Goats are important domestic animals in many parts of the world. They provide substance in the form of food and clothing. The rising demand for goat meat, milk, and cheese offers commercial goat production opportunities. Goats are also wonderful to raise for pure enjoyment or hobby. The type of goat selected depends on desired purpose—hobby, show, or commercial production. This booklet will introduce you to basic goat care knowledge.

GoatPower™
GOAT FEEDS

the goat guide

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the goat guide

Goats, important domestic animals in many parts of the world, have served mankind for ages. They provide substance in the form of food and clothing. These hardy ruminants can exist in harsh environments in which other livestock species would perish. Goats grow and reproduce under extreme conditions from rugged mountain areas where winters are bitter cold to desert regions where it is hot and dry, and water and forage are sparse.

Photo: Courtesy of hillshepherd.com

General Management

Opportunities with Goats

Goat meat is the preferred food for growing ethnic groups in North America. Since the demand for goat meat has outpaced domestic production, a substantial portion of the goat meat consumed in the US is imported. Goat milk is favored by health enthusiasts as well as some cheese makers. The rising demand for goat meat, milk, and cheese offers commercial goat production opportunities.

Goats are adaptable and easy to raise. Adequate space with pasture or browse is preferred. Sophisticated facilities are not a necessity.

Goat Selection

The type of goat selected depends on desired purpose – hobby, show, or commercial production of meat, milk, or mohair/cashmere. The choice will influence feeding and management decisions. Table 1 (on pages 6-9) lists goat breeds common in the U.S. Regardless of purpose, basic selection criteria for any goat purchase should include good health (bright, clear eyes, alert, cud chewing, no nasal secretions, normal feces, etc.) and sound conformation (no deformities, good leg and hoof structure, etc.). Goats should be structurally correct and well muscled with style and balance, and they should possess the desired genetic ability for meat or milk production. For those who desire to purchase goats for show, consult with knowledgeable individuals for assistance in selection based on breed preferences and desirable physical characteristics. Good genetics are important for show and commercial production animals. Keep in mind, size is not a reliable, primary indicator of a "good" goat.

GENERAL MANAGEMENT

Behavior

Goats are natural climbers and jumpers. These intelligent animals are quick to learn and like attention. Since goats can also acquire annoying habits, one should be careful how goats are handled, especially kids. For example, lifting a kid over a gate will teach the kid to jump or climb over the gate. Playful pushing on a kid's head will encourage it to push back or butt.

Facilities

Escape-proof fences are needed due to the goat's climbing capabilities. As with all livestock, goats should be provided with dry, clean bedding in a draft-free enclosure (15 sq. ft/goat). Barns/sheds should be well ventilated. When goats are slick shorn for shows, additional measures, such as heat lamps, may be needed to keep goats warm during cold weather. A well-drained outside pen large enough for the goat to get ample exercise should be provided. Since goats are skillful climbers, placement of large objects, such as rocks, wooden spools, or tree stumps, in the pen/pasture provides goats with climbing exercise and recreation.

(continued on page 8)

Table 1 Common Goat Breeds in the US

Photo: Goat Farmer Magazine

Photo: Taylor Ridge Dairy Goats

Photo: K-Lou Ranch

Photo: Michael Pazzani

Photo: K-lou Ranch

Photo: Michael Pazzani

Photo: www.ndga.org

Breeds	Body Structure	Color	Hair	Ears	Face
DAIRY					
Saanen (origin Switzerland)	Medium-large, rugged bone structure Doe: 30" height, 110-198 lb) Buck: 176-264 lb	White or light cream	Short and fine. A fringe over spine and thighs may be present.	Medium size, erect, preferably pointing forward	Straight or dished
Toggenburg (origin Switzerland)	Small-medium, sturdy Doe: 25" height, 120 lb Buck: 160 lb	Light fawn to dark chocolate with white ears and lower legs, two white stripes on face, sides of tail are white	Short, shaggier coat compared to other breeds	Medium size, erect, carried forward	Straight or dished
Nubian (origins Africa, India, and parts of the Middle East)	Medium-large, graceful Doe: 30" height, 130 lb; Buck: 175 lb	Any color or pattern	Short, glossy	Long, drooping, bell-shaped, extend 1/2" beyond mussel	Distinctive convex facial profile (Roman nose)
Alpine (French, British, Rock, and Swiss Alpine goats; French is most popular in US)	Medium-large Doe: 30" height, 130-198 lb Buck: 176-220 lb	Any color except solid white or light brown with white markings	Medium to short	Erect	Straight or dished
La Mancha (Developed in the US from Swiss breeds and short-eared Spanish breeds)	Small-medium Doe: 28" height, 130 lb Buck: 160 lb	Any color or combination of colors	Short, glossy	Very short or absent external ear flap. Gopher ear variety has 1" ear flap. Elf ear variety had 2" ear flap	Straight
Oberhasli (origin Switzerland)	Medium Doe: 28" height 120 lb Buck: 30" height 150 lb	Chamois (bay-colored) with a black dorsal strip, udder, belly, and black below the knees. The head should be nearly black with two black stripes down the face to a black muzzle	Short	Erect	Straight
Nigerian Dwarf (origin West Africa)	Very small Doe: 17-19" Buck: 19-21" Wt.: 75 lb	Any color or combination of colors	Soft, short to medium hair	Erect	Straight

Table 1 Common Goat Breeds in the US

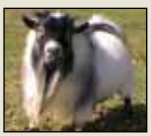
Goat Farmer Magazine

Shady Acres Goat Farm

Goat Farmer Magazine

southeasternsavannaranch.com

hillshepherd.com



Tyny Goat Ranch (tyny.com)

Breeds	Body Structure
MEAT	
Boer (origin South Africa)	Large, thick Doe: 200-225 lb Buck: up to 300 lb Preferred market goat weight: 70-90 lb
Kiko (origin New Zealand)	Well-muscled, large frame
Spanish (not specific breed)	Compact, varies
Savanna (origin South Africa)	Medium size
MOHAIR	
Angora (origin Turkey)	Small Doe: 70-110 lb Buck: 180-225 lb
HOBBY	
Pygmy (origin Africa)	Very small, compact 16-23" height, 40-70 lb

Color	Hair	Ears	Face
White body with dark cherry red neck and head with blaze face is most widely recognized and preferred	Short	Long, pedulous	Gently curved (convex)
Predominate coat color is white	Short, slick coat in summer; may grow longer in winter	Set high; moderate length	Moderate forehead; well proportioned nose
Varies	Varies	Varies	Varies
White coat; black skin, horns, and hooves	Soft, kempy hair	Fairly big, oval shape; hang next to head	Fairly long and broad, slightly curved head
White	Long (ringlet or flat and wavy)	Long, drooping	Thin, straight or slightly dished
Caramel, Agouti, and black patterns	Varies	Medium, erect	Slightly dished

(continued from page 5)

As well as being adept climbers, goats are also known for their jumping ability. Fences should be at least 42 inches in height and predator-proof. When using woven (net) wire fence, use a 12-inch wide by 6-inch mesh to prevent goats from getting their heads caught in the fence . Five-foot tall galvanized wire panels with four-inch squares make excellent fencing.

Also needed for dairy goats is a separate milking area with stanchion on elevated platform, which makes it easier to milk does.

Feeders

When self-feeding goats, place feeders at least six inches off the ground. The use of movable troughs that can be hung on a fence works well when hand-feeding. Hang troughs at the height of

the top of the goat's shoulder. Feed troughs should be cleaned regularly. To help reduce disease transmission, raise hay and mineral feeders off the ground. Place feed troughs so that goats cannot stand in them. Otherwise they may defecate or urinate in the trough.

Water

Fresh water is essential and is an often overlooked nutrient. Remember to check water availability on a daily basis and to regularly drain and clean water troughs. To keep water cool during warm weather, locate water source in the shade. Goats may drink a large amount of water during hot weather. It is very important to encourage water intake to help prevent formation of urinary calculi.

Reproduction

An excellent health program and nutrition program are essential to promote the birth of one to three live, healthy kids per doe on a yearly basis. Goats are polyestrous (seasonal anestrus) breeders. Gestation is five months. Puberty occurs at 6-8 months of age with breeding at 7-10 months of age or when doelings reach 60-75% of mature body weight.

The breeding season typically runs from August through January, with an 18-23 day estrus cycle. Does usually remain in heat for one to two days. Signs of heat are usually easily detected and include uneasiness, riding other animals, standing for riding, an unusual amount of tail flicking, frequent urination, an abnormal amount of bleating, reddish and perhaps swollen vulva, and moisture under the tail. Conception is highest from the middle to the latter part of the heat period. Consequently, if signs of heat are first noticed in the afternoon, goats should be bred late the following morning.

Bucks have a strong odor during the breeding season and should be kept in individual pens at all times to prevent fighting. The typical buck to doe ratio is one buck to 20-30 does.

Photo: M.E. Jenkins Boer Goat Ranch

Accurate records of heat periods and breedings are helpful in maintaining a 365-day kidding cycle.

Dairy goats, especially those used for commercial purposes, should lactate for 305 days followed by a 60-day dry period, which allows the mammary system time to regenerate and repair mammary tissue.

Shortly before the expected kidding date, the doe's udder, hind quarters, and tail should be clipped to facilitate cleanliness during kidding. The doe close to kidding should be moved to a quiet, draft-free pen with dry, clean bedding. Shortly after kidding, the doe should be cleaned and offered warm water. Fresh bedding should be provided after kidding. Once the kid(s) have nursed, check the doe for mammary tightness. The doe may need to be milked to relieve mammary tightness (excess colostrum may be frozen for future use).

Follow strict sanitary guidelines when milking goats. Udder and teats should be washed prior to milking and teats dipped with a disinfectant after milking to help prevent mastitis. Milk equipment should be disinfected between uses. Contact the local extension office for recommendations on handling milk for human consumption.

Kids

Kids should nurse as soon as possible after birth (the sooner the better) to receive colostrum, the doe's first milk. Colostrum provides maternal antibodies for disease resistance and essential nutrients needed for healthy, early growth. It also has a laxative effect which helps "clean out" the newborn kid's digestive system. After the first two or three days, kids can continue to nurse from the doe or can be bottle, bucket, or pan fed. Thoroughly clean all feeding equipment after each use. The newborn kid's navel should be dipped in iodine to prevent infection. To prevent sickness, keep pens clean.

Dehorning

When horns are not desired, it is preferable to dehorn (disbud) kids when they are a few days old. Otherwise dehorning becomes more stressful as horn size increases. Some shows require "tipping" of horns which can be accomplished with little stress. Tipping should be done four to six weeks prior to show date to allow ample time for horn tissue to completely heal.

Castrate

Castration of buck kids should be done at 4-6 weeks of age to allow proper urinary tract development. Of the three castration methods (knife, emasculatome, and elastrator), the elastrator method is the most popular. To prevent tetanus, kid bucks should be vaccinated with tetanus antitoxin at time of castration.

Tattooing

All registered goats must be tattooed, usually in the ear. The exception is the La Mancha breed which has very little, if any, external ear flap. This breed is tattooed in the tail. Contact the appropriate breed association for tattooing procedures.

Hoof Trimming

Rough terrain will wear down a goat's hooves. Goats kept in pens or on smooth terrain, may need regular hoof trimming approximately every six weeks. For show goats, hoofs should be trimmed one to two weeks prior to the show in the event that hooves are trimmed too short causing sore hooves. In one-two weeks, the hooves will have grown enough to enable to goat to walk normally.

Photo: Tri-Quest Boer Goats

Photo: USDA, Scott Bauer

NUTRITION

Photo: M.E. Jenkins Boer Goat Ranch

The best management and health program is accentuated with a nutritional program that matches nutrient needs to production purposes. Goats are ruminants, which means they can derive a substantial portion of nutrients from plants. These hardy animals are selective browsers, eating a wide variety of shrubs, woody plants, briars, and even weeds. The availability of browse material (twigs, leaves, bushes, trees, etc.) in goat pens and pastures appears to enhance contentment. Goats should be fed good-quality forages along with the needed supplemental nutrients to achieve desired goals, such as milk or meat production or a well-conditioned show goat. The nutritional program is dependent on type of goat (meat, milk, mohair/cashmere, hobby) and production stage. For instance, due to milk production needs lactating dairy goats have higher nutrient requirements than dry or gestating does.

A quality Goat Power™ nutritional program not only meets the goat's requirements, but also minimizes feed costs and maximizes profitability. The feeding program should be based on goals of the owner, available feedstuffs, and goat production stage. Basic nutrient requirements include water, protein, energy (carbohydrates and fat), minerals, and vitamins.

Forage

Hay and/or pasture (good-quality) can be used to provide primarily energy and some protein. Since the goat is a ruminant, it needs to consume fiber (forage) in the form of hay or pasture or browse to maintain rumen health. For dairy goats, fiber is needed to maintain milk fat test. Rarely, if ever, will forage alone provide all nutrients needed by the goat. The need for supplemental feeding will be dictated by type of goat (meat, milk, mohair/cashmere, hobby) and production stage.

Photo: Courtesy of hillshepherd.com

Water

The daily water requirement for goats is affected by level of milk production, environmental temperature, water content of feedstuffs consumed, amount of exercise, and salt/mineral content of the diet. Fresh, clean water should be available at all times. Goats are often more reluctant than other species to drink foul-tasting water. Low-quality and/or inadequate water supply will reduce feed intake and lower goat performance.

Protein

Protein supplies amino acids for protein synthesis and serves as a source of nitrogen for rumen microorganisms. Inadequate amount of protein in the diet can affect growth rate, milk production, reproduction, and disease resistance. The amount of protein needed varies depending on production stage. Young, fast-growing goats need a high level of protein in the diet to deposit muscle mass, and lactating goats need more protein for milk production. Mature goats can effectively utilize non-protein nitrogen (NPN). Rumen microorganisms need protein to effectively utilize forage. Inadequate protein leads to inefficient utilization of forages and reduces forage intake.

Energy

Energy deficiency in goats reduces growth rate, delays puberty, reduces fertility, and depresses milk production. Fiber, starch, and sugar from forages and grains are the primary sources of energy in goat diets. Fat can also be used to supply energy, but should be limited to no more than 5% of the diet. Energy requirements are affected by body size, growth, reproduction, and lactation. A deficiency of energy will result in loss of body condition, poor growth, reduced milking ability, and reduced reproductive performance. Obviously, goats that consume more energy than needed become fat.

Minerals and Vitamins

Proper mineral and vitamin supplementation make it possible for goats to achieve the most economical gains possible from the forages and grain fed. Minerals are needed in very small quantities, yet are critical components of the overall nutritional package fed to goats and are the backbone of successful commercial and show goat operations. Minerals play a vital role in nutrient digestion, reproductive performance, immune system function, and development of muscle, bone, and teeth. The copper requirement of goats is frequently questioned. The best information today indicates goats require levels of copper similar to cattle requirements. Angora and Pygmy breeds have been reported to be sensitive to copper supplementation.

Vitamins are needed in small quantities for normal body processes. Vitamins A, D, and E are likely to be the most deficient in the normal diets of goats. Vitamin K and the B-complex vitamins are normally synthesized by rumen microorganisms and are not considered essential for the goat.

A diet consisting of forage, even with added grain, will not provide the proper levels of minerals and vitamins for optimum performance or production. The amounts and ratios of certain minerals are also important in promoting the health and productivity of goats. Due to the rumen microbial population, a synergistic effect on digestive efficiency occurs when protein and minerals are provided to ruminants. It is suggested that meat and dairy goats be provided with a Goat Power™ free-choice mineral-vitamin supplement to enhance digestive efficiency.

Special Considerations

The ratio of calcium to phosphorus should be maintained at approximately 2:1 to prevent urinary calculi, especially in wethers (neutered bucks). While sheep are copper sensitive, goats can tolerate more copper than sheep and appear to need as much copper as cattle. The exception may be Angora and Pygmy goats. Even though sufficient B-vitamins are normally provided through rumen synthesis, goats on high-grain rations (particularly rations containing corn by-products) may be deficient in thiamine (a B vitamin).

Photo: The Goat Farmer Magazine

FEEDING MANAGEMENT

Table 2 and 3 (on pages 20-21) lists feeding rates for concentrate feeds (grain-based) for varying production stages.

Kids

Kids must be provided with colostrum soon after birth. If kids are removed from the doe after consuming colostrum, they can be fed milk replacer from a bottle, bucket, or pan. Suggested guidelines for feeding kids include:

- Feed milk or milk replacer at room temperature.
- Use a lamb milk replacer rather than calf milk replacer.
- Gradually increase amount of milk offered. Feeding too much milk will cause scours.
- Feed on a regular schedule.
- Offer succulent forage (such as vegetable leaves or green grass) during first week of age.
- At one-two weeks of age, provide small quantity of good-quality hay.
- At two to three weeks of age, gradually introduce high-quality starter.
- Wean when the kid is eating forage, drinking water, and consuming at least 0.5 lb of starter feed.
- Wean by gradually reducing the amount of milk/milk replacer fed. Most breeders will not typically wean kids before three months of age. Kids can be weaned as early as two months of age provided they are satisfactorily consuming starter feed, forage, and water.
- Replacement does and bucks should be separated at weaning.
- Always provide an unlimited supply of clean, fresh water.

Table 2
Suggested Feeding Rates for MEAT Goats

Stage	% Protein	Amount Daily (per head)*
Pre-weaning/ Creep feed	18%	0.25-0.33 lb
Weanlings	16%	0.5-0.75 lb
Growing/Finishing	14%	1 lb
Flushing (1 month prior to through 1 month after breeding)	14-16%	1-3 lb
Gestation (2nd-3rd month)	14-16%	0.5-1 lb
Gestation (last 6 weeks)	14-16%	0.75-2 lb
Lactation (avg., single kid)	14-16%	0.75-1.25 lb
Lactation (heavy, twins)	14-16%	2 lb
Replacement does	16%	0.5-1 lb
Bucks (adult, non-breeding) Feed to body condition	14%	≤0.5 lb

Provide free-choice access to forage and ensure goats have unlimited supply of clean, fresh water. Provide free-choice mineral supplementation.
*Feeding rate may vary for medicated feed products. Refer to product feeding directions.

Photo: M.E. Jenkins Boer Goat Ranch

Table 3
Suggested Feeding Rates for DAIRY Goats

Stage	% Protein	Amount Daily (per head)
Pre-weaning/starter feed (2 to 4 months)	18%	Free-choice
Growing goats (4 months to 6-8 weeks prior to kidding)	14-16%	1-1.5 lb
Dry does (6-8 weeks prior to kidding)	14-16%	1-2 lb
Lactating does	14-16%	1 lb for each 3 lb of milk produced
Bucks (adult, working) Feed to body condition	14-16%	1-2 lb

Provide free-choice access to forage and ensure goats have unlimited supply of clean, fresh water. Provide free-choice mineral supplementation.

Feeding Management

Photo: Fox Trot Farm, Fayetteville, TN

Growing Goats

Growth rate of young goats varies by breed and feeding regime. Under average commercial conditions, growing meat goats typically gain 0.4-0.5 lb per head daily. Meat goats should be slowly adapted to high-grain diets. Non-protein nitrogen can be used in the diet of finishing goats, but the amount should not exceed 2.5% crude protein equivalent.

Yearlings

If forage supply is of good-quality, supplemental concentrate feeding may not be needed; however, it will increase growth rate, reduce age at first breeding, and increase overall lifetime performance. Goat Power free-choice minerals should be available to yearlings at all times.

Photos
Top: Tadmore Farms
Middle: Goat Farmer Magazine
Bottom: Lords Acres

Does

The non-pregnant, non-lactating doe has low nutritional requirements. The dry doe in good condition can be maintained on good-quality pasture (or hay) with mineral-vitamin supplementation. Flushing, increasing the amount of energy fed 30 days prior to and 30 days after breeding, has been shown to increase ovulation rate in yearling does and does in poorer body condition. Nutrient requirements increase as pregnancy progresses. During the last six weeks of pregnancy, the amount of Goat Power concentrate-grain mix or complete feed should be increased. Replacement does will need additional feed because their bodies are still maturing.

Lactation places a great deal of stress on does, especially those nursing twins and dairy goats used for commercial milk production. Goat Power concentrate-grain mix or complete feed should be gradually increased to promote milk production and maintain body condition. A high-producing goat will produce three to four quarts of milk daily and require up to eight lb of complete feed daily. A rule-of-thumb is to feed one lb of complete feed for each three lb of milk produced (one gallon of milk equals 8.6 lb of milk).

Bucks

Non-breeding bucks can be maintained on good-quality forage (or hay) along with a Goat Power free-choice mineral supplement. During the breeding season, increase the amount of complete feed fed to maintain body condition.

Photo: Farmer's Pride

HEALTH

While goats are generally hardy animals, they are still susceptible to parasites and diseases. A preventative disease program should be discussed with a veterinarian knowledgeable in goat health related issues. Daily observation of goats is an important aspect of the management program. Warning signs of a sick goat may include:

- Avoidance of contact with other goats or owner
- Distressed facial expression, especially in the eyes
- Appears listless and dull
- Reluctance to move
- Quick shallow breathing
- Coughing
- Nasal discharge
- Teeth grinding
- Refusal to eat
- Frequent urination
- Change in color and consistency of feces
- Lower milk production (lactating goats)
- Abnormal color and consistency of milk (lactating goats)
- Fever (above 103^{O}F)
- Changes in behavior or habits.

Consult a veterinarian if any of these signs are observed. Early detection of health-related problems will increase the probability of successful treatment. To help ensure healthy goats, purchase goats from a healthy herd. Isolate newly purchased goats from the rest of the herd for at least 30 days. If the goat has an infectious disease, it will probably become evident within this time period.

External Parasites

External parasites affecting goats include lice, ticks, horn flies, house flies, stable flies, horse flies, deer flies, and mosquitoes. While it is unrealistic to expect 100% fly control, good management can prevent fly populations from becoming bothersome. Frequent pen/lot

cleaning and proper manure and bedding disposal are key factors in fly population control. If goats are infected with lice, consult a veterinarian for treatment.

Internal Parasites

Internal parasites, particularly *Haemonchus* (Barberpoleworm), are of great health and economic concern to goat producers. In fact, internal parasites are the major health threat to the U.S. goat industry. The best method to effectively control *Haemonchus* and other worms and minimize dewormer resistance is to selectively deworm (e.g. only deworm those animals that are seriously infected). A system of evaluation called FAMACHA has been developed to determine the degree of *Haemonchus* infection in goats and sheep. FAMACHA is a chart that correlates lower eyelid mucous membrane color to degree of anemia. *Haemonchus* feeds on blood in the abomasum where it resides. As *Haemonchus* levels increase each summer, animals can lose enough blood to affect growth and health. The FAMACHA chart consists of a scale of 1 to 5 to determine the degree of anemia. Level 1 and 2 is excellent, 3 and 4 require deworming, and 5 shows extreme infection and requires immediate deworming to avoid risk of sudden death.

General worm control recommendations for pastured goats:

- Keep stocking rates low and allow vegetation to grow tall
- Offer protein supplementation during high risk periods
- Rotate goats away from worn-contaminated pasture or use pasture grazed by cattle
- Cull poor doers
- Use dewormers labeled for goats whenever possible
- Administer oral dewormers (use drench gun) designed for goats/sheep
- Deworm purchased goats with two dewormers of different classes
- Selectively deworm before going to pasture
- Monitor often using FAMACHA during late spring and summer when risk is high and deworm selectively as needed
- Test for dewormer resistance every two years
- Deworm kids at weaning and consider deworming does prior to kidding when administering CDT vaccine

Coccidiosis

Young kids are more susceptible to coccidiosis, which is caused by an intestinal protozoan. Diarrhea, which is often blood-tinged, dehydration, weakness, and weight loss are characteristic of coccidiosis. Since this disease is potentially fatal, preventative measures should be part of the management program. Proper sanitation is essential since the infective organism is transmitted via manure. Feed additives are available for prevention and treatment of coccidiosis.

Enterotoxemia

Clostridium perfringens (types C and D) bacteria normally present in the intestinal tract are responsible for enterotoxemia or overeating disease, as it is commonly known. Death is rapid and signs are seldom seen in kids. Mature goats show depression and incoordination. Abrupt changes in the feeding program or overfeeding will predispose goats to enterotoxemia. Feeding changes enable the *Clostridial* organisms to rapidly grow and release a powerful toxin, capable of causing death in a few hours. All goats, especially show goats, should be vaccinated for types C and D *Clostridium perfringens*. Consult a veterinarian for suggested vaccination schedule. Due to the management/nutrition induced predisposition of enterotoxemia, feed changes should be made gradually over a period of 7-10 days.

Tetanus

Goats are very susceptible to tetanus. Tetanus is caused by a gram-positive bacillus *Clostridium tetani* that produces a neurotoxin. *Clostridium tetani* spores enter through wounds following castration, kidding, ear

tagging, disbudding, etc. Clinical signs of the disease can appear within 4 to 21 days of initial infection. Symptoms include erect ears, elevated tail, extended neck, rocking horse stance, rigidity, difficulty in opening mouth, and a prolapsed third eyelid. The infection is deadly, and **producers often find young goats dead with heads extended.** The best protection against tetanus is a regular vaccination program such as VISION CD-T, which is a combination of *Clostridium perfringens* C&D and Tetanus toxoid. *Does should be vaccinated 2-6 weeks prior to anticipated kidding date.* Kids should have an initial dose at 30 days of age and a booster at 60 days of age **or at weaning**. Bucks should have an annual booster. Horses routinely pass the tetanus organism in their droppings. This means that goat producers with horses may be at greater risk and should definitely have a tetanus vaccination program for their goats.

Urinary Calculi (Water Belly)

The formation of calculi (stones) in the urinary tract of male goats, especially wethers, is the result of an imbalance of calcium and phosphorus in the ration. Some are of the opinion that young males should not be castrated prior to 30 days of age. The first sign of this metabolic disease is a goat's inability to urinate. Restlessness, kicking at the belly, stretching, and attempts to urinate are characteristic signs of urinary calculi. Calculi may form when wether goats are fed rations high in phosphorus, which contain an imbalanced calcium to phosphorus ratio. Diets which provide large amounts of grains (grains contain more phosphorus than calcium) may predispose goats to urinary calculi unless the diet has been fortified to provide a 2:1 calcium to phosphorus ratio. Use of ammonium chloride in the feed has been shown to help lessen the likelihood of urinary calculi in male goats. A source of clean, fresh water should also be available at all times. Encourage goats to drink water. Providing a free-choice mineral supplement and salt will facilitate water intake.

Soremouth

Contagious Ecthyma (EC), commonly known as soremouth, is caused by a very hardy virus from the pox family. It is highly contagious and can be transmitted to humans. The disease progresses from water-filled blisters to pustules and finally brown scabs on the lips and in the mouth. Lesions may also occur on the udder and between the toes. If the lesions do not become infected, the disease runs its course in one-four weeks. Mature goats typically only suffer mild loss of condition due to unwillingness to consume feed due to sores in the mouth. Kids are more susceptible to dire effects of this disease. They may refuse to nurse due to mouth sores and may become lame from foot lesions. Infected animals should be kept clean and in a clean environment to help prevent lesions from becoming infected. Some owners rub iodine into the lesions after scabs fall off. This helps dry the lesion and reduces infections. A vaccine is available. Check with a veterinarian regarding usage.

Foot Rot

Foot rot can be prevented by keeping the goat's pen and pasture relatively dry. Drain and fill in wet, muddy areas. The obvious sign of foot rot is lameness. A grayish, cheesy discharge with a foul odor is typical. Intense pain can occur. The rotten hoof area should be trimmed and the foot treated with a 10-30% copper sulfate solution or other treatment prescribed by a veterinarian.

Bloat

The accumulation of excessive amounts of gas in the rumen (bloat) is generally caused by overeating tender, young, high-moisture forages, particularly legumes. Signs of bloat include restlessness evidenced by frequently lying down and getting up, kicking at abdomen, and making loud grunting noises. Call for veterinarian assistance immediately as goats can die quickly. Prevention hinges on ensuring goats are not hungry before turning them out to graze on lush forage. Providing goats with a sufficient quantity of hay to consume prior to turn out will help prevent bloat.

Pinkeye

Excessive eye watering, reddened mucous membranes, and clouding of the pupil are characteristic signs of pinkeye (infectious keratoconjunctivitis), which is contagious. Stress, such as transporting, predisposes the goat to pinkeye. Contributing factors include dry, dusty pens and constant exposure to sunlight. Flies are known carriers of pinkeye. Numerous broad-spectrum, antibiotic ophthalmic powders and ointments are available for treatment. Consult a veterinarian regarding the preferred products.

Ringworm

Ringworm, caused by the fungi *Trichophyton verrucosum* in goats, is easily spread from goat to goat, from infected equipment to goat, and from goat to human. Skin lesions are circular in appearance and the skin becomes dry and scaly. A preventative program is essential. Disinfection of equipment and premises is highly suggested, especially when showing goats.

Caseous Lymphadenitis

Corynebacterium pseudotuberculosis (or *C. ovis*) is the organism responsible for recurring (chronic) lymph node abscesses (Caseous Lymphadenitis or CL, also known as pseudotuberculosis). Abscesses can develop slowly, taking months or years to develop and can be internal and external. Infection enters the goat's body through wounds caused by head butting, punctures, or shearing. Although less likely, infection can also occur via ingestion, inhalation, or penetration of intact skin.

External abscesses are usually found under the goat's ears on the neck and head areas. Internal abscesses are commonly found in the lungs, although they can occur in the liver, kidneys, scrotum, and udder. Not all abscesses are CL. Many abscesses are fast-growing nodules containing a foul-smelling greenish pus caused by *Actinomyces pyogenes*. An inexpensive blood test can determine the bacteria responsible for abscess formation.

Currently, neither treatment products nor a preventative vaccine is available. Goats with CL should be isolated from the herd. An abscess should not be left to burst on its own and contaminate the environment. Care is needed in handling CL infected goats as humans can contract the disease. Contact a veterinarian regarding proper procedure for lancing CL abscesses.

Mastitis

An udder infection (mastitis) in lactating goats may be chronic or acute. It is evidenced by a hot, swollen, hard udder that is painful. The milk may contain abnormal secretions, such as clots, stringiness, or traces of blood. Antibiotics are used to treat mastitis. Proper milking practices, stringent sanitation, avoidance of injury to the udder and teats, and use of clean, dry bedding are crucial to mastitis prevention.

Ketosis

Ketosis is a metabolic disease, which can occur immediately prior to giving birth or shortly thereafter. Proper feed management prevents ketosis. During the last two weeks of pregnancy, the amount of feed fed should gradually be increased. Avoid sudden ration changes. Loss of appetite and little interest in kids after birth are typical signs. An unusual odor to the breath, urine, and milk may also be detected. Veterinarian intervention will be required for does with ketosis.

Milk Fever

A drop in blood calcium is the cause of milk fever. It usually occurs prior to kidding or shortly thereafter and occurs more often in high producing does. Affected does are typically found lying down and unable to get up (partial paralysis). Veterinary care is needed if this occurs. Prevention can be accomplished through dietary manipulation. During the last month of pregnancy, ensure the ration does not contain high amounts of calcium. Keep calcium content of the diet low by feeding good-quality grass hay rather than legume hay and using a low calcium mineral supplement.

Polioencephalomalacia

Polioencephalomalacia (PEM) is a thiamine-responsive disease caused by "factors" which impair thiamine synthesis or destroy thiamine, a B vitamin.

Thiamine is involved in carbohydrate metabolism. Primary factors contributing to occurrence of PEM include high-grain diets, incidence of acidosis, and feeds or water containing exceptionally high sulfur levels. Corn by-products contain high levels of sulfur. Signs of PEM, a non-infectious, neurological disease, include dullness, excitability, head pressing, aimless wandering, impaired vision, and muscular incoordination. Treatment involves injecting affected animals with thiamine solution.

Caprine Arthritis Encephalitis

This retroviral (virus that produces disease after long incubation period and infection persists throughout animal's life span) infection of goats causes chronic joint disease. Two forms of caprine arthritis encephalitis (CAE) have been identified – arthritic and nervous. The arthritic form is clinically evidenced at one-two years of age with varying severity. Some goats may show intermittent lameness or stiffness for several years without becoming totally debilitated. Lameness is usually seen first, followed by joint swelling, most often in the front knees. As arthritis progresses the animal looses body condition.

The nervous form of CAE usually appears between one-four months of age. Kids have weak hind legs eventually leading to paralysis. Some older goats may exhibit the nervous form. Signs in adult goats include circling, head tilt, and facial nerve paralysis.

Since not all goats infected with CAE show signs, a serology test can be conducted to test for viral antibodies. A positive serology test indicates the goat is a potential shedder of the virus, primarily during lactation.

The virus is spread primarily to kids via colostrum/milk from infected does. Mature goat transmission other than through colostrum/milk is rare. Disease transmission can be prevented by separation of kids from CAE-positive does at birth and artificial rearing. Colostrum from CAE-negative does should be given to kids. The virus can be inactivated by heating colostrum/milk to 133-138°F and holding at this temperature for one hour. To prevent CAE from entering a herd, all herd additions should be verified CAE-free.

Photo: Courtesy of hillshepherd.com


Riverbanks Zoo & Garden

FOR MORE INFORMATION

To obtain information on ADM Alliance Nutrition® Goat Power or MoorMan's® ShowTec® goat products, contact a sales representative or dealer, visit our web site at www.admani.com, or call us at 866-666-7626.

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GOAT FACTS

Polyestrous (seasonal anestrus)

Puberty	6-8 months (males 4-8 months)
Breeding age	7-10 months or at 60-75% of mature body weight (males 8-10 months)
Estrus cycle	18-23 days
Estrus duration	12-36 hours
Ovulation	12-36 hours from onset of standing heat
Gestation	145-155 days (5 months)
Buck to doe ratio	1:20-30
Body temperature	101.7° – 104.5° F
Heart rate	70-80/minute
Respiration	12-15/minute
Ruminal movements	1-1.5/minute

NOTES