

Full Length Research Paper

## Outbreak of theileriosis and anaplasmosis in herd of holstein crossbred cows of Dehradun district of Uttranchal, India: A Himalyan region

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The theileriosis and anaplasmosis are not common in Himalayan region of India. However, this paper reports the outbreak of theileriosis and anaplasmosis in a herd of Holstein cross bred cows maintained at Graphic Era University Dehradun, Uttarakhand, India. This was because of introduction of native Red Sindhi cows. These native cows are in apparent carrier of theileria and anaplasmosis. Even with given treatment for theileria with Butalex (Buparvaquone) 4 positive cows and 4 calves died. One of the cows pregnant for 5 month aborted. That outbreak of theileria in the elite Holstein cross bred herd is reported in Himalayan region of India.

**Key words:** Theileria, blood protozoon's, milk production, theileriosis, anaplasmosis.

### INTRODUCTION

The native Red Sindhi cows in tropics are low milk producers but they do not suffer from heat stress and blood protozoan infections. However, the higher Holstein crosses produce over 5000 L of milk per lactation at well maintained dairy farms are prone to suffer blood protozoan diseases. The blood protozoan disease, bovine theileriosis, is one of the most dangerous diseases as it affects all ages of the cows. In India, bovine tropical theileriosis is an inapparent infection of indigenous cattle, but has emerged as one of the fatal diseases of crossbred cows since early 1960. The disease is present in entire Indian subcontinent. The infection was first reported in Central Provinces. During 1989, the study conducted by All India Coordinated Research project of Indian Council of Agriculture Research

reported that out of 5454 blood smears of apparently normal crossbred cattle examined, 14.94% revealed presence of *Theileria annulata*. The result of serological survey conducted indicated that 30 to 60% of crossbred cattle were positive for antibodies to *Theileria annulata* piroplasms all over India, except in the Himalayan region. Devendra (1995) reported the annual loss of US \$800 million due to tropical theileriosis in India. The present report describes the death of 4 Holstein cross bred cows and 4 calves along with severe drop in milk production due to *Theileria annulata* infection following the introduction of carrier Sindhi cows from Rajasthan in the month of May 2010 at Graphic Era University of Dehradun district of Uttarakhand, India, a Himalayan region.

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**Table 1.** Production details of the cows used in the experiment.

S/N	Name of cow	Lactation number	Daily milk production kg/ day	Lactation yield/305 days
1	Narayani	III	35	8600
2	Jamuna	III	16	5050
3	Sarswati	II	16	4500
4	Roshni	III	15	4000
5	Chotu	II	12	3300
6	Reshma	III	14	4030
7	Kajri	III	16	6500
8	Chandni	III	15	4300
9	Ganga	III	22	6500
10	Krishna	II	16	6500
11	Rohini	II	20	5440
12	Bindra	II	18	6030
13	Boby	Heifer	-	-
14	Sharda	III	42	10000
15	Chandu	III	16	4030
16	Durga	IV	22	5040
17	Sundari	III	20	5600
18	Sitara	Heifer	-	-

## MATERIALS AND METHODS

### Animals used and site of research conducted

Graphic Era University of Dehradun, Uttarakhand, India has been maintaining a herd of 18 Holstein Friesian crossbred cows (16 lactating and 2 nonlactating cows) and 10 calves. The details of the cows are given in Table 1. These cows were maintained on standard feeding, nutrition, breeding and management practices. The animals have been looked after by the Para veterinarian under the control of Uttarakhand Livestock Development Board of the State. The crossbred cows were producing over 5000 L of milk/lactation (305 days) with an average production of 15 L/day and a maximum production of 42 L/day. These animals were highly susceptible to heat stress, mastitis and foot rot. The months of June to September are very stressful. Thus, it was planned to back cross with the native Red Sindhi cows. Therefore, four red Sindhi cows with four female calves and eight heifers were introduced from Rajasthan in this herd in the month of May 2011. Following the introduction of Red Sindhi cows, 8 out of the 16 lactating cows suffered from high rise in temperature, anorexia, severe drop in milk production and loss of weight. The cows did not respond to routine antibiotic treatment.

### Laboratory investigation and diagnosis

Blood was taken from ear vein and their smear was made. Then it was fixed with absolute alcohol. So, blood smears were prepared by staining with Giemsa stain and examined microscopically for the presence of blood parasites (Figure 1). The results revealed presence of *Theileria annulata* infection in seven out of the eight suffering cows (Table 2).

### Treatment

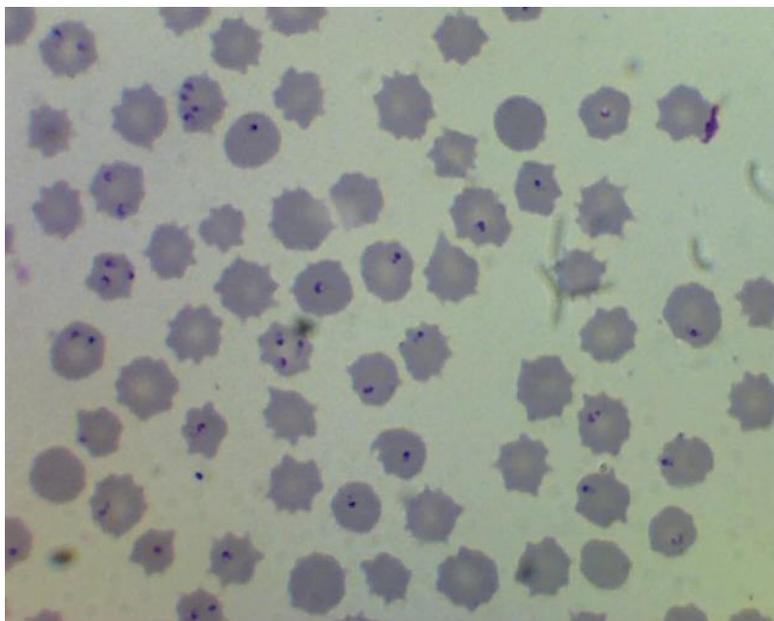
Those positive animals were treated with intramuscular injection. Butalex (Ranbaxy, India) at the dose of 2.5 mg/kg body weight,

while rest of the cows also received same dose (a prophylactic) of Butalex. However, the Red Sindhi cows were not given Butalex. Sick cows were given antipyretics. Since the temperature and humidity in the months of July, August and September was very high, those cows that were sick were kept in an air-conditioned room maintained at temperature of 15°C.

## RESULTS AND DISCUSSION

A total of 18 higher Holstein crosses with their 10 calves were maintained since 2001. Due to high exotic blood and presence of hot and humid climate during the months of June to September, they have been suffering of heat stress, mastitis, metritis, bloat, repeat breeding and foot rot. The same has been reported by Johnson and Vanjonack (1976), Alfredo et al. (2008), and Atheya et al. (2011). Overcoming these problems, it was decided to produce fifty percent Sindhi and Holstein crosses.

So, a group of Red Sindhi four cows with four female calves and six heifers were purchased from the villages of Rajasthan and added to the above herd. After introduction of the Red Sindhi cows, one cross bred cow was sick and did not respond to antibiotic treatment and suddenly died on 23rd May, 2010. Out of the 16 milk producing cows, seven cows fell sick, the signs observed were rise in body temperature 106° F, dull depressed, emaciated, respiratory distress, and were losing weight. There was complete loss of milk; two cows showed haematuria. Enlarged lymph nodes were not noticed in any of the cows. Soulsby (1982) has also reported that the disease commences with high fever and anorexia, this is in agreement with the findings of Bhojne et al. (2010). Following microscopic examination of Giemsa



**Figure 1.** Blood slide of cow suffered from Theileria.

**Table 2.** Details of animals that died and sick.

S/N	Name of cow	Pregnant or not	Date of calving	Buparva-Quone	Died/Alive	Positive for Theileria
1	Narayani	NP	May 2010	Yes	Died	+++
2	Jamuna	NP	2009	No	Died	-
3	Sarswati	NP	19-3-2010	Yes	Died	+++
4	Roshni	NP	16-6-2010	Yes	Alive	-
5	Chotu	NP	2-11-2010	Yes	Alive	-
6	Reshma	NP	26-6-2010	Yes	Alive	-
7	Kajri	NP	14-4-2010	Yes	Alive	-
8	Chandni	NP	21-4-2010	Yes	Alive	-
9	Ganga	NP	20-2-2010	Yes	Died	+++
10	Krishna	NP	25-5-2010	Yes	Alive	++
11	Rohini	NP	19-6-2010	Yes	Alive	++
12	Bindra	NP	15-9-2010	Yes	Alive	++
13	Boby	P(Aborted)	18-7-2010	Yes	Alive	++
14	Sharda	NP	9-1-2010	Yes	Alive	-
15	Chandu	NP	2-2-2011	Yes	Alive	-
16	Durga	NP	11-1-2010	Yes	Alive	-
17	Sundari	NP	9-12-2010	Yes	Alive	-
18	Sitara	P	4-8-2011	Yes	Alive	-

stained blood smears, small round to annular piroplasms were seen in erythrocytes, suggestive of *Theileria annulata*.

In the past, other animals treated with berenil and/or chloroquinone alone or in combination with tetracycline as described by Gautam et al. (1970) and Sharma et al. (1979) showed no response to the above treatment. So, Buparvaquone (Butalex, Ranbaxy) was injected at the

rate 2.5 mg/kg body weight intramuscularly. Buparvaquone is a second generation hydroxynaphthoquinone which inhibit the electron transport chain system of protozoa and not that of the host (McColm and McHardy 1984; Hudson et al., 1985).

After 48 h of buparvaquone injection, second injection of buparvaquone was given. When temperature was normal then Belamyl (B-complex, 10.0 ml) was given

intramuscularly once a day for 7 days. As haemolysis had occurred, so an injection of Feritas (iron sorbitol + Folic acid+Hydroxycobalamin) at the dose rate of 1.0 ml/50 kg body weight was given intramuscularly. All the sick cows were placed in temperature controlled air conditioned rooms in the month of July.

The outbreaks of theileriosis in organized farms are not uncommon. In Khera district of Gujarat during 1988 to 1999, out of 4000 exotic and crossbred cattle, 3800 cases of acute theileriosis were recorded. In Guntur district of Andhra Pradesh during 1989, out of 136 animals, 51.9% suffered of theileriosis and 27% died in spite of treatment. In the present study, out of 18 animals, 7 animals suffered, 4 animals, 4 calves died in spite of the treatment. The cows that died were in 3rd lactation and high producing cows. However, once the animals were kept in air condition environment the stress was reduced and those animals that suffered of theileriosis were saved. For mature theileria sporozoites to enter this saliva, it requires 48 to 70 h of attachment to the host. However, if temperature is high above 37°C then the mature sporozoites enter the salivary apparatus on the ground and it requires only an hour to infect the animals (Brown and Torres Eds, 2008).

Among the various tick borne haemoprotozoan diseases, bovine tropical theileriosis caused by *Theileria annulata* and transmitted by *Hyalomma* spp., results in lethal infections and cause considerable mortality in cross bred cows (Radostits et al., 2000). The erythrophagocytosis further complicates the recovery (Muraleedharan et al., 2005). The recovered cows become carrier of infection after treatment and parasites hide in macrophages and lymph nodes. In case of theileria and babesia immunity is developed after disease but the overall immunity is affected and the cows are prone to mastitis, metritis, foot rot and fertility infections (Wathes et al., 2009).

In the month of August 2010, again 4 cows exhibited signs of high fever, anoxia, anaemia and loss of weight. These cows were again suspected for theileriosis but microscopic examination revealed the presence of *Anaplasma centrale*. The cows were treated with oxytetracycline at the rate of 20 mg/kg intravenously for 5 days with iron and vitamin supplementation and the cows recovered. In this present study, cows suffered anaplasmosis after one month of theileriosis which can be attributed to lower immunity due to theileriosis. The reverse line blotting test is now available and babesia and theileria can be diagnosed in preclinical cases.

## Conclusion

The present study emphasizes that the animals introduced from *Theileria* endemic parts of the country viz. Gujarat, Haryana and Punjab to Himalayan region must be quarantined and the ticks removal should be

done from their bodies and premises before introducing them in the herd. Further, the microscopic monitoring of blood protozoa is important when the animals are sick for the differential diagnosis of theileria and anaplasmosis.

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