

Livestock Health Series

Herd Health Program for Meat Goats

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Importance of Health Program

An effective animal health program is an essential part of a successful meat goat management program. Good feeding and breeding will not result in maximum production if goats are not kept in good health.

Since each herd is a different situation, each owner should work with his/her veterinarian to create their own herd health plan. Keep good records for each animal regarding medications, vaccinations, wormers, injuries, production, breeding and culling. Use this information to plan your herd health program. Preventive medicine is usually less expensive than treating the disease.

The best economic returns are realized when disease problems are at a minimum. Because the symptoms of some diseases are so similar (i.e., white muscle disease, polyarthritis, CAE, tetanus), you need to work closely with a veterinarian, specifically one familiar with goats, if possible. In some cases, you may have to select a veterinarian that you like and allow him/her to gain experience with goats in your herd. The veterinarian has the training to provide a diagnosis or the means of obtaining a diagnosis when a disease occurs. The veterinarian should also be familiar with products for treating goats plus current regulations and health requirements for shipping animals.

As part of the scrapie eradication program, all goat herds must now have a premise identification number

for the herd. Goats will need ID tags if they are to be transported elsewhere, except for goats moving to slaughter, castrated males for exhibition, moving goats for grazing and low-risk commercial goats such as those raised for fiber and/or meat, not registered or exhibited, which have not been in contact with sheep, not from an infected or source herd and not from a scrapie-positive, high-risk or exposed herd. Call 1-866-USDATAG (866-873-2824) for forms to obtain an identification number for the herd and to obtain tags for the goats.

Observation and Records

Spending a few minutes every day watching your animals is time well spent. You can learn the normal behavior and attitude of your goats and then recognize anything that may be wrong. This knowledge is one of the most important characteristics of a good herder.

If abnormal behavior is observed, use common sense, your experience and knowledge and your physical senses to determine the problem. Don't overlook the obvious.

A physical exam may show an abscess, cut or bruise. Ask questions. How is the behavior abnormal? Is the head down or are the ears drooping? Is the animal off-feed? Is it sweating or shivering? Is the respiratory rate normal at 12-20 times/minute? Is there a fever? Temperatures range from 101.7-103.5°F with an average of 102.3°F. Is the heart rate normal at 70-100 times/minute? Has this disease occurred previously?

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Record all observations on a permanent record. Do you have a record of these same symptoms at another time? Has your veterinarian seen these diseases in other herds?

Nutrition and Feeding Practices

Goats too skinny or too fat and goats off-feed are the most common nutritional problems. Each can be prevented by properly balancing the ration and controlling other diseases. Frequent observations can allow early detection of these disorders and minimize their effects. The quality and quantity of feed during the dry period affect the doe and kids throughout at least the next year. Much emphasis should be given to the importance of nutrition in any stage of development of your goats. The Extension publication *MP427, Nutrition of Meat Goats*, is available with more details on feeding at www.uaex.edu.

Meat goats should be fed similarly to maximize production while minimizing feed costs. As such, good-quality forage should be the basis of the ration, and minimal amounts of a 14- to 18-percent protein concentrate should be fed as a supplement when does are nursing kids. Higher-producing does with multiple kids may require additional energy in the ration. The most economical forages are usually pastures that are growing vigorously and have not reached maturity. Annual grasses such as ryegrass, wheat and millet make excellent feed for meat goats. Excess forage can also be harvested as hay or silage but should be cut when the grass is high quality (low in fiber and in a vegetative stage of growth). Silage is not a common feed since most goats are kept in small herds, which does not justify costs of the equipment.

Periodically, feel your does to determine their body condition and avoid overfeeding grain to does in late lactation. Usually does will not need extra grain after the kids are weaned unless they have poor-quality forage or you want to flush the does before breeding. The best location to feel is along the backbone and over the ribs. Fat goats are more prone to go off feed, have problems at kidding and tend to have pregnancy toxemia. Additionally, overfeeding grain may lead to foundering the animal.

Loose or block trace mineral salt (TMS) should be available at all times. Goats are susceptible to copper deficiency and, unlike sheep, are fairly resistant to copper toxicity. Therefore, goats or cattle TMS, rather than sheep salt with very low copper, should be offered. The salt and other feeds should be kept dry and off the ground. If available in your area, it is best to offer an excellent quality goat mineral, but it will usually cost more than cattle mineral.

To avoid a decrease in water consumption, especially for does in early lactation that are nursing more than one kid, water should be fresh and plentiful. If possible, water should be warm in winter and cool in summer, although water from a ground source is acceptable if it is clean and free of manure and other disease sources.

Bucks and wethers fed on substantial amounts of grain are prone to develop urinary calculi. Genetics may also be a factor in the disease. Reducing grain consumption, adding ammonium chloride to the diet, keeping the calcium:phosphorus ratio at about 2:1 and keeping the magnesium level low help prevent the buildup of calcium in the urinary tract.

If you are not familiar with the meat goat ration, work closely with your county Extension agent or another person who is knowledgeable in formulating diets for goats.

Common Diseases

Internal parasites are the most common disease facing meat goat producers in Arkansas. Anthelmintics or dewormers should be the basis of a control program for goats. Generally, goats should be dewormed as indicated by fecal egg counts (FECs) with a dewormer that is effective against the worms that are present. See *FSA3045, Livestock Health Series: Internal Parasites in Beef and Dairy Cattle*, for more details.

There are a variety of parasite control measures farmers can use in addition to anthelmintics. Farmers may use a combination of methods and must be thoroughly familiar with the advantages, disadvantages and risks of each. Some of these methods include grazing at least 6-8 inches off the ground, the use of tannin-rich forages such as sericea lespedeza, mixed species grazing, grazing browse rather than grass and supplemental feeding. Recently there has been some success in reducing FEC and perhaps the adult worm numbers by feeding sericea lespedeza, either fresh or as hay. Animals prefer the young plant, but it should not be grazed until it is at least 6 inches in height to preserve the plant. Overly mature plants may lose the ability to reduce infection with *Haemonchus contortus*, or the small barber pole worm which is the most common internal parasite. However, other worms, especially the tapeworm in wet weather, may be a problem in the herd.

Coccidiosis is a common disease of young kids. Rotating all the kids through one or two pens is not recommended. Older goats shed coccidia in the manure and infect the pens. As coccidia build up in the pens, infection in kids is increased. Signs are diarrhea or pasty feces (sometimes on rump or legs), loss of condition, general unthriftiness and poor growth. Acute cases sometimes result in death with no noticeable signs. For some producers, the first indication of coccidiosis will be death of kids. To help prevent coccidiosis in dairy goats, the kids should be grouped by size in clean, well-ventilated inside pens or outside portable pens that are moved to clean ground periodically. Eradication is difficult once the facilities are infected. Coccidiostats added to the water or feed are necessary. A management control program also includes strict sanitation to minimize the contamination of kids with coccidia from the

manure of adults or infected kids. Chronic coccidiosis is one of the main causes of poor growth in kids.

Enterotoxemia, also called overeating disease, typically occurs in younger goats. *Clostridium perfringens* type C or D, primarily type D, can be fatal. It is usually but not always associated with a change in quality and quantity of feed. In problem herds, vaccination every 3-6 months may be necessary compared to once yearly in other herds. Depending on the severity of the problem, young kids will have to be vaccinated at 1 month of age or at least before weaning and being switched to a high-grain diet. Vaccination helps prevent the acute death syndrome, but a few vaccinated animals may develop symptoms of the disease. In the young kid, signs are watery diarrhea, depression, wobbly gait and sometimes convulsions. In acute cases, the temperature may be 105 F, and death usually occurs in 4 to 48 hours. Milk yield drops abruptly if the animal is lactating, and death may occur in 24 hours. Contact your veterinarian immediately if you have a problem, but death may be the first observed symptom. Treatment involves administration of antitoxin and antibiotics plus treatment of acidosis.

Pneumonia and related respiratory problems are more common in kids but affect all ages of goats. To prevent the disease, decrease stress on the goats by providing dry, well-ventilated housing with adequate space. Good nutrition, deworming and avoiding changes in environment decrease the problem. Vaccination for specific organisms causing the respiratory problems will help if pneumonia is a chronic problem in the herd. To treat respiratory diseases, correct the predisposing factors contributing to the disease and treat with antibiotics.

Caprine arthritis-encephalitis (CAE) is caused by a retroviral infection in goats. Typically, kids are infected via ingestion of infected colostrum and milk. The disease is usually slow to develop and normally occurs after goats reach adulthood. Adult goats are affected by lameness and arthritis. Lateral transmission can also occur when infected goats transmit the disease to other susceptible goats in the herd. This may occur through long-term direct transmission (close contact), reuse of contaminated needles or through inanimate objects like water troughs and feed bunks. Occasionally, young goats that are infected may begin to show signs at 2-4 months of age. Kids develop encephalitis leading to lethargy, decreased appetite, paralysis of the hind legs, convulsions, seizures and eventually reaching the area of the brain that controls respiration.

Clinical signs of CAE can fit into several categories. Arthritis or encephalitis are the most common symptoms. If the disease occurs in adult goats, it normally leads to arthritis. Symptoms include pain, lameness and swollen joints, particularly the knees, hocks and elbows. Sometimes disease develops in young goats. Affected kids may initially

exhibit subtle signs such as lethargy, decrease in appetite and lameness. As the infection continues, other signs may follow like paralysis of the hind legs, head tilt, lying, paddling and seizures. Chronic CAE infections have been associated with interstitial pneumonia and "hard udder" syndrome.

Diagnosis for CAE can be based upon clinical signs and serologic testing. Although a diagnosis can be made, there are currently no specific treatments for the syndromes caused by CAE. Supportive care can be done in order to eliminate as much suffering as possible. Anti-inflammatories (phenylbutazone or acetylsalicylic acid) may be useful in supportive treatment of arthritis. Control of the disease can be accomplished by frequent serologic testing and culling the seropositive goats.

Pinkeye, or infectious keratoconjunctivitis, occurs more often in warm or hot weather because it is spread by flies and close contact. To control the disease, good sanitation and management including fly control is essential. To treat the infected goats, use broad-spectrum antibiotics and commercially available sprays or powders. If severe, the goats should be removed from sunlight or have the eye covered with a pack. Treatment of pinkeye should be prompt since it can be highly contagious.

Vaccination for contagious ecthyma (soremouth) is not recommended unless the disease already exists in the herd. The main problems with infected kids are difficulty in eating, spreading lesions to the does' udders or the herder and not being allowed to attend goat shows. A live virus vaccine is used by scarifying the skin (e.g., inside the thighs or under the tail) and painting on the vaccine. It is easier to put a drop of vaccine on a hypodermic needle and pierce the ears. However, the probability of immunization is decreased and the ear is more likely to be touched by the herder than areas under the thigh or tail. Lesions may last as long as 4 weeks. After the scabs have healed, the animals can go to shows. If the herd is shown extensively, it should be vaccinated.

White muscle disease (WMD) can be seen in kids from less than 1 week to 3 months of age. This disease is normally noted in rapidly growing, heavily muscled kids that were born to does that consumed rations deficient in vitamin E and/or selenium. Other minerals can interfere with selenium metabolism. Minerals such as sulfur, iron and phosphate may bind up selenium's ability to work or be absorbed into the animal's body. WMD affects skeletal and cardiac muscle. It disrupts the ability for these muscles to perform normally.

Clinical signs that may be exhibited in kids with WMD include weakness, poor suckling reflex, stiffness, arched back, "sawhorse" stance, respiratory distress (if diaphragm is involved) and sudden death (if heart is involved). These signs can be misinterpreted as arthritis or pneumonia. This condition

may be brought on by stressful events (handling, weaning, transport, etc.) or by vigorous exercise. Necropsy findings may reveal degeneration of heart and/or skeletal muscle. White, chalky, streaked areas may be observed intermittently throughout these tissues. The affected area will have a pale and dry texture representing the fibrosis and calcification of the diseased tissue, hence the name “white muscle disease.”

Treatment is rarely successful if the heart has been affected. However, kids with the skeletal form may be treated with an injection of vitamin E and selenium. The appropriate dose is 1 mg of selenium and 68 IU of vitamin E intramuscularly per 40 pounds of body weight. The dose may be repeated in 2 weeks if necessary. There is a 30-day slaughter withdrawal once kids have been treated. Prevention of this disease is achieved through supplementation of vitamin E and selenium especially in pregnant does. Mineral supplements can be used to offset deficiencies. If you know you are in an area that is selenium deficient, it is recommended to administer an injection of vitamin E and selenium to the pregnant doe approximately 4 weeks before parturition.

Diarrheal diseases, or scours, are more common in young kids. In addition to coccidia, other causes include colibacillus such as *Escherichia coli* (*E. coli*), worms, salmonella and viruses. Symptoms vary with the cause but, in general, are anorexia (won't eat), high temperature, weakness and watery or pasty feces. Good sanitation, housing and management are the primary methods to prevent diarrhea. Treatment includes antibiotics, intestinal astringents (bolus or fluid to decrease contractions), and fluid and electrolyte therapy.

Abortion can be due to several infectious causes in goats. *Chlamydomphila abortus*, Toxoplasmosis and *Campylobacter fetus* are the three most common infectious agents that cause abortion in goats. Incidence of abortion in normal flocks is approximately 1-2 percent and can be caused by a mixture of the above agents.

Chlamydial abortion is also known as enzootic abortion in does. Generally, chlamydial infections will cause abortions in the last stage of gestation. Transmission normally occurs via oral or nasal exposure. Organisms are shed in the aborted fetus, uterine discharge and placenta. In large outbreaks, 25 percent or more of the flock can be affected. This pathogen typically affects yearlings and younger does. It is recommended to isolate does that have aborted due to a chlamydial infection away from the rest of the flock. Treatment with a tetracycline antibiotic is recommended for this disease. Tetracyclines can also be put in the feed the last 4 to 6 weeks of gestation. A vaccine is available for sheep that can be used in goats to help decrease incidence of the disease.

Toxoplasma gondii can also result in abortion in does. Toxoplasmosis is caused by a protozoan

infection. If the doe is affected in early gestation, the fetus may be resorbed or mummified. If infection occurs in late gestation, the fetus may be aborted or stillborn. Infective stages of this disease are shed most commonly by cats. Cats can shed *Toxoplasma* in their stool and can contaminate hay or feed that will be ingested by susceptible does. Once animals have aborted, they become immune and will not abort again due to this cause. Observation of the aborted placenta will show gray to white lesions on the cotyledons that are 1-3 mm in diameter. Prevention is best attained by limiting the number of cats on an operation to decrease the possibility of fecal shedding.

Campylobacter fetus, also known as vibriosis, can cause abortion in goats. This disease is caused by a related bacteria, but it is not the same strain that causes abortion in cattle. This disease affects does in late gestation, and it can lead to abortion, premature births or small, weak kids. Affected fetuses usually die 1-2 days before they are aborted, so they are typically autolysed when they are expelled. Does rarely show symptoms of illness before aborting, and they usually expel a brown, odiferous discharge once the abortion has occurred. After does abort from this disease, they form immunity to it and will not abort on subsequent pregnancies. If a doe aborts, one should separate her, the placenta and the fetus from the rest of the flock. Vaccines are available that contain both *Chlamydia* and *Campylobacter*. Vaccinate does prior to breeding. One can also feed tetracyclines in the ration the last 6 weeks of gestation to decrease the incidence of both diseases.

Each meat goat herder should have an annual calendar listing approximate times and ages when certain activities should be performed to maximize profits. This annual calendar should begin with the pregnant doe at 40 to 90 days prior to kidding. The dry period should be considered the beginning of the next lactation. The following calendar is an example of one arrangement of health practices on the dairy. A more detailed calendar is available in *FSA3098, Meat Goat Production Calendar*.

Annual Calendar

Dry doe:

1. At weaning, check to verify that the doe is in good body condition. Usually, good-quality forage will be adequate for does in good condition following weaning.
2. Inject does with 250 mg vitamin E and 5 mg selenium (5 cc Bo Se) 3 weeks before due date if white muscle disease is a problem or over 10 percent of the kids die within 3 days of birth.
3. Provide clean yards and housing. Sanitation is essential since poor sanitation or muddy lots will make the doe more susceptible to mastitis and later reproductive problems.

Kidding:

1. Provide a clean, dry, well-ventilated area. Usually a well-drained grassy area is acceptable. Be prepared to assist at kidding if necessary.
2. Examine doe's udder for mastitis.
3. Kids should receive colostrum within one hour following birth from a CAE-negative doe. Usually CAE-positive does should be culled.
4. Dip or inject navels of kids with iodine if there appears to be a problem with navel ill or related diseases. Usually this is not necessary or possible unless you have goats kidding in a confined area.
5. Give weak or sick kids 50 mg vitamin E (or vitamin ADE) and 1.0 mg selenium (1.0 cc Bo Se).

Kids at 1 day to weaning:

1. If a large commercial herd, observe closely to ensure that at least 90 percent of the kids live.
2. Castrate male kids unless they are to be sold before 90 days of age.
3. Consider giving tetanus toxoid and clostridial disease vaccination (*Clostridium perfringens* type C + D) at 3-4 weeks before weaning and at weaning, especially if you are feeding out the kids.
4. Kids should be checked closely and culled for genetic disorders, especially hermaphroditism and abnormal teat structure.
5. Provide creep feed with coccidiostat.

Deworming Program:

1. Worms are one of the biggest problems of dairy goats in Arkansas. You must set up a worming program and adhere to it. Worms not only kill both young and old goats, they contribute to poor growth rates, an unthrifty appearance, coughing, diarrhea and other digestive problems. To minimize contamination of uninfected goats, maintain a dry, clean environment with a sound manure management plan. Depending on location and density, deworming should be repeated as needed. For most producers with a high density of goats, worming will be 4 to 6 times per year. Some producers may worm only once or twice per year if they graze browse or maintain pastures more than 6 inches high.

As needed, have your veterinarian conduct fecal examinations for worm eggs or conduct them yourself. Most deworming products will require a relationship with your vet as the dosage rates are 2 times the cow dosage per unit body weight for all products except levamisole which is at 1.5 times the cow rate. Consult your local vet when in

doubt about prescription drugs. Some may recommend varying the dewormers while others may recommend using a dewormer until it is no longer effective, as determined by FECs.

2. Kids should be dewormed at weaning and treated for coccidia if it is in the herd. Repeat as necessary. Preferably kids should be fed a feed with coccidiostat to minimize effects of coccidiosis.
3. Adult goats should be dewormed at least 1-2 times yearly, but as often as needed to control the various types of worms.
4. Alternate dewormers since goats may build up worms that are resistant to one dewormer. At least once per year, goats should be dewormed for tapeworms.

Vaccination Program:

1. Your vaccination program should be for diseases in your herd and should be developed in consultation with your local veterinarian. Below are general recommendations.
2. Vaccinate for tetanus toxoid and *Clostridium perfringens* type C + D once yearly during the dry period in pregnant does, for kids at 4 weeks before or as they start to consume solid food. Also, it should be given at weaning plus twice yearly, and yearly for bucks. CDT is a combination vaccine that provides immunization for both *Clostridium* and tetanus. Seven- or eight-way vaccines are also available. Give each kid 2 cc's subcutaneously (SQ – under the skin). The dosage is the same regardless of a goat's weight, size, sex or breed. A booster vaccination (also 2 cc's SQ) should be given in 28-30 days. A lump may develop at the injection site and is no cause for alarm. It may go away but should not interfere with otherwise normal behavior.
3. Usually pneumonia is not a problem in the herd, but if it is, then vaccinate kids twice, 14 to 21 days apart prior to weaning. Vaccinate pregnant does once during the last month of gestation. Use a vaccine that is appropriate for the type of pneumonia that your goats have, e.g., *Pasteurella*.

Other vaccinations for diseases such as sore-mouth should be conducted only if needed.

Foot Care Program:

1. Trim hooves as needed but usually at least one time yearly. Herds in confinement may require trimming 2-4 times per year.
2. Fence goats out of wet, marshy areas where the organisms causing foot rot are more likely to grow.
3. Use a foot bath of dilute copper sulfate if foot rot becomes a herd problem.

4. Treat foot rot with appropriate antibiotics. Follow recommended withholding guidelines.

External Parasite Control Program:

1. Control flies with appropriate insecticides and strict manure management.
2. For biting and sucking lice, use coumaphos (25% wettable powder) or other recommended pesticides. Spray or dip all goats in the herd when necessary. See MP144, *Insecticide Recommendations for Arkansas*. Body dipping will reduce infestation of lice.
3. For ringworm, use daily topical treatment of equal parts iodine and glycerin or a commercially available product recommended for ringworm or fungal diseases.

Breeding Program:

1. If suspected, test all breeding-age animals periodically for brucellosis, caprine arthritis encephalitis or CAE and tuberculosis. Consult your veterinarian for assistance.
2. Observe buck for libido and conduct a breeding soundness exam if there are any suggestions of him not being a fertile breeder. Try to have a buck for each 20-30 does.
3. Mate buck to no close relative so that inbreeding is minimized. Maintain good records so that you know the parentage of each goat.

Culling

Culling is essential to the overall productivity of the herd. Goats will be injured, some will not become pregnant during the breeding season and some will produce less milk than you are willing to accept.

Some animals become unthrifty and “waste away.” Animals with these symptoms may not have a single disease but a syndrome. Generally, if a goat is well fed and has good teeth and a low parasite load, it should thrive in a sound environment. If it begins “wasting away” and does not respond to antibiotics, it should be culled.

The major causes of this syndrome, in addition to poor nutrition, parasitism and dental problems, are paratuberculosis or Johne’s disease caused by *Mycobacterium avium* subsp. *paratuberculosis* (contrary to cattle, goats show little or no diarrhea and thickening of the intestinal walls); internal abscesses associated with caseous lymphadenitis due to *Corynebacterium pseudotuberculosis (ovis)* or *Corynebacterium pyogenes*; locomotor problems (particularly arthritis due to retrovirus infection [CAE virus or caprine arthritis encephalitis]); and any chronic hidden infections (e.g., metritis, peritonitis or respiratory problems). Tumors occur rarely. These diseases are not treatable and many are contagious. Also, the chronic nature of their symptoms make the diseases difficult to diagnose.

Sanitation

Strict sanitation is necessary to prevent diseases. Although sanitation requires time and money, it is time and money well spent since prevention of the diseases is more economical than treatment. The housing for goats, feed and water must be kept fresh and sanitary.

References

- Extension Goat Handbook*, edited by G. F. W. Haenlein and D. L. Ace. Available from Caprine Supply, P. O. Box Y, DeSoto, Kansas 66018.
- Merck Veterinary Manual*, Merck & Co., Inc., Rahway, New Jersey 07065.