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## Cat flea (*Ctenocephalides felis felis*) and Oriental cat flea (*Ctenocephalides orientis*) infestation as a emerging nuisance to human population

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**Abstract**

Fleas are known as a vector of important diseases including plague, murine typhus, tularemia and dipylidiasis. This pest annually imposes a considerable economical loss and cause damage to human and livestock sector. Furthermore, flea bite is one of the causative agents of hypersensitivity responses, dermatitis, allergies and severe discomfort. Fleas were collected from corners of the houses and on the children's bodies during blood feeding. The fleas were collected and processed as per the standard protocol. On detailed microscopic examination, the collected fleas were identified as *Ctenocephalides felis felis* and *C. felisorientis*. This report demonstrates the need of precise history taking, identification of flea genus/species and implementation of an effective flea control strategy to eliminate an existing infestation in gardens as well as in houses.

**Keywords:** *Ctenocephalides felis felis*, *Ctenocephalides orientis*, human beings

**1. Introduction**

Fleas are blood sucking ectoparasites on warm blooded hosts and they are a matter of high importance both in medical and veterinary field. Fleas transmit several diseases to humans such as plague, murine typhus, tularemia and dipylidiasis. Flea infestation causes considerable economic losses in livestock sector and severe health problems to humans. Furthermore, flea bites also cause hypersensitivity responses, dermatitis, allergies and severe discomfort. Fleas pierce the skin with specialized mouthparts in human's leads to condition called Flea Allergy Dermatitis (F.A.D.) due to substances in flea saliva. Fleas mostly infest referred hosts<sup>[1, 2]</sup> and sometimes may infest other hosts also. *Ctenocephalides felis felis* (cat flea) can be found in all continents except Antarctica<sup>[3]</sup>. And infest cats, dogs, humans and other mammals. *C. felis* and *C. canis* (dog flea) are causes severe irritation and allergy to humans due to their painful bites. Cat fleas and their feces are considered as allergens and it can increase the allergen city of house dust. Fleas are also capable of transmitting several zoonotic pathogens to humans. These ectoparasites played a historic role in human plagues and in the 'Black Death' (bubonic plague), which is estimated to have caused the deaths of a one third of the world's population during the Middle Ages<sup>[4]</sup>. In recent years, flea bornerickettiosis (*Rickettsia felis*) reports are increased worldwide due to increased globalization. Repeated flea bites leads to allergic reaction in humans and this in turn lead to secondary infections.

Despite of all above mentioned facts like diseases transmission, economical losses and public health concerns, there is not enough information about flea and its complication in our country.

**2. Materials and Methods**

A family from staff quarters of College of Veterinary Science and Animal Husbandry, Mhow, Madhya Pradesh reported several multiple tiny bite marks with severe itching in the different parts of their bodies. Some samples of tiny live insects were collected from their bodies and clothing's were taken for examination to Department of Parasitology.

For the detailed morphological examination few fleas were collected and preserved in 70% alcohol. Collected fleas first treated with 10% KOH solution overnight then they were initially dehydrated by using ascending grades of alcohols starting from 30% to 50% to 90% to absolute alcohol. In each grade of alcohol, the specimen is kept for 20 minutes.

After dehydration, the flea specimens were transferred to a cavity block containing carboxyl xylol for clearing of fleas. After clearing fleas were mounted on a glass slide by using Phenol balsam.

### 3. Results and Discussion

Fleas identified according to morphological criteria based on the shape and structure of their genitalia and the presence and distribution of spinae, setae, and *ctenidia* on the body [5]. On detailed stereoscopic examination, the collected fleas were identified as *Ctenocephalides felis felis* and *C. orientis*.

#### 3.1 *Ctenocephalides felis felis*

In case of *C. felis felis*, frons elongated and more pointed anteriorly and dorsal margin of hind tibia has 6 notches with single bristle on 'V' notch (Fig. 1 and 2).

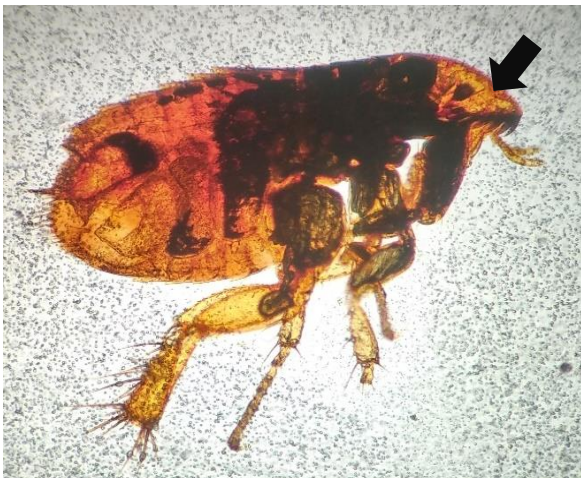


Fig 1: Micro photograph showing elongated frons and pointed anterior end (100x)



Fig 2: Micro photograph showing 6 notches on dorsal margin of the hind tibia with single bristle on 'V' notch (100x)

#### 3.2 *Ctenocephalides orientis*

The *C. orientis* fleas were characterized by presence of seven dorsal notches on hind tibia including the apical one, the third and sixth notches from base were having a single bristle each (Fig.3). The *C. orientis* has intermediate character between those of *C. canis* and *C. felis* having its frons more rounded

anteriorly.



Fig 3: Micro photograph showing seven notches with 3<sup>rd</sup> and 6<sup>th</sup> notches having single and stout bristles of *C. orientis* (100x)

### 3.3 Identification of male and female

#### 3.3.1 Female

Size of the females was (3.00 x 1.25 mm); row of 1 - 12 short spiniform bristles behind the antennal groove (Fig. 4c); dorsal and ventral surfaces of the abdomen were convex; C shaped spermatheca (Fig. 4d) was evident on the abdominal segment.



Fig 4: Micro-photograph showing genal, pronotalcombs (a & b), C shaped spermatheca (d), short spiniform bristles behind antennal groove (c) in female *C. orientis* (100x)

#### 3.3.2 Male

Size of the males was smaller (1.9 x 1 mm) than the females; dorsal surface was not convex and was moreover less flat whereas ventral surface was greatly curved; movable process of clasper; widened manubrium of the clasper at the apex; penis plate and spring of penis were evident (Fig. 5).



**Fig 5:** Micro-photograph showing flat dorsal surface and convex ventral surface in male *C. orientis* showing movable process of clasper, penis plate, spring of penis (100x)

The Various morphological and morphometric characteristics of *C. orientis* recorded in the present study were also reported by many workers from different countries [6, 8, 10, 17, 18]. Various previous studies also witnessed goat and sheep as the host for this flea [7, 12, 13, 16, 18]. Some workers [9, 14] also reported *C. orientis* as the most predominant flea of dogs from Thailand and Malaysia, others researchers also [11] recorded the flea in dogs from Mumbai (Maharashtra), Delhi and Rajasthan. Further, worker like [9, 14] observed *C. orientis* as a most prevalent flea in dogs in Asian countries.

#### 4. Conclusion

On detailed microscopic examination, the fleas are identified as *Ctenocephalides felis felis* and *C. orientis*. These fleas can potentially capable of transmitting disease like plague, murine typhus etc. The flea infestation in family may be due to close contact with cats with no history of ectoparasite control. Flea infestation can be prevented effectively by removing all fleas on the animal bodies using suitable ectoparasiticides. The surroundings, corners and crevices of pet/animal houses can be treated with suitable disinfectant so, all the developmental stages can be eliminated (prevent re-infection).

Hence, more studies on flea infestation in humans and animals highly recommended since, our country has optimum climate and geographical conditions for appropriate flea population development and flea borne zoonotic diseases transmission.

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