EFFECT OF WHOLE COTTONSEED SUPPLEMENTATION ON WORM LOAD IN DJALLONKE SHEEP IN THE TAMALE METROPOLIS; A CASE STUDY IN THE SAATINGLI AND ZAAGYULI COMMUNITIES.

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ABSTRACT

The study was undertaken to determine the effect of cottonseed supplementation on worm load in Djallonke sheep in Saatingli and Zaagyuli communities in the Tamale metropolis. Six Djallonke sheep farmers were randomly sampled from the two adjoining communities. Out of 54 Djallonke sheep, twenty seven (27) were on cottonseed supplementation while the other twenty seven (27) were not supplemented (control). Each treatment comprised nine (9) each of rams, ewes and lambs. The nutritional and general health conditions of the experimental animals were assessed. A weekly microscopic analysis was carried out to determine the levels of internal parasitic load in Djallonke sheep for three weeks. Data collected was analyzed by the use of 2-tailed T-test.

Sheep supplemented with cottonseed had lower worm load (1266.7, 2111.1 and 6311.1) for rams, ewes and lambs respectively than those not supplemented (3566.7, 4922.2 and 16644.4) ($p<0.05$). Mean fecal egg count for coccids in cottonseed supplemented animals were lower (388.9, 788.9 and 2677.8) for rams, ewes and lambs respectively than those not supplemented (1266.7, 1355.6 and 3044.4) ($p<0.05$). Also, fecal egg count for strongyles in cottonseed supplemented animals were lower (877.8, 1433.3 and 5188.9) for rams, ewes and lambs respectively than those not supplemented (2300.0, 3488.9 and 5188.9) ($p<0.05$).

It can be concluded that feeding whole cotton seed as a supplement has the ability to reduce worm load. The reduction in worm load in the supplemented animals may be due the presence of gossypol in the whole cotton seed.

INTRODUCTION

Koney (1992) noted that worms are responsible for considerable economic loss in livestock production. According to Gillespie (1983), economic loss emanates from weight loss, lower milk production, wasted feed and lower breeding efficiency. Susan (2005) observed that, the most common health problem of domestic sheep, especially young lambs, is internal parasites (worms).

Worms of stomach and intestines of ruminants are divided into two groups, the flatworm (platyhelminths) and the roundworms (nemathelminths). The flat worms are of two groups, flukes (trematodes) and the tapeworms (cestodes). The roundworms on the other hand are divided into a number of groups but the ascaris (nematodes) are of economic importance in livestock production since it is responsible for serious setbacks in growth and production, causing some tropical small ruminants to remain low producers for life (FAO 1983). Some signs of serious nematode infection are emaciation, unthriftiness, diarrhoea, stiff dry coat, pot belly, pale mucosa and fluid swelling under the jaw. Helminthosis attack all organs but most importantly gastrointestinal tract.

The extensive system of rearing ruminants commonly practiced by farmers predisposes them to gastrointestinal worms in the dry season when they graze stubble close to the ground. Helminths build up and become endemic in the semi-intensive and intensive systems if the pen is not routinely cleaned, disinfected and the animals dewormed. Heavy parasitic infestation of farm animals is often as a result of faulty husbandry (Katjivena et al., 2000).

There is increasing public concern regarding the use of pharmaceuticals in the animal industry. Much of this has been as a result of the emergence of drug resistance. For example, the banning of feed antibiotics by 2006 in the European Union (EU) prompted investment in the Framework 6 REPLACE program which, aims to screen 500 plants for a range of activities, including antibacterial, nematocidal and immune stimulating effects (EU-Replace, 2006).

Beside the role of whole cottonseed in meeting the protein and energy needs of the animal, it may be useful in worm control through the effect of gossypol on worms of the gastrointestinal tract. Not much has been done on effects of cottonseed supplementation on worm load in small ruminants, particularly in sub

Saharan Africa. The objective of this work therefore was to ascertain the effect of cottonseed supplementation on worm load in Djallonke sheep.

MATERIALS AND METHODS

Study Area

The study was carried out at Saatingli and Zagyuri communities, all within the Tamale Metropolis. Tamale is located on latitudes 9°16' and 9°34' North, and longitude 0°36' and 0°57' West. It is within the Guinea-Savannah Zone, characterized by flat land with short trees and shrubs. The rainfall is unimodal and mostly starts in April and ends in late October whilst the dry season starts in November to late April annually. The annual rainfall range from 800 mm to 1500 mm with an average of 1150 mm (TMS 2001).

The temperature range from a minimum of 15 0C in January when the weather is under the influence of the harmattan to a maximum of 36 0C at the end of the dry season. The mean annual temperature is 29 0C (TMS 2001). The soil is predominantly sandy-loam, known as Savannah Ochrosols and is characterized by high organic matter content.

EXPERIMENTAL PROCEDURE

Collection of Faecal Samples

A total of 54 Djallonke sheep were randomly selected from 6 flocks in the two communities involved. Prior to the study, the experimental animals were dewormed. Three flocks were on cottonseed supplementation while the other three were not. In all, samples were drawn from 27 animals on cottonseed supplementation. Of the animals supplemented, there were 9 each of rams, ewes and lambs. The unsupplemented flocks also consisted of same numbers of the various groups.

The experimental animals were restrained and 5 grams of faecal samples were collected directly from the rectum of each animal using a rubber hand gloves to prevent self and sample contamination. The samples were then kept in a clearly labeled container and sent to the Pong-Tamale Central Veterinary Laboratory for processing and examination the same day. Samples for a particular group per flock per collection were pooled together. The concentration method was used in processing the faecal samples since it has the advantage of giving a good concentration of worm eggs and makes identification easier.

PROCESSING AND IDENTIFICATION OF FAECAL SAMPLES IN THE LABORATORY

Three grams of faecal material taken from different points of the sample was used in each case. The sample was emulsified with 45 ml of water using a mortar and a pestle to obtain a homogenous solution. The emulsified sample solution was poured into a plastic test tube. The test tube with its content was then placed in a centrifuge and spun at 2500 rpm for 3 minutes. The sample supernatant was poured off to get a clean sample. An amount of 3 ml of concentrated sodium chloride solution was added to the sample to allow the eggs to float on top of the mixture in the plastic test tube. The sample in the plastic test tube was again centrifuged at a speed of 2500 rpm for 3 minutes. The sample was then taken from the centrifuge and a Pasteur pipette used to draw supernatant with eggs from the surface of the centrifuged sample in the plastic test tube. The McMaster counting chamber was then charged with the supernatant drawn. The sample solution in the chamber was systematically examined by scanning the filled counting chamber in parallel bands under a light microscope using the X10 objective lens.

IDENTIFICATION OF HELMINTH EGGS AND INTERPRETATION OF EGG COUNT

Identification of the various helminth ova was made by the morphology (size, shape and structure) of the egg with the aid of a microscope and with a guide from a helminthological chart.

The sum total of eggs seen in one chamber of the McMaster counting was multiplied by a factor of 100. This represented the amount of eggs per gram (e.p.g.) of faecal sample for the individual animal.

ANALYSIS OF RESULTS

The T-test (2-tailed) of SPSS was used to determine the effect of cottonseed supplementation on worm egg load in the various groups of sheep. All comparisms were done at 5 % level of significance.

RESULTS AND DISCUSSION

Effect of whole cottonseed supplementation on worm load in Djallonke sheep.
The mean faecal worm egg count in the animals supplemented with cottonseed

was lower (1266.7, 2111.1 and 6311.1) for rams, ewes and lambs respectively ($P<0.05$) than those not supplemented (3566.7, 4922.2 and 16644.4) (Table 1). The lower faecal egg count recorded in animals on supplementation may be attributed to the presence of gossypol in the whole cotton seed. It may also be due to the immunity built by these animals due to adequate nutrition (Sheffy and Williams, 1982). Even though the faecal egg count in supplemented animals was far lower than unsupplemented animals, the count in supplemented animals was still high generally above 2000 as indicated by Troncy (2005). This may be attributed to poor management practices despite the availability of adequate nutrition (Blood et al., 1989). In the case of young animals, they relied more on their mother's milk and only took the cottonseed occasionally. Besides, they were even not in position to handle gossypol like the mother (Knights and Lloyd, 2005). This explains why they still recorded high faecal egg count.

Faecal egg count for coccids in cottonseed supplemented animals were lower (388.9, 788.9 and 2677.8) for rams, ewes and lambs respectively while those for unsupplemented animals were quite high (1266.7, 1355.6 and 3044.4) (figure 2). Mean faecal egg count for strongyles in cottonseed supplemented animals were lower (877.8, 1433.3 and 5188.9) for rams, ewes and lambs respectively than the count in unsupplemented animals (2300, 3488.9 and 13488.9) (figure 3).

Table 1: The effect of cottonseed supplementation on fecal worm egg count (e. p. g.) in Djallonke sheep.

Group of animals	Supplemented (N=27)	Not supplemented (N=27)	Pvalue
Rams	1266.7ḿ187.8	3566.7ḿ551.0	0.001
Ewes	2111.1ḿ 275.1	4922.2 ḿ 630.7	0.001
Lambs	6311.1ḿ1181.0	16644.4 ḿ1558.8	0.000

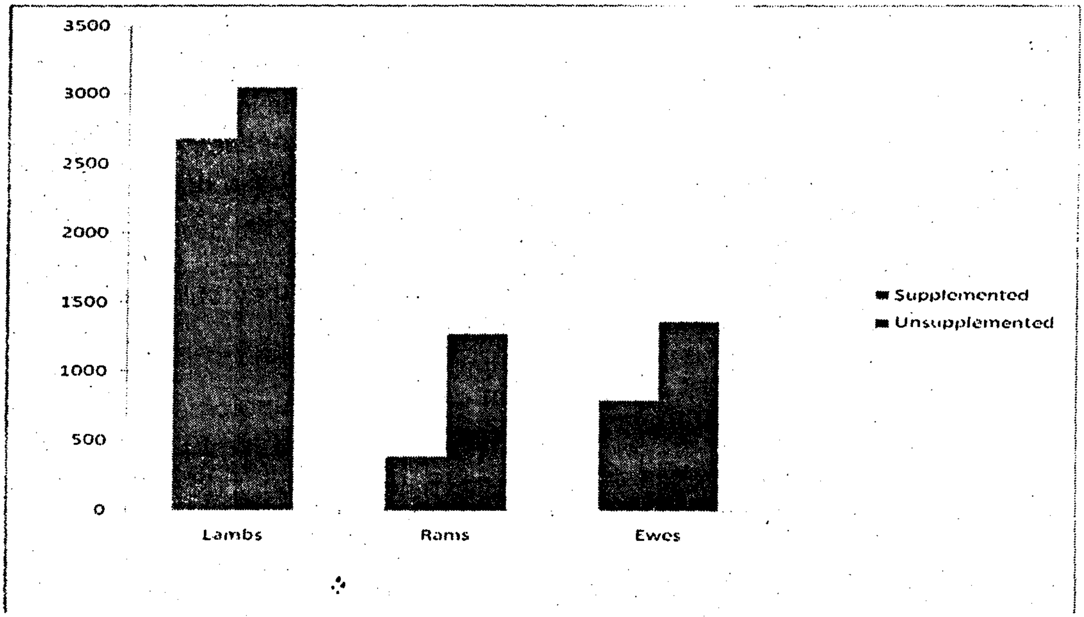

Figure 2: Mean coccids egg count (e.p.g.) in cottonseed supplemented and un-supplemented animals.

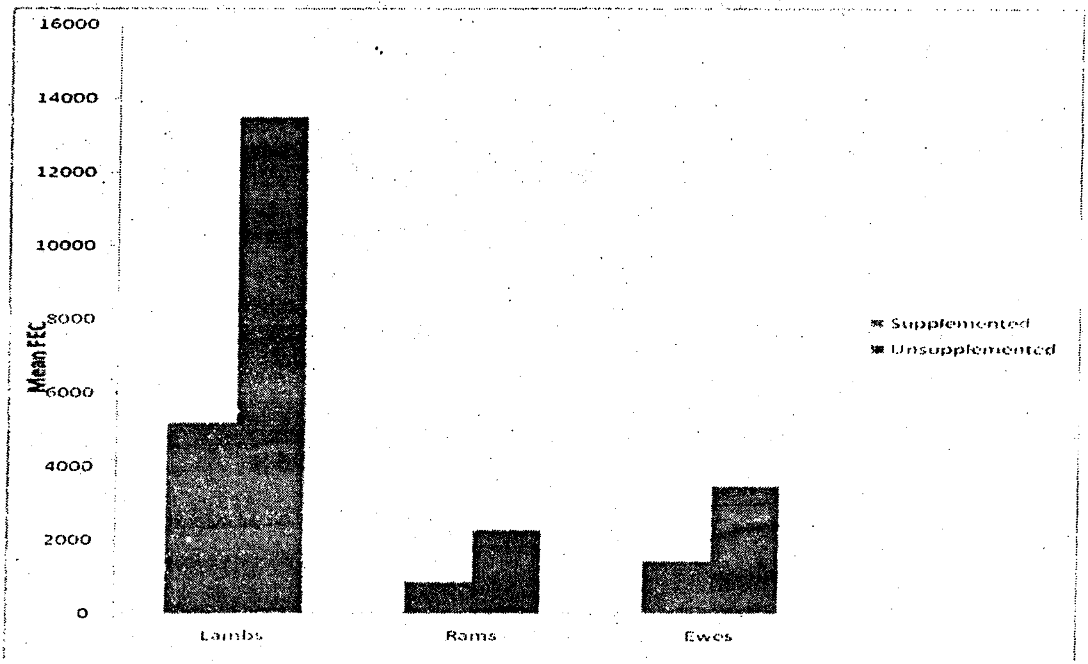

Figure 3: Mean strongyles egg count (e.p.g.) in cottonseed supplemented and unsupplemented animals.

High faecal egg count of nematode and coccidia parasites were observed in the experimental animals during the study. The predominant gastrointestinal parasites identified were strongyles and to a lesser extent coccids. Strongyles were most frequently endemic and usually caused varying degrees of stunting rather than death (Carles, 1983). It is clear that although coccids did not record high values, there were enough macrogametes (females) and microgametes (males) in the intestinal tract, but it could not produce more oocyst because this function was suppressed by high strongyle ova population (Urquhart et al., 1992). No trematode eggs were seen probably because the habitats in these communities were unfavourable for the molluscan intermediate hosts of trematodes.

CONCLUSION AND RECOMMENDATION

CONCLUSION

The worm load in animals supplemented with cottonseed was far lower than those which were not supplemented.

RECOMMENDATION

Further studies should be carried out to ascertain the efficacy of using whole cotton seed as a dewormer in ruminants.

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