June 4, 2008

To: Area Sheep & Goat Producers

From: Ben Chase
        Extension Livestock Agent
        Rockingham & Guilford Counties

Area Sheep & Goat Producers To Meet June 12th

Parasites are by far the biggest cause of death loss for Sheep & Goat producers. Worms and Coccidia infestations kill more of these animals than other causes combined. Even with death losses it is surprising how many producers do not get on a parasite control program. The only sure fire way to know what parasites you may be dealing with is to have a microscopic exam done on the feces of the animals to look for the parasites. This is also known as doing Fecal Egg Counts. This is not a difficult job, and one that should be incorporated into the management plan for your flock.

Sheep and Goat Producers in Rockingham and Guilford Counties will have an opportunity on June 12th to attend a class about internal parasites and learning how Fecal Egg Counts are done. Linda Trainum will be presenting and teaching this program. At this program you are asked to bring a FRESH fecal sample from your sheep/goat along with you to the class in a ziplock baggie. (Please dont bring samples that have sat in the heat for any length of time, not in your pocket or on the dash of your truck. This sample needs to be kept cool and fresh)

The program will begin at 7:00 pm at the Rockingham County Agricultural Center in Wentworth. (525 Highway 65). This will be a night with a really good educational program and the enjoyment of getting together with other sheep & goat producers.

If you are planning to attend this Program, Please give me a call or send an email by NOON, Tuesday, June 10th to let me know that you are planning to attend. Ben Chase, Extension Livestock Agent, Rockingham & Guilford Counties, 342-8235, 1800-666-3625 or ben_chase@ncsu.edu (This will tell us how many people to prepare for)

Included is some Suggested reading that would prepare you for the program. Please read this and familiarize yourself with Parasite Control prior to coming on June 12th.

Look Forward to seeing you!

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Internal Parasites (worms) cause more goats to die in the Southeastern U.S. than the total of the next three leading causes of goat deaths according to necropsy records from Kentucky State University. Controlling worms in goats is much more complex than controlling other goat diseases. Many other diseases can be controlled by simple management practices and vaccination. Many goat producers in the past have controlled worms solely by the use of dewormers, but now goats still die due to the worms developing resistance to the dewormer and some goat producers in the humid South have gone out of the goat business because no dewormer was effective against the worms in their goats. Goats have a lower immune response to worms than most other animals and therefore have greater problems with worms. There is a lot of disinformation on controlling worms which increases the problem. Our knowledge on controlling worms in sheep has quadrupled in the last decade due to research in Australia, New Zealand and South Africa and therefore many animal professionals may not be current on the recent developments. In fact, some of our old good management practices to control worms have been found to not be good and in some cases harmful.

This is the first of a series of articles which will appear in the Goat Rancher over the next several months. The articles are written and reviewed by the consortium members which include a number of parasitologists with an interest in small ruminants and a number of small ruminant scientists so that the articles contain the most up to date and accurate information on parasites.

This first article is an introduction to worms in sheep and goats. The next article discusses the life cycle of a goat worm and how we can use that knowledge to reduce their numbers. The third article describes dewormers and the correct use of dewormers and focuses on the problem of dewormer resistance and what can be done. The fourth article describes the FAMACHA system for reducing dewormer resistance and selecting more resistant animals. The final article describes alternative (non-chemotherapeutic) methods for controlling worms and what supporting data is available.

The purpose of this series of articles is to teach the producer to assemble his or her worm control program, using applicable management practices as the first line of defense against worms and using dewormers only when management is not enough to control worms. Using this program, we can reduce the use of dewormers, reduce the rate at which worms develop dewormer resistance and select for animals which have genetic resistance against worms. This will enable the goat business to be sustainable in the face of dewormer resistance.

Although there are more than 15 species of worms identified in goats, we will discuss the most economically important worms and parasites in goats and list some useful sources for further information. The most common worms in goats are gastrointestinal nematodes because they are nematodes which live in the digestive tract, predominantly the stomach and small intestine. In this first paper, we discuss several other worms including the tapeworm, the deer brain worm as well as coccidia and liver flukes which are other types of internal parasites in goats which can be important at times.

Worms are a normal part of the animal=s ecosystem. A low level of worms is desirable to keep the animal=s immune system active against worms. However, excessive worms causes disease. Excessive worms are caused by such things as a depressed immune system, consuming too many worm larva, filth and lack of sanitation, rainfall, close grazing etc. Worms function in the ecosystem to keep animals from overrunning the ecosystem when production conditions are good and they also prevent all animals from starving when there is a shortage of food. One cannot eradicate worms on your farm; you have to learn how to live with them and use management to control them to levels which do not harm animal production.

The most common worm (especially in the Southeastern US) that causes the majority of deaths as well as depressed animal performance is the Barber pole worm (scientific name Haemonchus contortus). In figure 1 is a picture of a fresh barberpole worm with red and white stripes like a barber pole. The red stripe is the gut which is filled with blood which he has sucked from the animal that he infects. The white stripe is the uterus which contains eggs. This pretty well describes the barber pole worm; he is a blood sucking-egg laying machine. He sucks about half to one drop of blood per day and produces 1,000-6,000 eggs per day. The barberpole worm can multiply rapidly under good conditions because of the large number of eggs that they lay. Since he sucks a half to one drops of blood per day, 1000 worms can suck two ounces of blood per day, two quarts in a month, which is why your goat will die from a heavy infection. The goat can make blood fast enough to replace that consumed by a low level of barberpole worm infection, but as the infection gets worse, the goat is unable to make components (red blood cells and blood protein) of blood fast enough to replace lost blood and the goat starts getting low on blood components. A low level of red blood cells (a component of blood) is called anemia (a thin layer of blood is pale because of the loss of red blood cells). The percent red blood cells in the blood can be measured in the laboratory to determine the extent of anemia. You can determine if an animal has anemia by looking at the color of the mucous membranes of the animal. Mucous membranes are areas of tissue where the capillaries are close to the surface of the skin and the color of the skin reflects the color of a thin layer of blood. When an animal becomes anemic these mucous membranes change from a healthy pink to a lighter pink and then if the anemia is severe, the mucous membranes will be white as a sheet of paper. When mucous membranes become white, the animal is critically low on blood and needs dewormed immediately. It must be remembered that other conditions that cause blood loss such as liver flukes or lice can also cause anemia. Mucous membranes that are easily observed are located on the inside of the lower eyelid (touching the eyeball), the...
gums (hard to see in animals with pigmentation in the mouth) and inside the vulva (often checked at goat dairies). A low level of blood protein also causes edema, due to a shortage of blood proteins to pull fluid back into the circulatory system. Edema is often seen as a pouch of fluid under the lower jaw. Angora goats may also get edema on the floor of the chest. When an animal gets edema, he is severely low on blood components and needs dewormed promptly.

The barber pole worm is a tropical worm; he likes a warm climate and therefore, predominates in the South, although he can cause major problems in northern areas, but for a shorter period of time. These worms require rain to infect small ruminants and therefore are much less of a problem in the West or any location where there is less than 25" of rain per year. The barber pole worm also has a short generation interval, being able to complete a generation as quick as 4 weeks which enables him to develop dewormer resistance quicker than for most other worms.

The barber pole worm is relatively large, and can easily be seen with the naked eye. He is about the diameter of paper clip wire and about an inch long. The barberpole worm pierces the stomach lining and establishes connections to small blood vessels to suck blood. If you open up the true stomach (abomasum) of a goat that has died from worms, you will see some floating free, but most are attached to the stomach and they may look like hair growing on the inside of the stomach. The barberpole worm will lose its coloration as it is exposed to air. The average lifespan of a worm in the stomach is 6 months, but they can live longer than a year. The animal’s immune system is constantly fighting against the worms and may suppress egg production of the worm or cause it to die prematurely. The immune system on some occasions may have a hyperimmune response and eliminate most of the worms in the animal. There are barber pole worms in sheep and cattle. But the strain in cattle will not infect sheep or goats (and vice versa) except under unusual circumstances.

There are two temperate species gastrointestinal nematodes which are important in goats and sheep. These are the Bankrupt worm (scientific name Trichostrongyulus colubriformis) and Brown stomach worm (scientific name Telodorsagia circumcincta formerly known as Ostertagia). Although these worms do not kill as many goats as the barberpole worm, under some circumstances they can cause important production losses as well as death of the goat. Many of the management practices which suppress the barberpole worm will also suppress these worms. Since these worms are best adapted to temperate conditions, they are more of a problem in the fall and winter as compared to the barber pole worm which dominates in the summer. The main symptoms of a bankrupt worm or brown stomach worm infection is diarrhea, a slow growing animal, a rough haircoat and an unthrifty animal. In the next article in this series, we will be discussing the life cycle of the gastrointestinal nematodes mentioned above with emphasis on management techniques that can be utilized to help control the parasites.

Coccidiosis is a common goat parasite that appears when animals are stressed or sanitation is lacking. It mainly causes diarrhea, but unlike cattle, blood is seldom seen in the feces. Coccidia are normally present at low numbers in the digestive tract of the animal, but the infection level is low and the immune system is able to prevent them from causing disease. Coccidiosis is a disease of stress and filth. The main route of infection is the consumption of feces due to uncleanliness. The animal is usually stressed, depressing the immune system.

Coccidiosis is most commonly seen in just weaned kids due to stress, lack of a mature immune system and fecal contamination. Stressing animals by shipping is also a major cause coccidiosis. Animals often consume the infective stage coccidia from feces, such as fecal contamination in the feed trough or water trough. Moisture whether by rain or humidity increases the time that infective coccidia live. Therefore, keeping the goat=s environment clean and dry will help prevent coccidiosis.

During times of stress, a medicated feed containing Rumensin or Deccox can be fed which is quite effective at preventing coccidiosis. Occasionally coccidiosis will still occur despite feeding medicated feed, but fewer animals will be affected. Animals should be treated when diarrhea first starts if coccidiosis is suspected (history of stress) because delaying treatment can result in scarring of the intestine and an poor-doing animal for life. Coccidia are not observed when feces are examined under a microscope in early stages of disease, but they are very numerous later on. Coccidiosis may be treated with Corid (Amprolium) or Albon (Sulfadimethoxine). If Corid is used at too high a dose, or for too long a time, animals may develop a thiamine deficiency called polioencephalomalacia (animals behave like they are drunk) which can be readily treated with thiamine and removal of the Corid treatment.

The meningeal worm or deer brain worm causes partial paralysis in goats, sheep and llamas that are exposed to the parasite by deer. The parasite occurs in deer and does not cause clinical symptoms as it does in goats. The larvae are passed in deer feces and are ingested by a variety of snails and slugs where they develop into infective larvae over a 3-4 week period. The snails or slugs are consumed by grazing goats. Inside the goat, the larvae penetrate the intestine and migrate to the spinal cord through the abdominal cavity over a 10 day period. The larva gets lost in migrating from the spinal cord to the brain because the goat anatomy is different from the deer. They end up destroying brain tissue causing differing degrees of paralysis. Symptoms of the brain worm include paralysis of one or more limbs, excessive tail twitching, circling, abnormal head position, blindness, inability to get up, toe dragging, being in a dog-sitting position or difficulty or exaggerated movement of limbs when walking. The disease usually occurs in the fall and winter. There is no treatment for the brain worm that is very effective. Sometimes it is treated with high doses of various dewormers (fenbendazole and ivermectin) and steroids, but treatment is...
Since the parasite is carried by deer and uses a snails or slugs as the infective intermediate host, prevention consists of discouraging deer from using the pasture and making the environment unfavorable for snails and slugs. As goats clear the cover from an area, deer will visit that area less frequently. Guard dogs may chase deer away from pastures. A number of snails may serve as intermediate host and some may be so small (1/4") as to be overlooked. Snails prefer water, and so swampy areas are good habitat for snails. Therefore, fencing goats out of areas that often have water can help on prevention. Slugs and some snails prefer organic matter, leaf piles and compost. These areas may be cleaned up if the area is not extensive. Guinea hens and Muscovy ducks are reputed to be effective at controlling snails and slugs and may aid in prevention of the deerworm. Some producers deworm goats every 30 days from 30 days after the grazing season until a hard freeze to prevent the deerworm. Ivomec and fenbendazole (Safeguard, Panacur) are the most common dewormers used for this purpose. This will likely create dewormer resistance, but for many people, these dewormers do not work for roundworms. One producer used a low dose of Rumatel fed every day in a minimal amount of corn and appeared to be effective.

Liver flukes may be caused by the common liver fluke and less commonly by the large American liver fluke (also called the deer fluke). The flukes invade the liver and cause internal bleeding. A goat with high numbers of flukes will have an acute infection, where the animal stops eating, has pale mucous membranes, gradually does not get up and often dies within days. With fewer numbers of flukes, the symptoms may be milder and is called a chronic infection. The animal will have a poor appetite, lose weight for longer than a month, poor body condition, rough hair coat, rapid heartbeat, pale mucous membranes and sometimes edema, especially bottle jaw.

Liver flukes can infect wildlife, cattle sheep and goats and even man. The fluke lays eggs in the bile duct of the animal it infects and the eggs end up in the feces. The infective larva develop inside the egg over a 2-3 week period which then infect snails. These are the common pond snails which are in or around water and may range form 1/4" to nearly 3" in length. The larvae further develops in the snail over 5-7 days and then becomes a true infective larvae which leaves the snail and attaches to grass where the goats may consume it. Once consumed, the fluke further develops and penetrates the intestine on its way through the abdominal cavity to the liver. Once in the liver, it starts consuming the liver. Prevention includes fencing off ponds or marshy areas in the pasture. Muscovy ducks and guinea hens may be used to control snails.

The snails are mainly active from January/February through May/June depending on environmental conditions. Thee snails burrow into the mud and become dormant through the hot summer months and the rest of the year. Because of this pasture contamination peaks late summer, early fall, with peak incidence of clinical disease in late fall, early winter. Control of the liver fluke is dependent on the stage of the larvae, which depends on the time of the year. Chlorsulon and valbazaen is effective late in the year when flukes are mature. Chlorsulon is the only product that is effective against immature flukes, in early stages of infection as well as mature flukes. Consult local veterinary expertise for the time of the year to treat for flukes.

Lungworm infections result in respiratory distress such as painful breathing, chronic coughing, unthriftness and death. There are several kinds of lungworms that live in the lungs of animals. Infection usually happens during the cooler months of the year. One kind of lung worm has a direct life cycle, the larvae are coughed up, go out in the feces, develop to infective worms in one to two weeks. The infective stage is killed by hard freezes or hot dry summer. These larvae can live a long time in a cool damp environment. These larva develop into adults a month after being consumed. Several other kinds of lung worms have an indirect life cycle, that is they spend part of their lives developing in many species snails and slugs. Fortunately, these worms are easily controlled with the drug Fenbendazole (Panacur or Safeguard). Other dewormers such as levamisole and Ivomec are effective on some species of lung worms, but ineffective on other species.

Veterinary Parasitology Reference Manual by W.J. Foreyt
Veterinary Parasitology By Urquhuart, Armour, Duncan, Dunn and Jennings
Diagnostic Veterinary Parasitology by C.M. Hendrix