

# Prevalence of Gastrointestinal Parasites of Sheep and Goats in the Fora and Mona Populations during Drought Mitigation in Marsabit County of Kenya

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## ABSTRACT

Gastrointestinal parasitism is a major problem among sheep and goats in arid and semi-arid areas like Marsabit County of Kenya. In this county, during drought, the animals are separated into two groups; the Mona group comprising of the pregnant and milking animals that are left with the women and children at the homestead and the Fora group comprising of the others are herded to far grazing areas by the men in search of pastures and water. As the drought progresses, stress from deteriorating body condition tends to lower the immunity of affected animals making them prone to internal worm burden. Studies comparing prevalence of worms in these two groups of animals have been scarce. This study investigated the gastrointestinal parasite burden in these two groups during drought period to determine which group resisted parasitism. Rectal fecal samples from 1328 animals collected in fecal pots, and were analyzed for both egg and oocysts counts using the McMaster technique. The prevalence of gastrointestinal parasites was significantly higher in the Mona group than Fora group. Coccidia were the main occurrence and a more rigorous worm control strategy is recommended for the Mona group to enable them cope better with the drought.

**Key words:** Gastrointestinal parasites, Mona and Fora group, Sheep and Goats, Fecal samples.

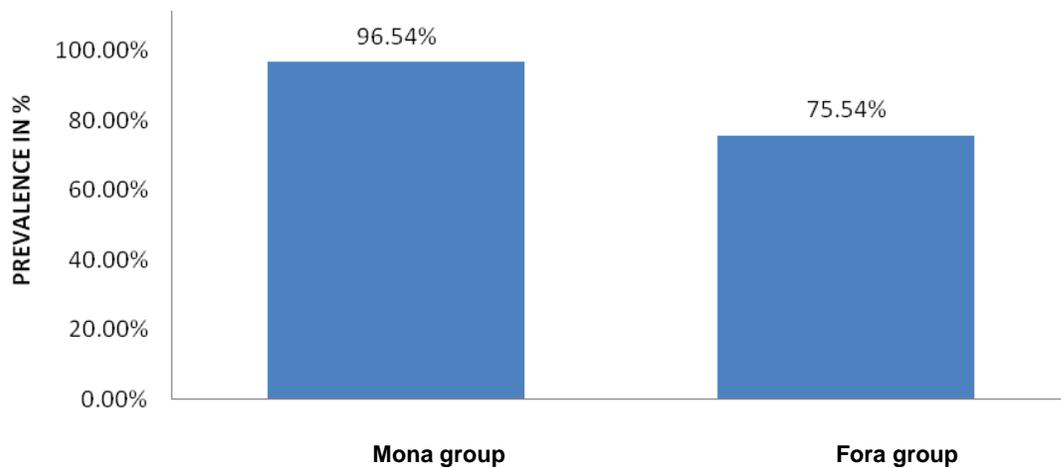
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## INTRODUCTION

Sheep and goats (Shoats) are known to be important for the economies of arid and semi-arid areas in Kenya and other tropical countries (Kosgey et al., 2008; Mutembei et al., 2015). Sheep and goats are preferred in these areas mainly because of their small body size that require less feed resources and due to their rapid and short reproductive cycles that enable them to reproduce faster during the wet months. In addition shoats have the ability to grow very fast and reach market weight (Mbae et al., 2004; Kosgey et al., 2008). Thus shoats are preferred by pastoralists in Kenya due to resistance to the harsh

climatic conditions. Gastrointestinal nematodes and coccidia infections are the major constraint to production of shoats for pastoralist communities in the tropics (Wafula et al., 1994; Githigia et al., 1995; Mba et al., 2004). The shoat's worm burdens in the tropics are favored by warm environmental conditions that aid in rapid multiplication and transmission of the parasites (Zeryehun, 2012).

In addition poor body condition of the animals due to poor nutrition during drought lead to increased stress and lowered immunity against such parasites (Sahoo et al.,



**Figure 1.** Graphical presentation of prevalence of the main worms (coccidian) burden in both Mona and Fora groups of shoats.

2013). Drought is a major threat to the livelihoods of pastoralist in the tropics and often leads to increased mortality of shoats (Mutembei et al., 2015). Over the years the pastoralists have a key drought coping strategy to move part of their animals to areas where water and pastures is available (Huho et al., 2012). As they move the animals, the milking animals and the pregnant ones are usually left behind in the homestead to provide milk for the children and the women left at home while the rest of the herd is moved in search of water and pastures (Huho et al., 2012). The animals left behind after pasture depletion would definitely be at a risk and studies are needed to compare prevalence of gastrointestinal parasites (measure of immunity) in the animals left behind (Mona group) and those moved to newer grazing zones (For a group) so as advice the pastoralists on the practiced coping strategy. Such studies are necessary in Kenya because country's 80% of landmass is arid and semi-arid areas occupied by pastoralists dependent upon shoats for livelihoods (GoK, 2004).

## MATERIALS AND METHODS

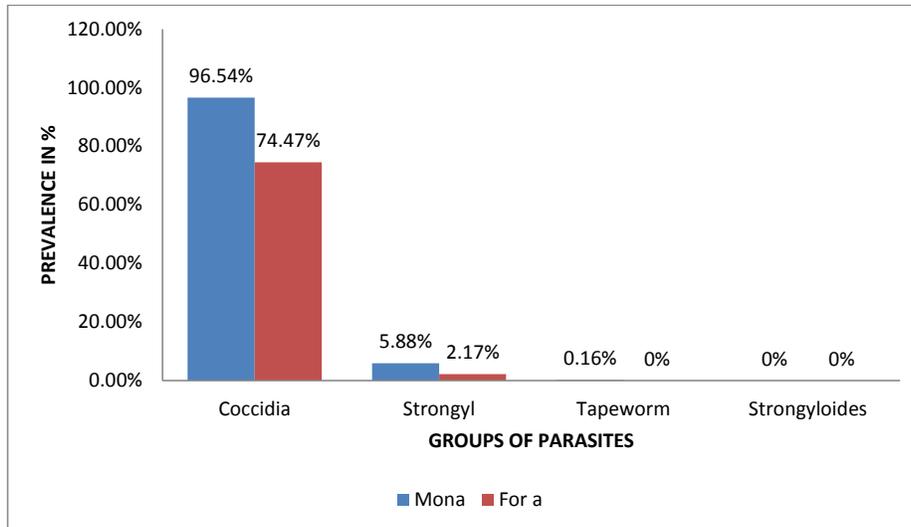
This study was carried out in Marsabit County of Kenya that lies between latitude 01 15' and 04 27' and longitude 36 03' and 38 59' covering 70,961 km square (Munyao et al., 2007). The temperatures average 20.1°C annually with high temperatures of 30.2°C. The area has an erratic rainfall pattern of 200 to 1000 mm. The main economic activity is of the area is pastoralism. A study design was developed to collect rectal fecal samples from shoats in Marsabit during drought. A total of 1328 fresh fecal random samples were collected, preserved in labelled fecal pots containing 70% alcohol until analysis was done. Equal samples of 664 samples, both from the Fora and the Mona groups of shoats were collected.

Households from which the animals were sampled were randomly selected and only adult sheep and goats were used for the study. The number of eggs and oocyst per gram of faeces was determined using the McMaster quantitative technique as previously described by Hansen and Perry (1994). The eggs were further identified using morphological appearance and size. Significant differences of the fecal egg count were tested using the Student T-test.

## RESULTS AND DISCUSSION

The worm burden in the samples from both the Mona and Fora groups of shoats are summarized in Table 1 and Figures 1 and 2. There were gastrointestinal parasite eggs in both groups of shoats but the prevalence was significantly higher ( $p \leq 0.01$ ) in the Mona group of animals. Other than the helminths, also detected at higher incidence in Mona group of animals were the coccidia oocysts. The prevalence of the parasites reported in the Mona group of shoats compare closely with that reported by other authors (Gatongi, 1995; Zeryhun, 2014). These results clearly show that the Mona group was at a higher risk of worm burden when compared to the Fora group of shoats. Although gastrointestinal nematodes and coccidia infections are major constraint to production of shoats for pastoralist communities in the tropics (Wafula et al., 1994; Githigia et al., 1995; Mbae et al., 2004), further worm burdens are favored by harsh environmental conditions (Zeryhun, 2012) and poor body condition of the animals due to poor nutritional status (Sahoo et al., 2013).

In drought the pastures within the homestead where Mona group is located is normally depleted whereas the pastures are better for Fora group which is usually grazed on the greener areas. Thus, it is not surprising



**Figure 2.** Prevalence of the different worms detected in the two groups of shoats.

**Table 1.** Prevalence of coccidia detected in the Mona and For a samples (eggs and oocysts).

	Mona group	For a group
Positive samples	641	488
Negative samples	23	176
Percentage positive	96.54%	75.54%

that the prevalence of worm burden is significantly higher in the Mona group, which by extension is expected to be of poorer body condition and lowered immunity than the For a group of shoats (Huho et al., 2012; Mutembei et al., 2015). Although over the years the pastoralists have developed a drought coping strategy to move only part of their animals to areas where water and pastures is available, this study suggest that in order to boost the immune system of the Mona group of animals, it is recommended to provide external feeding and deworming regularly to reduce the risk to parasites burden. This strategy for the animals left behind (Mona group) when compared to those moved to newer grazing zones (For a group) will boost their ability to cope with drought situations. Such strategy is necessary in Kenya because the country’s 80% of landmass is arid and semi-arid areas occupied by pastoralists dependent upon shoats as their source of livelihood (GoK, 2004).

**CONCLUSION**

The study showed that the Mona group of animals are more vulnerable and prone to intestinal worm burden than the For a group. Thus, it is prudent that the Mona group is dewormed regularly and provided external

feeding to improve on immunity against worms.

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