Chapter 5

Effect of nematode burden as assessed by means of faecal egg counts on body condition in goats farmed under resource-poor conditions in South Africa

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Abstract

A longitudinal study was conducted of the nematode faecal egg counts (FECs) and body condition scores (BCS) of goats of resource-poor farmers at Rust de Winter, Gauteng Province, Impendle, KwaZulu-Natal Province, and Kraaipan, North-West Province, South Africa.

Periods of higher FECs occurred from December/January to March/April at Rust de Winter and at Impendle and from January to March at Kraaipan.

Seasonal variations in body condition were evident in the goats at Impendle with the animals showing lower BCS from June to September. The goats at Rust de Winter and at Kraaipan did not show clear seasonal variations, although the goats at Rust de Winter showed lower BCS from mid-July to early December. The BCS for Rust de Winter where the animals were grazed on a private farm were generally higher than those of the other sites, where communal grazing is practised.

Keywords: Body condition scores; Faecal nematode egg counts; Goats

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5.1. Introduction

Small ruminants play an important socio-economic role within traditional farming systems in many developing communities in Southern Africa. However, in many communal grazing areas, lack of sufficient and adequate pasture is one of the most important constraints to improving the production of ruminants, particularly during the dry season. Also, in these areas little is known about the effects of worms on the production of goats and the interaction between nutritional status and parasite burden.

The aim of the present study was to examine the relationship between worm burden as assessed by means of faecal egg counts on body condition in herds of goats owned by resource-poor farmers at three study sites within the summer rainfall area of South Africa. It forms part of a larger study in which the nematode faecal egg counts (FECs), haematocrits and ocular mucous membrane colour scores were also recorded. The present paper reports on the body condition scores (BCS) in relation to the FECs while the interactions between FECs, haematocrits and ocular mucous membrane colour scores have been discussed in Chapter 4.

5.2. Materials and methods

These have been extensively discussed in Chapters 2, 3 and 4. In brief, faecal samples were collected from the goats of a farmer near Rust de Winter, Gauteng Province, two farmers in Impendle, KwaZulu-Natal Province, and a farmer in Kraaipan, North-West Province, at fortnightly (Rust de Winter) to monthly intervals (other study sites) over a period of 18-20 months. The Rust de Winter site is a private farm, while the other farmers grazed their animals on communal pasture. At Rust de Winter, all the weaner and adult goats were sampled at each visit, while representative sample sets were identified at Impendle and Kraaipan. The goats were body condition scored according to the chart depicted in Fig. 2.1, which method agrees with that of Williams (1990). The faecal samples were analysed for FEC following the method of Van Schalkwyk et al. (1995).

5.3. Results

Figs. 5.1-5.4 depict the mean strongyle FECs and BCS over the study period. Calavas et al. (1998) indicate that the reproducibility of body condition scoring is poor, i.e. scoring performed by different operators on the same animals at the same time is poorly comparable between persons. Thus, only those BCS recorded by the first author are included.

Periods of higher FECs occurred from December/January to March/April at Rust de Winter and at Impendle and from January to March at Kraaipan. Results of identification of third-stage nematode larvae (L_3) cultured from the faeces remaining after FECs had been carried out indicated that for the most part of the trial *Haemonchus* was the predominant genus at all three study sites (Chapter 4, Appendix 2).

Fig. 5.1 : Strongyle faecal egg counts and body condition scores for goats at Rust de Winter

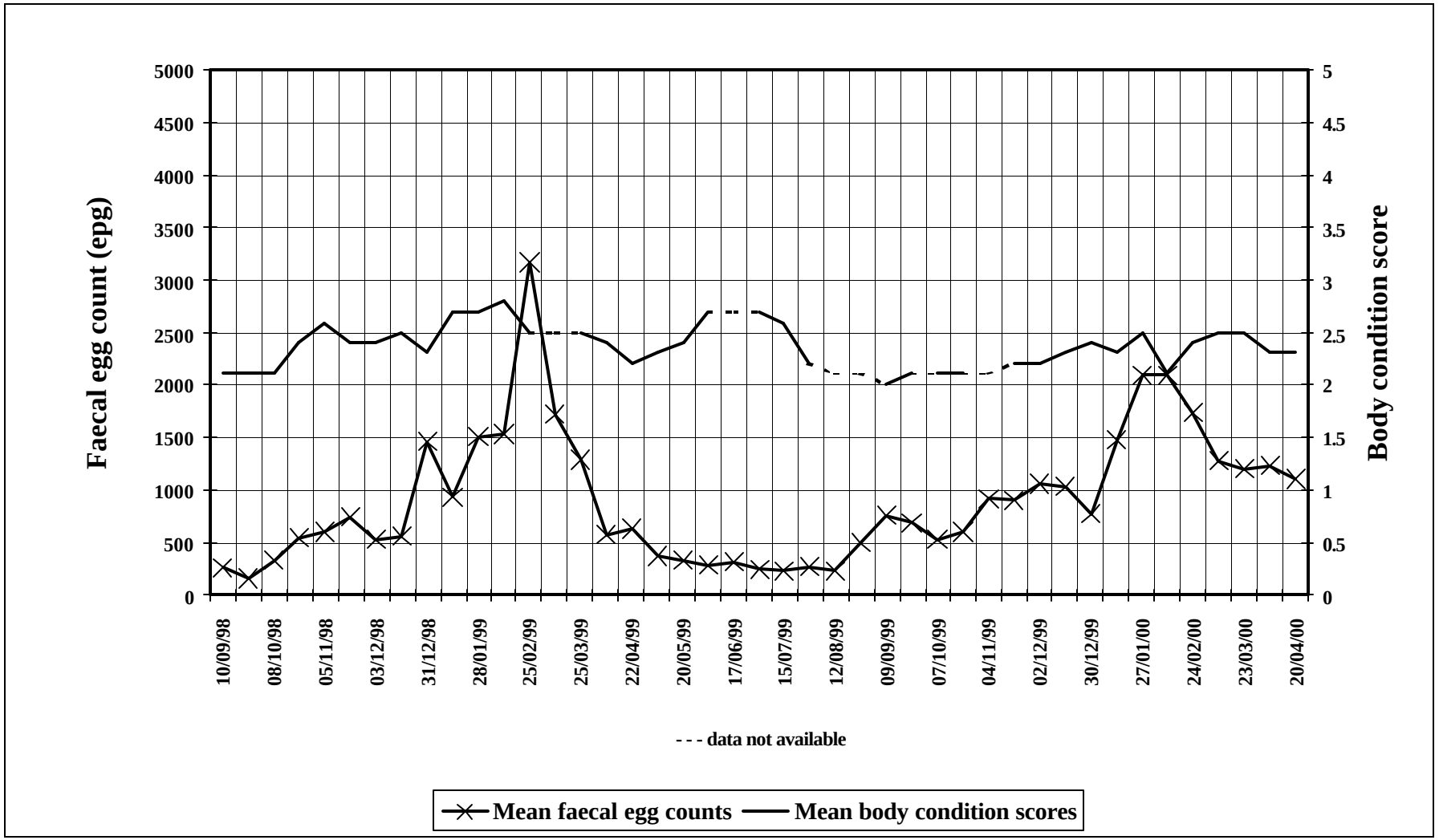


Fig. 5.2 : Strongyle faecal egg counts and body condition scores for goats at Site 1, Impendle

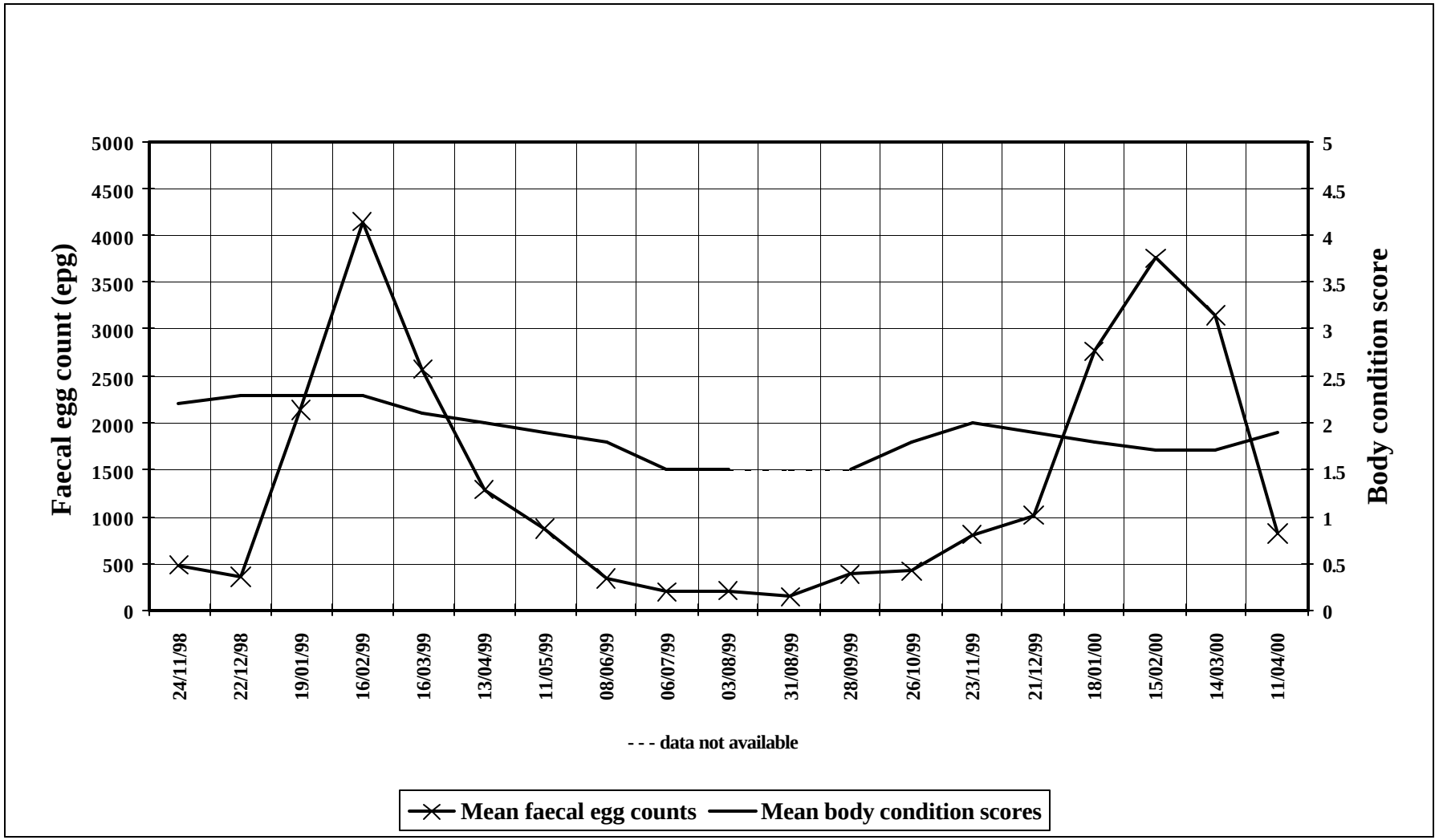


Fig. 5.3 : Strongyle faecal egg counts and body condition scores for goats at Site 2, Impendle

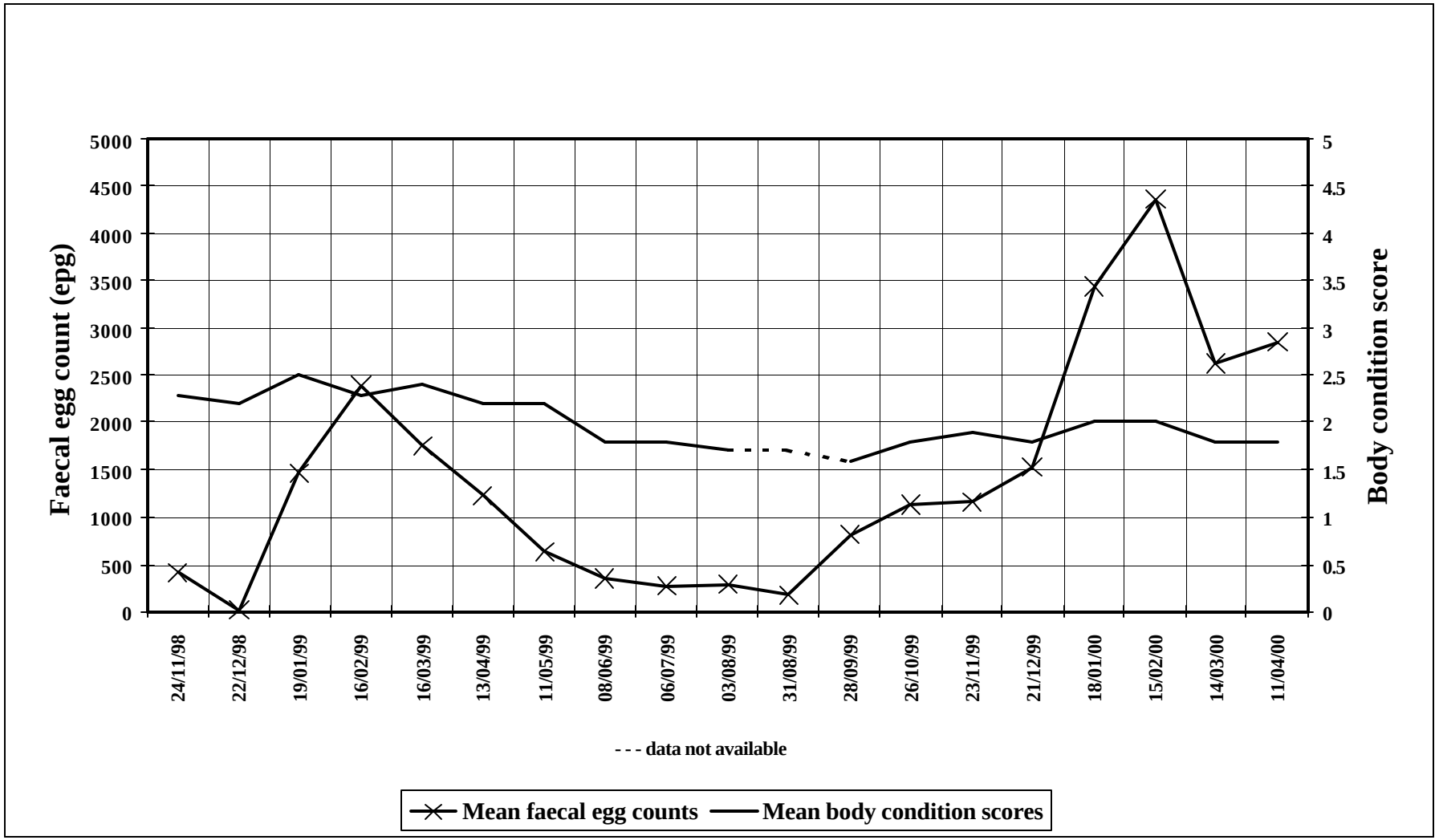
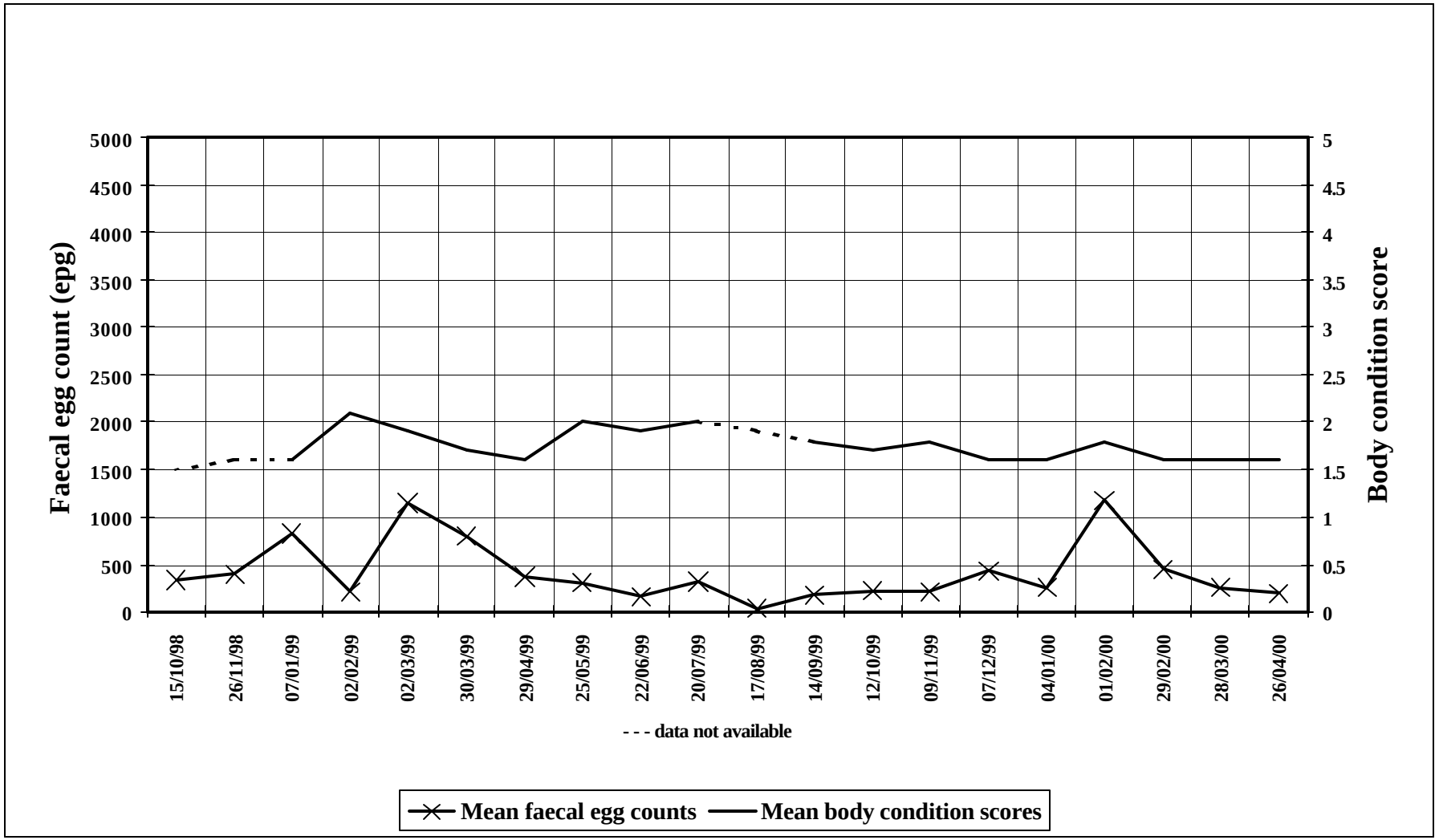


Fig. 5.4 : Strongyle faecal egg counts and body condition scores for goats at Kraaipan



Mean BCS for the goats at Rust de Winter varied from 2.0 to 2.8 over the trial period (Fig. 5.1). From the middle of July 1999 the animals dropped in condition to a level which persisted until the scores increased again in late December 1999. However, the goats did not show clear seasonal variations in BCS.

Mean BCS for the goats at Site 1, Impendle, ranged between 1.5 and 2.3, and never rose above 2.6 (Fig. 5.2). Higher scores were seen during October to April while the BCS were lower during June to September. Mean BCS for the goats at Site 2, Impendle (Fig. 5.3) showed a similar pattern to that of Site 1 but the general trend is that the goats of Site 2 were in better condition than those of Site 1.

The BCS for the goats at Kraaipan varied between 1.5 and 2.1 (Fig. 5.4). In contrast with the other sites, body condition was maintained from June to December 1999.

5.4. Discussion

Although FECs are generally considered inaccurate indicators of worm burden, they are nevertheless often used for this purpose, particularly where necropsy for worm recovery is not feasible or practical, as in the present study. Gastrointestinal nematode infection is known to have detrimental effects on production in small ruminants, and body condition scores were used in the current study to monitor changes in fat reserves. Horak and Louw (1977) and Horak (1978) have shown that there may be a delay of several weeks between maximum contamination of pasture with *Haemonchus* eggs and maximum larval availability. In effect, maximum worm burdens may only occur during April and May (when FECs are lower) and these worms may consist predominantly of fourth-stage larvae. Nevertheless, the adult egg-laying worm population is that which is responsible for the mortality owing to anaemia in haemonchosis and it is this blood-sucking population that is of greatest concern. Hoste and Chartier (1993) have shown that a significant decrease in BCS occurred in goats experimentally infected with *Haemonchus contortus* and *Trichostrongylus colubriformis* compared with controls. This

decrease occurred concomitant to decreases in haematocrit and red blood cell count. As has been shown in Chapter 4, the greatest effects on the haematocrit occur during and, in some cases, slightly after the periods of heaviest egg output. One would expect, therefore, that the greatest effect on body condition would also occur during the times of heaviest egg laying. However, in the present study, trends towards a decrease in BCS are not evident during this time of heaviest egg-laying capacity.

Body condition is an indication of nutritional status, with poorer scores corresponding to poorer nutritional intake and/or greater metabolic need, the latter occurring, for example, during pregnancy and lactation. It is probable that the effects of worm burden are masked during the summer months because of sufficient browse being available. When the condition of the veld deteriorated in the dry winter months, poorer BCS were noted during mid-July to early December at Rust de Winter and during June to September at Impendle. Chronic infection with *Haemonchus* may however also have contributed to decreases in BCS (Allonby and Urquhart, 1975).

At Rust de Winter, many of the female goats kidded during the late winter/early spring of 1999 (August and September 1999), which would have placed additional strain on body fat reserves. Parturition and lactation would have contributed greatly to the drop in body condition during the period of August to early December 1999.

Two differences in management may explain the differences in BCS of the two farmers of Impendle. Firstly, it was observed that the farmer at Site 2 did supply some supplemental feed in the form of whole maize kernels, but the frequency and quantity supplied throughout the trial could not be obtained. The farmer at Site 1 also supplied some supplemental feeding in the winter in the form of poor quality *Eragrostis* spp. hay. However, supplementation with maize would be more nutritious than with poor quality hay. Secondly, the farmer at Site 1 employed a shepherd to take the animals to pasture on the hills surrounding the village. The other farmer, however, allowed the animals to graze pasture surrounding his homestead. The latter animals would, therefore, use less energy than the former

animals, which would expend more body reserves in walking to the pasture, and may have had relatively less time per day to graze.

At Kraaipan, the goats were able to utilise the dried leaves of shrubs during the winter period. This would have allowed them to maintain their body condition during the dry season better than the goats at Impendle where fewer shrubs were available.

The BCS for the goats at the other sites were in general lower than those of the goats at Rust de Winter, where mean condition scores did not drop below 2.0. This may result from the fact that there is less forage available at Impendle and Kraaipan where communal grazing is practised than at Rust de Winter where the goats are not overstocked.

The effect of worm burden on the body condition is not resolved by the current study, however the results do indicate that supplementation of the animals with additional sources of protein and energy is recommended, particularly during the times of lower body condition cited. Such supplementation would probably also assist the animals to overcome partially the detrimental effects of worms during the winter period. Supplementation of indigenous Tuli cattle in Zimbabwe with cottonseed meal between July and October (i.e. from the end of the dry period into the beginning of the rainy season) improved the liveweight gains of the animals above anthelmintic-treated and untreated controls in the presence of subclinical gastrointestinal nematode parasitism (Magaya et al., 2000).