The prevalence of helminths in sheep and goats in Tanzania

Abstract

Helminths in sheep and goats pose an important problem on the health of these small ruminants in Africa. It is essential to know the prevalence of these parasites in order to provide a better health for the animals and their owners, because there is presumptive evidence that some helminths are transmittable and hence causing patent infection in humans.
Helminth infections of small ruminants, such as sheep and goats, affects production through economic losses due to weight loss, reduced growth rate, reduced fecundity and higher mortality. Depending on the type of parasite, the parasite/host interaction and the infective dose, there will be different effects of the infection on the animals. A successful control of helminth infections depends on available information and the transfer of this knowledge to the farmer.

Before the start of this project, the situation on local farms concerning the prevalence of helminth infections had not been extensively studied in Tanzania or the surrounding countries. The current study will provide better insights into the degree of infection, which may lead to better treatment for the animals. This can improve the health of animals and even farmers and local people, since some parasites are zoonotic.
It is important to acquire an insight on the prevalence of helminths in small ruminants, in order to have the occurrence of the different species in Tanzania, and how abundant they are.
To achieve this, different samples were taken, such as fecal samples and intestines.

Coprological investigation revealed that 81,8 % of the small ruminants excreted helminth eggs in their feces. The prevalence of various helminth species were: strongylid type eggs (76,9%), *Strongyloides spp*. (18,2%), *Moniezia spp*. (3,8%), *Trichuris spp*. (0,4%) and *Skrjabinema spp*. (13,3%).

Key words: Coprology, small ruminants, prevalence, helminths, Tanzania

Introduction

Helminths, who are commonly known as parasitic worms, are multicellular eukaryotic invertebrates with flattened or cylindrical bodies, exhibiting bilateral symmetry. They live in a host where they gain nourishment and protection, which causes harm to the host. The adult worms are macroscopically visible and they all have a similar shape.
Helminthosis is ranked in the top 10 of diseases of sheep and goats with a big impact on the poor (Perry et al, 2002).

Simple flotation, an easy way to detect helminth eggs.
Helminths in sheep and goat can be detected by several methods, but this article will only handle about the simple flotation technique to process the fecal samples, which leads to only a couple of helminths that can be detected (most of them are nematodes)..

Material and methods

Flotation
The simple flotation technique is a good technique to use in initial surveys to establish which groups of parasites are present. It relies on the differences between specific gravity of the eggs and other components in the fecal sample. Therefore a flotation solution can be used with a specific gravity higher than that of helminth eggs.

A total number of 264 fecal samples were collected during March, April and May 2017 in different parts of Southern Tanzania.

Fecal samples for parasitological examination are collected directly from the rectum of the animal. Therefore, gloves are necessary. After sampling, the glove can be used as a bag for the fecal samples, by turning it inside out.

On one farm, several samples should be collected, which have to be labeled with animal identification, date and place of collection. After sampling, the feces has to be transported to the lab in a cool box with ice packs, to avoid the eggs from developing and hatching.

Protocol:

Approximately 3 g feces is put in the tea strainer and placed in the mortar. Afterwards 30 ml saturated salt solution is added and the sample is mixed with the pestle. After that, the resulting fecal suspension is poured once again trough the tea strainer into a beaker.

This solution is poured into a 15 ml falcon tube, and is placed in a rack. There must be a convex meniscus at the top of the tube, so if the tube is covered with a coverglass, the solution touches the glass.

The tube stands for 3-5 minutes. Before the coverglass is transferred do a microscopic slide and examined under the microscope.

Preparation of fecal cultures

It is difficult to differentiate strongyles eggs and species such as *Haemonchus, Bunostomum, Oesophagostomum, Cooperia and Trichstrongylus*, because they look similar in fecal samples.

For these parasites, differentiation can be achieved by the use of fecal cultures. They provide a suitable environment for the hatching and development of helminth eggs into the infective stage (L3).

Approximately 3 grams of each positive sample of the same farm is put together in the mortar.
The samples are mixed with the pestle and water and sawdust is added, till the right consistency is obtained.

The mixture is transferred to a beaker with a perforated bottom and covered with cheesecloth before it is turned upside down into another beaker that is filled with a little bit of water. It was important to pay attention that the sample doesn't touch the water.
This culture stays at room temperature for 6 days. While the larvae will develop to the L3 stage.

After 6 days, the beaker with the sample is brought to a sedimentation cone that is completely filled with water. Now the sample has to touch the water.
This stays at room temperature for 1 day.

The sediment contains the L3 larvae, that can be sucked up with a 20 ml pipet and transferred to a 15 ml tube.

One drop of this sediment is transferred on a microscopic slide and covered with a cover glass before it is examined under the microscope to identify the larvae.

Results:

Coprological investigation of small ruminants

Table 1 presents the total amount of sheep and the total amount of goats with the prevalence of their parasitic worms.
Out of the 90 sheep, 83 sheep were positive for helminth eggs. This is a prevalence rate of 92,2 %. Four kinds of helminth eggs were identified: Strongylid eggs (91,1 %), *Strongyloides* spp. (20,0 %), *Moniezia* spp. (4,4 %) and *Skrjabinema* spp. (3,3 %).
Also the fecal samples of 174 goats were examined. Out of this 174 goats, 133 were positive (76,4 %). Five kinds of helminth eggs were identified: Stongylid eggs (69,5 %), *Strongyloides* spp. (17,2 %), *Moniezia* spp. (3,4 %), *Trichuris* spp. (0,6 %) and *Skrjabinema* spp. (18,4 %).

	Number of animals	**Positive (%)**	**Strongyles (%)**	***Strongyloides* (%)**	***Moniezia* (%)**	***Trichuris* (%)**	***Skrjabinema* (%)**
Sheep	90	83 (92,2 %)	82 (91,1 %)	18 (20,0 %)	4 (4,4 %)	0 (0 %)	3 (3,3 %)
Goats	174	133 (76,4 %)	121 (69,5 %)	30 (17,2 %)	6 (3,4 %)	1 (0,6 %)	32 (18,4 %)
Total	264	216 (81,8 %)	203 (76,9 %)	48 (18,2 %)	10 (3,8 %)	1 (0,4 %)	35 (13,3 %)

Table 1: Results coprological investigation of all animals

	Number of farms	***Haemonchus* (%)**	***Trichostronglus* (%)**	***Oesophagostomum* (%)**	***Bunostomum* (%)**
Sheep	7 farms	7 (100 %)	7 (100 %)	6 (85,7 %)	1 (14,3 %)
Goats	13 farms	13 (100 %)	12 (84,6 %)	11 (76,9 %)	5 (38,5 %)
Total	20 farms	20 (100 %)	19 (95 %)	17 85 %)	6 (30 %)

Table 2: Results of the fecal cultures

Differentiation of nematode species by fecal cultivation

To identify the different types of strongylid eggs, fecal cultures were performed per farm. There were seven different farms with a group of sheep and 13 different farms with a group of goats.
Table 2 shows that the identification of the L3 larvae in the fecal cultures of the sheep revealed that *Haemonchus* spp. and *Trichostrongylus* spp. were present in all farms, *Oesophagostomum* spp. in 85,7 % of the farms and *Bunostomum* spp. in 14,3 % of the farms. The farms with goats had a prevalence of 100 % for *Haemonchus* spp., 84,6 % for *Trichostrongylus* spp., 76,9 % for *Oesophagostomum* spp. and 38,5 % for *Bunostomum* spp..

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