

R6561

Helping lambs to control stomach worms before they get sick

Executive Message

- **Opportunities exist for sheep keepers in developing countries to improve earnings from their animals by better control of stomach worms in young animals. It is now possible to blood test lambs to see if they need extra protein in their feed to combat the negative effects of these worms. Supplementation of ‘at risk’ lambs will mean they reach reproductive age quicker without getting sick and are thus able to provide saleable products much earlier.**

The problem/context

Stomach worms (Gastrointestinal parasites) are an enormous drain on the efficient production of sheep in developing countries where they are mainly owned by poorer farmers.

The gastrointestinal 'worm' *Haemonchus contortus* is one of the most dangerous parasites of sheep in the tropics. Infections are a major problem to rearing small stock as nearly all grazing sheep are infected. This makes them anaemic, they do not eat well and the food they do take is poorly digested and the protein it contains is used less efficiently causing the animal to grow slowly and be susceptible to other diseases.

The standard methods of treatment for these worms is to treat all the animals in a flock with anthelmintic drugs to kill the parasites carried in the sheep. This reduces pasture contamination that comes from parasitic eggs passed in the droppings, which would otherwise grow into larvae and then infect more sheep. Unfortunately many farmers in the third world cannot afford these drugs. Even those farmers who can find that many drug preparations are ineffective, because the worms are becoming resistance to most common drugs. Using drugs may also stop young sheep building up their own natural resistance to these worms as they become adults. As animals get older

they become hypersensitive to worm burdens, resisting incoming larvae and expelling adult worms, which enables them to manage worm burdens.

*Stomach worms like *Haemonchus contortus* cause protein deficiency in sheep, which weakens them whilst letting the parasite survive.*

Infected lambs show signs of anaemia and poor health as nutrients are syphoned off from the host by the parasite. Animals on poor protein diets cannot then obtain enough nutrients to meet their basic needs and in severe cases will die. If the farmer can supplement the diet with additional protein animals will be able to withstand the effects of infection. The production of parasite eggs will then fall so reducing the parasitic challenge facing all animals in a flock. The best source of supplementary protein will vary in different locations, but in many cases cheap, local protein sources are available like dried cassava leaves.

A Solution 1 – early testing to identify at ‘risk animals’

Scientists in East Africa have discovered a way of identifying which animals that are likely to suffer most from stomach worms before they look sick. They measured the levels of an antibody called IgA in the blood that shows whether an animal is getting an adequate diet to resist worms.

They found:

- That growing lambs attempt to control parasites by suppressing the worms' size and fertility.
- The lambs do this by producing a local IgA antibody that directly affects the worm.
- The success of this IgA antibody response in controlling the worms is directly related to the level of nutrition (especially protein) that the lambs received.
- A simple test to measure the IgA responses can show whether the lamb is getting enough protein to best resist the effects of the parasite and this can do done before the lambs look sick.

A Solution 2 – feeding extra protein

Measuring the amount of IgA antibody can show which animals are nutritionally stressed or identify those animals that are relatively resistant to infection. A cheap test is being developed to enable farmers to use so this information in managing their livestock.

Being able to measure the IgA responses of an animal to stomach worms makes it possible to identify animals that are:

- 'at risk' before they develop clinical signs of disease
- on an inadequate diet to protect themselves,
- genetically susceptible to these parasites.

So if animals are found to have low IgA levels they lack sufficient protein in their diets and so are more susceptible to infection. Farmers can counter this by early feeding of extra protein to animals with poor IgA levels in their blood. If extra protein is fed then lambs will be able to grow despite being infected with stomach worms.

Benefits

Being able to help animals control stomach worms before they get sick will mean they grow faster and bigger and reach reproductive age earlier which for females means early breeding and young stock to sell. For males it means early sales.

Keeping healthy livestock is also much easier than sick ones and if all are healthy in a flock then the whole flock is easier to manage. For example if some lambs carry high worm burdens then they will breed later than the healthy ones and that will mean livestock keepers cannot breed the flock at the same time as some animals will not have reached puberty (breeding ability) in time.

For sheep keepers wanting to improve their flocks and get better income from sales there are monetary advantages to selling animals in groups rather than one by one. This is best achieved by getting all young lambs to grow at the same rate. If some are sick from worm infestations then they cannot grow as quickly as the healthy ones.

Costs

It is not always possible to provide actual figures to show the exact cost and thus benefits of managing young 'at risk' lambs in the way because the costs involved vary between different places. It is however possible to say that the benefits will exceed costs.

Dead, sick or poorly growing animals constitute an opportunity costs from the losses they generate.

Not only is there the lost of value from not being able to sell meat or milk from a sick or dead animal but there are losses in time and effort by livestock keepers and veterinarians and maybe drug costs in trying to treat sick animals. Handling ill stock even takes longer. Sick animals carrying large worm burdens are also a threat to other sheep.

Actual costs of supplementary protein feeding depends largely on local circumstances but small ruminants like sheep and goats are often able to use up by products (dried cassava leaves) or plants not directly of use to humans (leguminous fodder/trees) so their 'purchase price' is low.

Support

Initial support from an NGO, extension service or animal advisor is important in helping livestock keepers with testing and identifying animals liable to need help and supplementation. Assistance will also be needed to identify the best and most cost effective feed and to help identify the lambs needing supplementary protein.

Risks

The only risk in this approach to keeping lambs healthy is that the stockman feeds inappropriate or very expensive feed. Protein rich supplements are needed and ones that are not so expensive that they make the exercise one that costs more than the monetary return. This is unlikely as smallholders realize the cost of feed will be of paramount importance. The object would be to identify 'home grown' rather than 'bought in' feeds.

Impact

Early action to prevent animals deteriorating and dying will improve overall productivity in flocks and thus the livelihoods of African animal keepers in countries like Kenya and Tanzania where these parasites are a major constraint to production. Scientists are now working to develop cheap and reliable tests that will enable vets or farmers to establish how well their stock are able to resist infection. This information will then let farmers select the most appropriate action to reduce production losses. They could for example treat only those with low resistance.

Alternatives

An alternative strategy would be to keep only those animals that show a high resistance to *Haemonchus*. Substituting a more resistant sheep breed like the Red Maasai for susceptible animals can provide one option for farmers to overcome the effects of worm infections. For cultural reasons however some farmers prefer not to use indigenous breeds like the Red Maasai but opt instead for larger exotic breeds even though they are often less productive where there is a moderate to severe parasite challenge.

Further Information

More information about controlling worms in sheep can be found in the publications that resulted from the original scientific research work as given below.

Mugambi, J.M., Bain, R.K., Wanyangu, S.W., Ihiga, M.A., Duncan, J.L., Murray, M. and Stear, M.J. Resistance of four sheep breeds to natural and subsequent artificial *Haemonchus contortus* infection. *Veterinary Parasitology* 69:265-273 1997

Stear, M.J., Park, M. and Bishop, S.C. (1996) The key components of resistance to *Ostertagia circumcincta* in lambs. *Parasitology Today* 12, 438-441.

The facts in this article come from a research project undertaken by DFID funded scientists working in the UK and East Africa. If you would like to make contact with them they are listed below and would be interested to hear from NGO's, extension agencies and other bodies interested in livestock development.

Drs J.M. Maclean & M.J. Stear, University of Glasgow

Dr J.M. Mugambi, KARI, Muguga, Kenya

Dr D. Kambarage, Sokoine University, Tanzania

Dr S.C. Bishop, Roslin Institute, Roslin

Dr J. Buitkamp, Technical University, Munich