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Minimizing Disease in Your Sheep Flock

A Guide to Preventative Flock Health

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Introduction

Flock health is one of the most critical areas of management that can affect the overall productivity and ultimately the profitability of a flock of sheep. Failure to provide adequate attention to flock health can have disastrous effects on both the welfare of your sheep and your bank account. However, by implementing proper flock health management practices, you can minimize your exposure to production risks associated with diseases. This fact sheet will review several different aspects of flock management which can have an impact on disease resistance or susceptibility within your herd.

Vaccinations

Vaccinations are designed to stimulate the immune system into providing an enhanced level of protection when the animal is exposed to a specific disease. Not all vaccines are 100 percent effective in stimulating an immune response the first time used. The stress, nutritional status, and environment the animal is experiencing can influence a vaccine's response. Therefore, on a flock basis, animals may develop different levels of disease resistance due to differing stages of stress or nutrition that can negatively impact a vaccine response. Vaccine storage and proper administration are key factors in the ability of a vaccine to be effective. Booster shots are often given a few weeks after an initial dose if the animal is receiving the vaccine for the first time, or annually if the initial series is completed. This ensures that the immune system has had ample opportunity to generate a good protective response and memory.

There are two broad categories of diseases that sheep are routinely vaccinated against.

1. **Clostridial diseases**: This is the most common group of diseases that producers routinely vaccinate against. The bacteria (*Clostridium sp.*) in this group can devastate a flock. The most common organisms in this bacteria family to protect against are *Clostridium perfringens* and *C. tentani*. They cause overeating disease and tetanus, respectively. Overeating disease is caused by the over production of two toxins, *C. perfringens* types C and D. Consider using a clostridial product that contains a vaccine against both toxins (type C and D) and tetanus. These are commonly called "Clostridial CDT" vaccines. There are seven- and eight-way vaccine combinations, which protect against other Clostridial diseases, and are routinely used in the cattle sector. However, these vaccine combinations are considered not necessary for small ruminants.

a. **Adminstration**
    i. Ewes – Inject older flock members with a booster of CDT 4 to 6 weeks prior to lambing to ensure adequate antibodies in the ewe's first milk (colostrum). Adequate ingestion of good quality colostrum will provide a level of immunity in the lambs until they can be vaccinated at 3 to 4 weeks of age.
    ii. Lambs – Give an initial dose at 3 to 4 weeks of age, followed by a booster a month later.
    iii. Feedlot lambs – Provide a booster upon arrival (or prior to placement on a full-feed ration), with a booster about 3 weeks later.

2. **Reproductive diseases:** Diseases that can impact reproductive performance, either through decreased conception or loss of pregnancy, can devastate a flock's economic viability. There are two reproductive diseases commonly vaccinated against. The most common is caused by *Chlamydia psittici serotype 1* and referred to as enzootic abortion of ewes (EAE).[1] The other common disease is vibriosis. *Campylobacter fetus fetus* and *Campylobacter jejuni* are the two agents that cause late-term abortions or stillbirths with vibriosis.
    a. **Administration**
        i. Vaccinate females the first time 2 months prior to the breeding, with a booster a month later. Subsequent boosters are to be given annually, 3 to 4 weeks prior to the breeding season.

3. **Miscellaneous vaccines:** Other vaccines are available, but are not routinely used in Utah. These include foot rot, caseous lymphadenitis, contagious ecthyma, and rabies. These specific vaccines could be included in your flock's preventative health plan if there was adequate risk to warrant their use. Flock managers should work closely with local veterinarians to determine if these diseases are present locally and thus require vaccinations. While Utah is not considered to be endemic with cases of ruminant rabies, vaccination should be considered if you show animals in endemic areas or host a petting zoo.[2,3]

Parasites

Sheep commonly ingest internal parasites and also are susceptible to external parasites. The internal parasites associated with parasitism include the round-worms (nematodes), tapeworms, liver flukes, and lungworms. While the other groups of internal parasites can cause disease, nematodes cause the most economic loss. This is due to loss of nutrients, depletion of red blood cells, and reduced serum protein.

Deworming can be accomplished by treating the flock with anthelmintics. This class of medications kills the parasite, thus reducing its impact on the animals.

Different anthelmintics have different target species. Some will control nematodes, tapeworms and lungworms, while others are formulated to also kill liver flukes. Some target only internal parasites, while others will control both internal and some external parasites. You should consult your local veterinarian to determine which anthelmintic will most effectively treat your flock.

Sheep are also susceptible to external parasites. The external parasites most likely to infect a sheep flock are sheep keds, lice and flies. Sheep keds are commonly referred to as "sheep ticks" due to the fact that they look like ticks. However, they only have six legs as opposed to ticks which have eight legs, and they are actually a type of wingless fly. Ked infestation can be determined by parting the fleece and looking at the skin where the keds feed.

The second external parasite that commonly affects sheep is lice. Lice commonly are found on sheep in the winter months and can be diagnosed by the sheep scratching excessively or by loss of wool. Like keds, lice can be seen by parting the wool and looking at the surface of the skin. Unlike keds, lice tend to be much smaller (about the size of a pin head) and congregate in patchy areas of the skin. There are

several topical treatments specifically for keds and lice which can be sprayed or poured onto the animal to affect control.

The final external parasite to be discussed is the blow fly. These flies generally are the result of a wound or poor sanitary husbandry practices. Blow flies will commonly get into a wound or under wool that has been contaminated with feces and will lay their eggs in those areas. When the eggs hatch the larvae or maggots will actually begin consuming the healthy flesh, resulting in undue suffering by the animal. To eliminate these parasites, practice good husbandry by shearing in a timely manner and by cleaning and treating any wounds with fly repellent to discourage fly blow (sometimes called 'fly strike').

Nutrition

In order for any of the preventative treatments explained above to be effective, an animal must be on the proper plain of nutrition for the level of production for which it is expected to perform. In other words, a dry ewe should be fed a maintenance ration; whereas, a ewe which is suckling twins would require a much higher plain of nutrition due to her higher production requirements.

There are five nutrient groups which are required to maintain good flock health. These nutrient groups are water, energy, protein, minerals and vitamins.[4]

A dependable source of high quality water is critical in sheep production. Water is used in nearly all metabolic processes in the sheep's body and a lack of good water will decrease productivity and ultimately can be a stressor leading to illness.

Energy is also required in the diet for many of these same metabolic processes. If an animal does not have the necessary energy available in its diet, the deficiency will be met by using up stored fat reserves in the body. Once those reserves are expended, stress ensues which weakens the animals ability to fight disease.

Protein is the essential building block of the body's muscle structure. It is a key component of the cell structure of most soft tissues in the animal's body. As such, it plays a key role in maintaining the animal in a structurally sound state. Proteins, or amino acids from their breakdown, also can act as catalysts in development of antibodies when an animal is exposed to a disease or a vaccine. Without adequate protein in the diet, antibody development is either slowed or stopped altogether, exposing the animal to greater risk of developing a particular disease.

Minerals play important roles in nearly every part of an animal's disease resistance engine. Some minerals like salt (sodium chloride), calcium and phosphorus are required by the animal in relatively large quantities and are called macrominerals. Other minerals, while still important, are required in much smaller quantities and are called microminerals. Some of the microminerals are sulfur, zinc, manganese, magnesium, potassium, iodine, copper, iron and selenium. Animals obtain all of these minerals through their diet. Mineral deficiencies can weaken an animal's ability to fight disease and can even be the cause of metabolic diseases if the deficiency is severe enough.

Vitamins also play a similar role to minerals in protecting the animal from disease. Vitamins A and E must be obtained from the diet, while vitamin D is manufactured in animals when exposed to sunlight. When animals are on good quality green leafy feed, the diet supplies ample quantities to meet the requirements. In the case of vitamin A, forages eaten during the growing season supply an overabundance of ß-carotene which the animal can convert into vitamin A and store in abundance in fatty tissues. Vitamin E can be stored, but only in small quantities. Vitamin A is a key component in some reproductive processes, eyesight and proper bone formation. Vitamin E is essential in maintaining cell membranes in the body. The most common disease caused by vitamin E deficiency is known as white muscle disease and can cause great mortality in a sheep herd. When both vitamin E and selenium are deficient, the integrity of smooth muscle such as that in the diaphragm is compromised causing the diaphragm to quit working leading to sudden death.

Vitamin D only becomes deficient during times of extended cloudiness or in animals raised inside. In these instances, vitamin D should be supplemented. Vitamin D deficiency can lead to rickets in lambs and osteomalacia in older sheep. Ewes that are extremely deficient have been known to bear lambs with congenital defects. [5]

If you are concerned that the ration your sheep are consuming might contain deficiencies, consult your local county Extension agent for assistance in developing a balanced ration that will meet all the nutrient needs of your flock.

Husbandry

Sheep owners should consider several husbandry practices to reduce the risk of disease in their flocks and increase the overall health. Many diseases are spread from animal to animal. To minimize the threat of many of the common infectious diseases a strong biosecurity program should be implemented. This is simply applying a set of standard operating procedures that reduce the spread of disease. Some suggested items to consider are:

- Separate and isolate new additions for 21 days prior to introducing to your main flock. This common sense item is critical because the new additions may be harboring infectious diseases or parasites (both internal and external) that could become established in your flock.
- Maintain good records and participate in the National Scrapie eradication program[6]. If there are problems in your flock, records can quickly assist in the discovery and remedy.
- Take advantage of genetic diversity. Be sure to use breeding stock that is not too closely related to your flock. This can be a bigger problem with smaller flocks than larger ones. Bucks used for breeding should be purchased outside of your flock to minimize in-breeding. Genetic diversity can assist in a healthier immune system and minimize genetic defects.
- Taking care of organic material is critical. This reduces various fly populations that depend on organic material to complete their life cycles. It also diminishes unpleasant odors for your neighbors and cleaning can reduce the amount of disease organisms on your farm. Many bacteria are shed in the feces.
- Timely shearing. Removing the fleece yearly reduces the stress on the animal. In Utah, summer climates can be very hot. If sheep are not shorn in the summer they can experience
- More stress. Their fleece can also become matted with feces – particularly around the anus – which is an attractant for certain species of flies. The female fly will lay her eggs in the fleece. The developing maggots can cause a serious skin infection. We call this "fly struck." Timely shearing eliminates this risk.

By implementing proper flock health management practices, you will have an impact on disease resistance and susceptibility to disease within your herd.

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[1] The Merck Veterinary Manual. http://www.merckvetmanual.com

[2] Compendium of Animal Rabies Prevention and Control, 2008. National Association of State Public Health Veterinarians (NASPHV). http://www.nasphv.org/documentsCompendia.html

[3] Compendium of Measures to Prevent Disease Associated with Animals in Public Settings, 2009. National Association of State Public Health Veterinarians (NASPHV). http://www.nasphv.org/documentsCompendia.html

[4.] Thomas, V.M. (deceased). 2000. Feeding Ewes and Lambs. Chapter XII in Gates' Practical Guide to Sheep Disease Management. 3rd ed. Midstates Printing, Inc., Aberdeen, SD pp. 136-142.

[5.] Sheep Production Handbook. 1997. American Sheep Industry Association. C&M Press, Denver, CO. pp. 618-626.

[6.] National Scrapie Eradification Program. http://www.aphis.usda.gov/animal_health/animal_diseases/scrapie/

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