



Tick infestation of Borana cattle in the Borana Province of Ethiopia

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ABSTRACT

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A study was conducted to identify and determine burdens of ticks infesting Borana cattle in the Borana Province of Ethiopia. *Rhipicephalus pulchellus*, *Rhipicephalus pravus*, *Rhipicephalus muhsamae*, *Rhipicephalus praetextatus*, *Rhipicephalus evertsi evertsi*, *Amblyomma gemma*, *Amblyomma variegatum*, *Amblyomma cohaerens*, *Amblyomma lepidum*, *Hyalomma truncatum*, *Hyalomma marginatum rufipes* and *Boophilus decoloratus* were identified on the cattle. Their burdens ranged from 658–1 554 with a mean of 1 205 ticks per animal. Out of the total 6 025 ticks collected, about 82% were *R. pulchellus*, followed by *R. pravus* (about 8%) and *A. gemma* (5%). The other nine species of ticks accounted for only 5% of the total burdens. It is suggested that a strategic tick control method, aimed mainly at reducing the *R. pulchellus* burdens, with the objective of allowing a reasonable number of ticks to remain on cattle for the maintenance of endemic stability to tick-borne diseases be instituted.

Keywords: Borana cattle, Borana Province, burdens, Ethiopia, infestation, tick

INTRODUCTION

Ticks are associated with important animal health problems and worldwide cause severe economic losses to the livestock industry. They are vectors of the causative agents of major animal diseases such as theilerioses, babesioses, cowdriosis and anaplasmosis and in addition, as ectoparasites contribute to reduced productivity in cattle (De Castro 1987; Norval, Sutherst, Kerr, Jorgensen, Kurki & Gibson 1987; Sutherst & Kerr 1987; Scholtz, Spickett, Lombard & Enslin 1991). Tick infestations are also reported to have an immunosuppressive effect in cattle (Inokuma, Kerlin, Kemp & Willadsen 1993).

In Ethiopia, tick-borne diseases of cattle, such as babesiosis, cowdriosis and anaplasmosis are known

to exist (Pegram 1981), but do not appear to be as important as other livestock diseases such as trypanosomiasis, foot-and-mouth disease and contagious bovine pleuropneumonia, probably due to the resistance of the indigenous *Bos indicus* breeds (which constitute about 98% of the country's cattle population) to these diseases. There is great concern that tick-borne diseases will, in future, pose a potential threat to the country's dairy industry parallel with the present trend of dairy cattle productivity improvement programme, in which the indigenous *B. indicus* breeds are crossbred with the more productive European (*Bos taurus*) breeds, an operation known to produce tick-borne disease susceptible stock. However, at present it appears that ticks are more important as ectoparasites than they are as vectors of diseases.

More than 60 species of ticks infesting both domestic and wild animals have been recorded in Ethiopia (Morel 1980). Among these, about 30 species are very widespread and important parasites of livestock

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(Pegram 1981). They cause significant economic losses to the country's livestock industry. The loss inflicted to skins and hides (commodities second only to coffee in foreign exchange earnings) alone is very high. Downgrading the quality of skins and hides, mainly as a result of tick-bite damage was reported to be responsible for losses amounting to millions of USA dollars per annum (Mersie & Bekele 1994). Furthermore, there is a widespread consensus among animal health professionals and livestock owners that ticks are the major cause of udder damage, a predisposing factor to mastitis. The overall effects of tick infestations on cattle productivity in Ethiopia have yet to be determined.

The present study was conducted to identify the important tick species and determine their numbers on Borana cattle in the lowlands of Borana Province. This was done in response to the increasing complaint of livestock owners in the area about heavy tick infestations on their cattle and as part of an effort to assess the effects of ticks on the Ethiopian livestock industry.

MATERIALS AND METHODS

Study area

Borana Province is located roughly between 3–5°N and 37–42°E, covering an area of c. 120 000 km² (Fig. 1). The vegetation is predominantly tropical woodland and thornbush. The province has two annual rainy seasons: mid March to May and mid September to mid November. The average annual rainfall ranges from 400–800 mm. The greatest proportion of the province is lowlands. The Borana people of the lowlands area (where the present study was conducted) are nomadic pastorals whose livelihood depends almost entirely on livestock production.

Borana cattle

Although camels, sheep and goats are also maintained, cattle are the most important animals for the nomadic pastorals of Borana Province. This Province is the original home of the Borana breed of cattle, now also very popular in other East African countries such as Kenya and Somalia (Alberro & Haile-Mariam 1982). The Borana people keep as many cows as possible for milk production, while steers are usually destined for sale. The colour of Borana cattle is predominantly white, light grey, fawn or light brown, with grey, black or dark brown shading on the head, neck, shoulders and hindquarters, while the muzzle and hoofs are black (Alberro & Haile-Mariam 1982). Borana cattle are docile and well adapted to the environment. They are heat tolerant and able to withstand long periods of drought. The cows are very fertile and good mothers (Anon 1995). Borana cattle are excellent beef animals and appear to have good milk pro-

duction potential (Alberro & Haile-Mariam 1982). At present their number in the Borana Province is estimated to be about 1.8 million.

Ticks and tick-borne diseases

In Kenya, Borana cattle are reported to be very susceptible to East Coast fever (Anon. 1995), but Ethiopia is free of this disease. There is no history of any tick-borne disease outbreaks in these animals in their native land. In a study conducted on them at Didturyura Ranch, Borana Province, it was determined that bovine babesiosis and anaplasmosis exist in an endemically stable situation (Solomon, Kaaya, Gebreab, Gemetchu & Tilahun 1998). The ticks, *Amblyomma cohaerens*, *Amblyomma gemma*, *Amblyomma lepidum*, *Amblyomma variegatum*, *Boophilus decoloratus*, *Hyalomma marginatum rufipes*, *Hyalomma truncatum*, *Rhipicephallus evertsi evertsi*, *Rhipicephallus pravus*, *Rhipicephallus pulchellus* and *Rhipicephallus sanguineus* group have been reported to infest cattle in the Province (Pegram 1981). At time of this study, heavy tick infestations on the cattle were reported to be the most important livestock health problem of the area. Tick control was done mainly by means of hand dressing with acaricides by the stockowners and acaricides were very scarce. There was no history of acaricide resistance, which has not yet been reported to occur in the ticks of the indigenous cattle of Ethiopia (Regassa & De Castro 1993).

Tick collection

In this study, five localities, situated in each of five districts of the province, known for their cattle production were selected (Fig. 1). They were Milbana (Dire District), Negele (Liban District), Tedim (Yebelo District), Teltele (Teltele District) and Wacile (Arero District). From each locality five adult cattle were randomly selected and all visible adult ticks were collected from one side of their bodies. The ticks were preserved in 70% ethanol and transported to Bedele Regional Veterinary Laboratory for identification and counting. Tick identification was done using the keys of Mathysse & Colbo (1987). The half-body tick counts were doubled to obtain an estimate of whole body tick burdens.

RESULTS

Twelve tick species belonging to four genera were collected from the cattle. Their identification and burdens are summarized in Table 1. Whole animal tick burdens for the five localities ranged from 658–1 554, with a mean of 1 205 ticks per animal. *R. pulchellus* was found to be the most abundant tick and comprised c. 82% of the total of 6 025 ticks collected from all of the animals in the experiment. It was fol-

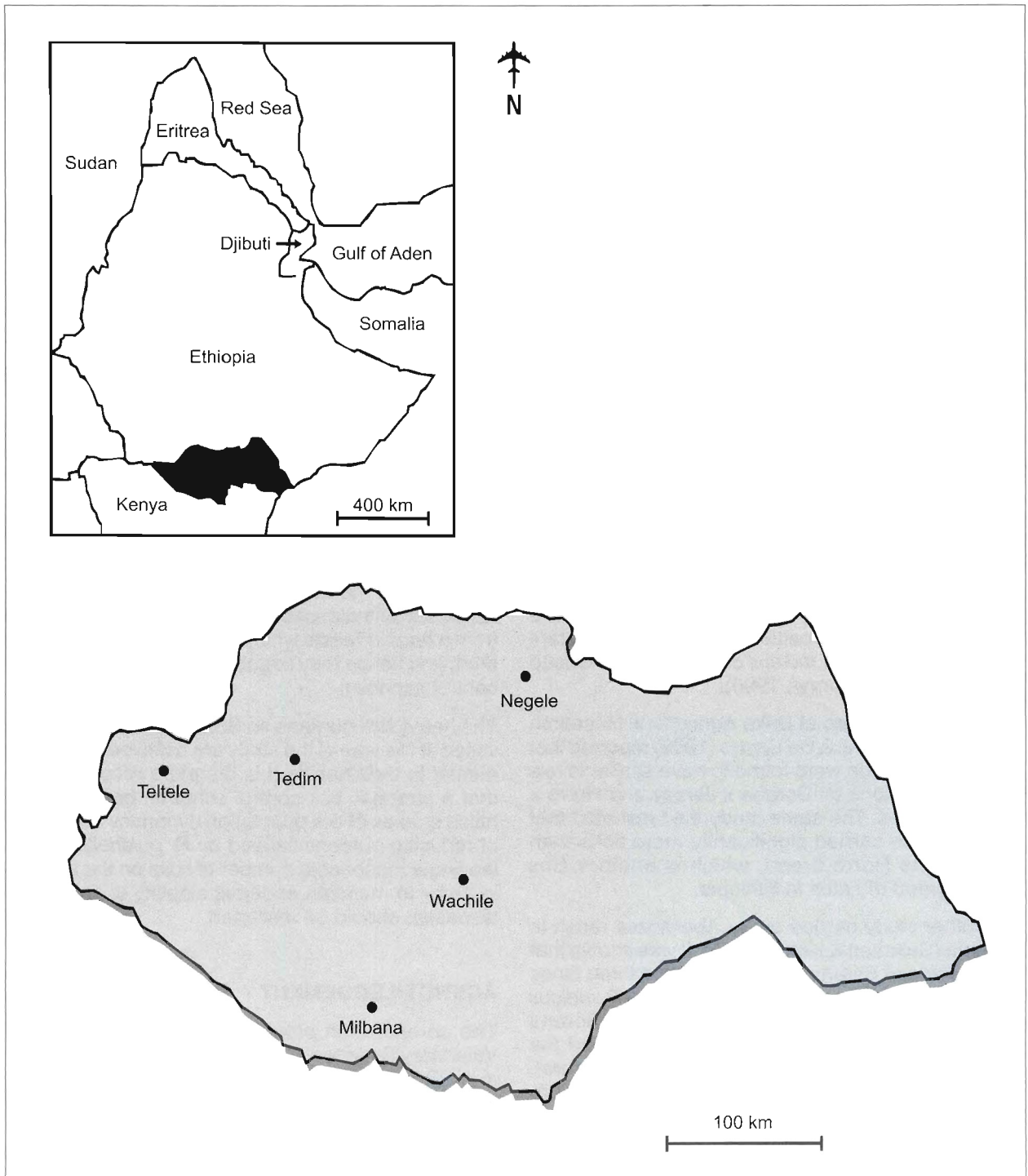


FIG. 1 Study area

lowed in numbers by *R. pravus* (c. 8 %) and *A. gemma* (5 %). The remaining species (*B. decoloratus*, *A. variegatum*, *A. cohaerens*, *H. truncatum*, *R. e. evertsi*, *Rhipicephallus praetextatus*, *H. m. rufipes*, *Rhipicephallus muhsamae*, and *A. lepidum*) accounted for only about 5 % of the total tick burdens.

DISCUSSION

The study was limited to adult ticks for the reason that they are more visible, easier to collect and believed to be the most important ectoparasite stage in causing reduced productivity in cattle (Norval *et al.* 1987).

TABLE 1 Ticks identified and their burdens on Borana cattle in the Borana Province, in descending order of prevalence

Tick species	Study sites					Total	%
	Wachile	Tedim	Milbana	Negele	Teltele		
<i>Rhipicephallus pulchellus</i>	984	1 060	1 232	1 068	588	4 932	81.90
<i>Rhipicephallus pravus</i>	399	23	40	2	8	472	7.80
<i>Amblyomma gemma</i>	133	97	46	4	22	302	5.00
<i>Boophilus decoloratus</i>	–	68	2	24	3	97	1.60
<i>Amblyomma variegatum</i>	–	34	4	9	33	80	1.30
<i>Amblyomma cohaerens</i>	33	24	1	–	–	58	1.00
<i>Hyalomma truncatum</i>	4	24	–	4	2	34	0.56
<i>Rhipicephallus e. evertsi</i>	–	24	–	2	–	26	0.43
<i>Rhipicephallus praetextatus</i>	–	10	6	–	1	17	0.28
<i>Hyalomma m. rufipes</i>	–	4	–	1	–	5	0.08
<i>Rhipicephallus muhsamae</i>	1	–	–	–	–	1	0.02
<i>Amblyomma lepidum</i>	–	–	–	–	1	1	0.02
Total	1 554	1 368	1 331	1 114	658	6 025	100.00

In general, *B. indicus* cattle are more resistant to tick infestations as compared with *B. taurus* breeds and their crosses. However, the level of tick burdens observed in the present study on Borana cattle, a *B. indicus* breed, was very high. Previous studies have indicated that Borana cattle are not as tick resistant as other Ethiopian *B. indicus* cattle (Ali & De Castro 1993; Solomon & Kaaya 1996).

In a study conducted at Bako Agricultural Research Centre, Ethiopia, Ali & De Castro (1993) reported that pure Borana cattle were found to have similar levels of tick infestations as Borana x Jersey and Horro x Jersey crosses. The same study also revealed that Borana cattle carried significantly more ticks than cattle of the Horro breed, which is another *Bos indicus* breed of cattle in Ethiopia.

In another study carried out at Abernossa ranch in Ethiopia (Solomon & Kaaya 1996), it was shown that tick burdens of Borana cattle were about three times those of the Arsi breed, also an Ethiopian *B. indicus* breed. Therefore, the susceptibility of the Borana cattle to tick infestations might have favoured the gradual build-up of ticks in the environment (pasture), which is facilitated by the prevailing tick control methods used in the Borana Province. The tick burdens are further exacerbated by the availability of adequate numbers of hosts for ticks, since each and every family keeps as many cattle, goats, sheep and camel as possible, an activity that increases livestock density and promotes tick-host contact. This is an important factor especially for *R. pulchellus*, a tick adapted to a wide range of hosts. Both mature and immature stages of *R. pulchellus* feed on a wide variety of domestic animals, such as cattle, sheep and goats, and various large wildlife species such as zebras, impalas, hyenas, lions, elephants and hartebeests (Walker, Keirans & Horak 2000).

The level of tick infestations observed at all the five study localities was generally very high. However, the burdens at Teltele were found to be the lowest when compared to the others. This could probably be because the animals used in the experiment were drawn from a herd in Teltele where a veterinary clinic is situated, and hence they might have received better tick control services.

The heavy tick burdens on Borana cattle, which prevailed at the time of the study are believed to be detrimental to their health. It is therefore recommended that a strategic tick control scheme, based on detailed studies of tick population dynamics and aimed at reducing burdens caused by *R. pulchellus*, while leaving a reasonable number of ticks on the animals in order to maintain endemic stability to tick-borne diseases, should be instituted.

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