



TECHNICAL BULLETIN No.3
CONTROL OF INTERNAL PARASITES IN
SHEEP AND GOATS



ESGPIP

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FOREWORD

This fact sheet titled “*control of internal parasites in sheep and goats*” is produced by the Ethiopia Sheep and Goat Productivity Improvement Program (ESGPIP). The ESGPIP is a USAID funded Project with the objective of improving the productivity of Ethiopian sheep and goats.

Internal parasites are one of the main factors that affect the productivity of sheep and goats especially in the wet and highland areas. The economic loss to the Ethiopian meat industry due to parasitic diseases is estimated at US\$ 400 million annually. This fact sheet is intended to serve as an extension aid for Kebele Development Agents (KDA’s) to help improve the productivity of sheep and goats through the control of internal parasitism. The information contained in this fact sheet is also useful for other users engaged in business ventures based on sheep and goat rearing and also production of other types of ruminants.

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CONTROL OF INTERNAL PARASITES IN SHEEP AND GOATS

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1. Introduction

Internal parasites are worms. Worms are small creatures that are found inside animals. Sometimes they can be seen with the naked eye, but they are not easily seen in many cases. Unless you specifically look for worms in an animal that dies or which is slaughtered, you may not see worms. Helminthiasis results in the following economic losses:

- **Obvious losses:** death, wasting, condemnation of human food
- **Hidden losses:** reduced live weight gain, poor food conversion, reduced lactation, poor fleece etc. The aggregate hidden losses are probably more serious than obvious losses, but are often not noticed because:
 - Such losses are widespread;
 - The process is not easily observable and chronic;
 - Most losses occur in young, growing animals and in those under physiological stress, when poor condition is regarded as normal
- **Control costs:** drugs, labor, fences, inefficient use of land etc.

In Ethiopia, 5-7 million sheep and goats die each year due to diseases including helminth infections. More significant, however, are losses resulting from inferior weight gains, condemnation of organs and carcasses and lower milk yields. The overall economic loss to the Ethiopian meat industry due to parasitic diseases is estimated at US\$ 400 million annually.



2. Signs of internal parasites in live animals

Some animals are more badly affected by worms than others, while some animals never develop a bad worm infection.

How will you know if an animal is suffering from worms? There are a number of signs that may indicate that an animal has worm infection. However, the signs will not tell you that the problem is definitely caused by worms, but should make you suspicious. Here are some of the signs.

- **Bottle jaw**
 - You may notice that a sheep or a goat has a bottle jaw. This is a soft, cold swelling under the chin of the animal. It may be seen with a serious worm infection.
 - Brisket edema- swelling between the front leg and belly.
- **Pale mucous membrane (*anemia*)**
 - Some animals may be very pale when you look at the inside of the eyelid. This may be seen because of bad worm infection.
- **Shabby wool or hair (poor condition)**

- Animals may have poor hair or shabby wool during the dry season. You may notice at first that sheep or goats are emaciated. You should feel the animals over their lower backs.
- Diarrhea
 - It may be difficult to see that a sheep with a fat tail has diarrhea unless you look carefully under the tail.
 - Diarrhea can be caused by round worms, coccidian or liver flukes. It may also have other causes. Sometimes toxic plants or an inappropriate diet may cause diarrhea.
- Weakness, depression and lying down abnormally.
- Stop eating or eating less than normal.
- Ewes or does may not have enough milk for their lambs or kids. The young may die of starvation.
- Pass tapeworm segments in their feces.

	
<p>Loss of condition and rough hair coat(http://attra.ncat.org/attra-pub/parasitesheep.html)</p>	<p>Bottle Jaw</p>
<p>Figure 1. Signs of parasitism</p>	

3. Signs of worm infection in dead or slaughtered animals

You may notice the following signs of worm infection when you open the carcass of a dead or slaughtered animal.

- Worms and bleeding in the milk stomach
- Worms and fluid in the intestines
- Fluid in the body cavities
- Bumps on the intestines
- No fat on the carcass
- Pale carcass

4. Types of internal parasites and their control

The major types of gastro-intestinal parasites of sheep and goats can be categorized into four groups:

- Nematodes (round worms)
- Trematodes (leaf like worms, liver flukes)
- Cestodes (tape worms)
- Protozoa (Coccidia)

In Ethiopia, farm animals are kept on pasture throughout the year and climatic conditions are favorable for the development and survival of infective stages or vectors. Helminth parasites are therefore a major cause of economic loss. Major factors that contribute to the multiplication and sustainability of parasites are climate, ecology and systems of animal production. As a result, the distribution and intensity of infection of helminth parasites vary from area to area depending on these factors.

It is not possible to recommend one deworming program suitable for all regions of Ethiopia. Local knowledge is essential to develop such programs. The following recommendation may be implemented where there is no detailed epidemiological knowledge available.



4.1 Liver fluke

If possible, delay grazing on flooded pasture until the area has been dry for at least eight weeks. Most fluke cysts will have been killed by then. It is also possible to leave the

grass until it dries well and use it to make hay to feed the animals during the dry period. Pastures that remain wet for long periods are ideal environments for the survival of internal parasite larvae. Drainage fields reduce the larvae's chances of survival and extend grazing periods. It is also important that animal watering areas be situated in well drained places.

The farmers/pastoralists using the same pasture should undertake control measures together and all sheep and goats that are grazing together should be treated at the same time. Deworm all newly introduced sheep and goats and keep them separate from the flock for three days

In the highlands where liver fluke is a problem: Deworm all sheep and goats in late November or early December. Few liver fluke cysts can survive this long into the dry season and few will be picked up until the end of the next rainy season. The second deworming can be at the end of April or beginning of May. In some areas where the problem is severe, it may be necessary to treat all animals at the end of January or beginning of February.

In lowland areas where liver fluke is a problem: Deworm all sheep and goats in the middle of the dry season (December), at the start of the short rainy season (March) and at the start of the long rainy season (May).

In mid-altitude areas where there is one long rainy season giving long crop growing periods and where liver fluke is a problem: Deworm all young animals (below one year) every three months during the rainy season. Deworm all sheep and goats after the rainy season (November). Deworm all sheep and goats before the beginning of the rains (May).

Use narrow spectrum anthelmintics (Flukicide) against liver flukes. Most broad spectrum anthelmintics (against most nematodes and cestodes) have little or no effect on liver flukes.

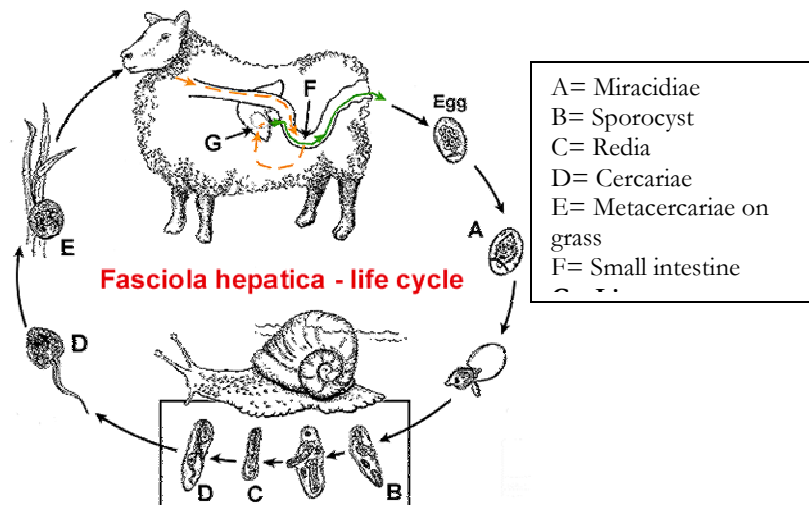


Figure 3. Life Cycle of *Fasciola hepatica*

4.2 Gastrointestinal worms and lung worms

Since the susceptibility of animals varies with age, it is important, especially in the rainy season, to graze young stock in advance of older stock. Using cut and carry feeding systems can significantly limit worm infestation. Overpopulation increases the concentration of parasites and also forces animals to graze closer to the ground, and may result in consumption of a higher number of infective larvae.

All farmers/pastoralists using the same pasture have to take control measures at the same time. Deworm all newly introduced animals and keep them separate for three days before allowing them to mix with the rest of the flock. Keep barns clean and dry.

- **In highland areas, with short rains followed by long rains:**
 - Deworm all sheep and goats at the end of the rainy season when the pasture becomes dry: December.
 - Deworm all sheep and goats at the end of the dry season before the rain starts: April
- **In lowland areas where there are two distinct rainy seasons.**
 - Deworm all sheep and goats at the end of the dry season (February) before the rains start.
 - Deworm all sheep and goats at the end of each of the rainy seasons: September and April.
- **In mid-altitude areas where there is one long rainy season giving long crop growing periods:**
 - Deworm all sheep and goats after the rainy season: November
 - Deworm all sheep and goats before the beginning of the rains: May
 - Always consider the possibility of acute parasitic gastroenteritis at any time from the start of the rains until shortly afterwards.

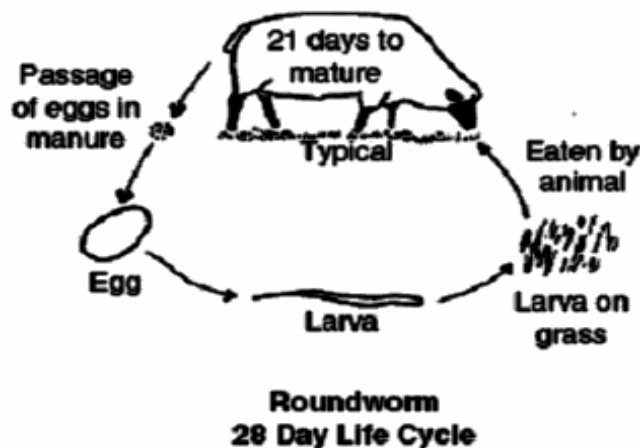


Figure 3. The life cycle of a typical gastrointestinal parasite worm:

Strategic deworming using a FAMACHA© card can be established in intensive farms in the Rift Valley where haemonchus is prevalent. FAMACHA© is a technique developed in South Africa that is used to identify anemic animals on a 1 to 5 scale. The system is based on examination of the lower eyelid of sheep and goats and comparison with the FAMACHA© color chart depicting varying degrees of anemia. This test is used to determine the need for anthelmintic treatment. Administration of treatment should follow only if anemia (a sign of parasitism) is present. The FAMACHA© card can be ordered through animal health input suppliers and training on how to use it can be obtained from veterinary professionals.

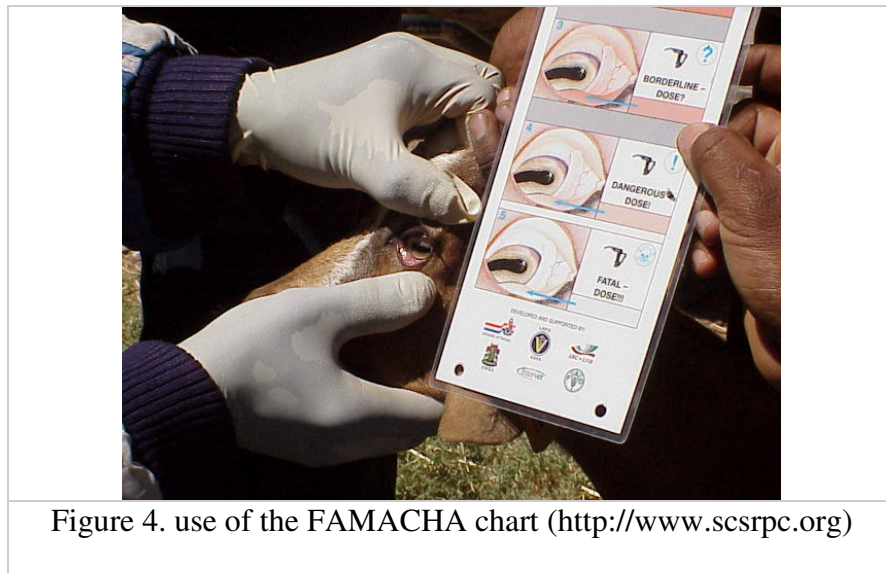


Figure 4. use of the FAMACHA chart (<http://www.scsrpc.org>)

4.3 Recommended time of anthelmintic treatment for small ruminants

Table 1: Schedule for treatment of small ruminants in different ecological zones

Month	Broad-spectrum Anthelmintics			Flukicide		
	Highlands (Dega)	Mid altitude (Woinadega)	Lowlands (Kola)	Highlands (Dega)	Mid altitude (Woinadega)	Lowlands (Kola)
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						

4.4 Use of anthelmintics

Strategic deworming of animals with approved drugs is an important strategy in controlling internal parasites.

Annual rotations of anthelmintic drugs are not recommended anymore as this can increase rate of resistance to all drugs. Using one class of a broad spectrum drug until it is no longer effective and then switching to another class of a broad spectrum drug is considered a better strategy. The new strategy is thus recommended for use. Moreover, it is necessary to consider the following points seriously:

- Use a full dose of anthelmintic whenever treatment is done. This is recommended to help prevent the development of resistance.
- Treat all newly introduced animals before allowing them to mix with the remaining flock.

There are different formulae and presentations of anthelmintic drugs. The following are some examples:

- Boluses/pills or tablets - these are easy and practical for use
- Liquid preparations/drenches - these are ready to use preparations, available locally
- Pastes - easy to give if you have a dispenser. Not commonly available locally
- Medicated blocks - difficult to control the amount of drugs absorbed. Not available locally.
- Slow-release formulations - drug is placed in the rumen and released slowly on a continuous basis. Not available locally.

5. Principal anthelmintics

Benzimidazole

- Albendazole - trade name Valbazen. It is active against nematodes such as *Haemonchus*, and other trichostrongyles (round worms), to some extent liver flukes (*Fasciola hepatica*), tapeworms (*Moniezia*, *Taenia saginata*), etc. Dosage is 5 mg/kg for round worms and 10 mg/kg for flat worms (trematodes).
- Thiabendazole - trade name TBZ, Thibenzole. Active against gastrointestinal round worms. Recommended dose between 75 mg/kg and 120 mg/kg (usually 80 mg/kg).
- Triclabendazole - trade name Fasinex. Active against liver flukes. Recommended dose, 10-12 mg/kg.

Imidazothiazole derivatives

- Tetramisole hydrochloride - trade name is Nilverm. Active against gastrointestinal and lungworm. Recommended dose, 15 mg/kg.
- Levamisole hydrochloride - trade name is Ripercol. Active against gastrointestinal and lungworm. Recommended dose, 7.5 mg/kg

Salicylanides

- Oxyclozanide - trade names, Diplin, Zanil. Active against adult liver flukes. Recommended dose, 15 mg/kg.
- Rafoxanide - trade name Ranide, Flukanide. Active against immature and adult liver flukes and also against abomasal and intestinal roundworms. Recommended dose against immature and adult liver flukes is 7.5-10 mg/kg. Only 5 mg/kg against adult Fasciola.

Miscellaneous

- Ivermectin is active against gastrointestinal and lung worms. Recommended dose, 200 mcg / kg.

Combinations of anthelmintics

Several anthelmintics can be combined to increase the spectrum of activity of the drugs. Such combined drugs are available in the market. Some examples are:

- Nilzan: oxyclozanide + tetramisole
- Ranizole: rafoxanide + thiabendazole

Table 4. Anthelmintics for sheep and goats

Generic name	Common names	commercial	Dosage (mg/kg)	Spectrum of activity			
				GI	L	T	F
BENZIMIDAZOLE							
Albendazole	Valbazen		5-10	+	+	+	+
Thiabendazole	Thibenzole		80	+	+	-	-
Triclabendazole	Fasinex		10-12	+	-	-	+
IMIDAZOTHIAZOLES							
Levamisole hydrochloride	Ripercol		7.5	+	+	-	-
Tetramisole hydrochloride	Nilverm		15	+	+	-	-
SALICYLANIDES							
Rafoxanide	Ranide		7.5	+	-	-	+
Oxyclozanide	Zanil			-	-	+	+
MISCELLANEOUS							
Ivermectin	Ivermectin		0.2	+	+	-	

GI = Gastrointestinal nematodes, T = Tapeworms, L = Lungworms, F = Liverfluke
 + = Effective, - = Ineffective