

## Prevalence of *Cephalopina titillator* (Diptera: Oestridae) Larvae in One-Humped Camel (*Camelus dromedarius*) in Najaf-Abad, Iran

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**Abstract:** The prevalence of *Cephalopina titillator* larvae in 384 slaughtered camels was 80.72% that 76.8% in males and 86% in females. The rate of infestation was significantly greater in the rainy season (95.04%) compared to those of dry season (56.3%) ( $P < 0.001$ ). No significant difference was observed between the prevalence in males and females ( $P > 0.1$ ). The prevalence rate was lower in camels younger than 2 years old (68.1%) compared to those of 5-10 (72.73%) and over 10 years old (86.95%). The major gross lesions observed were congestion of the pharyngeal mucosa; nasal cavity was congested and filled with mucous. Haemorrhagic lesions were observed in early infections. The main microscopic lesions were desquamation of epithelial cells. Infiltration of macrophages, eosinophils and lymphocytes was seen in mucosa and sub-mucosal tissues.

**Key words:** *Cephalopina titillator* • Camel • Prevalence

### INTRODUCTION

Dromedary camels are an important species of livestock in arid and semi-arid environments [1]. Camels are raised basically for meat consumption. In some areas of Iran, people are used to consume camel meat which has better quality and is economically fair in comparison to beef and sheep [2]. *Cephalopina titillator* is an obligate parasite of camel, the larvae of which cause nasal myiasis. The adult fly is widely distributed in areas where camels are found. During part of its life-cycle, the female fly darts towards the nostrils and deposits its larvae directly into the nasal cavity. From there the larvae crawl up to the nasopharynx and sometimes to the paranasal sinuses and molt twice while attached to the naso-pharyngeal and paranasal mucous membranes and cause extensive irritation and tissue damage. They remain attached to the mucous membrane of these organs for up to 11 months; during which time they feed and cause extensive irritation and tissue damage [2, 3, 4]. The mature white or grey third stage larvae grow up to 35 mm in the second

stage, but the L1 stage is only about 0.7 mm long. These infestations impair animal's welfare, reduce host physiological functions, destroy host tissues and cause significant economic losses to livestock through abortion, reduction of milk production and losses in terms of weight gain, fertility and hide quality [5, 6]. Infested camels lose their appetite, show difficulty in breathing, snort, sneeze, express abnormal behavior resembling cranial coenuriasis and they often become restless and may even stop feeding [7]. They may finally die from meningitis caused by secondary bacterial or viral infections [8,9]. *Cephalopina titillator* has been reported in Chad, Saudi Arabia, Egypt, Sudan, Ethiopia, Libya and in Iran [1, 2, 10-15].

The objective of this study was to determine the prevalence rate of *Cephalopina titillator* larvae from camels that were processed through Najaf Abad, Central of Iran slaughterhouse. In addition the gross and histopathological abnormalities associated with *C. titillator* infection in camel are also described.

## MATERIALS AND METHODS

During a 1-year period, from 2007 to 2008, 384 camels, 164 females and 220 males, grouped as (<5, 5-10 and >10 years old) slaughtered in the Najaf-Abad slaughterhouse, Iran, were selected randomly. Their age was determined on the basis of cameleer information. Following slaughter, the facial cranium was opened to expose the predilection site for *C. titillator* larvae in the anterior and posterior chambers of the pharynx. The facial cranium was transected at the top border of the frontal sinus and again about 5 cm caudal and parallel to the first cut. To reach the debris at the tissue site, pieces of bone and secretions were removed. After the pharynx was revealed, the presence or absence of the different stages of larvae was checked and all larvae removed and counted. The gross damage to the site of attachment was described and recorded. Selected tissue samples were collected, preserved in 10% formaldehyde solution, processed by standard histopathological techniques and stained with haematoxylin and eosin.

**Statistical Analysis:** Data were transferred to a Microsoft Excel spreadsheet (Microsoft Corp., Redmond, WA, USA) for analysis. Using SPSS 16.0 statistical software (SPSS Inc., Chicago, IL, USA), a chi-squared test was performed and differences were considered significant at values of  $P < 0.5$ .

## RESULTS

The prevalence rate of *C. titillator* larvae of 384 camels slaughtered at Najaf Abad, slaughterhouse, Iran in different sex and age groups is shown in Table 1. The prevalence rate increased by age. The prevalence rate was lower in camels younger than 2 years old (68.1%) compared to those of 5-10 (72.73%) and over 10 years old (86.95%). The rate of infestation was significantly greater in the rainy season (95.04%) compared with that of dry season (56.3%) ( $P < 0.001$ ) (Fig. 1) but no significant difference was observed between males (76.8%) and females (86%) ( $P > 0.1$ ). The maximum and minimum numbers of parasites were 70 and 1, respectively.

**Gross Pathology:** The nasopharyngeal cavities were congested and profuse mucous secretion was observed in most of the cases. The mucous membrane was swollen, hemorrhagic and edematous. Haemorrhagic lesions were observed in early infections. Congestion of nasal cavity with mucous, severe inflammation and degenerative changes, leading to extensive damage of nasopharyngeal tissues and formation of lymphoid nodules at the site of larval attachment were observed.

**Histopathology:** The main microscopic lesions were desquamation of epithelial cells. Infiltration of macrophages, eosinophils and lymphocytes was seen

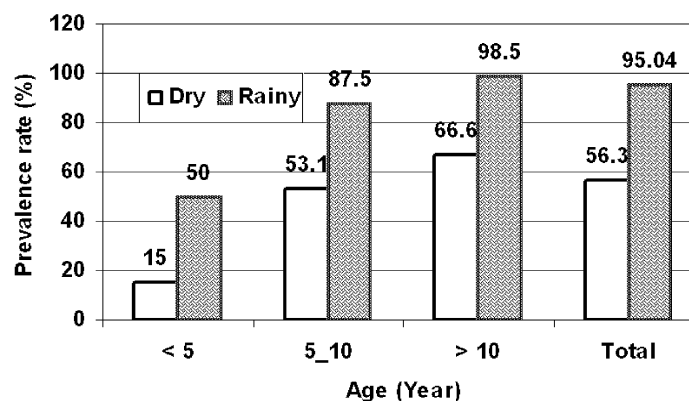


Fig. 1: The prevalence of *Cephalopina titillator* larvae in 384 camels slaughtered during the dry and rainy seasons at Najaf-Abad slaughterhouse, Iran

Table 1: The prevalence of *Cephalopina titillator* larvae in 384 camels slaughtered at Najaf-Abad slaughterhouse, Iran

Age groups (years)	Male		Female	
	No. of camels	No. of infected camels (%)	No. of camels	No. of infected camels (%)
<5	30	20 (66.6)	14	10 (71.4)
5-10	70	50 (71.4)	40	30 (75)
>10	120	99 (82.5)	110	101 (91.8)

in mucosa and sub-mucosal tissues. The other observed microscopic changes were nodular formations surrounded by epithelial cells and fibrotic tissues.

## DISCUSSION

The present study showed that *C. titillator* is a common parasite of camels in the central regions of Iran. The overall rate of infestation among 384 inspected camel heads was 80.72%. The higher infection rates in this study may be due to the geographic conditions and climate changes on the larvae survival.

No significant difference in the infection rate of *C. titillator* ( $P > 0.1$ ) was observed between females and males. Therefore it seems that the sex of examined animals had no effect on infection by *C. titillator*. It would appear that the females are particularly prone to being attacked by fly. Kassa [16] in Dire Dawa, reported that the difference in the number of larvae between males and females was not significant, which is in accordance with the current study. The reason for the difference between the two sexes might arise from the management systems of the nomads, in that female camels are kept not very far from their villages, even during the dry season, because they supply milk for the family. This might expose the female camels to more heavier fly challenge in the valleys near the village. On the other hand, the males move far from the fly challenge in the course of their continuous movement as pack animals. Finally, females are under continuous stress which may suppress their immunity [1, 16, 17].

The prevalence rate was lower in camels younger than 2 years old (68.1%) compared to those of 5-10 (72.73%) and over 10 years old (80.95%). This observation agrees somewhat with Bekele [1], Oryan *et al.* [2] and the El-Rahman [14]. The older camels may be more tolerant of the flies and allow the deposition of the eggs around the nostrils, whereas the younger animals actively seek to prevent the flies settling around the nostrils.

The current study indicated that the percentage of infected camels in the rainy seasons was higher than in the dry seasons. It seemed that the rainy and wet conditions favours the multiplication of the flies. This agrees to some extent with Fatani and Hilali [12] who found that the infestation rate showed two peaks in February and in September and the lowest in June in the Eastern Province of Saudi Arabia. In North Egypt, the highest prevalence was in October and the lowest in April [18]. In Iraq the highest rate was from September to December [19] whereas Alahmed [11] in Saudi Arabia

reported that the highest peak of infested camels was in April while the lowest was in July. The reasons for the low prevalence in warm seasons could be due to the small size of the first stage larvae that may be overlooked and absence of the larger sized, second and third stages larvae [2, 12].

The major gross pathological changes observed are in agreement with those reported by Bekele [1]. The microscopic lesions, with cellular infiltration, are consistent with inflammation resulting from the injuries caused by the parasites. The desquamation of the epithelial tissue may result from a heavy burden of second- and third- stage larvae.

In conclusion, the prevalence of *Cephalopina titillator* larvae in camels in Najaf-Abad, Iran was found to be high, therefore it is important to control *Cephalopina titillator* using any nasal drench of approved insecticide to reach a maximum benefit for camels. In general, some myiasis producers are zoonotic parasites. Nevertheless, the control of the adult *C. titillator* and its larval instars is a must for the sake of the animal and for the human welfare.

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