Theriogenology Insight: 9(1): 51-56, April 2019
DOI: 10.30954/2277-3371.01.2019.9

Prevalence of *Theileria annulata* on the Basis of Managemental Practices of the Crossbred Cows

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ABSTRACT

Theileriosis is the major protozoon disease which can kills young animals & reduces the growth & production of infected animals. Looking to this aspects a study was conducted to evaluated the effect of managemental practices of crossbreed cow on disease prevalence. The prevalence of *T. annulata* on the basis of nutritional status of the animals was found to be highest in animals having poor nutritional status and lowest prevalence was found in animals having good nutritional status. The prevalence recorded on the basis of nutritional status of animals as inquired by owner have shown that calves up to 1 year of age having good nutritional status have prevalence of 14.81 per cent. Calves having fair nutritional status have prevalence of 40.74 per cent. The highest prevalence 44.44 per cent was recorded in calves having poor nutritional status.The prevalence of *T. annulata* in heifers 1 to 3 years having good nutritional status have prevalence of 20.00 per cent. Heifers that have fair nutritional status have prevalence of 33.33 per cent. The highest prevalence 46.66 per cent was recorded in heifers having poor nutritional status. The prevalence of *T. annulata* infections in animals up to 1 year reared in Pakka house was 18.51 per cent in *kaccha* house prevalence was 44.44 per cent and the prevalence of disease in open housing system was 37.03 per cent. The prevalence of *T. annulata* infection in heifers 1 to 3 years reared in *pakka* house was 20.00 per cent heifer reared in *kaccha* house had prevalence of 53.33 per cent and the prevalence of disease in open housing system was 26.66 per cent. The prevalence of *T. annulata* infection in adult more than 3 years reared in *pakka* house was 23.07 per cent. Adult reared in *Kaccha* house had prevalence of 46.15 per cent and the prevalence of disease in open housing system was 30.76 per cent. Hygiene is very important factor in dairy industry especially in disease prevalence and management hygiene play very important role in respect of disease flare up situation. The prevalence of *T. annualata* infection in calves up to 1 year reared under good hygienic condition was 11.11 per cent in fair hygienic condition prevalence was 37.03 per cent. The prevalence of disease was highest 51.85 per cent in calves reared under poor hygienic condition.

Keywords: Theilariosis, Prevalence, Housing system

Bovine tropical theileriosis a tick born protozoan disease caused by Theileria annulata and transmitted by *Hyalomma* spp., is one of the most divesting bold parasites affecting in cattle (Sayin *et al.*, 2009). The disease in its mildest form is responsible for lower milk production while in severe cases causes high mortality resulting in economic losses to the dairy farmers (Reddy *et al.* 1991).

Continuous change in climatic condition in the past few decades resulting in high environmental temperature and numidity has favored tick multiplication and thereby a gradual surge in

the incidence of tick-borne menace. Increased population and introduction of the exotic/ crossbred cattle population especially in the endemic ateas, has magnified susceptibility to theileriosis. Predisposing factors linked with stress such as high production, low nutrition, poor housing, unhygienic indoor condition, and development of drug resistance to acaricidal agents have further intensified the adverse impact of theileriosis.

MATERIALS AND METHODS

A total 300 crossbred cows of different daiy farms of Indore districts (organized and unorganized) were included in the present study. The cows with clinical signs such as fever, inappetence, anaemia dyspnea reduced milk yield etc were screened and grouped into three groups vizcalves up to 1 year, heifers 1 to 3 years and dult cows more than 3 years.

Thin blood smear was prepared and stained with Giemsa stain. Presence of piroplasm(s) inside the erythrocytes was considered positive for *Theileria* spp. infection. Only BTT positive animals were further processed for Haemetalogical examination.

The animals were bled from the jugular vein into vacutainers containing EDTA for estimation of various haematological parameters, viz., haemoglobin (Hb), total erythrocyte count (TEC), total leukocyte count (TLC), and for preparation of blood smear.

Crossbreed cattle at different dairy farms (organized and unorganized) of different villages of Indore district (Silotiya, Tillore, Bagoda, Cheerakhan, Datoda, Merkhedi, Asrawad Khurd and Indore) were included to record the incidence of Bovine Tropical Thileriosis during the year 2013-14.

A total of 300 crossbreed cattle of different of age and either sex showing high rise of body temperature were screened on the basis of blood smear examination for BTT. Blood smear were fixed in methanol and standby Stained by Giemsa method of staining (Jain, 1986). Only BTT positive animals were further processed for Haemetalogical examination.

Incidence of *T. annulata* on the basis of managemental practices like nutrional status of the animal, housing pattern and hyginic condition were also calculated. As these managemental practices were found to be different in different surveyed villages these managemental practices considerable affected the disease incidence, there corelation percentage incidence were calculated. For this animals reared under such managemental practices divided as follows:

Nutritional status: Information regarding feed and fodder given to screened animals were inquired from the owner and recorded in the format and the incidence was recorded. For recording the incidence on the basis of nutritional status animals were classified into 3 groups:

(a) Good

(b) Fair

(c) Poor

Housing pattern: The housing pattern of screened animals from different surveyed villages were recorded in the format as in surveyed villages the housing pattern were found to be different. The housing pattern of screened animals were classified into 3 groups:

(a) Pakka

(b) Kachcha

(c) Open yard

Hygienic condition: The hygienic condition of the screened animals under which they reared were also recorded. The hygienic condition of screened animals were divided into 3 groups:

(a) Good

(b) Fair

(c) Poor

Print ISSN: 2249-6610

RESULTS AND DISCUSSION

Prevalence of *T. Annulata* Infection on the Basis of Nutritional Status of Animals

The prevalence recorded on the basis of nutritional status of animals as inquired by owner have shown that calves up to 1 year of age having good nutritional status have prevalence of 14.81 per cent. Calves having fair nutritional status have prevalence of 40.74 per cent. The highest prevalence 44.44 per cent was recorded in calves having poor nutritional status (Table 1).

Table 1: Prevalence of *T. annulata* infection on the basis of nutritional status of animals

Nutritional status	Age of animal		
	Up to 1 year	Heifers 1 to 3 years	Adult cows more than 3 years
Good	4 (14.81%)	3 (20.00%)	3 (11.53%)
Fair	11 (40.74%)	5 (33.33%)	10 (38.46%)
Poor	12 (44.44%)	7 (46.66%)	13 (50.00%)
Total	**27**	**15**	**26**

Note: *Value of chi square 0.7575 (5%) is not significant.*

The prevalence of *T. annulata* in heifers 1 to 3 years having good nutritional status have prevalence of 20.00 per cent. Heifers that have fair nutritional status have prevalence of 33.33 per cent. The highest prevalence 46.66 per cent was recorded in heifers having poor nutritional status (Table 1).

The prevalence of *T. annulata* in adults cows more than 3 years having good nutritional status was 11.53 per cent. Cows that have fair nutritional status have prevalence of 38.46 per cent highest prevalence of *T. annulata* 50.66 per cent was recorded in cows rearing under poor nutritional status.

Nutrition plays an important role in disease prevalence. As animals having good nutrition have better immunity to fight with the antigens that helps in controlling the disease. During the course of study in all age group animals, it was found that animals that have poor nutritional status have suffered more from dieses due to their immune status. Animals having fair nutitional status have moderate disease prevalence. The disease prevalence was least in animals having good nutritional status.

Prevalence of *T. annulata* on the basis of nutritional status of the animals

In the present study, the prevalence of T.annulata on the basis of nutritional status of the animals shoed that animals having good nutritional status suffer least from ticks infestation in all age group animals ie calves up to 1 year, heifers 1 to 3 years and adult cows more than 3 years having good nutritional condition the prevalence of T.annulata was found to be least 14.81%, 20.00% and 11.53% respectively indicating that animals having good nutritional status have better immune system.

In all age group animals having fair and poor nutritional status this disease prevalence increases due to heavy ticks infestation which lead to loward body immune system. As nutrition plays a key role in the balance of health and disease which decides whether an animal stays healthy or succumbs to disease.

When an animal is exposed to a bacterium, virus or other infectious agent the animal's immune system mounts a response to raising antibodies to fight the infection as well as using white blood cells and other killer

cells to attack anything that it recognize a clearly needs energy, materials for manufacturing the antibodies and cells and other feature involved in communicating messages in with fighting infections.

The direct effect of animal diseases on livestock productivity are significqnt and include reduced feed intake, changes in digestion and metabolism, increased morbidity and mortality and decreased rates of reproduction, weight gain and milk production.

The higher prevalence of *T. annulata* in animals having poor and fair nutritional status could be explained by the findings of Okelly and Kennedy (1981), and Nelson, 1984 who had explained the relationship between tick numbers and host nutrition, due to heavy tick infestation behavioural disturbanaces such as rubbing, scratching, kicking and biting at ecto parasites occurred due to which the feed intake of animals were affected.

Prevalence of *T. annulata* infection on the basis of housing pattern

The different age group animals ie calves up to 1year, heifers 1 to 3 years and adult cows more than 3 years reared under *pucca* houses had lower prevalence of *T.annulata* 15.21%, 20.00% and 23.07% respectively. As in *pucca* houses there were low chances of ticks to bred come also in *pucca* houses sanitary and hygienic management were adequate. Acaricide treatment of *pucca* houses were also effective as compared to *kuccha* houses and open yard system.

The highest prevalences of *T. annulata* were found in all age group animals ie calves up to 1 year, heifers 1 to 3 years and adult cows more than 3 years reared under kuccha house pattern 44.44%, 53.33% and 46.15% respectively..

Housing pattern plays an important role in disease prevalence of *T. annulata.* The prevalence in different housing pattern was studied in survey. Which reveals that the ticks population was high in animals which were reared in Kaccha housing pattern. As in *Kaccha* house, there present sufficient humid atmosphere that helps in breeding of ticks.

This might be due to humid atmosphere present in *kuccha* houses throughout the year. Which is favorable for breeding of ticks. The cracks and crevices present in the kuccha house also help the ticks to hide and bred.

The prevalence of *T.annulata* in all age group animals i.e. calves up to 1 year, heifers 1 to 3 years and adult cows more than 3 years reared under open system were moderate 37.03%, 26.66% and 30.76% respectively as compare to kuccha houses. In open yard houses bushes and vegetation help as hiding places for ticks. In such kind of houses transformation of ticks from one animal to another animal was more and the acaricides treatment of such houses were not feasible.

Open and *Kachcha* houses had better opportunity for ticks to breed and transmit. The hygienic conditions in such type of houses were also not satisfactory. Both these conditions helped in flare of the ticks and due to heavy ticks infestation on animals the prevalence of *T. annulata* was also high in such type of houses.

The higher prevalence of *T. annulata* in *Kachcha* and open yard were best explained by the findings of Garbi *et al.* (2011) who had studied that upgrading barns is a sustainable eradication policy against tropical Thileriosis based on a single investment and is environmentally friendly too.

Table 2: Prevalence of *T. annulata* infection on basis of housing pattern

Housing pattern	Age of animal		
	Up to 1 year	Heifers 1 to 3 years	Adult cows more than 3 years
Pakka	5 (18.51%)	3 (20.00%)	6 (23.07%)
Kachcha	12 (44.44%)	8 (53.33%)	12 (46.15%)
Open	10 (37.03%)	4 (26.66%)	8 (30.76%)
Total	**27**	**15**	**26**

Note: *Value of chi square 0.6564 (5%) is not significant housing pattern and prevalence of T. annulata is different age groups animals are not dependent on each other.*

Prevalence of *T. annulata* infection on basis of hygienic condition

Hygiene is very important factor in dairy industry especially in disease prevalence and management hygiene play very important role in respect of disease flare up situation.

Print ISSN: 2249-6610

Poor hygienic condition of dairy shed prevail many disease to flare up. During the present investigation prevalence of *T. annulata* on the basis of hyginic condition was studied.

The prevalence of T. annualata infection in calves up to 1 year reared under good hygienic condition was 11.11 per cent in fair hygienic condition prevalence was 37.03 per cent. The prevalence of disease was highest 51.85 per cent in calves reared under poor hygienic condition (Table 3).

The prevalence of *T. annulata* infection in heifers 1 to 3 years reared under good hygienic condition was 13.33 per cent in fair hygienic condition prevalence was 33.33 per cent, the prevalence of disease was highest 53.33 per cent in heifers reared under poor hygienic condition (Table 3).

Table 3: Prevalence of *T. Annulata* Infection on Basis of Hygienic Condition

Hygienic Condition	Age of animal		
	Up to 1 year	Heifers 1 to 3 years	Adult cows more than 3 years
Good	3(11.11%)	2(13.33%)	4(15.38%)
Fair	10(37.03%)	5(33.33%)	8(30.76%)
Poor	14(51.85%)	8(53.33%)	14(53.84%)
Total	**27**	**15**	**26**

Note: *Value of chi square 0.3365 (5%) is not significant.*

Different age group animals ie calves up to 1 year, heifers 1 to 3 years and adult cows more than 3 years reared under good hygienic condition showed prevalence of 11.11% 13.13% and 15.38% respectively good hygienic conditions prevents occupancy of disease and establishes conditions that ensure preservation of health.

All animal reared under good hygienic condition had lower prevalence of disease.

Different age group animals ie calves up to 1 year,heifers 1to 3 years and adult cows more than 3 years reared under fair conditions showed prevalence of 37.03% 33.33% and 30.76%respectively, which indicate that as the sanitary and hygienic condition were defoliate the prevalence of disease increases.

The highest prevalences of T.annulata were recorded in different age group animals ie calves up to 1 year, heifers 1 to 3 years and adult cows more than 3 years reared in poor hygienic condition were 51.85% 55.33% and 53.84% respectively this high prevalence of disease may be due to poor hygienic and sanitary condition which favor the spreading of tick due to which tick infestation increases.

The higher prevalence of *T. annulata* in animals rearing in poor and fair hygienic conditions could be best explained by the findings of Shariff, (1997) who had correlated the disease prevalence with good managemental and hygienic practices and concluded that lower prevalence in animals under good hygienic and managemental practices were due to decrease load of vectors.

CONCLUSION

Theileria annulata is deadful protozoan disease which mainly affects the production potential of crossbreed cow. The present study was conducted to evaluate the effect of managemental practices on disease prevalence. Which implicate that the prevalence of *T. annulata* on the basis of nutritional status of the animals was found to be highest in animals having poor nutritional status and lowest prevalence was found in animals having good nutritional status.

The prevalence of *T. annulata* infection on the basis of housing pattern was found to be highest in animals which reared in Kachcha houses. A lowest prevalence was found in animals which reared in pakka houses.

The prevalence of *T. annulata* infection on the basis of hygienic condition was found to be highest in the animals having poor higinic condition and lowest prevalence was found in animals having good hygienic condition.

REFERENCES

Garbi M., Touay A., Khayeche, M., Laarif, J., Jedidi M., Sassi, L. and Darghouth M.A. 2011. *Rev. Sci. Tech. Off. Int. Epiz.,* **30**(3): 763-778.

Jain, N.C. 1986. Schalm'sthedition, Veterinary Leaand Febiger, Haema.

Nelson, W.A. 1984. Effect of nutrition of animals on their ectoparasites. *J. Med. Entomol.,* **21**: 621-635.

O'kelly, J.C. and Kennedy, P.M. 1981. *Metabol of the tick, Boophilus microplus the british J. Nutri.,* **5**: 557-566. Philadephia.

Reddy, R.M.T., Jagannath, M.S., Rajasekhar, M. and Rahman, S.A. 1991. Estimation of antibody levels of cattle to *Theileria annulata* vaccine by avidin-biotin ELISA. In : Proceedings of the Second EEC Workshop on Orientation and Coordination of Research on Tropical Theileriasis, NDDB, Anand. Mar 18-22, 1991, pp. 104-106.

Sayin, F., Diner, S., Karaer, Z., Cakmak, A., Inci, A., Yukari, B.A., Eren, H., Vatansever, Z. and Nalbantoglu, S. 2009. Studies on the epidemiological of tropical theileriosis (*Theileria annulata* infection) in cattle in Central Anatolia, Turkey. *Trop. Anim. Health Prod.*, **35**: 521-539.

Shariff, N. 1997. Studies on the incidence of bovine tropical theileriosis and Comparative efficacy of some antitheilerial drugs in crossbred cattle of Mhow region. M.V. Sc. Thesis. J.N.K.V.V., Jabalpur (M.P.).

Sharma, R.D., Nichani, A.K. and Nanda, P.C. 1989. Epidemiological observations on blood protista diseases in cattle. Proceedings of 8th Annual Convention of Indian Society for Veterinary Medicine, Izatnagar, Oct 4-6, 1989.

Print ISSN: 2249-6610