Hyalomma* sp., *Haemaphysalis* sp., *Linognathus* sp. and *C. felis orientis* were reported in young goats by Muraleedharan and Sahadev (2012). Further infestation of *C. felis orientis* has also been recorded in sheep and goats from Karnataka by Ashwini *et al.* (2017). Later *C. felis orientis* was reported in goats and dogs from Madhya Pradesh (Shakya *et al.*, 2018). Occurrence of *C. felis orientis* and *C. felis felis* have also been recorded in humans from Uttar Pradesh by Fular *et al.* (2020). *C. felis orientis* has been identified as a dominant flea of dogs in Thailand and Malaysia (Changbunjong *et*





Fig. 1: Geotagged photographs according to the location of the collection of the fleas.



Fig. 2: *C. felis orientis* Male.



Fig. 3: *C. felis orientis* female.

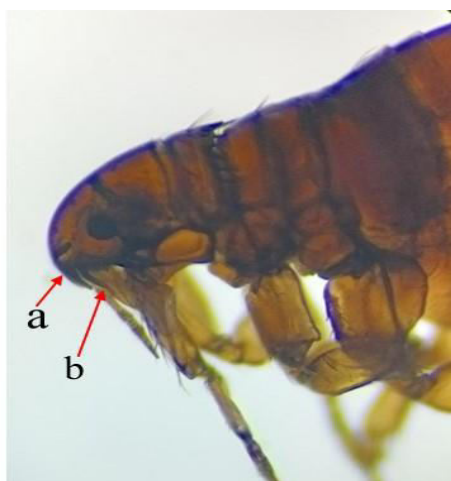


Fig. 4: *C. felis orientis* with elongated broadly rounded frons and 1<sup>st</sup> genal spine (a) is shorter than 2<sup>nd</sup> (b).



Fig. 5: Genal (a) and pronotal (b) combs of *C. felis orientis*.

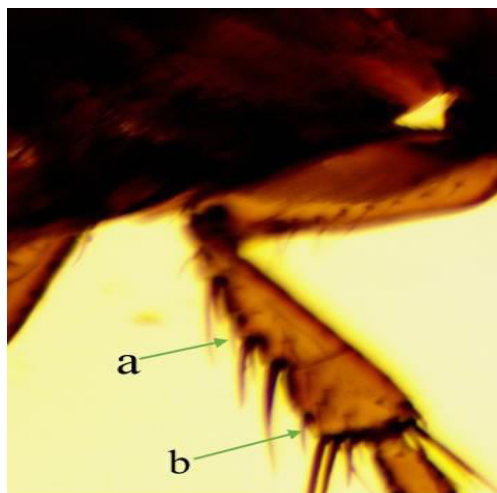


Fig. 6: Hind tibia showing seven notches with 3<sup>rd</sup> (a) and 6<sup>th</sup> (b) notches having single and stout bristles of *C. felis orientis*.



Fig. 7: Clasper (a) of male *C. felis orientis*.

al., 2009; Kernif *et al.*, 2012). *Ctenocephalides felis*, *C. canis*, and *C. felis strongylus* have been found in small ruminants in accordance with the descriptions given by Yeruham *et al.* (1997), Jain (1993) and Fagbemi (1982). Although infestation of fleas in cattle is very rare (Fular *et al.*, 2020).

In the present study, the infestation of *C. felis orientis* were observed all over the body of young goats but it congregated mostly in the neck, axilla and below the chin regions. Fleas were noticed to move rapidly in between the hairs. The infested goats showed symptoms of severe itching, self-excoriation, restlessness, dermatitis and shedding of hairs.

According to Thilkan and Karunanithi (2001); cypermethrin at 0.01% concentration spray could be used to eradicate *C. felis orientis* from goats. In another study by Muraleedharan and Paramasiviah (1993), it was found that fenvalerate at concentration of 0.1% could be effective to destroy the *C. felis orientis*. Also, methoprene or pyriproxyfen spray could be effectual in extermination of fleas at each phase of their lifecycle according to Blagburn and Dryden (2009).

## Conclusion

Infestation of *C. felis orientis* in goats has been occasionally reported from some of the southern

states of India. However, to date reports from West Bengal for infestation of *C. felis orientis* in domestic, wild animals or humans are non-existent. This study is the first report on the identification of *C. felis orientis* in goats from West Bengal. The Jalpaiguri district of West Bengal has high humidity all the year-round which peaks during the monsoon season making it advantageous for the growth of the flea population and thus, accentuating the chances of transmission of fleas-borne diseases in domestic animals. Proper management and expeditious treatment strategy can prevent the occurrence of flea infestation in small ruminants.

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