RESEARCH COMMUNICATION

Gastro-intestinal parasites of cattle in the communal grazing system of Botshabelo in the Free State

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ABSTRACT

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Twelve Bonsmara tracer calves (aged 6–12 months) were used to monitor helminth infections in the communal farming system of Botshabelo in the Free State. One calve was slaughtered each month from December 1995 to November 1996 and processed for helminth recovery. All the calves harboured worms, but the numbers were always low. The order of prevalence of the major parasites was *Trichostrongylus axei, Haemonchus placei, Cooperia punctata* and *Cooperia pectinata.*

Keywords: Cattle, cestodes, communal grazing, gastro-intestinal parasites, nematodes

INTRODUCTION

Helminth infection can result in losses in productivity through a reduction of feed intake and feed conversion efficiency, loss of blood and even death (Preston & Leng 1987). The seasonal incidence of helminth infections of cattle on irrigated pastures, artificially established dryland pastures and on natural pastures in South Africa have been thoroughly investigated (Reinecke 1960; Hobbs 1961; Horak 1978; Horak & Louw 1978; Malan, Reinecke & Roper 1982). However, no studies on the helminths of cattle in urban communal grazing systems have been conducted.

The grassland regions of the central Free State Province, South Africa are used for grazing large herds of cattle in both commercial farming and communal grazing systems. Cattle on communal grazing play an important role in the culture and economics of small-scale farmers living in villages or townships in South Africa (Dreyer 1997). These cattle are seldom, if ever, treated for internal parasites. Information on helminth infections and production losses in cattle belonging to small-scale subsistence farmers is not readily available and often only deaths and the presence of worms are recorded (W. Stöhr, State Veterinarian, Agricor, personal communication 1995). Usually it is the underfed animal on overgrazed pastures or the one that does not receive the correct balance of essential nutrients that suffers the greatest losses (Hobbs 1961; Preston & Leng 1987). Carmichael (1972) reported that helminthosis in cattle on communal grazing systems in Botswana can result because of a variety of factors such as overstocking, the grazing of vegetation right down to ground level, the concentration of animals in kraals and around common watering points, and protein and phosphorous deficiencies.

The epizootiology, prevalence and incidence of helminth species under such farming systems must be ascertained before recommendations on anthelmintic control can be made. The objective of this study was to determine the species composition of helminths infecting the communally grazed cattle of Botshabelo and their seasonal abundance.

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MATERIAL AND METHODS

This study was conducted from December 1995 to November 1996 at Botshabelo, an urban area situated on the central highveld of the Free State. Fencing is non-existent in the communal grazing areas in and around the city. Forty six percent of cattle belonging to farmers (n = 100) that participated in a questionnaire study, drank water at the "Klein Modder" River, and 45 % at nearby gravel dams (Dreyer 1997). Cattle graze the communal fields during the day and are kept in kraals in the backyards of their owners at night. Except for calves from 2 weeks to 6 months of age, which are tethered separately the cattle of each owner are kraaled together at night. The backyard and the kraal floors are covered with manure. Fresh dung from these kraals is collected regularly, dried and used as fuel.

Twelve Bonsmara tracer calves (aged 6–12 months) were used to monitor infection in the study area over a 1-year period. Prior to release, each animal was treated with a broad-spectrum anthelmintic containing levamisole and oxyclozanide (Tramizan, Hoechst Ag-Vet, Johannesburg, South Africa). This treatment took place 5–6 weeks before slaughter. The consecutive tracer animals were kept under the same management system as the local cattle, and one animal was slaughtered monthly. The techniques used for necropsy, helminth recovery and couting were adapted versions of those described by Reinecke (1967, 1983) and Van Wyk, Schröder, Van Schalkwyk & Horak (1987). Helminth identification was carried out as described by Levine (1980), Soulsby (1982) and Reinecke (1983). Logarithmic transformations of the worm burdens were done in order to achieve normality and equality of variances (Mattioli, Cassama & Kora 1992). Rainfall was recorded by the Botshabelo Municipality at the City Council buildings in the centre of Botshabelo.

RESULTS

All the tracer calves harboured some worms, but the numbers recovered were low. The total worm burdens are summarized in Tables 1 and 2. The order of prevalence of the major parasites was *Trichostrongylus axei, Haemonchus placei, Cooperia punctata* and *Cooperia pectinata.* No worms were encountered in the eyes, lungs and livers of any of the animals.

A total rainfall of 653 mm was recorded during the 12-month study period and the total monthly rainfall exceeded 50 mm during December 1995, January, February, April and November 1996, respectively (Fig. 1). Total monthly worm burdens followed the pattern of the monthly rainfall and in general, the highest worm burdens were found during periods of higher rainfall (Fig. 1).

DISCUSSION

When cattle graze on natural pasture climate plays an important role in the transmission of worms (Reinecke 1983; Gatongi, Gathuma & Munyua 1987). In the present study the summer rains and harsh winter temperatures were the most important factors causing seasonal fluctuation in infestations. Decreased worm burdens during the winter were probably due to the low rainfall and the very low mean minimum atmospheric temperatures ranging from –3,1 °C to –2,4 °C during June to August 1996. Soaking, steady rains of at least 50 mm are necessary for mass migration of infective larvae to take place from dung pads (Reinecke 1983), and such rains did not fall in the study area during May to October. The low numbers or absence of especially *H. placei, Trichostrongylus axei* and *Cooperia* spp. from August to October were possibly as a result of the relatively lower monthly rainfall during these 3 months and an exposed micro-environment because of the short vegetation on the commonage after the harsh winter months.

According to Preston & Leng (1987) one would expect to find high worm burdens in cattle on overgrazed, communal pastures, causing severe disease and deaths. Results from the present study indicate that this is not necessarily the case. Possible reasons for the low endoparasite burdens of cattle in the current study are the management system of communal pastures and the regular removal of faeces from the kraals and backyards. Pasture contamination does not occur regularly in one area over a period of time, and many infective larvae are not ingested. The fresh manure from the kraals and backyards is collected regularly, dried and used or sold as fuel (Dreyer 1997), and as a result excess accumulation of faeces on the kraal floor is prevented.

An integrated worm control plan including pasture spelling, rotational grazing or the alternation of pasture and cash crops would not be feasible in a communal grazing system such as the one in existence in Botshabelo. Treatment with anthelmintics would seem to be more practicable as a control method. Strategic drenching programmes used for the control of internal parasites in cattle are generally based upon epidemiological studies (Cornwell & Jones 1971). When helminth infections are very low, such as during this study, they would probably not have any deleterious effects on the hosts. The routine treatment of animals may therefore prove to be unjustifiable and costly and in addition treated animals will immediately become reinfected on the commonage (Mares 1984).

Since gastro-intestinal worm burdens were apparently correlated with rainfall in this study, a tactical approach would appear to be more sensible than a strategic one (Pegram, Hargreaves & Berkvens

TABLE 1 The total nematode burdens of tracer cattle slaughtered over a 12-month period at Botshabelo

Month	Number of nematodes recovered												
	Haemonchus placei		*Trichostongylus axei*		*Ostertagia ostertagi*		*Cooperia* spp.		*Bunostomum phlebotomum*	*Oesophagostomum radiatum*		*Trichuris globulosa*	
	4th	Adult	4th	Adult	4th	Adult	*C. pectinata*	*C. punctata*	Adult	4th	Adult	4th	Adult
1995													
December					0	0			0	0	2	0	1
1996													
January	0	30	50	50	0	0	0	301	0	1	0	0	0
February	0	164	0	50	0	0	200	50	1	0	0	0	0
March	0	36	0	50	0	0	0	50	0	0	1	0	2
April	50	40	0	1 450	0	0	0	150	0	0	4	0	0
May	50	0	0	200	50	50	50	0	0	0	2	0	3
June	50	0	0	50	0	0	50	0	0	0	0	0	0
July	50	99	0	50	0	0	0	0	0	0	2	0	3
August	0	5	0	0	0	0	0	0	0	0	3	0	2
September	0	3	0	0	0	0	0	0	0	0	0	1	6
October	0	14	0	0	0	0	0	0	0	0	5	0	17
November	51	75	0	53	0	0	52	1	0	0	8	0	2

4th = 4th stage larvae

TABLE 2 The total cestode and trematode burdens of tracer calves slaughtered over a 12-month period at Botshabelo

Month slaughtered	*Moniezia* sp.	*Avitellina* sp.	*Calicophoron microbothrium*	
	Scolices		Immature	Adult
1995				
December	0	0	8	0
1996				
January	1	0	1	0
February	2	0	0	1
March	0	0	0	0
April	0	0	0	0
May	1	3	3	0
June	1	0	0	1
July	0	0	0	3
August	1	1	0	0
September	0	0	0	0
October	0	0	0	0
November	0	0	0	1

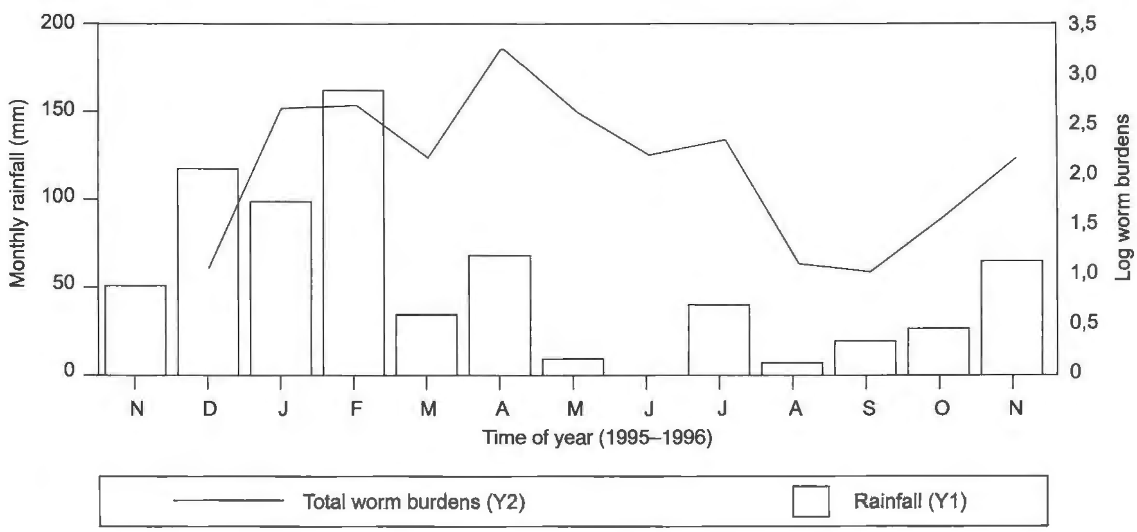

FIG. 1 Monthly rainfall (mm) and total monthly worm burdens of tracer cattle slaughtered over a period of 12 months at Botshabelo

1995). Bryan (1976) stated that there was no significant difference between mass gains of cattle treated only after saturating rainfall and those treated on a monthly basis. Both groups, however, gained significantly more mass than the untreated cattle. Consequently, when the communal management system in Botshabelo and the low worm burdens contained in the study are considered, a broad-spectrum anthelmintic, dosed 14 d after 40 mm of rain falling during a 2 to 3-day period (Bryan 1976; Schröder 1979), would most likely suffice.

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