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CASE REPORT

Concurrent Infestation of Buffalo Calves with *Ctenocephalides felis strongylus* and Piroplasms

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ABSTRACT

The present report describes four cases of *Ctenocephalides felis strongylus* infestation in buffalo calves of district Toba Tek Singh, Punjab, Pakistan. The infested animals were suffering from pyrexia, alopecia, hyperkeratinization, accelerated pulse, tachypnea, depression, anemic mucous membranes and ataxia (n=3). Flea infestation was generalized with higher infestation in hairy areas of body especially legs, flank and mane. Microscopic examination of the peripheral blood revealed moderate (n=2) to high (n=2) numbers of piroplasms. All four calves were treated with ivermectin (Ivomec, Merial, France; 0.02mg/kg) twice at 15 days intervals. The treated calves were found aparasitemic on day 10th post treatment. The three cases recovered in 10 days after completion of the second round of treatment. One calf died 8 days after second treatment on day 11. However, the vector role of *Ctenocephalides felis strongylus* may be better studied on conventional/ molecular grounds using salivary glands of the specimens.

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INTRODUCTION

Flea (Insecta: Siphonaptera) is a laterally compressed, wingless member of Class Insecta measuring about 1.5-4.0 mm (Soulsby, 1982). These may bear ctenedia on pronotum or gena which are significant in taxonomic identification of the species. Flea infestation and associated hypersensitivity are major parasitic and clinical problems of sheep and goats (Obasaju and Otesile, 1980). However, the present paper describes the first report of flea infestation in buffalo calves kept for meat and breeding purposes in district Toba Tek Singh, Punjab, Pakistan.

History: During a survey of animals for parasitic infestation in a village of district Toba Tek Singh (30°33'-31°2'N and 72°08'-72°48'E), Punjab, Pakistan conducted from April-July 2009, four Nili-Ravi buffalo calves were found infested with flea infestation. The average highest and lowest temperatures during the study period were 41°C and 27 °C, respectively in district T.T. Singh. History revealed that the animals on this farm were not treated with any ectoparasiticide from the last 6 months. Moreover, 3 other calves had died over the same period in the same area with similar signs and symptoms. Table 1 shows the observations of clinical examination of the animals and treatment effects.

Clinical Examination: Collected specimens were preserved in 70% ethanol and brought to the Department of Parasitology, University of Agriculture Faisalabad, Pakistan for taxonomic identification under stereomicroscope using the keys of Segerman (1995) and Soulsby (1982). Skin scrapings were collected from excoriated and hyperkeratized areas of the infested calves in order to test mange (if any) according to the procedure as given by Soulsby (1982). Blood samples with an anticoagulant (EDTA) were collected for hematological and parasitological examinations according to the standard procedures **(**Benjamin, 1978) and Soulsby (1982), respectively. Biting lesions clogged with clotted blood was observed on the hairless legs, tails and inguinal areas of calves. Based on the morphological characteristics, the specimens were identified as *Ctenocephalides (Ct.) felis strongylus*. The major clinical signs observed in all the four infested calves were restlessness, self-excoriation, alopecia, emaciation, constant stamping of feet on ground and weakness. Infested calves showed marked hyperkeratinization (75%), inflammation (100%) and excoriation (75%) of heavily infested regions. All the calves were under severe depression with inability to rise. Clinical examination revealed pyrexia (103˚F-104˚F), rapid pulse rate (70-79 beats/minute), tachypnea (40-51 breaths/ minute) and pale mucous membranes in all the calves. Calves were reared in mixed farming system with sheep

Table I: Summary of observations of buffalo calves infested with *Ctenocephalides felis strongylus* along with piroplasmosis

Buffalo calves	1	2	3	4
Age (months)	8	11	12	18
Weight (kg)	34	54	59	59
Duration of sickness (days)	3	15	20	30
No. of fleas collected	12	17	36	23
Clinical signs	Pyrexia Inflammation Excoriation	Pyrexia Inflammation	Pyrexia Inflammation Excoriation	Pyrexia Inflammation
Laboratory findings	Piroplasm +ve	Piroplasm +ve	Piroplasm +ve	Piroplasm +ve
Hematological findings:				
RBC million/ mm^3	5.3	5.1	4.8	5.5
WBC / mm^3	6000	5900	5600	6600
Hemoglobin (g/dl)	6.5	5.9	5.5	6.9
PCV (%)	21	20	19	22
MCV (fl)	39.6	39.2	39.5	40
MCH (pg)	12.2	11.5	11.4	12.5
MCHC (g/dl)	30.9	29.5	28.9	31.4
Treatment (ml)	0.70	1.8	1.20	1.20
Post treatment recovery	Normal after 10 days of 2^{nd} therapy	Recovered 10 days of 2^{nd} therapy	Normal 10 days of 2^{nd} therapy	Died after 10 days of therapy

and goats. Hygienic conditions were poor with heaps of manure and organic matter in the vicinity of farms.

Diagnosis: Examination of skin scrapings did not reveal any mite infestation. Microscopic examination of the blood films revealed the moderate to higher number of piroplasms. Values of different blood parameters in infested calves and their comparisons to normal ranges have been given in Table I. Hematological analysis of infested calves revealed anemia with decreased packed cell volume (PCV), red blood cells (RBCs) and hemoglobin (Hb).

Treatment: The animals were treated with ivermectin (Ivomec, Merial, France; S/C at the dose rate of 0.02mg/kg body weight) and repeated after 15 days. The calves (75%) gradually recovered over a 10 days period after the administration of 2^{nd} dose of therapy. Blood films of three calves were negative for piroplasms on days 5, 10 and 15 post treatment. Thus flea control by ivermectin was successful. However, fourth calf died at the 10^{th} day after the administration of 2^{nd} round of therapy. Unfortunately, owner did not permit the necropsy examination of died calf.

DISCUSSION

This paper describes the first report of concurrent infestation of *Ct. felis strongylus* in Nili Ravi buffalo calves infected with piroplasmosis in Pakistan. *Ct. felis felis* (Dryden, 1993) and *Ct. canis* (Opasina, 1983) are the two important species of fleas which have been recorded from domestic animals of various regions of world. So far, *Ct. felis strongylus* has been frequently isolated from farm animals as compared to its rare occurrence on domestic cats and dogs (Kaal *et al*., 2006). There is possibility that reports of *Ct. canis* on sheep and goats were the result of misidentification because of similarity in some morphological features of *Ct. canis* and *C. felis strongylus* (Opasina, 1983). In Pakistan, previously no species of flea have been found to be infested on buffaloes. Clinical signs observed during current report were similar to those recorded by Opasina (1983) and Yeruham *et al*. (1997).

The practice of allowing manure to accumulate in vicinity of farms resulted in increased warmth and humidity, which favored the propagation of fleas while abundance of organic matter, provides nutrition and protection for the developing larvae (Dipeolu and Ayoade, 1982). This is in accordance with observation of Kaal *et al.* (2006) that better hygiene prevented the build up infestation in farms practicing semi-intensive management system as compared to those having intensive systems.

A feature of heavy infestation with marked hyperkeratinization and scaling in our report might be confused with the lesions of sarcoptic mange (Parker *et al*., 1999) but skin scrapping examination of these areas did not reveal any mite infestation. This differential diagnosis confirmed that the infested calves were suffering from flea-bite hypersensitivity. Concurrent infection of piroplasmosis with flea infestation has also been reported by Kaal *et al*. (2006). Moderate to severe anemia and decrease in PCV, erythrocyte and leukocyte counts in flea infested ruminants have been reported by Opasina (1983). Calves were also found to be co-infected with piroplasms when blood smears were examined. Thus no conclusions can be drawn as to the effect of flea infestation regarding hematological parameters. Efficient control of flea by ivermectin has also been reported by Jain (1993). Probable reason for death of fourth calf might be the chronicity of infestation, severe allergy or higher rate of prevalence of piroplasmosis.

The major flea specie infesting calves is *Ct. felis strongylus*. Flea infestations might be associated with intensive livestock husbandry practices. However, the results of current report provide several important implications. This indicates that flea infestation may be one of the major problems of livestock in the study area.

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