

Disease and Mortality on U.S. Goat Operations

Poor goat health can cause economic losses for goat producers. Disease awareness and preventive management practices can reduce economic losses associated with poor goat health. Certain physiological symptoms are suggestive of disease in goats. Measuring the level of symptoms provides an estimate of the level of disease present in the U.S. goat herd.

The NAHMS Goat 2009 study was the first national study of the U.S. goat industry and was conducted in 21 of the Nation's major goat-producing States.¹ These States represented 75.5 percent of U.S. goat operations and 82.2 percent of U.S. goats (NASS 2007 Census of Agriculture). Data for the study were collected from a stratified random sample of goat operations that kept at least one goat for meat, dairy, fiber, or other purposes. A total of 2,484 operations completed the study's first survey questionnaire and 634 completed a second mail-in questionnaire. The second questionnaire was limited to operations with 10 or more goats.

Deaths

Note: Data in this section represent only operations that had 10 or more goats.

Overall, 59.7 percent of operations had adult goats that died or were euthanized from July 1, 2008, to June 30, 2009, and 65.9 percent of operations had kids that died or were euthanized in the same period (excludes slaughtered goats and kids). A higher percentage of meat goat operations (74.1 percent) than dairy goat operations (55.0 percent) had kids that died or were euthanized. Overall, 13.8 percent of kids and 7.2 percent of adult goats died or were euthanized from July 1, 2008, to June 30, 2009. These mortality percentages were calculated by dividing the number of deaths in the 12-month period by the goat/kid inventory on July 1, 2009.

¹ States and Regions:

Northeast: Indiana, Iowa, Michigan, Missouri, New York, Ohio, Pennsylvania, Wisconsin

Southeast: Alabama, Florida, Georgia, Kentucky, North Carolina, Oklahoma (east), Tennessee, Texas (east), Virginia

West: California, Colorado, Oklahoma (west), Oregon, Texas (west), Washington.

Disease awareness and management

Producers were asked to report the occurrence of symptoms commonly associated with several economically important goat diseases. These symptoms include joint swelling or crippled goats; weight loss; central nervous system signs; sores on hoof area; udder inflammation; abscesses/boils/lumps on the head or upper rear legs; and scabs around the mouth, udder, or hoof area. The above symptoms are suggestive of caprine arthritis encephalitis, Johne's disease, scrapie, footrot, bacterial mastitis, caseous lymphadenitis, or sore mouth, respectively.

The occurrence of producer-observed disease symptoms generally increased with herd size. More than one-third of large operations² reported that they had animals with mastitis or abscesses from July 1, 2008, to June 30, 2009 (35.8 and 34.9 percent of large operations, respectively). The increase in observed symptoms on large operations could be the result of more experienced producers on large operations who are more adept at identifying possible illnesses. Large operations also have more animals and typically add more new additions from outside the herd, which increases the risk of introducing new pathogens.

Producers were asked about their level of familiarity with several goat diseases. About half to three-fourths of operations were not familiar with Q fever, Johne's disease, and caprine arthritis encephalitis (76.0, 62.7, and 56.8 percent of operations, respectively) [figure 1]. Similarly, about half of operations were not familiar with caseous lymphadenitis (51.1 percent), brucellosis (49.3 percent), scrapie (45.6 percent), and sore mouth (44.1 percent).

Less than one-third of operations knew that brucellosis and sore mouth were infectious to humans (28.2 and 30.7 percent of operations, respectively). In general, the percentage of operations that knew that brucellosis, pinkeye (Chlamydia), Q fever, sore mouth, and toxoplasmosis were infectious to humans increased as herd size increased.

² Operation size groups:

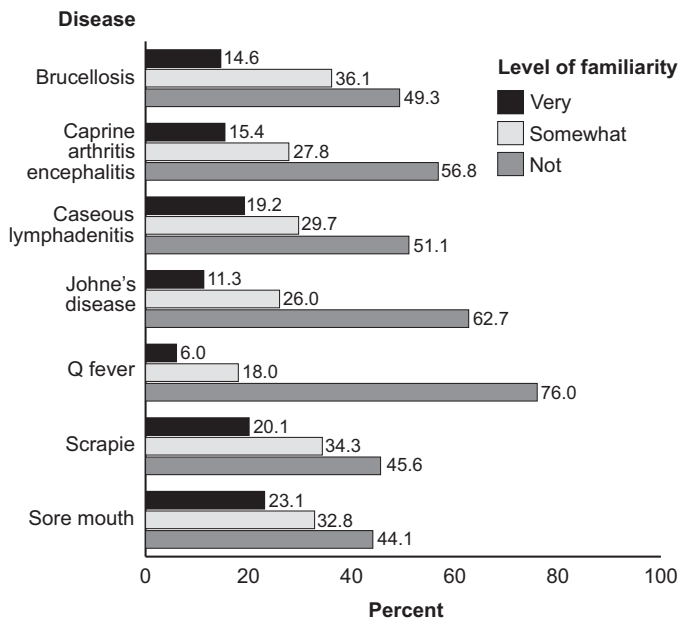
Very small: 1 to 9 goats

Small: 10 to 19 goats

Medium: 20 to 99 goats

Large: (100 or more goats).

Figure 1. Percentage of operations by level of familiarity with the following diseases in goats



Diseases

Caseous lymphadenitis is caused by the bacterium *Corynebacterium pseudotuberculosis*. Also known as boils or cheese glands, this disease is an important source of economic loss to sheep and goat producers. The percentage of operations in which producers observed goats with abscesses from July 1, 2008, to June 30, 2009, was relatively high (12.2 percent). Since drainage from abscesses can contaminate the environment and cause disease spread within a herd, it is important to avoid letting pus or other material from abscesses contact areas frequented by other goats. Recommendations include isolating affected animals until lesions heal or culling affected animals.

Since caseous lymphadenitis can also cause disease in humans (zoonotic), gloves should be worn when working with goats that have abscesses, especially when the abscesses are draining.

Sore mouth, also known as scabby mouth, orf, or contagious ecthyma, is caused by a pox-virus and often appears as vesicles and thick scabs around the mouth, lips, nose, teats, udders, and hoof area of infected animals. Kids are most likely to be affected by sore mouth. Infection may reduce the amount kids eat or they might refuse to eat at all. Does, when affected on their udders, may refuse to allow kids to nurse and even abandon their kids. Sore mouth is a zoonotic infection; therefore producers should not touch scabs and should always wear gloves when working with these animals.

Overall, 4.4 percent of operations had observed goats with scabs around the mouth, udder, or feet from July 1, 2008, to June 30, 2009. Of operations with 10 or more goats, 14.9 percent indicated sore mouth was

either suspected or confirmed on their operation during the previous 3 years.

The most common precaution taken by producers on these operations was to wash hands with soap and water after handling the goats (88.7 percent of operations). A little more than half of producers (54.4 percent) wore gloves when handling these goats.

Johne's disease in goats is difficult to diagnose and is one of several causes of weight loss despite a good appetite. Clinical signs common in cattle with Johne's disease are often not present in goats, and laboratory tests for Johne's disease are not as sensitive in goats as they are for cattle.

Brucellosis can be diagnosed by blood or tissue testing. Blood tests identify antibodies in the blood of animals that have been exposed to brucellosis, while testing tissues isolates the organism. About 6 percent of operations had tested any of their goats for brucellosis at least once during the previous 3 years.

Producers on operations with 10 or more goats were asked what type of brucellosis test had been used most recently. Of producers who knew what type of test had been used, 83.0 percent had used a blood test. Of operations that tested goats for brucellosis, 21.1 percent tested their goats for brucellosis because they drank the goat milk themselves.

Q fever is a zoonotic disease most often associated with infection in sheep, goats, and cattle, but it can also infect other domestic animals and wildlife. In sheep and goats, it often causes abortions and stillbirths. Humans often become infected by inhaling contaminated dust or consuming unpasteurized dairy products. In humans, Q fever symptoms are often mild and go undiagnosed. Of operations with 10 or more goats, only 0.3 percent reported that the producer, family members, or employees had ever been infected with Q fever. Acute infection may cause flu-like illness and pneumonia.

Abortions can be caused by various diseases, including Q fever and toxoplasmosis, but are often the result of a combination of health issues. Of operations with 10 or more goats, 41.5 percent had ewes that had abortions or stillbirths from July 1, 2008, to June 30, 2009.

Scrapie is a fatal, degenerative disease affecting the central nervous system of sheep and goats. There are currently no tests available to determine genetic resistance/susceptibility to scrapie in goats. Keeping sheep on the same premises with goats can increase the risk of goats becoming infected with scrapie; however, not all scrapie cases in goats have been linked to exposure to sheep, so there is a possibility of transmission of the disease between goats. One way to protect a herd from disease introduction, including scrapie, is to keep a closed herd.

Mastitis

Note: Data in this section represent only operations with 10 or more goats that had does in milk from July 1, 2008, to June 30, 2009.

Overall, 2.8 percent of does in milk had clinical mastitis, and 30.7 percent of operations with one or more does in milk had at least one doe with clinical mastitis. Visual observations of the udder and/or milk was the most common method used for diagnosing mastitis (92.6 percent of operations), as opposed to using somatic cell counts or milk cultures.

Vaccinations

Note: Data in this section represent only operations that had 10 or more goats.

Vaccination can play an important role in reducing disease within a herd and should be part of any herd management program. Overall, 49.0 percent of operations vaccinated at least one goat or kid from July 1, 2008, to June 30, 2009. Of operations that vaccinated goats or kids, a higher percentage of operations in the West region (12.8 percent) gave a sore mouth vaccine than operations in the Northeast region (2.2 percent). For the 8.2 percent of operations in which sore mouth was present, 16.0 percent used a sore mouth vaccine on at least one of their goats.

Because the sore mouth vaccine actually introduces infection, producers should not vaccinate unless sore mouth is already present in the herd. The vaccine is a live virus that causes disease in the vaccinated animal so it is best to vaccinate when disease will not cause production losses. For example, it is recommended that does be vaccinated 1 to 2 months prior to kidding so that there will be antibodies to sore mouth in their colostrum, which will protect the newborn kids from disease. Use of gloves is recommended when vaccinating, as the vaccine can also cause disease in humans.

Kidding management and kid care

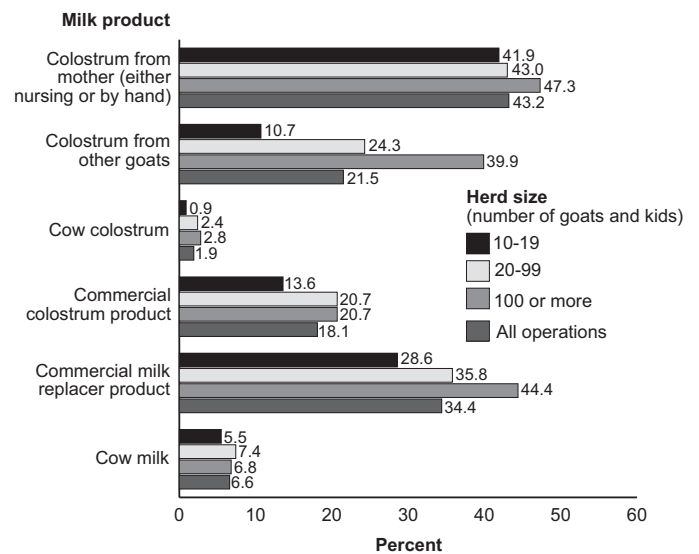
Note: Data in this section are for operations with 10 or more goats that had any kids born alive.

Colostrum provides valuable antibodies from the doe which help protect newborn kids against disease. Colostrum can be provided to newborns as soon as possible following birth. There are, however, a number of reasons for not letting newborns get colostrum from their mothers. For example, producers attempting to eliminate caprine arthritis encephalitis in the herd should remove newborns before they suckle mothers thought to be infected with the disease.

Overall, 43.2 percent of operations fed unweaned kids colostrum from the mother, either through nursing or by hand, while 21.5 percent fed colostrum from other goats (figure 2). A higher percentage of operations in the

Northeast region (70.8 percent) fed unweaned kids colostrum from their mother than operations in the West or Southeast regions (39.2 and 31.9 percent, respectively). Three of four dairy goat operations (74.6 percent) fed unweaned kids colostrum from their mother (either by nursing or by hand) compared with 39.4 percent of meat goat operations.

Figure 2. Percentage of operations that fed the following liquid diets (or milk products) to any unweaned kids during the previous 12 months, by herd size



Coccidia are tiny parasites that infect cells in the small intestine and can cause scours, unthriftiness, weight loss, and, in extreme cases, death. Coccidia are the most common cause of diarrhea or scours in goats from 3 weeks to 5 months of age. Overall, 43.4 percent of operations fed medicated feed to kids to prevent coccidia.

Culling

Operations cull animals because of disease, to reduce herd size, to improve genetics or desirable phenotypic traits, or to economize during episodes of high feed costs. Operations attempting to enlarge their herds are less likely to cull animals. The percentage of operations that culled either breeding bucks or does during from July 1, 2008, to June 30, 2009, increased with herd size, ranging from 8.1 percent of very small operations to 52.6 percent of large operations. About twice the percentage of operations culled breeding does (29.9 percent) as culled breeding bucks (14.5 percent), possibly because most operations have more breeding does than bucks. As a percentage of the July 1, 2009, breeding goat inventory, 15.3 percent of does and 20.6 percent of bucks were culled. The top three reasons does were culled were economic issues (27.3 percent of does culled), old age (24.4 percent of does culled), and low productivity (14.3 percent of does culled).

Producers were asked if specific symptoms had been observed in any goats or kids on the operation

from July 1, 2008, to June 30, 2009. The symptoms listed were: joint swelling or crippled goats; weight loss in spite of good appetite; central nervous system signs; sores on hoof area with foul odor; mastitis; and abscesses, boils, or lumps on the head, shoulder, or upper rear legs.

When comparing operations by whether they culled or did not cull animals, there was a 2.4-fold greater chance (OR 2.4, 95% CI 1.1, 5.4) that operations that culled animals had observed three to five symptoms in goats or kids compared with operations that had observed no symptoms. It was about twice as likely that operations that culled animals had observed abscesses in goats or kids compared with operations that had not observed abscesses.

Summary

The occurrence of mastitis or abscesses was relatively common on large goat operations, possibly because producers on large operations are more experienced and adept at identifying symptoms of disease. Mastitis was common in operations with does in milk and was primarily diagnosed by visual observation. Many producers were not familiar with common goat diseases such as caseous lymphadenitis, sore mouth, Johne's disease, brucellosis, and Q fever. Only about one third of producers were aware that some of those diseases also are infectious to humans (zoonotic). Vaccinating at least one goat or kid was common, and operations in the West region were more likely to vaccinate for sore mouth than operations in the other regions. Other health management practices such as isolating first kidding does were also relatively common. Culling was much more common on large operations than on smaller operations, and was also twice as likely to have taken place on operations that had observed several disease symptoms.

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