



**Incidence rate of blood parasites in some Dairy Farms, Nyala, South Darfur State,
Sudan**

Adam¹, M.E.; Salih², D.A., Malik³, K.H. and A/Rhman², A.H.

¹*Nyala Regional Veterinary Research Laboratory*

²*Central Veterinary Research Laboratory*

³*Faculty of Veterinary Medicine, University of Khartoum*

E.mail:drmamin69@yahoo.com

Abstract: This study was conducted in dairy farms around Nyala town, South Darfur State. Seven dairy farms were selected as sentinel herds to study the incidence rate of blood parasites in dairy farms around Nyala town. Bleeding was done at monthly interval for twelve month from August 2003 till July 2004. A total of 1229 blood smears and buffy coats were examined by conventional parasitological methods for blood parasites. All cattle in dairy farms were resident crosses of Frezian and local breeds. The study showed high incidence rate of theileriosis 3% in August, 2% in September and (2.9%) in December followed by anaplasmosis (2.1%), filariasis (3.1%) in August, *Trypanosoma vivax* (1.5%) and *Trypanosoma theileri* (1%) in September. The study showed that tropical theileriosis is an emerging threaten to the growing dairy industry of South Darfur, while the presence of migratory cattle around dairy farms during the rainy season in the presence of biting flies presents a source of trypanosomosis to resident cattle through mechanical means. Further studies using more sensitive diagnostic methods besides indepth ecological studies of *H. a. anatomicum* are required to take the required actions against blood parasites threatening dairy production in South Darfur.

المستخلص:

تم اختيار سبعة مزارع بمنطقة نيالا حول مدينة نيالا كأبقار رصد، أجريت عملية أداء للحيوانات في كل شهر ولمدة 12 شهر اعتبارا من شهر أغسطس 2003 وحتى يوليو 2004م. خلال هذه الفترة تم فحص 1229 عينة عن طريق الشرائح الدموية المصبوغة وطريقة تركيز الدم في الانابيب الشعرية بواسطة جهاز الطرد المركزي. كل الأبقار التي تم فحصها من السلالات المهجنة بين أبقار الفرزيان والابقار المحلية. أعلى نسبة حدوث لطفيل الحمى المدارية (3%) في شهر أغسطس، (2%) في سبتمبر و (2.9%) في ديسمبر بيلها طفيلي الانابلازما بنسبة (2.1%) في شهر أغسطس، بيرقات الميكروفلاريا بنسبة (3.1%) في شهر أغسطس وآخر طفيلي داء المتفقيات من النوعين ترباتوسوما ففاكس بنسبة (1.5%) وترباتوسوما ثاليرياي بنسبة (1%) في شهر سبتمبر. أظهرت الدراسة بأن مرض الحمى المدارية يشكل تهديدا لصناعة الالبان المتزايدة بالولاية بينما وجود أبقار الرحل في فترة الخريف وفي وجود أنواع الذباب العاض يشكل مصدراًصابة بمرض النوم لابقار المستقرة عن طريق النقل الميكانيكي. هناك حاجة للمزيد من الدراسات باستخدام طرق التشخيص ذات الحساسية والكفاءة العالية بجانب الدراسة المتعتمدة لبيئة القراد من النوع هيلالوما انوكلكم الناقل لمرض الحمى المدارية حتى يتسمى وضع الاستراتيجية المناسبة للمكافحة.

Introduction

The impact of the blood parasites in South Darfur State is tremendous due to the wide distribution of biting flies and ticks throughout the different climatic zones of the region, beside the existence of tsetse fly in the extreme south of the state (Abdel Karim and Benjamin, 1989).

Theileriosis is an infectious disease caused by protozoan parasites it occurs in wide range of mammalian hosts and throughout the world (FAO, 1983). In Sudan, *H. a. anatomicum* is the main vector transmitting *Theileria annulata* (Jongejan *et al.*, 1983).

In Africa, two species of *Anaplasma* were reported, *Anaplasma marginale* and *A. centrale* (Ilemobade, 1991). The most pathogenic is *A. marginale*, and is widely distributed through Africa, and transmitted biologically by at least twenty tick species (DeVos, 1991). In the tropics, *Boophilus* is thought to be a significant vector (Rodostits *et al.*, 2000) in addition to *Rhipicephalus*, *Hyalomma*, and *Haemaphysalis* in tropical and temperate areas.

Wiessenhulter (1976) found that the *Trypanosoma vivax* was the only encountered species infecting cattle in a dairy herd outside tsetse belt in Tanzania. Similar results were obtained by Musa *et al* (1991) in a dairy farm in Khartoum area, A/Rahman *et al.* (1991a) in South Kordofan, Suliman (1992) in Sinnar and also Homeida (1993) in Sinnar, Kosti and Eldueim. *T. vivax* in South Darfur was found predominantly in all herds increasingly with increasing distance from tsetse foci (Hall *et al.*, 1983).

At present there is expansion of urban communities in Nyala town with high domestic need for milk in the town. There is a growing dairy farming around the urban areas of Nyala where the farmers are breeding improved cattle lines with high milk yield. The objective of the study is to assess the burden of blood parasites and their incidence rate in dairy farms around Nyala town.

Materials and methods

A cohort study was conducted in dairy farms in Nyala town, South Darfur State. The state is located on the extreme south west of Sudan,

covering an area estimated at 93.000 km², extending between latitudes 8° 42' - 13° 07' N and longitudes 23° 33' - 25° 47' E. There are three distinct seasons in South Darfur. The hot dry season starts in March and ends in June, the hot wet, during July to October and the cool dry season, November to February. A total of 1229 blood samples were collected from Cattle (average of 104 cows per month) kept in dairy farms around Nyala town. Those animals were crosses between Friesian and local breeds. Regular treatment regime with diminazene acetarate (Berenil), Buparvaquone (Butalex) and application of acaricide on animals by spraying or hand dressing were practiced by farmers. The animals were examined monthly for blood parasites starting from August 2003 till July 2004.

Blood collection: Blood samples were collected from jugular vein into heparinized vacutainers using needles and needle holders. Blood samples were collected in the morning (7-11hrs) a.m.

Conventional Parasitological Methods: Wet, thin and thick blood smears: These methods were described by Uilenberg (1998) for identification of trypanosomes.

Concentration Method: This method was described by Woo (1970).

Results:

Blood parasites detection

Theileriosis incidence rate was 2.8%, followed by anaplasmosis (0.7%), microfilariasis (0.7%), *Trypanosoma vivax* (0.4%) and *Typanosoma theileri* (0.2%). The overall results are shown in Table 1.

The highest monthly incidence rate of theileriosis was in August, September and December while no infections were reported in November, April, May and June. The highest incidence rate of anaplasmosis was in October and no cases were reported during the period Feb. to July besides September and November. Concerning microfilariasis, the highest incidence rate was in August, Some animals were found positive in Sept, March, April, May and July. Some cases of *T. vivax* were detected in August, September and October. Two cases of *T. theileri* were observed in September and one in July.

Statistical analysis

Data obtained from the experiment was subjected to analysis of variance (ANOVA) according to (Steel and Torrie, 1980) for

complete randomized design (CRD) using a computer programmed known as statistix⁸. The comparison among means was separated by the least significant difference (LSD).

Table 1: A cumulative incidence of blood parasites in dairy farms around Nyala based on monthly visit during August 2003 to July 2004.

| Months | No. examined | Anaplasma | Theileria | Microfilaria | <i>T. vivax</i> | <i>T. theileri</i> |
|---------------|---------------------|------------------|------------------|---------------------|------------------------|---------------------------|
| 2003 | | | | | | |
| Aug | 96 | 2 (2.1%) | 3 (3.1%) | 3 (3.1%) | 1(1%) | 0 |
| Sept | 101 | 0 | 4 (2 %) | 1 (0.5%) | 3(1.5%) | 2(1%) |
| Oct | 94 | 3 (1%) | 4 (1.4%) | 0 | 1(0.3%) | 0 |
| Nov | 71 | 0 | 0 | 0 | 0 | 0 |
| Dec | 80 | 2 (0.5%) | 13(2.9%) | 0 | 0 | 0 |
| 2004 | | | | | | |
| Jan | 132 | 1 (0.2 %) | 5 (0.9%) | 0 | 0 | 0 |
| Feb | 63 | 0 | 2 (0.3%) | 0 | 0 | 0 |
| March | 112 | 0 | 2 (0.3%) | 2 (0.3%) | 0 | 0 |
| April | 141 | 0 | 0 | 1 (0.1%) | 0 | 0 |
| May | 148 | 0 | 0 | 1 (0.1%) | 0 | 0 |
| June | 94 | 0 | 0 | 0 | 0 | 0 |
| July | 97 | 0 | 1 (0.08%) | 1 (0.08%) | 0 | 1 (0.08%) |

| Total | 1229 | 8 (0.7%) | 34(2.8%) | 9 (0.7%) | 5(0.4%) | 3 (0.2%) |
|-------|------|----------|----------|----------|---------|----------|
|-------|------|----------|----------|----------|---------|----------|

Discussion:

In the last few years Nyala town witnessed a huge influx of people that led to considerable expansion of the town population coupled by high demand for food especially milk. The local private sector started to invest in dairy production and as a result of that dairy breeds were introduced into the region. Therefore, losses due to tick-borne diseases increased as these breeds were introduced from Central Sudan where tropical theileriosis causes a major threat to animal health and production (El Hussein *et al.*, 1991; Mohammed, 1992; El Hussein *et al.*, 2002 and Salih, 2003).

A part from studies conducted by Osman (1977 and 1978), information on ticks and tick-borne diseases in South Darfur are inadequate. The present study focused on trypanosomes transmitted mechanically by tabanids and other biting flies in the region, as well as haemoprotezoa transmitted by ticks in dairy farms around Nyala. The results obtained revealed an overall *Theileria* spp. Incidence rate of 2.8% among dairy cattle although the owners are keeping their animals under prophylaxis cover in addition to implementing ticks control by acaricides. The disease is not reported to cause problems in nomadic cattle in the area. This is more or less similar to that reported by Salih (2003) (3.9%) in dairy farms around Nyala. The highest incidence rate recorded in August, September and December, this might be due to high abundance of ticks during and after rainy season.

Anplasma infections were observed in the cool and rainy seasons. This may be due to the availability of their vectors, biting flies and ticks, in these seasons.

Only *T. vivax* and *T. theileri* species were detected among dairy cattle, with highest incidence rate in September correlated with high abundance of tabanid flies particularly *Tabanus suffus* and *Atylotus* spp. during September and early October. This agreed with Abdel Karim (1980) findings in the same region and Abdel Salam (1996) and A/Rahman (2002) from Khartoum and Blue Nile State. As nomadic herds were observed in the area

around dairy farms, these findings suggested the importance of mechanical transmission in the epidemiology of trypanosomosis in tsetse free areas (Karib, 1961 and Raymond, 1990). The absence of Babesia and the low prevalence of trypanosomosis in dairy farms may due to the regular treatment with diminazene aceturate, and application of acaricide on animals by spraying or hand dressing. No blood parasites were found in dairy farms during November, this might be due to the intensive and strategic treatment of cattle against blood parasites infection during this period (Hall *et al.*, 1983).

Further studies using more sensitive diagnostic methods besides in-depth ecological studies of vectors of tropical theileriosis such as *H. anatolicum* are required to take the **required** actions against blood parasites threatening dairy production in South Darfur.

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