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Effect of Age and Breed on Worm Burden in Indian Caprines

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ABSTRACT

Goat farming is a substantial source of income, especially for people living in rural areas. But the biggest threat to goat production is gastro-intestinal nematodosis. Concerning the issues raised - the location, breed, age, sex, and season of an animal all affect the occurrence and severity of different GIPs. Therefore, the objective of this study was to analyze the effect of age and breed on worm burden in Indian Caprine. A total of 150 animals (50 each of Barbari, Sirohi, and Black Bengal breeds of goat) were grouped according to their age, i.e., 3-6 months (n=12), 6-9 months (n=12), 9-12 months (n=12) and above 12 months (n=14). All animals were screened at the start of the experiment for fecal egg count by McMaster method. Screening was conducted three times at 15-day intervals, after which a statistical analysis was conducted to evaluate the results. Both within and between breeds, the impact of the intestinal nematode resistance trait was determined. On the basis of egg per gram (EPG) (Screened fortnightly), it was observed that age had no significant effect on parasitic load whereas breeds had a significant effect on the parasitic load.

HIGHLIGHTS

- Gastro-intestinal nematode infections are one of the most important constraints to small ruminant production.
- Age had no significant effect on the parasitic load.

Keywords: Goats, gastro-intestinal nematodes, resistance, breeds and age

Goats are an important species of livestock, particularly in tropical and subtropical areas where they are used for small-scale farming and the rural economy through generating employment and raising household income. Despite of a huge number of goat population, the economic benefits remain marginal due to prevailing diseases, poor nutrition, poor production systems, and reproductive inefficiency and management constraints. Among the diseases, gastro-intestinal nematode infections are one of the major illnesses affecting small ruminants.

Gastro-intestinal nematode infections are responsible for causing direct and indirect economic losses in small ruminant production systems, particularly in goats (Hoste *et al*., 2007), through lowered fertility, susceptibility to other infections, involuntary culling, reduction in food intake, and lower weight gains, decreased work capacity, lower milk production, carcass and organ condemnations, treatment costs, morbidities, and mortalities in heavily parasitized animals (Hoste *et al*., 2007). The death of the affected goat is mainly due to parasitic gastroenteritis (Asmare*et al*., 2016).

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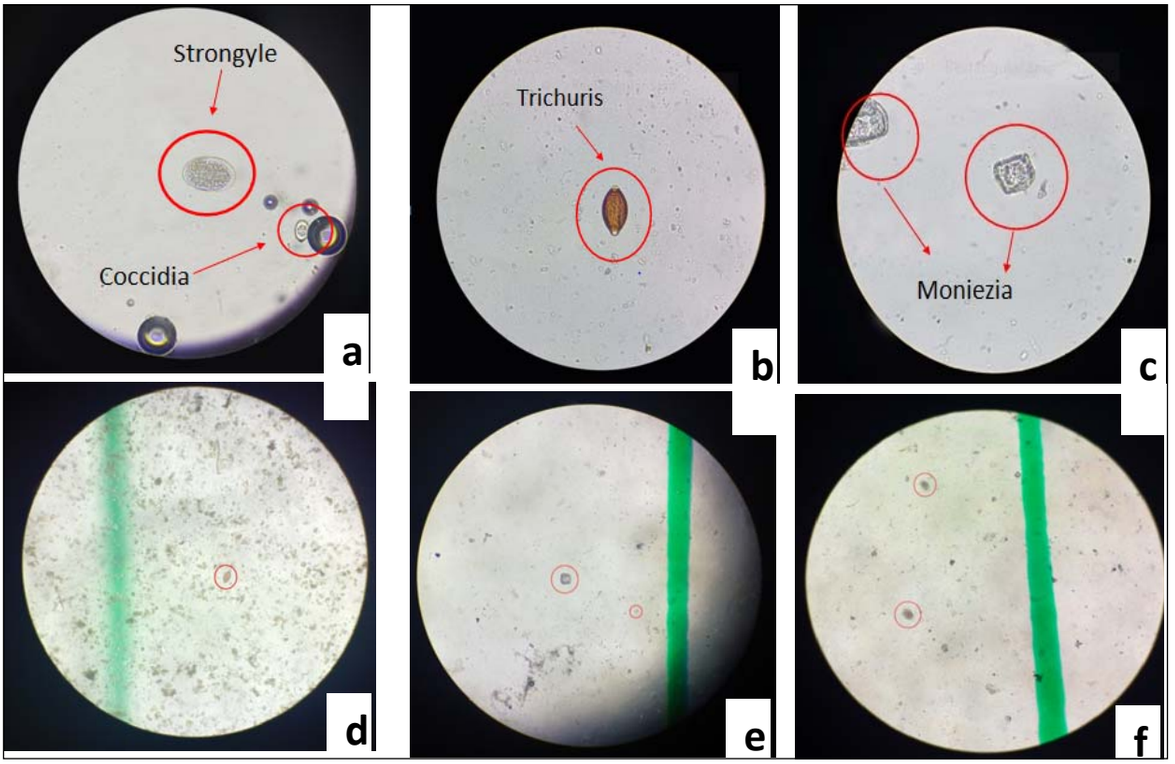

Fig. 1: Identification of eggs in a fecal sample using flotation technique (a, b, c) and estimation of numbers of parasite eggs or cysts per gram of feces, using McMaster technique (d, e, f) in Barbari, Sirohi and Black Bengal breeds of goat

Effective control and management of gastro-intestinal nematode parasites in grazing livestock relies heavily on the strategic use of efficacious chemotherapy (Singh *et al*., 2017). However, improper anthelmintic use, such as under-dosing and frequent (or continuous) use of a single anthelmintic, causes widespread development of anthelmintic resistance by various gastro-intestinal nematode populations(Almeida *et al*., 2010).

In recent years, research works have focussed on increasing goat productivity. To increase goat productivity, it is mandatory to identify and estimate the genetic and non-genetic factors affecting the economically important traits (Hoste *et al*., 2007). Genetic improvement can be achieved by selection where the effect of non-genetic factors on productive traits is most important. Knowledge about environmental factors, namely climate, breed, sex, type of birth ,age of the dam, etc., is essential for the production of goats. In this background, this study aims to analyze the effect of age and breed on worm burden in Indian Caprine.

MATERIALS AND METHODS

The study was carried out on 150 animals (50 each of Barbari, Sirohi and Black Bengal breeds of goat) maintained at Livestock Farm, Amanala, College of Veterinary Science and Animal Husbandry, N.D.V.S.U., Jabalpur (MP). Further each breed was grouped according to their age i.e., 3-6 months (n=12), 6-9 months (n=12), 9-12 months (n=12), and above 12 months (n=14). All animals were screened at the start of the Experiment for fecal egg count by McMaster method.

The identification of eggs was done using flotation method. Two grams of faecal sample were taken and thoroughly mixed with 30 ml of flotation solution with the help of a glass rod. Through the tea strainer, the emulsion was poured into the vial. The cover slip was placed gently on the top of the vial for 10-20 minutes. The area of the slide under the cover slip with a microscope was examined.

In order to estimate the number of parasite eggs or cysts per gram of feces, McMaster technique was used. Two grams of fecal sample were thoroughly mixed with 28 ml of flotation solution with the help of a glass rod. Through the tea strainer, the emulsion was poured into the vial. The vial was kept undisturbed for 10-20 minutes. With the help of a pipette small amount of faecal mixture from the top of the vial was taken, and the Mc master chamber was charged. Observed under 10X microscope in order to count a number of egg or cysts. The number counted in the single chamber was multiplied by 100.

Screening was done three times at 15-day intervals. The effect of gastro-intestinal nematode resistance trait was determined within the breed and between breeds.

RESULTS AND DISCUSSION

In each breed, Egg per gram was determined three times at the interval of fifteen days and statistical analysis was then performed. On the basis of egg per gram (EPG) (Screened fortnightly) (Fig. 1), it was observed age had no significant effect on parasitic load. The results obtained in the current study are in accordance with Sharma *et al.* (2009), Bansal (2012), Chedge *et al.* (2013) and Jamra (2013). Contrary to the findings of Sissay *et al.* (2007) where age-wise significant difference was observed between age groups, with young animals being more susceptible and having higher FEC than the adult animals.

The mean±SE for parasitic load for Barbari, Sirohi, and Black Bengal are presented in Tables (1, 2, and 3) and Fig.

Table 1: Effect of age on parasitic load in Barbari goat

Age / EPG	EPG 1	EPG 2	EPG 3	AVG EPG
3-6 Month (12)	491.68±51.22	466.68±54.06	466.68±59.35	475.00±44.17
6-9 Month(12)	525.00±51.22	500.00±54.06	516.67±59.35	513.89±44.17
9-12 Month(12)	475.00±51.22	466.68±54.06	458.33±59.35	466.67±44.17
Above 12 Month(14)	457.14±47.43	400.00±50.05	464.29±54.95	440.48±40.89

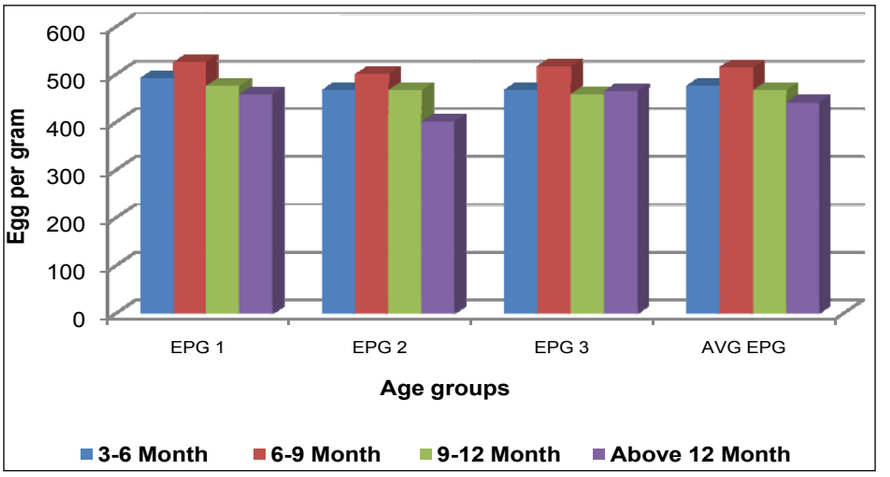

Fig. 2: Mean of gastro-intestinal nematodes resistance trait in Barbari goat

Table 2: Effect of age on parasitic load in Sirohi goat

Age / EPG	EPG 1	EPG 2	EPG 3	AVG EPG
3-6 Month(12)	383.33±55.97	408.33±50.07	400.00±46.07	397.22±31.99
6-9 Month(12)	441.67±55.97.	416.67±50.07	383.33±46.07	413.89±31.99
9-12 Month(12)	458.33±55.97	391.67±50.07	333.33±46.07	394.44±31.99
Above 12 Month(14)	357.14±51.82	307.14±46.36	328.57±42.65	330.95±29.62

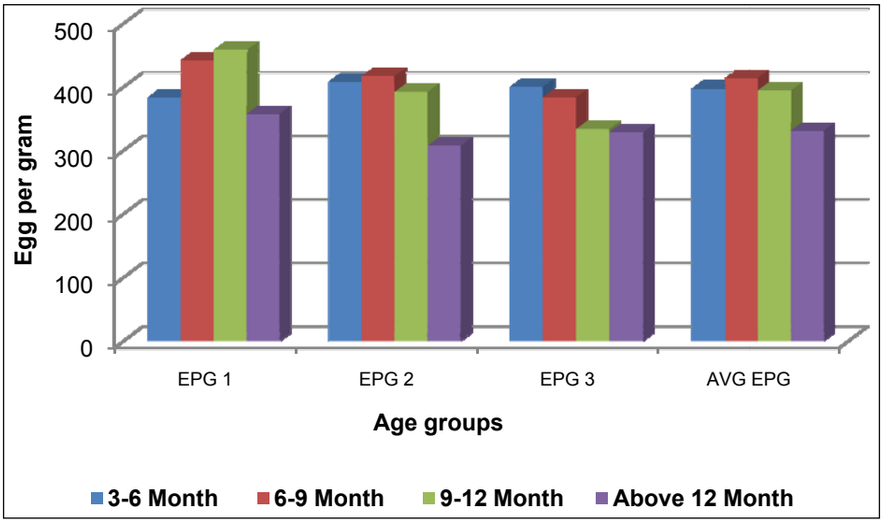

Fig. 3: Mean of gastro-intestinal nematodes resistance trait in Sirohi goat

Table 3: Effect of age on parasitic load in Black Bengal goat

Age/ EPG	EPG 1	EPG 2	EPG 3	AVG EPG
3-6 Month(12)	566.67±37.27	525.00±35.82	500.00±45.04	530.56±24.80
6-9 Month(12)	416.67±37.27	550.00±35.82	458.33±45.04	475.00±24.80
9-12 Month(12)	458.33±37.27	533.33±35.82	525.00±45.04	505.57±24.80
Above 12 Month(14)	442.86±34.50	492.86±33.16	471.43±41.70	469.04±22.97

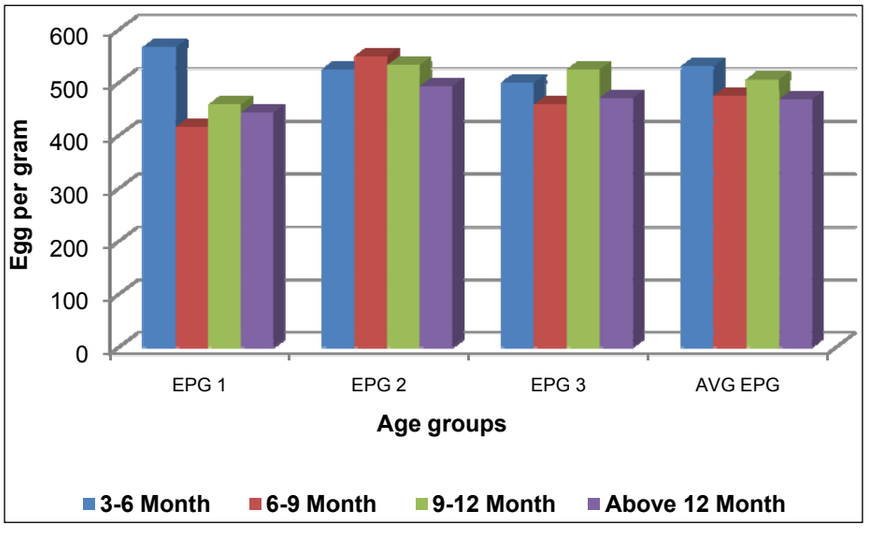

Fig. 4: Mean of gastro-intestinal nematodes resistance trait in Black Bengal goat

Table 4: Effect of breeds on parasitic load

Traits / Breed	Barbari (50)	Sirohi (50)	Black Bengal (50)
EPG 1	486 [a] ±24.58	408[b]±27.23	470[c]±19.43
EPG 2	456 [a] ±26.21	378[b]±24.63	524[c]±17.28
EPG 3	476 [a] ±28.36	360[b]±22.31	488[c]±21.69
Average EPG	472.67 [a] ±21.31	382[b] ±15.88	494 [c] ±12.29

Figures in parenthesis shows number of observations, means bearing different superscript differ significantly ($p<0.05$)

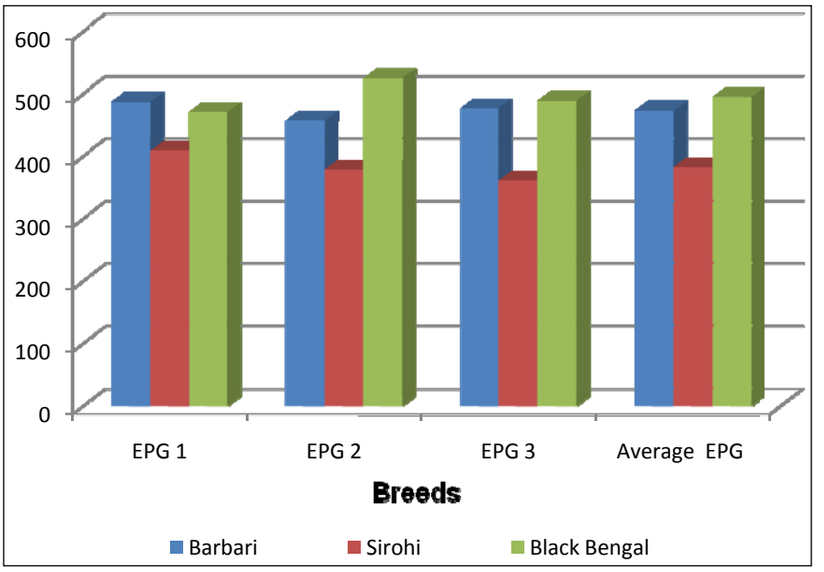

Fig. 5: Mean of gastro-intestinal nematodes resistance trait for Barbari, Sirohi and Black Bengal goats

(2, 3, and 4), respectively. Breeds had a significant effect on the parasitic load. The mean±SE for parasitic load for Barbari (n=50), Sirohi (n=50), and Black Bengal (n=50) goat is presented in Table 4 and Fig. 5.

CONCLUSION

Age had no significant effect on the parasitic load, whereas a significant difference was observed for the breed. However, the variation found may not be signified due to less volume of data. This study may be further continued with an increased number of breeds and data in order to analyze the effect of age and breed on worm burden.

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