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Research Article

Study on Parasitic Load in Local Goats Reared in Three Different Systems of Rearing

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Abstract

An experiment to study the effect of three systems of rearing on the parasitic load and welfare of growing goat kids were studied. The 3 months study was conducted on local osmanabadi crossbred goats at Niharika Sheep and Goat Farm, Sira, Tumkur district, Karnataka, India. Thirty weaned local goat kids (3 months) were randomly allocated into three treatment groups with ten kids in each viz., T_1 (Intensive-in housed and fed all time), T_2 (Semi intensive- browse for 5 - 6 hours during day time, housed and fed rest of time) and T_3 (Extensive rearing- browse throughout the day 6 - 8 hours and no feed supplementation). The animals in T_1 group were confined to the shed both during day and night.

The average parasitic load at the beginning of the trial was 180 ± 38.15, 205 ± 36.86 and 185 ± 33.37 in T_1, T_2 and T_3, respectively. At the end of experimental trial, parasitic load was 1320 ± 35.12, 1985 ± 75.3 and 2235 ± 91.91 eggs per gram in T_1, T_2 and T_3 respectively. This study indicates to design a suitable deworming program to control helminths more often in extensive system while for protozoans like coccidiosis in intensive system of rearing.

Keywords: Goat; Intensive; Extensive; Semi Intensive; Helminth; Protozoans

Introduction

Goats are one of the important small ruminants which have been domesticated by man since time immemorial. Sheep and goat contribute to the livelihoods of millions of rural poor in most of the developing countries of the Asia and Africa, where 95% of the world's sheep and goat population is concentrated. Their production has witnessed excellent growth over the years. Hence Small farmers and landless agricultural labourers are increasingly relying on sheep and goats for meeting their cash requirements [1].

Rising world population and economic development have led to global demand for meat, milk and other animal products that are increasing dramatically. Parasites are major constraints to communal goat production and safe utilization of goat products. The impact of parasites manifested as weight loss or reduced gains. They have a heavy impact on kids because of the poor immunity status of these young animals leading to an increased susceptibility and high kid mortality that diminishes the benefits of the high reproductive performance of does [2].

Internal parasite infestations of herds can cause major health issues, which have a major effect on the animal's performance and cause great economic loss to the producer. In fact, most of the economic losses caused by internal parasites are actually not due to mortality but production loss [3]. Controlling parasitic diseases in goats, in particular helminth infections, could rapidly improve pro-

ductivity and resource utilization. Hence it is essential to study the systems of rearing of small ruminants and their influence on the productive performance in relation to parasitic load.

Materials and Methods

The experiment was carried out at Niharika Sheep and Goat Farm located at Sira (13.7448° N, 76.8990° E) Tumakur District, Karnataka, India. Thirty weaned Osmanabadi crossbred Goat kids aged 3 to 4 months were purchased from local goat market of Sira. The goats were selected based on comparable body weights and randomly allocated into three treatment groups with ten kids in each group (5 male and 5 females). The present study was carried out for a period of three months (90 days) during January 2018 to April 2018 to assess the impact of different rearing systems on growth performance of weaned kids.

Three groups comprised of T_1 (Intensive system) group animals which were stall fed and confined to the shed both during day and night. The kids were fed with roughage and concentrates as per the specifications [4]. Clean and potable drinking water was made available round the clock. The T_2 (Semi Intensive system) group animals were let out for grazing for a period of 6 hours and provided with supplementary feeding on return and in T_3 (Extensive system) group, animals were exclusively maintained on grazing for 6 - 8 hours per day without any extra supplementation and were housed in shed for rest of day. The feeding schedule of the experimental animals has been presented in the table 1.

Treatment	No of Animals	Average body weight (Kg)	Management
T1	10	11.05	215g Concentrate + 100g Sesbania + 100g Ground nut hay + *ad libitum* Ragi straw
T2	10	11.05	100g Concentrate + 50g Sesbania +50g Ground nut hay + *ad libitum* Ragi straw + 6 hours of browsing
T3	10	11.14	6 - 8 hours of daily browsing only

Table 1: Feeding schedule of experimental kids.

Housing management

Since the experiment was carried out in field condition, simple Semi open shed was constructed using locally available materials. One week prior to arrival of the animals the experimental feeders, waterers and floor were thoroughly disinfected. The goats were housed on mud floor with ample ventilation in and around animal house roofed under coconut leaves and plastic sheet. The standard management practices in animal house along with the traditional management practices of goat rearing outside the house were followed for all groups similarly. Uniform floor space of $1m^2$ was provided to all the groups throughout the experimental period. The housing system has been shown in the plate (Figure 1 and 2).

Figure 1: Experimental animals under intensive system of management.

Figure 2: Experimental animals under semi intensive and extensive system of management grazing on nearby field.

Study of parasitic load

Fifteen days prior to start of the experimental trial, all the kids in treatment group T_1, T_2 and T_3 were dewormed with Fenbendazole and Praziquantel combination as per the prescribed dosage. Faecal samples were collected directly from the rectum and sub-

jected to qualitative and quantitative analysis to access the parasitic load by modified McMaster's technique [5] and results were statistically analyzed.

Results and Discussion

The average parasitic load in kids reared under three different systems i.e. treatments T_1 and T_2 and T_3 is presented in table 2 and figure 3. The average initial and final Parasitic loads were 180 ± 38.15 and 1320 ± 35.12 in T_1 group, 205 ± 36.86 and 1985 ± 75.3 in T_2 group, 185 ± 33.37 and 2235 ± 91.91 EPG (Eggs Per Gram) in T_3 groups respectively. There was no significant difference in mean parasitic load between treatments T_1, T_2 and T_3 at day one but highly significant ($P < 0.01$) differences among treatment groups T_1 Vs T_2 and T_1 Vs T_3 were observed at the end of 90 days of experimental trial suggesting low parasitic load in Intensive group.

Sl. No.	Period (days)	T1 (Intensive system)	T2 (Semi intensive system)	T3 (Extensive system)	P Value
1	0	180 ± 38.15	205 ± 36.86	185 ± 33.37	0.8755
2	30	555 ± 64.31^a	885 ± 85^b	1030 ± 76.45^b	0.0005
3	60	1035 ± 48.33^a	1490 ± 108.7^b	1745 ± 85.13^b	0.0001
4	90	1320 ± 35.12^a	1985 ± 75.3^b	2235 ± 91.9^b	0.0001

Table 2: Average parasitic load (EPG) of Faecal sample of kids during different days of experimental period.

Note: Means in a row with different superscripts differ significantly with each treatment group (a, b, c-superscript).

Figure 3: Average parasitic load (EPG) in kids during different days of experimental trial.

Types of internal parasites

Different species of parasites (per cent) in the faecal samples of kids reared under Intensive (T_1), Semi intensive (T_2) and Extensive (T_3) group are presented in table 3 and figure 4. The proportions of *Strongyle* and *Moniezia* were significantly higher in T_2 and T_3 than T_1 group. The Trichuris eggs and Oocysts of *Eimeria* was higher in T_1 group but the values were non-significant.

Parasitic egg	T1	T2	T3	P Value
Strongyle eggs	44.50^a	52.10^b	57.70^b	0.0001
Trichuris eggs	22.50	15.70	17.70	0.2382
Moniezia eggs	10.70^a	18.80^b	15.00^b	0.0009
Oocysts of Eimeria	22.30	13.40	9.62	0.2878

Table 3: Different species of parasites (per cent) in the faecal samples of kids during 91 days of experimental period.

Note: Means in a row with different superscripts differ significantly with each treatment group (a, b, c -superscript).

Figure 4: Different species of parasites (per cent) in the faecal samples of kids during entire experimental period.

Initial parasitic load was almost similar on day one of the Experimental period in all treatment groups and the parasitic load (Eggs per gram) significantly increased in T_2 and T_3 compared to T_1 group could me mainly due letting out the T_2 and T_3 animals for grazing where they might have come in contact with intermediate hosts or larval stages of endoparasites. In this study mainly three types of helminth ova (*Strongyles, Trichuris* and *Moniezia*) and one protozoan (Oocysts of *Eimeria*) species was identified in different proportions in different treatment groups.

The proportion of *Strongyle* eggs were predominant in kids from semi intensive (52.1%) and extensive management (57.7%)

compared to Intensive system of management (44.5). T_2 and T_3 group animals were allowed to graze freely in the fields where they might have come in contact with open water bodies like ponds, cannels, marshy land and exposed to helminth infestation.

In contrast, the proportion of *Moniezia* eggs was more in the faecal samples of the kids reared under Semi intensive group (18.8%) and proportion of Oocysts of *Eimeria* was more in intensive system (22.3%). This could be due to the fact that *Eimeria* are shed in faecal material and the possibilities of kids coming in contact with these parasites in increased frequencies are much higher in the kids under intensive management compared to those under semi intensive and extensive system of management.

Results of the present experiment were in close agreement with [6] who recorded prevalence of helminths and protozoa significantly higher in extensive system (86.1%) followed by semi intensive (76.3%) and intensive system (57.5%) and stated goats reared under extensive and semi intensive systems were 4.6 and 2.4 times more susceptible to helminth infection than those of intensive system. They also observed that goats under extensive rearing system were 1.9 times more susceptible to helminth infection than those of semi intensive system. Pandit BA., *et al*. [7] had reported higher nematode infections in the field managed sheep (88.4%) than the farm managed sheep (75.9%). Higher parasitic load in extensive and semi intensive systems were also reported by several authors [8-11].

The dynamics of faecal egg count is variable according to different seasons, physiological status, breed, age, managemental practices and different geographical regions. Species wise prevalence of present study was in partial agreement with several authors [12-18].

There are several strategies to control the parasitic infestation whereby [19], suggested totally housing the animals and feed them with 'cut and carry' uncontaminated grasses. As an alternative to drugs, the option of feeding small ruminants with herbal neem leaves (*Azadirachta indica*) have been reported to give promising results in small ruminant worm control [20].

The present study suggested rearing system has great impact on the prevalence of parasites and their load and regular deworming and health management is essential to enhance the productivity. As seen from this study the parasites are prevalent in all three systems of rearing, the level of loads is significantly less in confined housed goats. Further in this study coccidiosis infestation is observed to be more in T_1 (under Intensive system of rearing) group kids housed indoor whereas helminths in general are observed more in outdoor reared goats (T_2 and T_3 groups). Thus, this study envisages that a suitable deworming program can be designed to control the helminths which occurred more often in extensive system while for protozoans like coccidiosis that occurred more often in intensive system of rearing.

Conclusion

It can be inferred that management of goats in different rearing systems has an important role in control of external or internal parasites. Particularly deworming should be aimed primarily to control protozoan parasites in confined intensive rearing system while aiming to control both the protozoans and helminth parasites in semi intensive and extensive rearing systems.

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