

Prevalence of *Coccidia* and *Gastrointestinal strongyles* Infections in Goats in Djelfa (Algeria)

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Abstract: 97 Fecal samples from goats on 5 small farms in Ain Oussara (Djelfa-Algeria) were examined to determine the prevalence and intensity of the *Eimeria spp* and *Gastrointestinal strongyles* that infect goats in this region. The number of oocysts of *Eimeria spp* and eggs of *Gastrointestinal strongyles* per gram of feces (OPG and EPG) were determined by the modified McMaster technique. *Eimeria* oocysts and *Gastrointestinal strongyles* eggs were found in 77% and 61% of the fecal samples, respectively. The mean oocyst counts per gram of feces were 820 and 776 in kids and adult, respectively. The mean egg counts per gram of feces were 1196 and 352 in kids and adult, respectively (P=0.05).

Key words: *Coccidia* • *Gastrointestinal strongyles* • Goats

INTRODUCTION

Helminth parasites of ruminant are ubiquitous, with many tropical and subtropical environments of the world providing nearly perfect conditions for their survival and development [1]. Helminthiasis, especially parasitic gastro-enteritis, represents a serious health threat and a limitation to the productivity of small ruminant due to the associated morbidity, mortality, cost of treatment and control measures. Nematodes parasites of small ruminant result in low productivity due to the stunted growth, poor weight gain and poor feed utilization [2].

Enteric protozoan parasites are ubiquitous in domestic mammal populations [3]. Many species have intracellular life-cycle phases in the intestinal epithelia and have the potential to cause disease [2].

Caprine coccidiosis caused by the apicomplexan protozoan genus *Eimeria* is a worldwide and frequent intestinal parasitosis of goats. It affects the profitability of the industry, particularly in rural and semi-arid geographic regions. Economic losses result from the high mortality rate among goat kids, reduction of productivity and delayed weight gains of parasitized animals [4].

Few studies have been conducted in Algeria, to indicate the prevalence of coccidiosis and gastrointestinal

strongyles infections in goats [5]. Therefore, the current study was aimed to investigate the prevalence and count the number of oocysts of *Eimeria spp* and eggs of *Gastrointestinal strongyles* per gram of feces in goats (local breed) in the region of Djelfa (Algeria).

MATERIALS AND METHODS

Study Area: The wilaya of Djelfa is located in the high plateau, south of Medea and located 300 kilometers south of Algiers. Wide of 256.35 km², its continental climate is marked by cold, wet winters and hot dry summers. However, landscapes and landforms are relatively varied. Forests occupy 8% of the territory. It is a pastoral-oriented department where steppe predominates. The department has a population of more than 1,164,000 inhabitants, mainly concentrated in the cities of Djelfa, Ain Oussara, Messaadi and Hassi Bahbah [6]. The present study was carried in Ain Oussara.

Study Design: The study was carried out during April 2014 in 5 small farms situated in Ain Oussara city. The fecal samples were collected from goats kept under extensive management system together with sheep.

The goats (essentially females) examined were categorized into two groups based on age of animal: kids (age equal to or less than 1 year) and adults (older than 1 year). The ages of the animals were based on the dentition and owner records. The farmers indicated that they never used anthelmintic drugs for goats.

Study Methodology: The fecal samples were collected per rectum and or freshly dropped feces of 97 goats from local breed (Arabia goats). Collected samples were put into fecal pots, labelled and kept cool prior to transportation to the laboratory of parasitology of the veterinary institute of the University of Tiaret (Oust of Algeria), where they were immediately examined or stored at refrigerated temperature (4 °C) for a maximum of three days before processing.

Eimeria spp oocysts (OPG) and *Gastrointestinal strongyles* eggs (EPG) per gram of feces were determined for each sample following the modified McMaster technique using saturated sodium chloride as flotation fluid [7].

Data Analysis: Prevalence of *Gastrointestinal strongyles* and *Eimeria spp* infections was calculated as a percentage of the population screened. The analysis of OPG and EPG was done using the analysis of variance (ANOVA) to determine differences among age groups. The differences were regarded as significant if P-value is less than 0.05.

RESULTS

Out of 97 samples examined over the study period, 92 were found to harbor at least one parasite species. Of this, 36% (33/92) was infected by *Coccidia*, 18% (17/92) by *Gastrointestinal strongyles* and 46% (42/92) by mixed infection. The overall rate of infection by *Coccidia* and *Gastrointestinal strongyles* were 77% (75/97) and 61% (59/97), respectively as shown in Table 1.

The mean oocysts counts per gram of feces of *Eimeria spp* in kids and adult goats were 820 and 776, respectively. The mean eggs counts per gram of feces of *Gastrointestinal strongyles* in kids and adult goats were 1196 and 352, respectively. *Coccidial oocysts* counts were higher in young than in adult goats (but not significantly). Young goats had also higher *Strongyle* eggs counts compared to counts in adult goats (P=0.05). (Table 2).

Table 1: Prevalence of *Eimeria spp* and *Gastrointestinal strongyles* infections in goats

Parasite species	No of examined	No of positive	Prevalence (%)
<i>Gastrointestinal strongyles</i>	97	59	61
<i>Eimeri spp</i>	97	75	77

Table 2: Mean counts of *Eimeria* oocysts and *Gastrointestinal strongyles* eggs per gram in kids and adult goats

	Kids	Adult
Mean OPG of <i>Eimeria spp</i>	820	776
Mean EPG of <i>Gastrointestinal strongyles</i>	1196*	352

* P=0.05

DISCUSSION

Coccidial infection in small ruminants had been reported worldwide [8]. In the present study, the prevalence of coccidial infection of goats was 77%. Comparable findings for our results were reported by Gebeyehu *et al.* [9], who reported 67.6% in Korean native goats. Higher prevalence (97%) was cited by Kahan *et al.* [10] in Florida. Koinari *et al.* [11] reported lower rate (16.4%) in Papua New Guinea.

On the other hand, this study revealed that the prevalence of *Gastrointestinal strongyles* was 48%. This rate was very similar to 47.3% cited by Mhoma *et al.* [12] in peri-urban area of Mwanza city (Tanzania). Lower prevalence was reported by Gebeyehu *et al.* [9] (20.7%). Koinari *et al.* [11] observed higher prevalence (85.5%).

The higher intensity of infection of kids when compared to adult goats in this study was similar to the findings of previous authors [10,13-15]. These findings further the notion that the number of oocysts shed decline as the animal matures. This decline is most likely due to the development of an immunological resistance that is related to host age and exposure to the parasites. The resistance observed in adult goats appears to be relative rather than absolute as adults continue to shed oocysts in the feces, which allow them to act as the major source of infection for young, naïve animals [10]. Young goats had higher *Gastrointestinal strongyles* egg counts compared to counts in adult goats (P=0.05).

The higher levels of egg counts in the younger goats were ascribed to the poor immunity status of the young goats [16], which increases their susceptibility to gastrointestinal parasites [17].

However, the present findings do not agree with the previous study [9] in that adult were more susceptible to gastrointestinal parasitic infection than younger.

CONCLUSION AND RECOMMENDATIONS

The results in the present study showed that *Coccidia* and *Gastrointestinal strongyles* as single or mixed infections are prevalent in goats. Thus, these parasites should be considered among those diseases responsible for health and productivity problems in goats in the study area. Regular control measures should be practiced to reduce the parasitic burdens in the affected areas. More investigations will be useful to study other gastrointestinal parasites and their factors risks in goats.

Conflict of Interest Statement: None of the authors of this paper has a financial or personal relationship with other people or organizations that could inappropriately influence or bias the content of the paper.

ACKNOWLEDGMENT

The authors would like to express their special thanks to the farmers of Ain Oussara city.

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