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Co-infection of *Babesia divergens* and *Babesia bigemina* leading to Abortion in a Holstein Friesian Crossbred Cow

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43/25

Bovine babesiosis is a hemoprotozoan disease transmitted by a tick vector (Battsetseg *et al*., 2018; Ravindran *et al*., 2002). Springer *et al* (2020) reported global spread of the bovine babesiosis due to Babesia divergens and reported the same in Austria in bovine population. Curtis and Lopez (2024) reported that the reasons related to termination of pregnancy in animal populations due to hemoprotozoan diseases yet to be explored. A case report of abortion in a crossbred Holstein Friesian cow infected with Babesiosis is presented in this report.

A 5-year-old Holstein Friesian crossbred cow from a dairy farm near Apollo College of Veterinary Medicine, Jaipur, India, presented with abortion of a 6-month fetus. Clinical signs included pale mucous membranes in the eyes and vagina, mild swelling of prescapular and precrural lymph nodes, and infestation with Ixodes species ticks. There were no other evidences of alternative infectious causes.

Giemsa-stained blood smears revealed intraerythrocytic merozoites of *B. divergens* at the periphery of erythrocytes and *B. bigemina* stages within erythrocytes. Hematological analysis (Table) revealed a marked decrease in Hemoglobin (5.3 g/dL), Hematocrit (10.4%), and Total Erythrocyte Count (2.66 × 10^6/µL). Conversely, there were significant elevations in MCV (69.1 fL), MCH (44.7 pg), and MCHC (64.6 g/dL), indicating a macrocytic hypochromic regenerative response. Monocytosis (4.9 × 10^3/µL) was also recorded, consistent with an active inflammatory response to protozoal infection.

The animal was treated with Inj.Diminazine aceturate at the dose rate of 3.5mg/ body weight as a single dose as deep intramuscular route along with the supportive therapy of iron dextran 6 ml I/M, cortisone 10 ml I/M, and B-complex vitamins 10ml I/M.

The clinical presentation of abortion in this case is attributed to the hemolytic anemia and subsequent fetal hypoxia caused by the dual parasite burden. This aligns with findings in other tick-borne infections where maternal illness and hematopoietic disruption lead to pregnancy failure (Curtis and Lopez, 2024). Exotic crossbreds are known to be more susceptible to *B. bigemina* than indigenous breeds (Jacob *et al*., 2020), and the added stress of *B. divergens* likely exacerbated the clinical outcome.

Control of bovine babesiosis relies heavily on integrated pest management and therapeutic intervention. Effective management requires the use of acaricides to limit the Ixodes vector population, particularly in regions like Jaipur where transmission is seasonal (Vahora *et al*., 2012). Furthermore, the use of specific babesiacides is essential; drugs such as imidocarb dipropionate or diminazene aceturate remain the mainstays for treating active infections and clearing the carrier state (Mosqueda *et al.*, 2012). Improving the "enzootic stability" of the

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herd through controlled exposure or vaccination remains a long-term goal for preventing such outbreaks in highly susceptible crossbred cattle (Schnittger *et al.*, 2012).

This case confirms that co-infections of *B. divergens* and *B. bigemina* can lead to severe hematological derangement and abortion in Holstein Friesian crossbreds. Systematic screening for hemoprotozoa should be a standard protocol in investigating bovine abortions in tick-endemic areas.

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Table. I. Hematological Profile of the Infected Holstein Friesian Cow

Parameter	Observed Value	Reference Range
(IDEXX laboratories, 2020)	0	10
Hemoglobin (g/dL)	5.3	7.8 – 13.8
Hematocrit (PCV %)	10.4	22.0 – 42.0
Red Blood Cell Count (× 10^6/µL)	2.66	4.80 – 8.20
Mean Corpuscular Volume (fL)	69.1	37.2 – 56.0
Mean Corpuscular Hemoglobin (pg)	44.7	12.5 – 19.8
MCHC (g/dL)	64.6	31.0 – 39.0
Monocytes (× 10^3/µL)	4.9	0.00 – 1.20

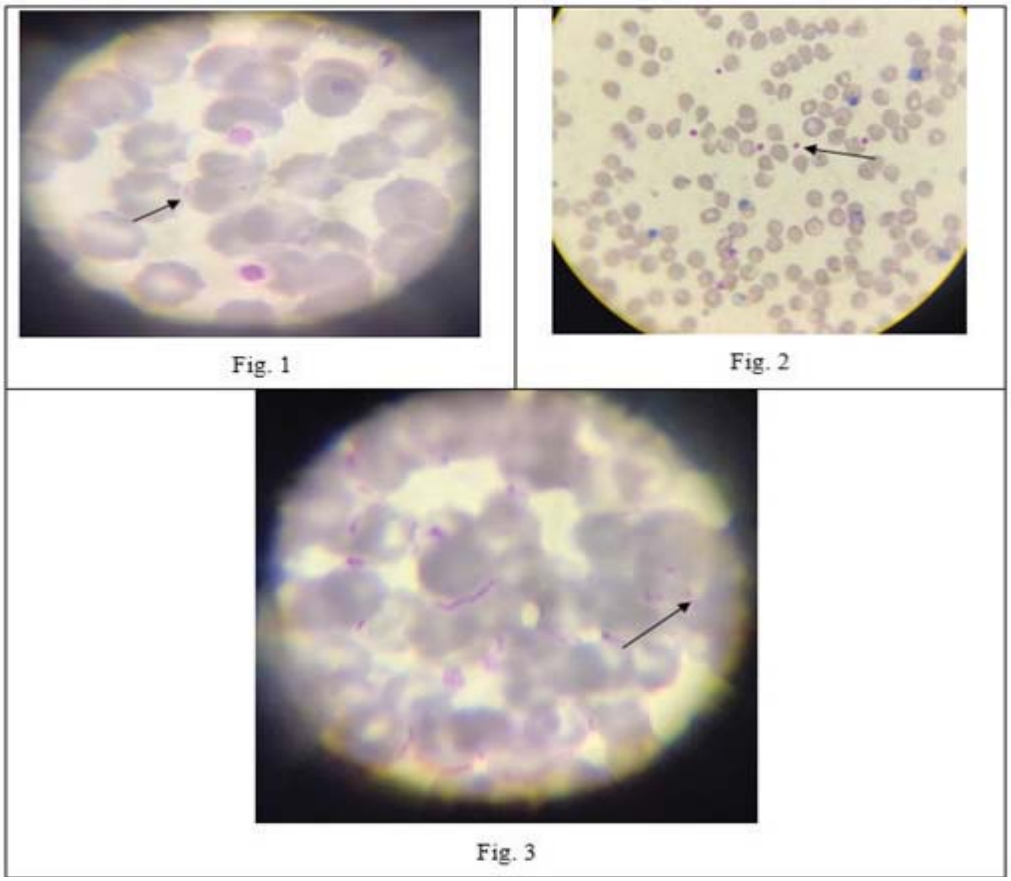

Fig.1 and 2. *B. bigemina* and Fig.3. *B. divergens* - Intraerythrocytic stages (Arrow marks)