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Short Communication

Factors affecting seasonal prevalence of blood parasites in dairy cattle in Omdurman locality, Sudan

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This study was conducted in Al-Rodwan project in Omdurman to investigate the prevalence of blood parasites in dairy cattle during different seasons. A total of 290 animals were examined during three seasons: dry cool (100), dry hot (95) and wet hot (95). The results showed that the prevalence of blood parasites during different seasons was 8, 5.25 and 6.32% for dry cool, dry hot and wet hot season, respectively. The prevalence of *Theileria* species infection was found to be 7, 5.25 and 6.32% for dry cool, dry hot and wet hot season, respectively. While the prevalence of *Babesia* species infection was only recorded in the dry cool season as (1%). There was no effect (χ^2= 0.6, p> 0.05) of season on the occurrence of blood parasites. Strong association (t-test= –43.6, p< 0.05) was found between presence of blood parasites and milk yield.

Key words: Dairy cattle, blood parasites, season, Sudan.

INTRODUCTION

Intensive and semi-intensive production system of Sudan distributed either within aggregation sites in different locations or in small herds located in different sites around towns. The high needs for animal proteins especially milk and milk products in recent years in Khartoum State oriented the producers to import highly milk producing foreign breeds to face the human consumption. Parasitic diseases affect the milk industry by the direct effect on milk production, difficult control of vectors, high cost of the treatment and financial implications for farms management to prevent the parasitic infestations.

Therefore, this study was planned to investigate the presence of blood parasites in dairy cattle during different seasons in Al-Rodwan project, Omdurman.

The effect of blood parasites and their vectors on cattle productivity differ according to several factors such as the causative agent, breed and the disease status (clinical, sub-clinical or chronic). Many studies were conducted to study the impact of each of these factors on cattle productivity such as milk yield and weight gains (Pholpark et al., 1999; Michael et al., 1989; Gitau et al., 2001; Muragura et al., 2005).

Many workers conducted research in Sudan on the scope of epidemiological aspects of blood parasites in cattle. Many of these studies discussed the evidence and prevalence of parasitic infections in different parts throughout Sudan (Karib, 1961; El Bihari et al., 1974; Osman, 1992; Abdel et al., 1994; Hassan, 2003).

MATERIALS AND METHODS

Area of study

Al-Rodwan project in Omdurman was chosen to screen dairy cattle for blood parasites. It is located in the North Western site of the locality and considered as the main dairy cattle aggregation site in the area with approximately 5,000 head according to the record of Ministry of Agriculture, Animal Resources and Irrigation, Khartoum State (2003).

Study population

Selected cattle from dairy farms in Al-Rodwan project were investigated during dry cool (February-March), dry hot (May-June) and wet hot (August-September) seasons. A hundred animals from the chosen herds of animals were studied during the above seasons. The majority was of cross breeds (89%) and the rest was a local breeds (11%).

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Sampling and sample collection

The sampling was done according to cluster sampling method (two stage sampling) as described by Thrusfield (1995). A total of 290 blood samples were collected during the three different seasons from the same animals identified. The blood was collected in the morning from the jugular veins using vacutainers with EDTA. The samples were labeled with animal number, placed in an ice box at 4°C and transported as soon as possible to the laboratory before processing for parasitological examinations.

Parasitological examinations

Wet mount

One drop of fresh blood was placed on a slide, covered with a cover slip and examined microscopically for detection of motile parasites at 10×40 magnification.

Buffy coat examination (Woo, 1970)

A capillary tube was taken; the end of capillary tube was put on a drop of the blood sample, filled to about three-quarters and sealed by plastoseal at one end. It was placed in the haematocrit centrifuge which was run for 5 m. After centrifugation the packed cell volume was read, and then the capillary tube was placed onto a clean slide and covered with one drop of distilled water and examined microscopically at 10×40 magnification to detect trypanosomes and microfilariae.

Thin blood film

A small drop of fresh blood was put in the middle of one end of the slide, and spread right across the slide and then air dried. The slide was labeled using a pencil. Blood films were fixed in absolute methyl alcohol for 2 m, stained in 5% diluted Giemsa's stain for 45 m, and washed in distilled water and then dried. Immersion oil was put on the blood film and examined microscopically for the detection of blood parasites at 10×100 magnification.

Data analysis

Stata 6.0 for Windows 98/95/NT was used for data analysis.

RESULTS

The presence of blood parasites using blood film in Al-Rodwan dairy project was investigated during different seasons. The results showed that a prevalence of blood parasites was 8 (8%), 5 (5.25%) and 6 (6.32%) for dry cold, dry hot and wet hot season, respectively (Table 1). The prevalence of *Theileria* species infection was 7, 5.26 and 6.32% in dry cold, dry hot and wet hot season, respectively. Prevalence of *Babesia* species infection was only recorded in dry cool season as 1% (Table 2). There was no effect of season (χ^2= 3.1, p> 0.05) on the presence of blood parasites. A positive association (t-test= –43.6 - p< 0.01) was found between presence of blood parasites and milk yield of cows resulting in reduction in milk production.

DISCUSSION

The study of blood parasites in dairy cattle during different seasons in Omdurman area revealed a higher prevalence of *Theileria* species infection compared to *Babesia* species infection. Similarly, different workers recorded the presence of blood parasites in both intensive and pastoral production systems of Sudan (Abdalla, 1984 and Hassan, 2003). The presence of blood parasites infection in dairy cattle in Al-Rodwan project was attributed to the fact that most of the farms in this area were infested with ticks; particularly, all the farms built of mud and block stones which constitute a suitable environment for that ticks.

There was no effect of season (χ^2=3.145, p>0.05) on the prevalence of blood parasites. This finding disagreed with the results of different researchers. Perez et al. (1994) found that season was a risk factor for presence of *Babesia bovis* infection. El Mentenawy (2000) found during a study aimed at investigating the parasites infecting cattle blood at Al-Qassim region in Saudi Arabia, that theileriosis prevalence reached a maximum in (84.3%) in both autumn and summer seasons, while it dropped to 59.4% in spring.

The disagreement of this study could be attributed to application of acaricides and administration of anti-piroplasmal drugs by farm owners at intervals, which could have affected the prevalence of blood parasites during different seasons. It could also be due to the mismanagement practiced at Al-Rodwan while allows for continuous tick challenge throughout the year. An association (p < 0.01) was observed between presence of blood parasites and milk yield of producing animals. Similar results were reported by different researches. Michael et al. (1989) studied the effect of theileriosis on milk yield and suggested that it caused decrease in milk yield. Patarroyo et al. (1995) stated that bovine babesiosis caused by *Babesia bigemina* remains a significant constraint to milk cattle production. Although we could not link PCV with blood parasites, yet this could be one of the major factors that affect milk yield.

Other blood parasites, particularly *Trypanosoma* or microfilaria were not encountered during this study, although reported in other parts of the capital Khartoum. Possible explanation is that Al-Rodwan project is found in an area where present conditions are not suitable for insect propagation.

This should not be overlooked as micro-climates may be created through negligence and lack of awareness and that used permit the infestation of insect species that are known as mechanical or biological vectors of some parasites. This may come as a result indiscriminate introduction of cattle which may originate from infected herds for example, with *Trypanosoma* species or microfilaria In conclusion, infection with *Theileria* species and *Babesia* species were prevalent in Omdurman. Infection with blood parasites had economic impact due to reduction in milk production.

Table 1. Summary of the blood parasites survey in Al-Rodwan dairy project.

Unit	Season Frequency (%)		
	Dry cool	Dry hot	Wet hot
Total of animal examined	100	95	95
Buffy coat			
Positive	0(0)	0(0)	0(0)
Negative	100(100)	95(100)	95(100)
Wet mount			
Positive	0(0)	0(0)	0(0)
Negative	100(100)	95(100)	95(100)
Thin blood stain			
Positive	8(8)	5(5.26)	6(6.32)
Negative	92(92)	90(94.74)	89(93.68)

Dry cool: February-March Dry hot: May-June Wet hot: August-September

Table 2. Prevalence of blood parasites during different seasons in Al-Rodwan dairy project.

Season	No. examined	Prevalence (%)		Over all
		***Theileria* spp.**	***Babesia* spp.**	
Dry cool	100	7	1	8
Dry hot	95	5.26	0.00	5.26
Wet hot	95	6.32	0.00	6.32

Dry cool: February-March Dry hot: May-June Wet hot: August-September

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