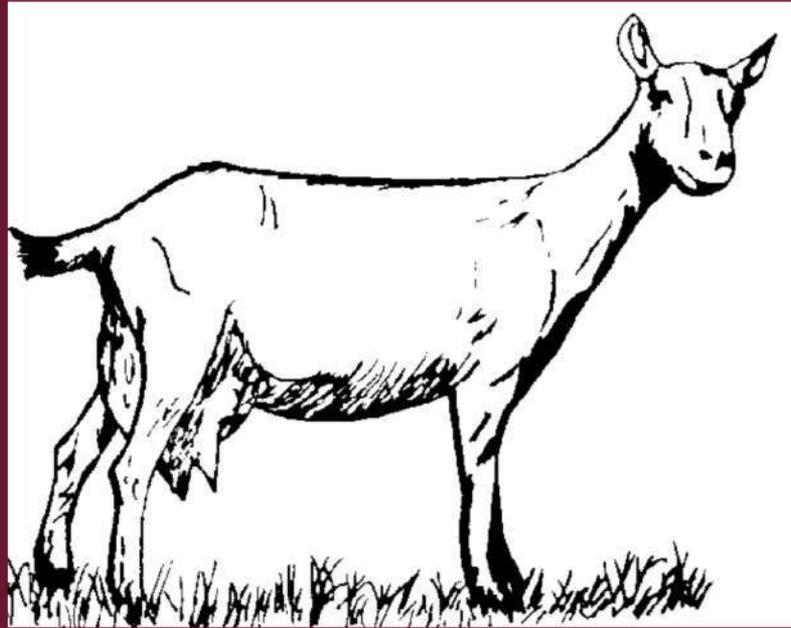


BARNYARD IN YOUR BACKYARD



**A Beginner's Guide To
Raising Goats**

Despite what you may have heard, being opportunistic eaters does not mean goats eat things like tin cans. A goat learns about new things by tasting them with its lips. Young goats like to carry things around in their mouths, as puppies do. If you see a goat with an empty can, it could be playing with it or eating the label, which, after all, is only paper made from wood. Although the goat may look cute carrying a can, it's a bad idea to leave such things where a goat can find them; the goat may cut its lips or tongue on the sharp rim.

Another myth is that goats are smelly. A goat is no more smelly than a dog, unless you keep a breeding buck, which will smell pretty strongly during the breeding season. But unless you plan to breed your does, you don't need a buck. And even if you do plan to breed, you may find it more convenient and economical to use someone else's buck if you have only a few does.

So what's your reward for keeping goats? If you raise dairy goats, each doe will give you about 90 quarts of delicious fresh milk every month for 10 months of the year. You and your family might drink the milk or use it to make yogurt, cheese, or ice cream. Surplus milk may be fed to puppies, chickens, pigs, calves, or orphaned livestock and wildlife.

From each meat wether (castrated buck), you will get 25 to 40 pounds of tasty, lean meat, which may be baked, fried, broiled, stewed, or barbecued. If you raise fiber goats, from each adult Angora, you will get 5 to 7 pounds of mohair twice a year. From each cashmere goat, you will get just less than 1 pound of down per year.

Each doe you breed will produce one kid or more annually; some does kid twins year after year. Every day, each goat will drop a little more than 1 pound of manure, which makes good fertilizer for the garden.

The ultimate reward, of course, is the fun of raising healthy, contented goats.

BUYING GOATS

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More than 200 breeds of goat may be found worldwide. Each breed has characteristics that are useful to humans in different ways. Some are efficient at turning feed into milk or meat, others at turning feed into hair for spinning. Some breeds are small and produce less milk or meat than larger breeds, but are easier to keep in small spaces. Your purpose in keeping goats will determine which breed is right for you.

Dairy Goats

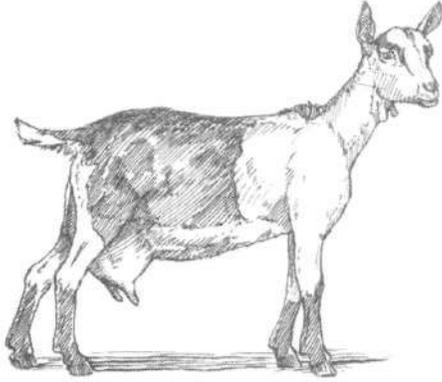
A dairy goat, sometimes called a milk goat, is one that produces more milk than it needs to nurse its kids. In the United States, there are six main dairy breeds,

Alpine. An Alpine has a long neck and a two-tone coat, with the front end a different color from the back. A mature doe weighs at least 135 pounds, and a mature buck weighs at least 170 pounds,

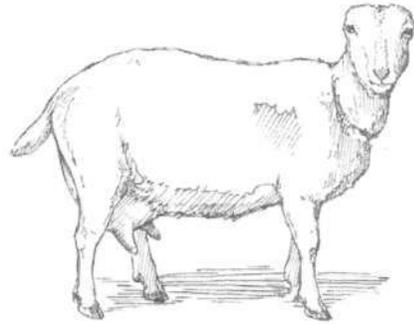
LaMancha. LaManchas come in many colors and are the calmest of the dairy breeds. A LaMancha is easy to recognize because it has only small ears or no visible ears at all. A mature doe weighs 130 pounds or more. A mature buck weighs 160 pounds or more.

DAIRY GOATS

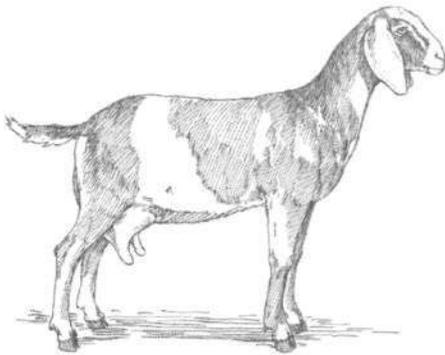
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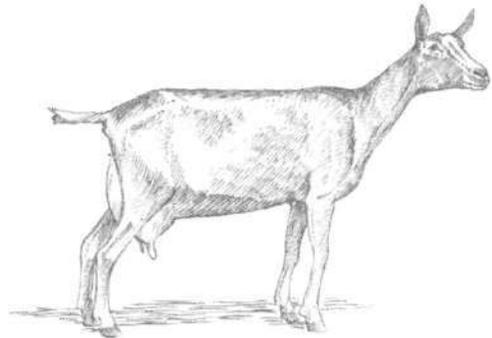
Alpine



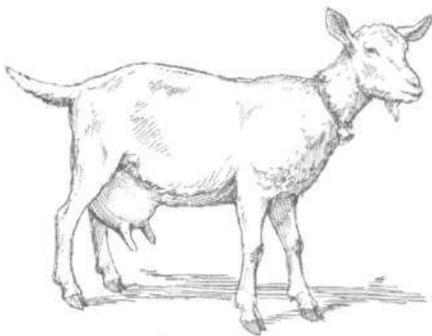
LaMancha



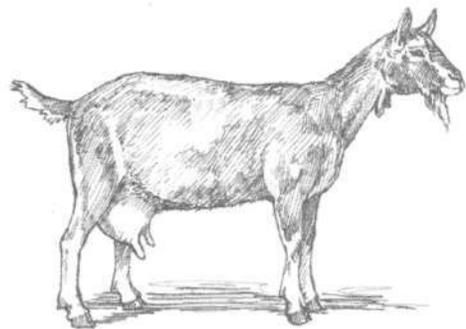
Nubian



Oberhasli



Saanen



Toggenburg

Nubian. Nubians come in many colors and are the most energetic and active of the dairy breeds. You can tell a Nubian from any other goat by its rounded face (called a Roman nose) and long floppy ears. A mature doe weighs 135 pounds or more. A mature buck weighs 170 pounds or more.

Oberhasli. The Oberhasli looks something like a refined deer. Its coat is bay (reddish brown) with black markings. A mature doe weighs at least 120 pounds, and a mature buck weighs at least 150 pounds.

Saanen. A Saanen is all white or cream colored. A goat of this breed in any other color is called a *Sable*. A mature doe weighs 135 pounds or more. A mature buck weighs 170 pounds or more.

Toggenburg. A Toggenburg has white ears, white face strips, and white legs setting off a coat that may range in color from soft brown to deep chocolate. A mature doe weighs 120 pounds or more. A mature buck weighs 150 pounds or more.

Alpines, Oberhaslis, Saanens, and Toggenburgs are closely related and are similar in shape. They all originated in the Swiss Alps and are therefore referred to as the Swiss breeds or European breeds. These goats have upright ears and straight or slightly dished faces. They may or may not have wattles consisting of two long flaps of hair-covered skin dangling beneath their chins. These breeds thrive in cool climates.

LaManchas and Nubians, on the other hand, originated in warmer climates and are therefore grouped together as tropical or desert breeds. The Nubian originated in Africa, and the LaMancha comes from the West Coast of the United States. As a general rule, both breeds are better suited to warm climates than the Swiss breeds.

If you buy a young female, or doeling, you can't tell for sure how much milk she will give when she matures, but you can get a good idea by looking at her dam's milk records. An average doe yields about 1,800 pounds, or 900 quarts, of milk per year. A doe's dairy character gives you a fair idea of whether she will be a good milker. Characteristics of does that prove to be good milkers include:

- A soft, wide, round udder
- Teats that are the same size, hang evenly, and are high enough not to drag on the ground or get tangled in the doe's legs when she walks
- A well-rounded rib cage, indicating that the doe has plenty of room for feed to fuel milk production
- A strong jaw that closes properly, so the doe has no trouble eating
- Strong, sturdy legs
- Soft skin with a smooth coat

A dairy goat may be born with horn buds that will eventually grow into horns. Kids with buds are usually disbudded, because mature dairy goats without horns are easier to manage and are less likely to injure their herdmates or their human handlers. If they are to be registered or shown, they are not allowed to have horns. Goats born without horns are called polled.

If your dairy herd includes polled does, make certain your buck is disbudded rather than polled. The polled trait is linked to a gene for infertility; if you breed a polled buck to your polled does, half of their offspring will be incapable of reproducing.

Meat Goats

In many countries, more goats are kept for meat than for any other purpose, and many people prefer goat meat to any other. Since slightly more than half of all goat kids are male and only a few mature bucks are needed for breeding, most young bucks are raised for meat. Surplus goats of any breed may be used for meat, but a breed developed specifically for meat puts on more muscle, and does so more rapidly, than other breeds. In the United States, three types of goat are kept primarily for meat.

Boer. The main meat breed today is the Boer goat. Boers originated in South Africa, where they were developed for their rapid growth, large size, high-quality meat, and uniformity of size, meat quality, and color. The Boer has a white coat, a brown or dark red head with a white blaze, and horns that curve backward and downward. A mature doe weighs 150 to 225 pounds. A mature buck weighs 175 to 325 pounds.

Spanish. Before Boer goats became popular in the United States during the latter part of the 20th century, most meat goats were essentially those that were left to roam over brushy range or forest land in the South and Southwest to keep the land cleared of brush and undergrowth. These goats are often called Spanish goats because the first feral herds were brought to this country by Spanish explorers and sometimes left behind to furnish meat for future expeditions. Because these goats vary widely in shape and color, the term *Spanish* doesn't really refer to a specific breed. Mature does weigh 80 to 100 pounds; bucks weigh 150 to 175 pounds.

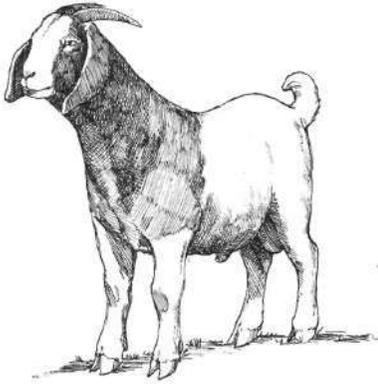
San Clemente. During the 1500s, Spanish goats were left on San Clemente Island, off the California coast near San Diego. A few descendants still survive as a kind of living history, showing us what goats must have looked like 500 years ago. At one time, so many goats populated San Clemente that they nearly destroyed the island's vegetation. However, because of a successful eradication effort, the goats are now in danger of disappearing. San Clemente goats are smaller and more fine-boned than other Spanish goats, and their horns grow more upright. They come in all colors, the most common of which is tan or red with black markings. A mature doe weighs 30 to 70 pounds. A mature buck weighs 40 to 80 pounds.

Myotonic. A rare goat formerly raised for meat, but that is today more of a curiosity, is the myotonic goat. This animal is also called the Tennessee fainting goat, the Texas nervous goat, or the wooden leg goat. Myotonic goats are not a specific breed, but they share a genetic disorder called myotonia. When a goat with myotonia is frightened by a loud noise, its muscles contract and its legs go stiff. If the animal is caught off balance, it falls to the ground and can't get up again until its muscles relax. Frequent tensing and relaxing of the muscles gives myotonic goats heavy thighs, making them suitable as meat animals. Myotonia also keeps these goats from becoming aggressive, making them good pets. Because they cannot climb or jump like other goats, they are more easily confined, but they also make easy prey for dogs and coyotes.

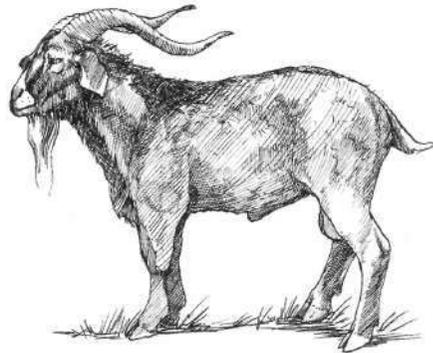
The origin of myotonic goats has been traced back to four goats brought to Tennessee in 1880 by a man from Nova Scotia who later disappeared, leaving the goats behind. When those goats were bred, their odd genetic trait was inherited by their offspring and passed on through other generations. Myotonic goats come in a variety of colors. Mature does weigh about 75 pounds; mature bucks weigh up to 140 pounds.

MEAT GOATS

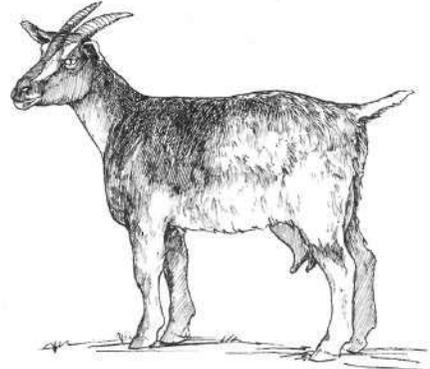
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Boer



Spanish



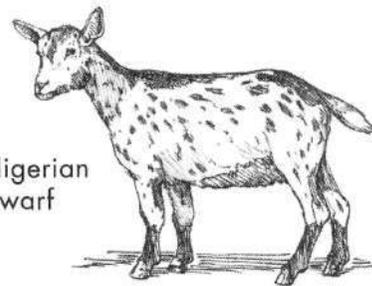
San Clemente

MINIATURE GOATS

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African
Pygmy



Nigerian
Dwarf

Miniature Goats

Miniature goats are smaller than full-size goats and therefore produce less milk or meat. Minis eat less, require less space, and have scaled-down housing needs that make them ideal for cold climates, where they spend a lot of time indoors. The two miniature breeds are African Pygmy and Nigerian Dwarf

African Pygmy. Pygmies are blocky, deep, and wide, and their faces are dished. The most common color is agouti, meaning they have two-tone hairs that give the coat a salt-and-pepper look. The Pygmy has the muscular build of a meat breed. Mature does weigh 35 to 60 pounds, and mature bucks weigh 45 to 70 pounds.

Nigerian Dwarf. The Nigerian Dwarf is a miniature dairy breed. It is smaller and finer-boned than a Pygmy and has longer legs, a longer neck, and shorter, finer hair. Nigerian Dwarfs are lean and angular, with faces that are flat to slightly dished. Dwarfs come in all colors. Mature does weigh 30 to 50 pounds, and mature bucks weigh 35 to 60 pounds.

A Dwarf yields about 300 quarts, or 600 pounds, of milk per year, which is one-third the amount you would get from a regular-sized goat. Despite its stockier build, a Pygmy doe produces about the same amount of milk as a Dwarf. The milk from miniature goats tastes sweeter than other goat milk because it is higher in fat.

Fiber Goats

Some goats have long hair that may be spun into yarn and woven or knit into fabric to make clothing, drapes, and upholstery. Two kinds of goat are known for their fine hair or fiber.

Angora. The Angora goat originated in the Himalayas and came to the rest of the world via Turkey. The name *Angora* is derived from Ankara, the capital of Turkey. Angoras are raised for their long, silky, wavy hair, called mohair. Like sheep, Angoras are sheared twice a year, in spring and fall. The average amount of mohair sheared from a doe per year is 10 to 14 pounds; a wether averages slightly more.

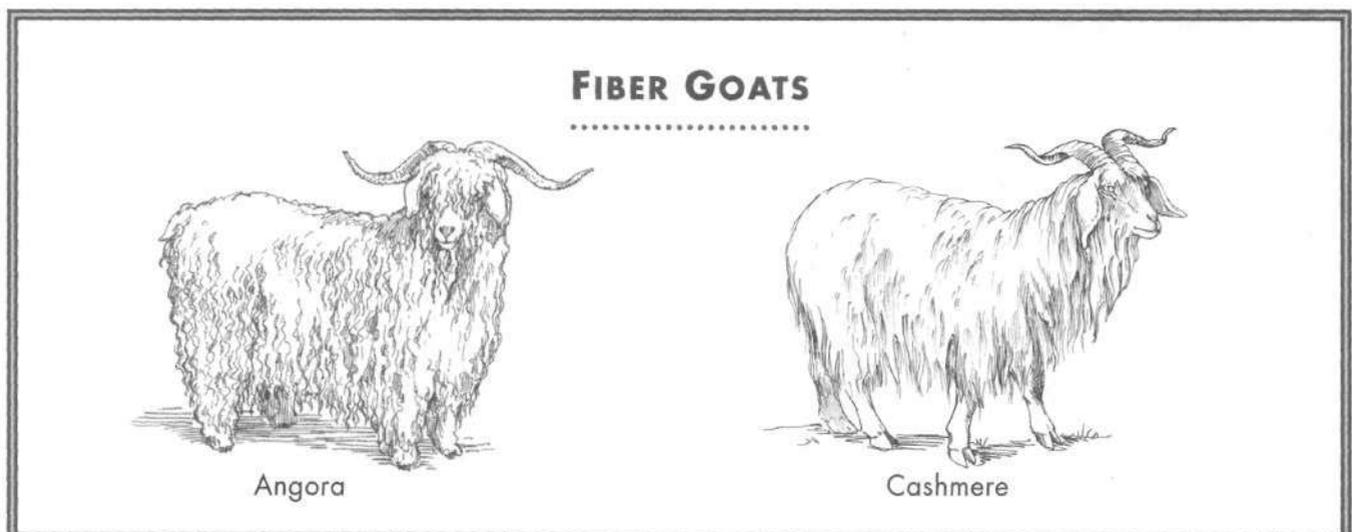
When selecting an Angora, spread the hair with your hands and notice how much pink skin you see. The less skin you see, the better. The best Angoras have hair that is neither light and fluffy nor dark and greasy. Avoid a goat with a chalky white face and ears; it is likely to have lots of straight, brittle, chalky white hairs, called kemp, that are undesirable because they do not produce quality yarn.

Pure mohair is creamy white. Colored hair results from crossing an Angora with some other breed. Naturally colored mohair is popular among hand spinners, even though the hair of a crossbred goat is usually lower in quality and quantity than the hair of a pure Angora.

Angoras have floppy ears and short faces that may be straight or slightly rounded. A mature doe may weigh 75 pounds or more. A buck usually weighs about 150 pounds.

Cashmere. The cashmere goat is prized for its fine undercoat, called cashmere. The word *cashmere* derives from the eastern Himalayan state of Kashmir. Goats originating in this area and in other cool climates grow downy coats for winter warmth.

Cashmere is not a breed but a kind of downy hair that is softer and finer than mohair. Cashmere is found on more than 60 breeds worldwide. In the United States, it most often occurs on Spanish and myotonic goats. Cashmere is usually white but may be gray, tan, brown, or black.



The best way to determine whether a young goat will produce cashmere is to ascertain that both of its parents are good producers. Cashmere is valuable because of its rarity; the average cashmere goat produces only about one-third pound of down per year. You may be able to find a good cashmere goat at a reasonable price, but top-quality mature animals cost thousands of dollars.

Making the Purchase

Once you have selected a breed, you must decide whether you will raise does, wethers, or bucks, and whether you will register them.

If you are keeping goats for milk, you must, of course, have does. Even if the milk from one doe is plenty for your needs, your doe will need a companion, which may be another doe or a wether. If you want milk year-round, you must have a second doe; a doe must be bred to produce milk, but during the 2 months just before she gives birth, she will not produce any milk. A wether is a good choice if you want to engage in goat packing or driving, since it can handle more weight than a doe. If you raise fiber goats, a wether produces more hair per shearing than does a doe, and the quality of the hair is more consistent for a longer part of its life. If you are raising a goat to butcher for meat, a wether is cheaper and grows bigger than a doe.

Getting a buck (uncastrated male) as your first goat is not a good idea. A buck must be housed separately so he won't fight with other goats or breed does that are too young. During breeding season, a buck becomes aggressive and hard to handle. In addition, a buck develops a strong odor that gets on your skin and clothing when he rubs against you. Unless you have a lot of does to breed, keeping a buck is an unnecessary expense. You'd be better off finding a buck owner nearby who is willing to breed your does.

If you choose to keep a buck and you are raising dairy goats, you'll need to provide separate facilities so the buck smell won't affect the taste of the milk. Bucks are often relegated to a back shed, which may have poorer living conditions than those enjoyed by does or wethers. This practice is not fair to the animal; bucks require the same amount of shelter and grazing land as the others. A buck kept confined to a dark shed or stall will become bored and difficult to handle. Except when bucks get excited during breeding season, they are generally just as gentle as does or wethers.

Registration Papers. When purchasing a doe or a buck, find out whether the animal is registered. A registered goat has official papers issued by an organization that keeps track of production records, show records, and pedigrees for that breed. A good goat need not be registered, although you may want registered animals if you wish to compete at shows or you might someday sell your goats. Insist on receiving the registration papers when you pay for the goat. A registered goat will cost more than a goat without papers. Exactly how much more depends on how easy it is to find the breed you want in your area. The more common the breed, the less your goat should cost, regardless of whether it is registered.

Before You Bring Home a Goat. Once you have selected the goat you wish to purchase, the final matter is to make sure the animal is healthy and sound. A healthy goat has a clean coat and bright, alert eyes. It should be as curious about you as you are about it. A good goat has a strong, wide back, straight legs, sound feet, and a wide, deep chest. Avoid a goat with a swayback, a narrow chest, a potbelly, bad feet, lame legs, or a defective mouth.

How Long Do Goats Live?

The normal life span of a goat is 10 to 12 years, but some goats live as long as 30 years. The productive life of a dairy goat or fiber goat, during which you can expect it to produce a reasonable amount of milk or fiber, is about 7 years.

Ask the seller to make a list of medications or vaccinations the goat has had, and the date of each. Ask for recommendations regarding future vaccinations. If you live in the same general area, find out who the seller's veterinarian is — good goat veterinarians are hard to find.

Ask what the goat has been eating and obtain enough of the same feed to last at least 1 week. If you plan to alter the feeding program, make the change gradually to ensure that your new goat remains healthy.

Before you take the goat home, ask the seller to trim hooves, remove horn buds, vaccinate, and perform any other necessary procedures. Even the most routine procedures cause some degree of stress, which is considerably reduced when the animal undergoes them in familiar surroundings.

HANDLING GOATS

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Working with goats can be frustrating or rewarding: frustrating if you try to work against their nature, rewarding if you put their nature to work for you. By understanding why goats act as they do, you will better know how to treat them, and the experience will be more rewarding.

Goats are like cats in that they are curious and independent and do pretty much as they please, whether or not their behavior pleases you. If you know what pleases them, you can get them to do what pleases you.

Goats are social animals. A goat should have at least one companion, which may be another goat or some other type of animal. No goat should be housed alone.

As soon as you put two or more goats together, one of them takes over. You can easily tell which goat is the herd boss — it's the one in the lead. The herd boss is usually the oldest doe, called the herd queen. The other goats won't move until the herd queen leads the way. If anything happens to the boss, the herd falls into confusion until a new leader takes control. When you visit a herd, if you don't give your attention first to the queen, she'll display jealous misbehavior.

Goats protect themselves by butting enemies with their hard heads. They also butt heads with each other in play and to determine the pecking order. Baby goats play by pushing each other with their heads and will try to push against your leg or hand. Don't let them, because as a young goat grows up, pushing turns into butting. If you teach your goats while they are young not to push or butt you, they will be easy to handle as they mature.

Goats and Other Animals

Goats get along well with other animals. They are often kept in the same pasture with cows, sheep, horses, or donkeys. Goats do especially well with cows because they eat some plants that cows won't eat, whereas cows eat inferior hay the goats turn up their noses at. Keeping cows and goats together is an economical way to manage available feed.

Goats are sometimes kept with sheep because they are generally calm, while sheep are easily frightened. Sheep tend to remain calmer with goats around.

Donkeys are sometimes housed with goats to fend off predators, especially coyotes and dogs, which donkeys will kick at or chase away. Goats also get along great with horses. In the nineteenth century, a common practice was to house a goat with a racehorse. Sometimes before a race, a competitor would sneak in and steal a goat.

The horse, missing his buddy, could become upset enough to lose the race. The horse's owner then became angry because someone "got his goat" — a familiar expression to this day.

Goats get along well with dogs and cats, too. Certain breeds of guardian dogs are used to protect goat herds. Cats are often kept as mousers in dairy barns, an arrangement that works out well. Treat your barn cats to a daily saucer of warm milk fresh from the goat, and they'll stick around.

Housing chickens with goats may be picturesque but is not a great idea. The chickens will nest in the hay and roost over the manger. Much hay will be wasted, because goats will not eat it once it's been soiled by the chickens.

Goats and Stress

Any unusual, painful, or unpleasant experience causes goats stress. Such experiences include being chased by dogs, teased by insensitive people, or handled roughly. Many ordinary events in a goat's life are inherently stressful, including being weaned, castrated, disbudded, transported, isolated, or artificially bred. How a goat reacts to stress depends somewhat on its genetic background. Some breeds, especially Nubians, are more excitable than others. Reaction to stress also depends on individual temperament, past experiences, and familiarity with surroundings.

Developing a routine for managing your goats helps reduce stress. Goats like to be fed by the same person at the same time every day. If you are late, your goats will misbehave. The same goes for milking. If you fail to milk on time or send someone unfamiliar to do the milking, your goats may act up.

Oddly enough, although regular routine reduces stress, an overly rigid routine can also cause stress. The trick is to make change part of your routine. Instead of always taking care of your goats by yourself, occasionally ask a friend or family member to come along and help. Then, if one of them takes over while you are away, your goats won't be upset by the presence of a stranger. Similarly, if you don't feed or milk at the exact same time every day, your goats won't be upset if you arrive early or late once in a while.

Because goats are naturally curious, not all new situations are stressful. Forcing a goat to confront a new situation, however, always causes stress. When a goat balks, give it a little time to check things out, and it will probably soon proceed on its own.

Preconditioning goats to new procedures goes a long way toward reducing stress. If you regularly take a doeling to the milk stand for a brushing and an udder massage, she will be comfortable with the idea of getting on the milk stand long before she starts giving milk. Handle a kid's feet frequently while it's young, and it won't balk when it needs its first hoof trim. Run the electric clippers when you handle a young goat — bringing the clippers gradually nearer until they eventually touch the goat's body — and when it's time to clip its coat, the goat won't be frightened by the noise and vibration.

Another stress reduction measure is to reassure each animal by repeating its name. Talk or sing to your goats while you milk, feed, groom, shear, medicate, or perform other chores. After a goat has had an unpleasant experience, talk calmly or sing quietly until the animal has calmed down.

. Training your goats, especially the herd queen, to be cooperative and well-mannered reduces stress for the entire herd. To minimize squabbles among the herd, start with the queen whenever you perform any procedure, such as feeding, grooming, milking, hoof trimming, and shearing.

Well-Behaved Goats

Goats that aren't handled often tend to become shy. You will have a hard time getting them to come for milking, hoof trimming, or weighing, and if you plan to show them, they will behave poorly in the show ring.

Handling goats to keep them friendly takes little time. Whenever you enter your goat house, greet each animal by name, starting with your herd queen. Scratch each goat's ears and face. Your goats will crowd around, happy to see you. If you always handle them in the same order, they will learn to come to you each in turn.

As soon as your goats are big enough, give each one a collar. A plastic chain makes a good collar. It is sturdy enough to lead a goat by but will break if the goat gets hung up somewhere and pulls away, preventing the goat from being choked by its own collar. Collars work for all goats except Angoras. Since a collar will tangle in the Angora's long hair, teach the goat to be led by its horns or chin hairs, or guide it with one hand under its chin and the other hand on its rump.

A well-behaved goat will learn to follow you when you talk gently, use its name, and put your hand on its collar or chin. A stubborn goat will plant all fours on the ground and refuse to budge. If the goat balks, grab one ear and pull firmly. A goat doesn't like to have its ears pulled and will usually come just to make you stop pulling.

A frightened goat may rear up on its hind legs. If a goat rears, let go and move out of the way to avoid being hurt. Talk gently until the goat calms down, then try again.

Packing and Driving

A benefit of having well-behaved goats is that you can use them for driving and packing. Goats make wonderful draft and pack animals because they are active, friendly, and enjoy being with people. They eat less than larger animals used for these purposes, their smaller hooves do less damage to the environment on pack trips in the wilderness, and their droppings are indistinguishable from a deer's.

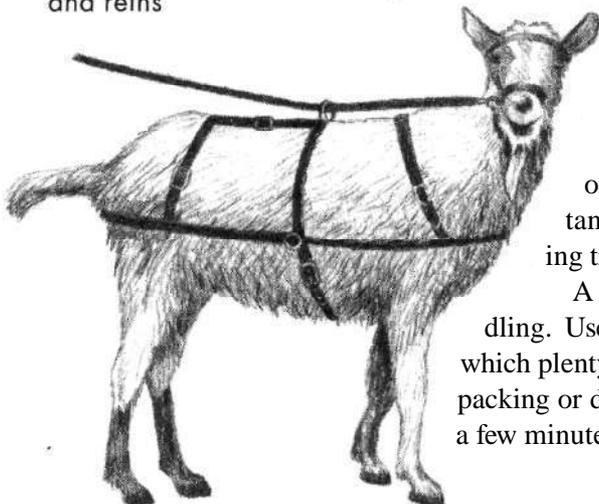
A *draft goat* pulls a cart, small wagon, sled, or other load. A draft goat may be hitched up for fun or to help with light chores, such as hauling hay, bedding, or firewood. Goat-sized cultivators are available that let you use your goat to turn garden soil.

A *pack goat* wears a saddle that may be loaded with supplies. The most common use for pack goats is to haul camping gear on wilderness hikes, but they have also been used to carry sensitive research equipment and other fragile goods into mountainous areas.

The same goat may be trained to do both driving and packing. Wethers of a European breed are most often trained for draft or pack use because they are calmer than bucks but stronger than does. A doe, on the other hand, tends to move more lightly (which may be important if she's carrying fragile items) and will supply fresh milk on camping trips.

A goat is trained to pack or drive with lots of patience and gentle handling. Use the same methods as for training a donkey, mule, or horse (for which plenty of good reference material is available). Like any animal trained for packing or driving, a goat learns through repetition, so work with it for at least a few minutes every day.

Draft goat halter, harness, and reins



Transporting Your Goats

Because goats are small, they are easy to transport. A baby goat can easily be transported in a pet carrier. Many goats ride in the back seat of the family car. On a long trip, though, you'll have to stop once in a while and take the goat for a walk.

For long distances, the back of a pickup truck works better for both the goat and the human passengers in the cab. The goat must not be able to jump out and must be protected from wind. The pickup bed should be covered with a camper shell or a sturdy stock rack wrapped in a tarp. Add a little bedding to help the goat keep from slipping during curves or sudden stops.

HOUSING GOATS

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A goat's housing needs are simple: fresh air; a place to get out of hot sun, blowing wind, and cold rain and snow; a clean place to sleep; and safety from predators.

Goats are incredibly curious creatures. They constantly check things out. If the fence develops a hole, in no time they will find the hole and wiggle through. If you accidentally leave a gate open, before you know it they'll be down the road checking out the neighborhood. Goats investigate not only with their eyes but also with their lips, which they use to test new foods and objects, including gate latches. If a latch moves, they'll keep working it until it falls open, and out they go.

Goats also chew on things. If you use a rope to tie a gate shut, a goat will chew through the rope, open the gate, and go exploring. Electrical connections are especially dangerous for a goat to chew. Since a goat will stand on its hind legs and stretch to investigate anything that looks interesting, make sure all electrical wiring and fixtures are well out of reach.

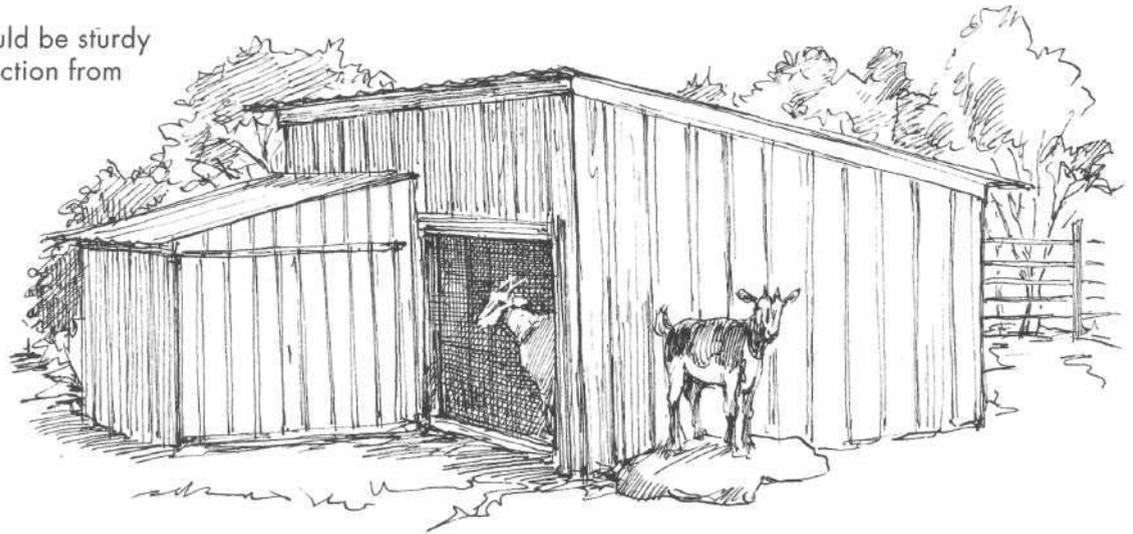
Goats are famous for their ability to jump. Kids love to leap against a wall and push off with all fours. If the wall has a glass window in it, the glass could shatter and the kid could be seriously cut. Goats also love to climb. Make sure your goats can't climb onto the roof of their house. Their sharp hooves could cause the roof to leak, and even though goats are surefooted animals, one could fall off the roof and break a leg.

Every time you visit your goats, check around for things that could hurt them. A nail sticking out of the wall can rip open a goat's lip. A loose piece of wire can get wrapped around a goat's neck or leg. A rake or pitchfork lying on the ground can pierce a goat's foot.

The Goat House

Goats require a dry, clean shelter, which need not be fancy. Any sturdy structure will do as long as it provides shade and protection from rain, snow, and wind. Goats will keep one another warm down to temperatures as low as 0°F, provided they can get out of wet and drafty weather. To find out whether your goat house is too drafty, go out on a cold or windy day and squat down to goat height. If you feel an uncomfortable draft, your goats will feel it, too. Seal the gaps where the wind comes through. On the other hand, take care not to make your goat house too tight, since good ventilation promotes good herd health.

A goat house should be sturdy and provide protection from the elements.



Goats suffer more in warm weather than in cold weather, Swiss breeds, because they originated in cool climates, suffer more in warm climates than desert breeds do. Using electric animal clippers to give them a trim will keep these longhaired goats cooler.

When temperatures get above 80°F, make sure your goats have shade and cool water. Stir up a breeze indoors by opening the doors and windows. To keep your goats from escaping through the wrong door, create a screen door of sorts by using a stock panel or other sturdy open wire structure that lets in the breeze but keeps the goats confined.

In warm climates, give your goat house a south-facing wall that may be removed in summer to increase air movement. In climates that remain mild, the house will need only three walls. Some large dairy herds are sheltered by only a roof and one or more half walls mounted with hayracks. Sometimes meat herds, and often brush herds, have no housing other than a wooded area for protection against the weather.

A small family herd, however, should have a shelter, no matter how rudimentary. Allow at least 15 square feet of housing per goat, 10 square feet per miniature. If you're building from scratch, plan now for future herd expansion.

In addition to the main area, you will need at least one smaller stall to hold one goat. An extra stall will come in handy for housing a sick or injured goat, a pregnant goat that is about to kid, or kids you wish to wean.

You will need space to store feed, supplies, and dairy equipment away from the goats' living area. Separate the storage area from the goat area with a wall at least 4 feet high; the half wall lets you watch your goats and your goats can watch you while you work in the storage area.



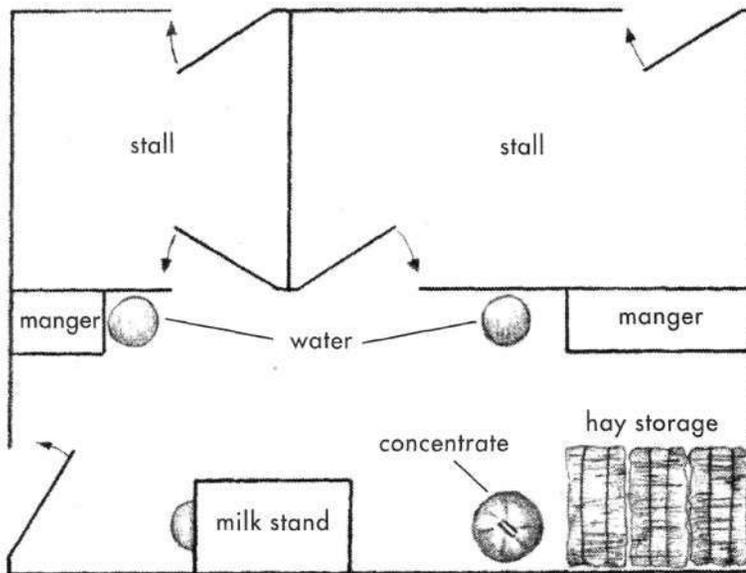
Goats should be able to reach their heads into, but not enter, the feeding area.

Feeding Arrangements

A well-designed goat house lets you feed and water your goats from the storage area without entering their living space and getting mobbed. Head-sized openings to the feeding area let a goat reach through to munch on hay in a manger. A manger is nothing more than a trough designed to keep the hay off the ground, where it won't get trampled or dirty. Clean hay is important, because goats like to snack all day long.

Through additional openings, the goats can drink water from a bucket. Keep the bucket outside their living area so the goats can't easily fill it with droppings or kick it over.

Layout for a typical goat house



Allow one opening per goat for hay so all your goats can eat at the same time. Because they are herd animals, goats tend to all eat and sleep at the same time. However, they won't all drink at once; you'll therefore need fewer additional openings for water. One opening per six to eight goats should be adequate, depending on how rapidly they empty the bucket and how often you refill it. If you have a lot of goats and you install watering devices that refill automatically, you'll need fewer water openings.

Make the feed and water openings just big enough for a goat to push its head through but not big enough for its whole body to get through. An opening big enough for a doe's head is big enough for a kid to pop through — which is another good reason for housing weaned kids in a stall separate from adult goats.

To keep Angoras from getting bits of hay in the hair of their heads and necks, build their manger of stiff wire or slats of wood spaced 2 inches apart.

Bedding

Packed dirt makes a good floor for a goat house because it lets urine and other moisture drain away. Better yet is to cover the dirt with a slat floor made from 2x4 lumber set on edge with 1/4-inch gaps between the boards. Design the floor in sections that may be lifted for cleaning.

A plain dirt floor should be covered with a thick layer of bedding. Shavings make excellent bedding. Straw also works fine, if you clean it out often. Otherwise, it gets packed down so tight that you'll hurt your back removing it, unless you have a tractor with a front loader and tines. Waste hay that isn't moldy is the most common bedding for goats. Hay is the primary food of goats, but they tend to eat only the best parts and leave the rest. Using waste hay as bedding saves you money by making use of leftovers. The goats will help you out by pulling hay into their living area and spreading it around to make themselves comfortable.

Goats that spend their days on wet or filthy bedding may develop a bacterial infection in their udders or hooves. Keep the bedding clean and dry by periodically removing and replacing it. Between cleanings, spread a fresh layer on top as often

as necessary to provide your goats a clean place to sleep. Some people replace the bedding weekly; others replace it only in the spring and fall. The more often you clean out the bedding, the easier the job.

Each day, each goat produces about 1 1/4 pounds of manure and 11/4 pounds of urine. Some of this manure and urine gets mixed into the bedding. Used bedding from a goat house makes good fertilizer for flower beds, vegetable gardens, or fruit and nut trees. To fertilize crops and gardens, spread the used bedding in the fall and work it into the soil so it is well rotted by spring planting time. Before mulching trees and shrubs, compost the bedding to avoid damaging plants with fresh manure.

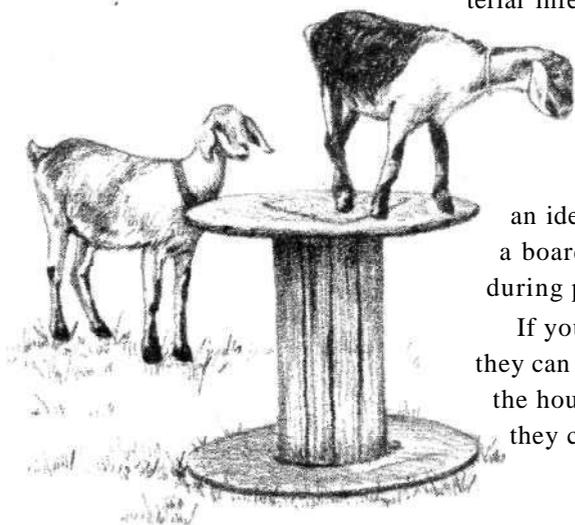
The Goat Yard

Goats need space outside to wander around and get fresh air and sunshine. Allow at least 200 square feet of outdoor space per regular-sized goat, 130 square feet per miniature.

A yard on the south side of the house gets more sun and stays drier than a yard on the north side, an important factor in avoiding damp ground that can lead to bacterial infections of the hoof. The yard should slope away from the house for good drainage. If your land is level or drains poorly, erect a wooden platform or a concrete pad in the yard to give your goats a dry place to stand. A concrete pad also gives goats a place to scrape their feet, which helps wear down excess hoof growth.

Goats of all ages love to jump and play. An outcropping of rocks makes an ideal play area. A popular and inexpensive toy is an empty cable spool with a board securely nailed over the holes in both ends so that the goats can't slip during play and break a leg.

If you provide your goats something to climb on, take a good look to see what they can climb onto from there. Make sure the climbing object is far enough from the house that they can't jump onto the roof, and far enough from the fence that they can't jump over and escape.



An empty cable spool is a popular toy.

A Goat Fence

Goat owners love to say that "a fence that won't hold water won't hold a goat." Of course, that's a slight exaggeration — but only slight. Most goat troubles occur because of inadequate fencing. Goats are curious, agile, and persistent. If there's a way to escape, they'll find it. They can flatten their bodies and crawl under a fence or spring off the ground and sail over it. If they can't get under or over a fence, they'll lean on it until they crush it down.

Goats seem to believe the grass is greener on the other side of the fence, and they'll stretch their necks to eat that grass and whatever else is growing out there. They will nibble on trees and shrubs growing within 2 1/2 feet of the fence. In doing so, they push against the fence until they bend it out of shape.

A goat loves to scratch its back by leaning sideways against a fence and walking along in one direction. It will then turn and go the other way to scratch the other side. Sooner or later, all that pushing and rubbing will knock down a flimsy fence. A properly built fence not only keeps goats where they belong but also protects them from predators, such as stray dogs, coyotes, wolves, and bears.

A goat-tight fence may be made of woven wire or electric strands. A woven-wire fence should be 4 feet high for calm breeds such as myotonic goats and Angoras and 5 feet high for active breeds such as miniature goats and Nubians. Woven wire comes

with 6-inch or 12-inch openings. Wire with 6-inch spacings is best because kids can't slip through it. Attach the wire to 8-foot posts driven at least 2 1/2 feet into the ground every 8 feet. Place corner post and gatepost bracing on the outside of the fence; if you brace on the inside, your goats will use the braces to climb up and out.

Electric fence wire may be used in conjunction with a nonelectric fence or to build an all-electric goat-tight fence. One strand of electrified wire placed 12 inches off the ground on the inside of a fence will keep goats from pushing against the fence. Another strand placed about nose high will keep goats from leaning on the fence or jumping over.

Electrified wire is the way to go if you wish to goat-proof an existing non-electric fence. If you are building a new fence, it's cheaper to make it all electric from the start. Use high-tension smooth wire and a high-energy, low-impedance energizer. Goats will stay away from it because they don't want to get shocked; however, the fence must always be on. Your goats will test the fence constantly, and the moment the juice goes out, so will they.

An electric fence need not be as high as a woven wire fence; up to 40 inches will suffice. String the bottom wire 5 inches from the ground. String the second wire 5 inches from the first, the next wire 6 inches up, the next wire 7 inches up, the next wire 8 inches up, and the top wire 9 inches up. Connect every other wire to the energizer, and the alternating wires to the ground. For safety reasons, you must get all the connections right.; if you aren't sure how to build an electric fence, consult an expert or a good book (see Recommended Reading, page 379).

The Goatproof Gate

Goats are expert gate-crashers, so take special care in designing your gate. Make the gate as high as the rest of the fence. Use a latch that goats have trouble opening. A latch that requires two different motions, such as lifting and pulling, is more difficult for a goat to open than a latch that simply flips up.

No matter what kind of latch you use, secure it with a bolt snap, available from any hardware or farm store. Attach the snap to the gate with a short chain so you can't drop it, put it into your pocket, or otherwise misplace it

Install the latch partway down the gate, on the side away from the goats. They won't be able to reach over the gate to work the latch, but be sure you can reach the latch from the inside — if a tall person installs the latch, a shorter person may have trouble reaching it.

Hinge the gate to open into the yard, toward the goats. Even if the goats manage to open the latch, they'll be pushing against the gate and keep it shut. Make the gate strong enough to support the weight of a goat standing on its hind legs to peer at the world outside the goat yard.

FEEDING GOATS

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Goats, like humans, need a balanced diet to remain active and healthy and to produce kids, milk, meat, and fiber. A goat's digestive system fills up one third of its body. Like cows and sheep, goats are ruminants. (See pages 313-314 for a detailed description of the ruminant digestive system.)

Even among ruminants, goats eat the widest range of plants. Their ability to use plants other animals can't digest makes them popular as livestock worldwide.

Grazing and Browsing

Humans and other animals with simpler digestive systems need dietary fiber to stimulate digestion, even though their stomachs cannot digest the fiber itself. A goat's digestive system breaks down fiber into nutrients the animal needs for survival. Fiber is a goat's main food, and the goat consumes it in the form of grass, hay, twigs, bark, leaves, cornstalks, and various other plant parts.

Whereas some animals are grazers, reaching down to munch on grass and other low-growing plants, and others are browsers, reaching up to snack on leaves and bark, goats are opportunistic feeders — they eat whatever is available. Given a choice, they wander from one food source to another, grazing and browsing as necessary.

Because they can eat such a varied diet, goat herds can live in diverse circumstances. Some goats roam entirely in wooded areas, others are kept on pastures, and still others are confined to barns and have all their food brought to them. Each arrangement has advantages and disadvantages.

Letting your goats browse or graze reduces feeding time, labor, and expense. Since feed is about 70 percent of the cost of keeping goats, letting them forage adds up to big savings. Foraging works well for meat and fiber breeds. Allowing dairy breeds to browse forested areas, however, may not be a good idea for two reasons. First, brambles and low branches can scratch udders. Second, some plants give milk an unpleasant flavor. Dairy goats are more often allowed to graze on improved pasture (pasture that is maintained by the owner), where their udders are safe from harm and weed control eliminates wild onion, garlic, mint, and other plants that give milk a bad flavor.

Goats kept on pasture produce more milk, but the milk has a higher water content than the milk of goats not allowed to graze. For cheese makers, the higher percentage of water is problematic because the milk produces less cheese than does milk with a lower water content. Goats in commercial dairies are therefore confined to loafing sheds, where all their feed is brought to them. The confinement system is also suitable for goats living on a small lot with insufficient land for browsing or grazing.



Left to their own devices, goats browse on shrubs and trees, much like deer.

Feeding Hay

Whether goats browse, graze, or are kept in confinement, they need hay. Hay is nothing more than pasture plants that have been cut, dried, and stored loose or compressed into square or round bales.

On average, a goat eats 3 percent of its body weight in hay each day, which adds up to about 4 pounds for a large goat and 2 pounds for a miniature. If a square bale weighs 40 pounds, two full-grown goats will consume approximately 73 bales per year. Since a goat won't eat more hay than it needs, feed hay "free choice" — that is, always keep the manger full, so that the goat can eat hay whenever it wants to.

Fresh green pasture plants contain a high percentage of water. If pasture is a goat's sole source of feed, the animal will have a hard time satisfying its hunger. Hay takes the edge off, making the goat less likely to scarf down poisonous plants or overeat proper pasture plants. In addition, fermentation in a rumen full of nothing but fresh pasture produces excess gas that cannot escape fast enough, causing the rumen to bloat dangerously. A goat that eats plenty of hay before going out to pasture will not graze frantically to curb its hunger and will be much less likely to bloat. A goat that can come and go as it pleases, munching on free-choice hay and wandering out for a mouthful of pasture, has little chance of bloating.

The quality of hay varies, as does a goat's nutritional needs. A growing goat, a pregnant doe, and a lactating doe all have higher nutritional needs than a mature wether or an open dry doe (one that is neither pregnant nor giving milk). During breeding season, a buck's nutritional needs are higher than at other times of year.

Legume hays, such as alfalfa, clover, soybean, vetch, and lespedeza, provide excellent nutrition for kids, pregnant does, and lactating does. Grass hays, such as timothy, red top, sudan, bromegrass, and fescue, are less nutritious. A good all-purpose hay is a 50-50 grass-legume mix.

Look for early-cut hay that is fine-stemmed, green, and leafy. Buy hay sold for goats or horses; hay sold for cows is often too stemmy. Goats, especially milking does, can be pretty persnickety about eating hay with coarse stems; they'll nibble down the tender parts and leave the rest. Bucks and wethers will eat stemmy hay when forage is sparse, but if they have a choice they, too, will waste most of it. Stemmy hay does not even make good bedding.

Hay sellers advertise through the classified section in the newspaper, especially from late spring through early fall. Various county agriculture offices keep lists of hay growers. The clerk at your feed store may know someone who sells hay, or the feed store may stock it.

Most goat owners prefer to handle small square bales, even though many growers have switched to large round or square bales that are easy to transport by tractor. Small square bales that are easy to move by hand are ideal for the small goat herd. For a large herd, the large square or round bales may be more convenient, but they require a feeding system suitable for doling them out.

You can buy hay by the load delivered to your door. To save money, you can sometimes buy hay in the field, right after it has been baled. The grower will expect you to pick it up and probably load it yourself onto your truck. If you do not have room to store enough hay to last a year, find a grower who will store it for you and let you pick it up as you need it. Expect to pay more for stored bales than for hay purchased in the field.

Keep your hay under cover and off the ground on pallets. Properly stored hay retains its nutrients for a long time, but one good rainstorm can ruin baled hay. Never feed your goats moldy or musty-smelling hay.

Unless the hay is exceptionally good or your goats are exceptionally hungry, about one third of the hay will go to waste. Remove leftover hay from the manger every morning and use it as bedding or toss it onto a compost pile. Don't put the hay directly onto your garden soil, or you will introduce unwanted weed seeds.

Concentrate

A young growing goat and a mature animal that produces kids, milk, or fiber needs more nutrients than even the most nutritious hay can provide. Such a goat requires a ration that contains grains and other nutrient-rich feeds combined into a dietary supplement variously called goat feed, goat chow, goat ration, or concentrate (because it is a concentrated source of nutrients).

Not all goats in a single herd require the same amount of concentrate at the same time. One doe may be dry while another is lactating. One may be still maturing while another is about to give birth. Even two does of the same size and age, both dry or both lactating, may require different amounts of concentrate to maintain the same body weight or to produce the same amount of milk.

Feeding guidelines are therefore nothing more than estimates. Always use your own best judgment. If you raise miniature goats, feed them approximately one

half the amount required by large goats. Keep written records to remember who gets what. Adjust concentrate levels according to the following four factors:

The quality of the roughage the goats eat. Goats that eat fresh browse, green pasture, or good hay need less concentrate than goats that get little or no browse or pasture and poor-quality hay.

Each goat's physical condition. A well-conditioned goat is fleshed out but not too fat. A dairy goat is too fat when you can't feel her ribs. A fiber goat or meat goat is too fat when you can grab a handful of flesh behind the elbow. If a goat is too thin, feed more grain. If a goat is too fat, feed less grain.

The goat's age. Let kids nibble on concentrate as soon as they are interested. At first, they will just mouth the ration with their lips, but as they grow they will learn to relish their little taste of grown-up feed. After the kids are weaned, gradually work up to 1 pound of concentrate per day. When feeding any goat 1 pound or more per day, divide the concentrate into two feedings, morning and evening. Feeding too much concentrate at once upsets the rumen's balance.

The goat's level of production. Mature goats that are not pregnant or lactating require a maintenance ration that provides just enough nutrients to maintain the animal's health and body weight. A maintenance ration for wethers and open dry does on good browse or pasture need not include concentrate. A supplemental feeding of 1/4 to 1/2 pound (1 to 2 cups) of concentrate per day, however, increases the growth rate of a meat goat, improves the hair growth of a fiber goat, and keeps all goats easier to handle because they look forward to your regular visits with the feed can.

Open dry does or wethers raised in confinement may be fed up to 1 pound of concentrate per day. The same applies to open dry does and wethers that normally browse or graze but whose feeding pattern is disrupted by bad weather or whose forage supply has been curtailed by drought. Since open dry does and wethers have low nutritional requirements, you may save money by feeding them shelled corn, barley, oats, wheat, sorghum, or milo instead of commercial concentrate. Whole grains that are dry and hard do not digest as well as grains that have been rolled, crimped, cracked, or flaked.

A pregnant dry doe that is not a dairy breed should be kept on a maintenance ration until 6 weeks before she gives birth. Then feed her a little concentrate, gradually increasing the amount to 1 pound. After she gives birth, continue feeding 1 pound a day (1 1/4 pounds if she has twins) until her kids are 6 weeks old, then begin gradually decreasing the concentrate. By the time her kids are 3 months old, the doe should be back on a maintenance ration.

DIETARY CHANGES

Anytime you change a goat's diet, you run the risk of disrupting the rumen's digestion activity. To keep your goat from getting sick, make all dietary changes gradually. Whenever you increase or decrease the amount of concentrate a goat gets, do it gradually over several days. If you change from one kind of hay or concentrate to another, mix the new feed with the old in increasing quantities until the switch is complete.

CONCENTRATE FEEDING GUIDELINES*

Kid	Nursing Weaned	Nibble 1-2 lbs.
Maintenance ration	Fresh forage available	¼-½ lb.
	No fresh forage available	1 lb.
Wether or open dry doe		Maintenance ration
Nondairy goat	Pregnant dry	Maintenance ration
	6 weeks before kidding	Increase to 1 lb.
	Nursing	1-1¼ lbs.
	3 months after kidding	Maintenance ration
Dairy goat	Pregnant dry	1 lb.
	2 weeks before kidding	Increase to 3 lbs.
	Lactating	½ lb. per 1 lb. milk (1 lb. minimum)

**Reduce amounts by half for miniature goats. Adjust all amounts to each goat's condition.*

If your pregnant dry doe is a dairy breed, feed her about 1 pound of concentrate per day. During the last 2 weeks of pregnancy, gradually increase the concentrate to about 3 pounds a day by the time she gives birth. During early lactation, when her milk production is increasing, feed her a minimum of 1 pound of concentrate per day plus an additional 1/2 pound for each pound of milk she produces over 2 pounds. During late lactation, when her production has leveled off, feed her 1/2 pound of concentrate per pound of milk. After the doe has been bred, gradually decrease her concentrate to 1 pound per day, and start the feeding cycle again.

Above all, remember that concentrate is a supplemental ration and not a goat's main diet. No matter how little or how much concentrate a goat gets, it should have access at all times to as much hay as it wants.

Concentrate Feeders and Storage

Some herd owners feed concentrate from a communal trough, but doing so can mean that timid goats don't get their fair share. Feeding concentrate to each animal separately means each goat gets an appropriate portion and the portion is tailored to the individual goat's needs.

Placing feeders in a manger the goats can access through the usual feed hole ensures that each animal eats its own ration. To keep fast eaters and bullies from stealing feed from others, you may find it necessary to run a chain across their feed holes so that they can't get out until everyone is finished eating.

Lactating does are often fed on the milk stand to keep them from getting restless. However, if you train your does to stand calmly without being fed, they won't get restless when they finish eating before you finish milking.

Concentrate comes in 50-pound bags. Store unopened bags away from moisture, out of the sun, and off the ground. Your feed store may let you have a wooden or plastic pallet to store sacks on. Otherwise, raise sacks off the ground by using bricks, concrete blocks, or pieces of lumber.

After opening a bag, pour its contents into a clean plastic trash can with a tight-fitting lid. A 10-gallon can holds 50 pounds. Storing concentrate in a can keeps it from getting stale or absorbing moisture from the air. Moisture causes concentrate to become moldy; never feed moldy grain to goats. Empty the can completely before pouring in another bag, so that stale concentrate won't build up at the bottom of the can.

Store concentrate where your goats can't get into it. Otherwise, they will jump on unopened sacks until they tear a hole. They will work on the lid of a storage can until they get it open. The resulting feast will disrupt rumen fermentation, and the goats will become ill, like kids who eat too much candy the day after Halloween. In the case of goats, however, all that fun could prove fatal. As a safety measure, in case a goat should get out, secure the lid of the storage can with a bungee cord.

Besides preserving the feed, a storage can keeps out munching mice, which consume an astonishing amount of concentrate while fouling what they leave behind, until the goats may turn up their noses at it. When you transfer feed from the sack to the can, take care to avoid spillage, since mice are attracted by spilled grain. Sweep the floor of your storage area regularly. In spring and fall, when barn mice are most active, reduce the population by using traps baited with peanut butter. Better yet, keep a cat in your barn and reward it with a daily saucer of warm goat milk.

Soda and Salt

The rumen ferments its contents best within a narrow range of acidity. Feeds that ferment rapidly increase the rumen's acidity. If the acidity goes up too fast, the microorganisms that cause fermentation multiply too fast. As a result, the rumen's balance is upset, and the goat becomes sick. Your goat's health therefore depends in part on proper rumen acidity.

Alkaline substances, such as sodium bicarbonate (common baking soda), reduce acidity. A goat eats soda to keep its rumen acidity within the proper range. The goat knows when it needs soda, and how much. All you have to do is make sure your goats can get soda when they need it. Feed-grade baking soda may be purchased at any feed store and is less expensive than baking soda from the grocery store.

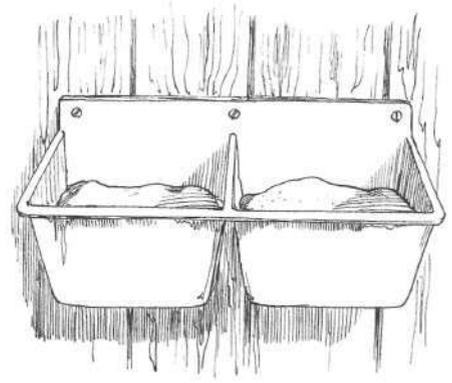
Each day, a goat will lap up an average of 2 tablespoons of soda. Lactating does, and all goats on summer forage, eat more soda than at other times. The choice should be theirs.

Sodium chloride, or common salt, helps control rumen acidity, aids digestion in other ways, and helps keep a goat's body tissues healthy. Besides regular salt, goats require many other minerals in minute amounts. They obtain some of these trace minerals from good hay, fresh forage, and concentrate. To make sure your goats get all the minerals they need, give them free-choice trace mineral salt, which is a combination of trace minerals and salt and is sold at any feed store. It comes in loose form, like table salt, or compressed into a block. Loose salt is easier for many people to handle than a heavy block and is easier for goats to lick, especially at times when their salt need is high.

Your feed store may sell a trace mineral mix formulated specifically for goats. If not, get the mix for horses or cows. The mix must contain copper, iodine, and selenium. Copper is essential for dairy goats. If your goats browse on trees and other deep-rooted plants, or if their drinking water flows through copper pipes, they already have some copper in their diet and need less from the trace mineral mix. Iodine and selenium are both essential for a doe to give birth to healthy kids. Iodine and selenium do not occur in plants grown in regions where these minerals are lacking in the soil.

Be careful not to overfeed trace minerals. Excess iodine in a doe's diet makes her milk taste unpleasant. And because excess selenium in the diet can be toxic, do not give your goats trace mineral mix containing selenium if the soil in your area is high in selenium. The soil tends to be high in selenium in Colorado, Kansas, Montana, Nebraska, North Dakota, South Dakota, Utah, and Wyoming. The soil is deficient in selenium in some areas of the Northeast, the southern Atlantic seaboard, and the Pacific Northwest in the United States and in the Maritimes and parts of British Columbia in Canada. Your local veterinarian or county Extension agent can tell you if the soil in your area is high or low in selenium.

An easy-to-clean plastic salt feeder is available for a few dollars from nearly any farm store. Clean and refill the feeder often. Salt attracts moisture that causes the surface to crust over. Soda and salt both turn lumpy from the water dripping off the chin of a goat that has just had a drink. And your goats will periodically delight in backing up to the feeder to fill it with droppings.



Soda and salt feeder

Water

The most important and least expensive item in a goat's diet is water. Goats should have access to clean, fresh water at all times. Water aids digestion, controls body heat, and regulates milk production. The more water a doe drinks, the more milk she gives. Lactating does drink more water than dry does. All goats drink more water in warm weather. They drink less when they graze on spring pasture, because fresh grass contains water.

An ideal way to make drinking water available at all times is to have waterers that refill automatically, which requires installation of some plumbing. In winter, wrap the lines with heater tape to keep the water from freezing, or install a heater device in the water fount.

A 5-gallon plastic bucket works well as a water container for a small herd. Place the bucket outside the stall, where it may be accessed through a head hole. Keeping the water bucket outside the stall means your goats can't knock it over and wet the bedding, fill it with droppings, or accidentally drop a kid into it while giving birth. A goat won't be able to get its head through the handle and spend the day wandering around with a bucket hanging around its neck.

Goats will not drink water that has been contaminated. Many items may contaminate the drinking water, including hay, hair, manure, insects, and a drowned mouse. Empty and refill the bucket at least once a day, and scrub it with a plastic brush and bleach at least once a week.

To encourage your goats to drink, fill the bucket with cool water in warm weather and warm water in cool weather. In cold weather, you must keep the water from freezing. If the goat house has electricity, keep the water from freezing by setting the water bucket on an electric pan heater or by using a plug-in bucket with a self-contained heater. Both devices are available through farm supply sources (see Resources, page 380). Otherwise, check the water at least twice daily and break ice as necessary.

BREEDING GOATS

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Part of a doe's normal annual cycle is giving birth. Whether you keep goats for milk, meat, or fiber, selling kids is one way to earn income that pays for their upkeep. You may choose to raise the kids yourself as meat for your family. If you keep a doe as a pet or for fiber, you may choose not to breed her at all. A doe used for dairy purposes, on the other hand, must be bred each year to renew milk production.

Most dairy goats produce more milk than their kids need. They give more milk over a longer period than meat or fiber goats, but over time, their milk production gradually lessens. Does that give milk steadily for more than a year are exceptions.

When to Breed

In deciding when to breed each doe, consider three factors:

Her age and size. Do not breed a young doe until she reaches at least 75 percent of her mature weight, which usually happens when she is about 8 to 10 months old. A doe may think she is ready to breed when she is 6 months old, but breeding her before she is large enough may stunt her growth. A doe that is bred early will produce fewer kids that are smaller than normal.

When she was last bred. Renewing a doe's milk production by breeding is called freshening. Most dairy goats are milked for 10 months of the year, then are given 2 months off before they freshen again. Meat and fiber goats are often bred every 8 months. Once-a-year breeding, however, will give your doe time to rest and produce more kids per breeding over her lifetime.

The season. A doe must come into heat, or estrus, before she may be bred. Spanish goats may come into estrus every 3 weeks year-round. For most other goats, the breeding season is August, September, and October. Most dairy goats are bred during September and October so they will give birth when spring's green pastures provide the extra nutrition a freshened doe needs. Angoras are usually bred from August through November, after the fall shearing, so they will kid after the spring shearing. Cashmere does are bred no later than mid-November so their kids will be weaned by the time down starts growing in late June; otherwise, lactation may decrease fiber production.

Estrus

Throughout the breeding season, a doe comes into estrus every few weeks. Estrus lasts for 2 to 3 days. The time between the start of one estrus and the start of the next is called the estrus cycle. Different does have different estrus cycles, ranging from 17 to 23 days. The average doe has a 19-day cycle. Keep accurate records on each doe to track her exact cycle.

Some does show little or no signs of estrus, a phenomenon known as silent heat. Most does show some signs, but each has different signs or different combinations of signs. As you record each doe's estrus cycle, note the signs she displays so you'll know what to look for next time.

Signs of estrus are as follows:

- The doe may "talk" more than usual. She may bleat so loudly you think she is in pain. Don't worry, she isn't.
- She may urinate more often than usual.

- The area under the doe's tail may become dark or swollen and wet. You may see sticky mucus that will be clear early in estrus and white toward the end of estrus.
- The doe may be restless. She may flag, or wag her tail. She may let you handle her tail, or she may move away if you try to touch it.
- The doe may give more milk than usual just before coming into heat, then give less milk than usual for a day or two.
- She may mount another doe as if she were a buck, or let other does mount her.
- If a buck lives nearby, you'll have no doubt when a doe is in heat. She'll get as close to the buck's yard as she can. The buck will wag his tongue, slap a front hoof against the ground, urinate on his own face, and otherwise act the fool.
- If no buck is around, you might trick the doe into displaying signs of estrus by using a buck rag, which is a piece of cloth rubbed on the forehead of a mature buck and placed in a sealed container. When you open the container near a doe in estrus, she will show clear signs of interest.

Flushing

A doe gets pregnant more easily and has more kids if she gains weight starting 1 month before she is bred until 1 month afterward. When a doe gains weight, more eggs "flush" from her ovaries during estrus. Getting a doe to gain weight at breeding time is therefore called flushing. Flushing is more important for a thin doe than for a well-conditioned doe. To get the maximum benefit from flushing, worm your does before breeding season.

You may flush does in one of three ways:

- Move them to fresh pasture.
- Feed them an extra 1 to 1 1/2 pounds of alfalfa cubes, pellets, or hay each day.
- Feed them an extra 1/2 to 1 pound of grain or concentrate each day.

The Buck

For a small herd of does, keeping a buck may not be economical, but it's convenient if no suitable breeding buck is nearby. Otherwise, by the time you recognize the signs of estrus, make an appointment to have the doe bred, and transport her to the buck's location, it may be too late. If you'd rather not own a buck, you might arrange to lease one during breeding season.

If you find a suitable buck nearby, make breeding arrangements with the owner in advance. Find out whether the owner will be reachable on short notice and what the breeding fee will be. Some stud owners like to keep the doe overnight to make sure she is bred. Others expect you to wait while the doe is bred so you can take her back home with you.

No matter which breeding arrangement you prefer, seek a strong, healthy buck that's been well cared for. If you plan to do some serious breeding, sell the kids for breeding, or show the offspring, the buck should be the same breed as your doe. If you plan to raise or sell the kids for meat, the buck need not be the same breed as the doe. Mating your doe to a buck of a different breed, in fact, often produces larger, faster-growing kids.

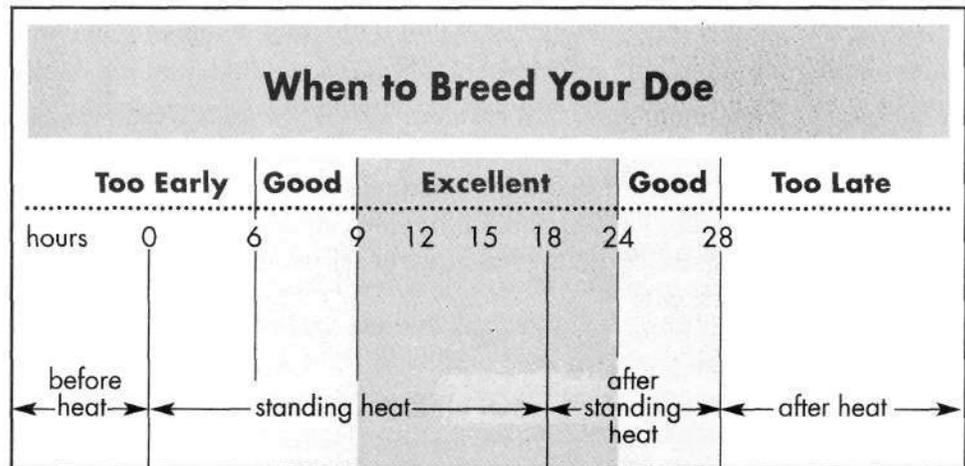
Breed a fiber doe to a buck with good fiber quality. Breed a dairy doe to a buck whose dam had a good record in milk production. To improve the udders of your doe's offspring, select a buck whose dam has a good udder. If the buck has been bred

previously, try to look over his offspring as well. If he has produced quality kids in the past, he will probably continue to do so.

Breed your does only to a buck with sound, strong, well-trimmed feet. A buck with poor feet may have a hard time mounting the does.

Like does, the buck should be wormed and his concentrate ration increased in preparation for breeding season. These measures help produce healthy, motile sperm.

If you cannot find a suitable buck within a reasonable distance, you may wish to breed your does by artificial insemination (AI). To find an AI practitioner, contact the nearest goat club, check the ads in one of the goat magazines (listed in the appendix), or ask your veterinarian. The AI practitioner will help you select a buck through descriptions in a catalog and arrange to purchase that buck's semen for local storage until your does come into heat. When your doe is in estrus, the AI practitioner may come to your place or may ask you to take your doe elsewhere for insemination. You will be charged for both the semen and its placement. Artificial insemination can be costly; be sure to find out in advance how much it will cost.



Mating

A doe is ready to breed when she is in standing heat. A doe that is not in standing heat will move away from a buck that tries to mount her, whereas a doe in standing heat waits patiently to be mated. Some bucks have to go through their whole clownish routine before getting down to business, but the act of mating itself takes just a few seconds. You can distinguish a trial run from the real thing by the way the buck arches his back before uncoupling from the doe.

By remaining on hand for the mating, you can be sure the act has been completed and you can make a close estimate of the kidding date. If you are away a lot, you may prefer to run a buck with your does during breeding season. This is a lot less work for you, but you never know for sure when each doe has been bred and, therefore, when she is likely to kid. In these circumstances, chances are greater you won't be on hand to help out if something goes wrong at kidding time, such as the doe having trouble during labor, the newborn kids suffering frostbite in freezing weather, or kids getting trampled by anxious herdmates or butted to death by a suspicious first-time mother.

As each doe is bred, note the date and the names of the doe and the buck. You might jot this information on a calendar in the goat barn and transfer it to a notebook or computer database at the end of breeding season. If you have your doe bred by a

registered buck and you plan to register the kids, you will need a formal service memo signed by the buck's owner that shows the date, the names of the doe and the buck, their registration numbers, and the owners' names. The organization that registers your breed supplies pads of preprinted service memos to buck owners. Since the owner may be busy, be sure to ask for this record at the time your doe is bred.

When a doe has been successfully bred and becomes pregnant, she is said to have settled. A doe that does not settle usually comes back into heat on her next cycle. If she settles, she will not come back into typical heat. She may show some signs of estrus when her next cycle is due, but they won't be as strong as usual. If you put her together with a buck at that time, she will display little interest in him. For the next 150 days, the doe will spend much of her time sleeping.

GESTATION AND KIDDING

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The gestation period for goats is approximately 150 days, give or take 2 weeks. First-time mothers often kid early, especially if they are carrying more than one kid. A doe that kids late may give birth to extra-large kids and may therefore have trouble in labor. Keep a record of the gestation period for each doe; you will find that each follows her own pattern, which will help you predict pretty precisely when she is likely to kid next time. Note the time of day as well as the date, since each doe tends to be fairly consistent whether she gives birth in broad daylight or in the wee hours of the morning.

Managing the Expectant Doe

Except for dairy goats, most does will no longer be giving milk by the time they are bred; they will have dried off naturally after their previous kids were weaned. A dairy doe may be milked up to 2 months before she is due to kid, then should be dried off so that her body can rest. Drying off consists of discouraging milk production by putting the doe on a maintenance diet and by no longer milking her. Some does dry off on their own. Others will stop producing milk within a few days after you stop milking. A really good milker may continue producing milk. Relieve the doe of the excess milk about 1 week after you stop the regular milking. But do not continue milking her regularly, because that encourages further milk production.

As kidding time draws near, you will need to attend to a few management chores:

Adjust the doe's diet. Using the guidelines in the section on feeding goats (page 187), adjust the doe's diet to ensure that she is getting hay of the proper quality and the right amount of concentrate for her age, breed, and condition.

Give vitamins and minerals. Unless you live in an area where the soil is high in selenium, give each doe a selenium injection 1 month before she is due to kid. If your herd does not have access to fresh forage, also give each doe an injection containing vitamins A, D, and E. Obtain the doses from your veterinarian or the owner of a large goat herd. If you have never given an injection, ask a veterinarian or experienced goat handler to show you the proper procedure.

Crotch the doe. Before the due date, use electric clippers to trim the hair from the doe's udder and tail and beneath her tail. This procedure, called crotching, makes the doe more comfortable and makes kidding cleaner. Crotching lets you more easily watch the doe's udder development and helps newborn kids find her teats. A kid can starve by sucking on a doe's long hair by mistake. Crotching also makes it easier to clean postkidding fluids from the doe's hindquarters and udder.

Gestation Checklist

Date of breeding _____

Signs of return of estrus
(17–23 days) _____

Dry off (90 days) _____

Start increasing feed
(100–120 days) _____

Inject selenium and vitamins
A and D (135 days) _____

Kidding day (150 days,
more or less) _____

Clip your own nails. As kidding time gets close, keep your fingernails cut short. If you have to help out, long fingernails may scratch and injure the doe.

Prepare a kidding stall. Have a clean stall ready with fresh bedding where the doe can kid in a relatively sanitary environment. Straw or waste hay makes better bedding than shavings, which tend to stick to a wet newborn kid. Make sure the water bucket is positioned where a kid can't be accidentally dropped in and drowned. The best place for the water bucket is outside the stall, so that the doe has to drink through a head hole.

Arrange for help. If this kidding will be your first, try to find an experienced goat or sheep keeper who is willing to be on hand at kidding time. That person can at least reassure you that everything is going fine (which it usually is). If you can't find someone to be on hand in person, find one who is willing to offer advice over the phone at a moment's notice (and at any time of day or night) and come right away should you feel you need help.

Assemble kidding supplies. Before kidding starts, gather the following supplies and keep them in a handy place. After each doe kids, replenish your supplies in preparation for the next kidding. You don't want to be running around looking for things when a doe starts to kid; you need to be there to watch. If you keep your supplies in a clean container with a lid, you can leave them at the goat barn. Store medical items that might freeze in a separate smaller container, such as a lunch bucket, and leave it where you can grab it as you hurry out the door.

- Paper and pencil to write down the date and time of kidding, order of birth, and any unusual events or problems
- A pair of overalls and a washable jacket (kidding can be messy)
- A snack for yourself, in case you're at the goat barn a long while and can't or don't want to leave to get something eat
- A large box to put the newborn kids in
- Plenty of old towels or large absorbent rags to line the bottom of the box and dry the newborn kids
- A hair dryer to dry the kid fast in cold weather
- A heat lamp in case a kid is weak or sickly (needed only in freezing weather)
- Tamed iodine (such as Betadine) to coat the kid's navel
- Soap and a container to hold warm water to wash your hands
- Long surgical gloves (available in drugstores) in case you have to reach inside the doe
- Water-based lubricant (such as K-Y jelly) to lubricate your hands in case you have to reach inside
- Two uterine boluses of antibiotic (available from a veterinarian or farm store) per doe to prevent infection in case you have to reach inside
- A stack of old newspapers, so the second kid won't land in the mess left by the first kid and to wrap the afterbirth for disposal
- A scale so you can weigh each kid as soon after birth as possible
- A washcloth to clean the doe's udder after she kids
- A bottle and rubber nipple in case you need to feed a kid with a weak sucking instinct
- Popsicle sticks and surgical tape to splint a kid's legs if it can't stand properly.
- Ear splints and surgical tape to straighten out folded ears (needed only if your doe is a Nubian; see page 199)
- Molasses to mix with warm water to feed the doe after she gives birth
- A bowl or bucket to hold the warm molasses water
- A handful of raisins or roasted peanuts to reward your doe

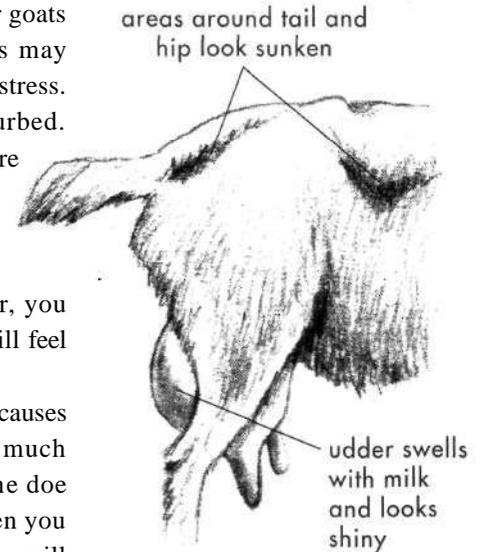
It's Almost Time

When a doe is due to kid, you should separate her from the other goats. The stall where the herd lives is probably not clean enough for a newborn kid. The other goats may panic at the sight of kids and butt or trample them. And the other goats may become curious when birthing starts, crowding around and causing the doe distress. The new mother needs space to bond with her new kids without being disturbed.

Signs that kidding is near may be distinct or undetectable. A few days before a doe kids, her udder may swell and look shiny; however, some does won't swell with milk until after the kids are born. The hairless area beneath the doe's tail may redden and swell. The doe may show little interest in eating.

A doe carries kids on her right side. When her time for kidding draws near, you can put your hand on her side and feel the kids moving. As long as you can still feel them, they probably won't be born for at least 12 hours.

Just before birth, the kids will move back toward the birth canal. This shift causes the areas around the doe's tail and hips to look bony. Her muscles may loosen so much that she can't hold her tail down, and it will remain in an upward position. The doe will probably become extremely affectionate toward you, perhaps nickering when you approach her and trying to lick your face. She will discharge thick mucus. She will get restless. She will paw the ground and repeatedly lie down, then stand up.



Signs that kidding is near

Pregnancy Toxemia

If a doe stops eating late in pregnancy, she may have pregnancy toxemia, also known as ketosis. This condition occurs when a doe draws energy from her own body to feed her developing kids. It is seen most often in first-time young mothers, in does carrying multiple kids, in extremely fat does, and in does that have not received sufficient nutrition throughout pregnancy.

As a result of pregnancy toxemia, the doe becomes progressively weaker, may wobble when she walks, has trouble getting up, and may appear lame. A good preventive is to keep a bag of feed-grade dry molasses on hand to sprinkle on top of the concentrate of any pregnant doe that shows signs of going off feed. If a doe becomes weak before you notice she has gone off her feed (as may happen if you have more than a few does), stronger measures are needed to keep the doe alive. Give her 2 to 3 ounces of propylene glycol twice a day until she kids. Pregnancy toxemia may be prevented through proper nutrition.

It's Time!

Most kids are born without human help. Chances are good, in fact, that you will go out to check on a doe only to find she has already given birth. It's a good idea to try to be there during the event, in case the doe needs help. However, unless a problem occurs, let your doe kid on her own. The most she will likely need from you is moral support. Some does seem to wait for the comfort of your arrival before they start giving birth. Others seem to deliberately wait until you leave.

When a doe lies down and starts straining and groaning, she is in labor. Soon the water sac will emerge; do not break it. When it breaks on its own and fluid spills out, a kid will soon follow. Usually, the first thing you see is a pair of tiny white hooves. Then you will see a little nose resting on the hooves. If you see two hooves and no nose, don't worry. The kid could be coming out back legs first, which is perfectly normal — the birth will just take a little longer.

' Once you see the hooves, the doe will strain a few more times, and out will come a newborn kid. The doe should lick her kid, which stimulates it to breathe and creates a bond between mother and offspring.

How many kids a doe has depends on her age and breed. An older doe usually has more kids at a time than a doe giving birth for the first time. Angora and Spanish goats have either one or two kids. A Pygmy usually has twins. Most other breeds have either twins or triplets. Nubians and myotonic goats may have four or five kids at a time. A doe that is herself a twin, triplet, or quadruplet is more likely to have twins, triplets, or quads. Flushing a doe before breeding increases her chances of producing multiple kids.

If the doe starts straining again after the first kid emerges, dry the first kid and put it into a clean box out of harm's way. You don't want it to be trampled or rolled on while the second one is being born. Scatter fresh bedding over the mess left by the first birth, or spread newspapers behind the doe to give the next kid a clean place to fall.

Stay with your doe until you are certain she has had all her kids. You don't want to come back later to find that a kid has died because the doe was so busy taking care of the first one that she didn't clean off the second one's face to help it breathe.

The birth of kids is exciting but can also be scary the first time around. Talking to your doe and repeating her name in a reassuring tone will help keep both of you calm. No matter how nervous you are, stay as calm as possible so the doe will remain calm as well.

When a Doe Needs Help

If the doe is straining and you see two hooves but no nose, the kid's head may be folded back. You might see a nose and only one hoof, or no hooves, because one or both legs are folded back. In these cases, the doe needs your help. Here's what to do:

1. Wash the area under the doe's tail with soap and warm water.
2. Scrub your hands and arms with soap and water and put on surgical gloves, if you have them. Lubricate your hands with water-based lubricant (K-Y jelly) or liquid soap.
3. Reach inside the doe and feel for the kid's feet and nose.
 - If the kid's head is turned back, push the feet back until you have room to move the head forward,
 - If one or both legs are folded back, push the kid back and try to bring both legs forward, one at a time. Cup your hand around each hoof so it doesn't tear the doe.

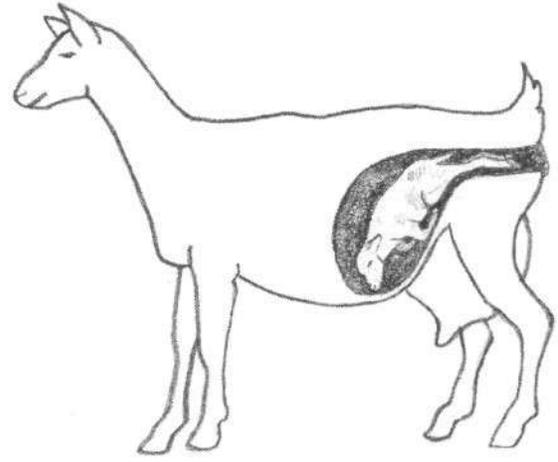
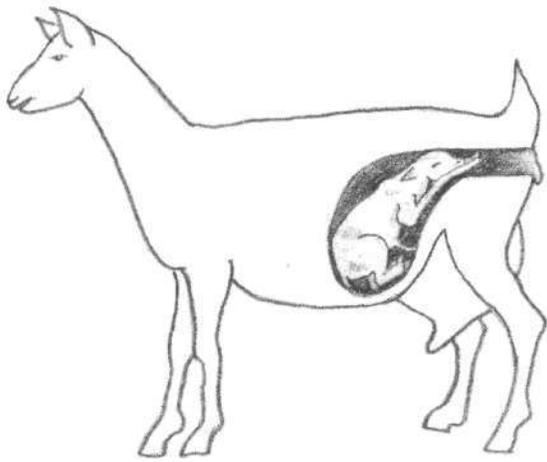
Take care to ascertain exactly what it is you are feeling. If the doe is carrying more than one kid, they may be tangled together. Follow each leg to the body so you know that both legs belong to the same kid. If two kids are coming through at once, push one back to give the other more room,

4. When you have one kid in proper position, take hold of both of the kid's legs and pull gently, but pull *only when* the doe strains. *Do not attempt to pull out the kid when the doe is not straining.*

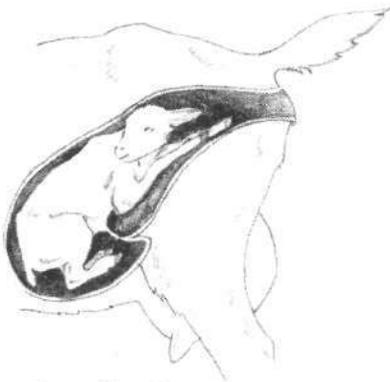
5. To prevent infection due to your intrusion, after all the kids are born, scrub your hands, take two uterine boluses, reach inside the doe again, and deposit the boluses.

If you fail to get things sorted out or your doe strains for more than 45 minutes without giving birth, get help immediately. A doe that has trouble giving birth may die, her kids may die, or both may die.

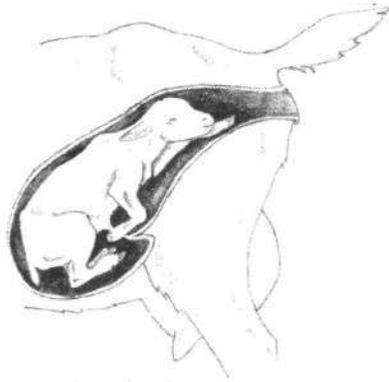
NORMAL KIDDING POSITIONS



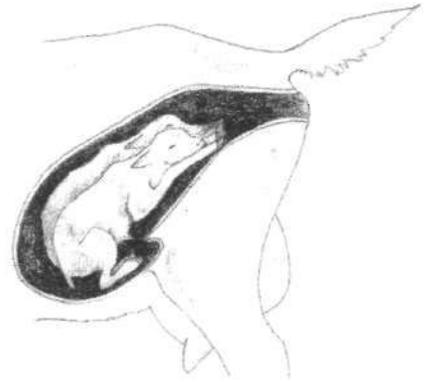
PROBLEM KIDDING POSITIONS



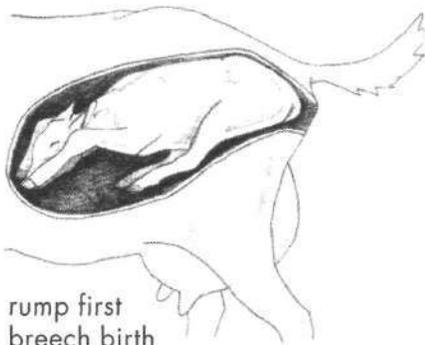
head back



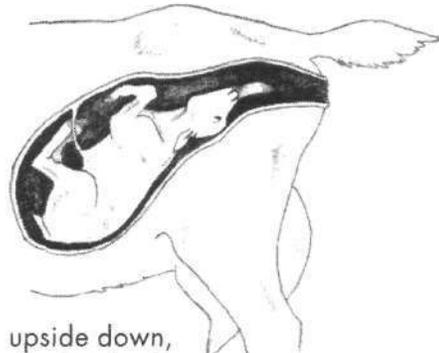
one leg back



two at once



rump first
breech birth



upside down,
one leg back

After the Birth

Thirty minutes to 12 hours after a doe gives birth, she will pass the afterbirth — a mass of bloody tissue. Most does produce only one afterbirth, but occasionally a doe will pass two. The doe may try to get rid of the afterbirth by eating it. Even though goats are vegetarians, eating the afterbirth is a normal and instinctive act designed to avoid attracting predators to the birth site. If you find the afterbirth before it is eaten, wrap it in newspapers and dispose of it.

Never pull on afterbirth while it is hanging from the doe. It may still be attached, and you could cause the doe to bleed to death. If the afterbirth does not fall out on its own within 24 hours, call the vet.

Giving birth causes a doe to lose a lot of fluids, and she will probably be thirsty afterward. Give her a bucket of warm water with a little molasses mixed in. Besides replacing lost fluid, warm water will help her relax and pass the afterbirth, and the molasses will provide energy.

As a reward for a job well done, offer the doe a handful of raisins or roasted peanuts. Feed her as usual, but don't worry if she doesn't eat right away. Depending on how hard she labored and how many kids she produced, she may be tired and prefer to rest. Some goats, however, have their heads in the hay manger the moment kidding is over.

Breeding and Birth Record	
	No. _____
On (date) _____	Buck (name of buck) _____
Registration No. _____	Registry _____
Was Bred to Doe (name of doe) _____	
Registration No. _____	Registry _____
Owned by _____	
Address _____	
Signed (buck owner) _____	
Date of Birth _____	
Name of 1st Kid _____	Sex _____
Description _____	
	Tattoo: L _____ R _____
Name of 2nd Kid _____	Sex _____
Description _____	
	Tattoo: L _____ R _____
Name of 3rd Kid _____	Sex _____
Description _____	
	Tattoo: L _____ R _____

The new mother will discharge bloody fluid for up to 2 weeks after kidding. Keep her comfortable by cleaning her tail and udder twice a day. Use warm soapy water, pat her dry with a paper towel, and coat the hairless parts with dairy balm (such as Udder Balm or Bag Balm) if they appear dry and chafed.

As each kid is born, note the date, time of day, and duration of labor. Weigh the kid and jot down its birth weight and sex. When a doe has two or more kids, note any identifying marks that will help you remember their order of birth. If two kids look exactly alike, put temporary marks inside their ears with a marking pen until you can identify some other distinguishing feature. You may choose to name them at this time, or you may prefer to wait until some feature of appearance or personality hints at an appropriate name.

First Things First

A kid is born covered with slimy mucus. The doe licks the kid's face to remove the mucus so it can breathe. If the doe is distracted by another kid on the way, help her out by cleaning the first kid's nose and mouth. If the kid does not start breathing immediately, tickle the inside of its nose with straw. If you hear rattling sounds when the kid breathes, lift it by its back legs so mucus can easily drain from its airways. You will know the kid is okay when it bawls, an indication that it has gotten enough air into its lungs.

In cold weather, dry the kid rapidly with old towels or clean rags so that it won't become chilled. If the weather is freezing, complete the job with a hair dryer or towels warmed in a clothes dryer. If you find a newborn kid that is not moving or feels cold, warm it up in a hurry. A kid that is shivering but otherwise seems fine may be warmed by holding it inside your jacket. A kid that is not breathing or moving may be warmed by soaking it in warm (not hot) water for 15 minutes, then drying it thoroughly and placing it on a heating pad or under a heat lamp while it revives. Even a kid that appears to be dead may be brought around, so don't give up too easily. A kid that has been cold or wet for too long, on the other hand, may not revive.

Do not put a kid under a heat lamp unless it is premature, sickly, or suffering from extreme cold. As soon as a newborn kid is dry, its body should adapt to normal temperatures. Using a heat lamp prevents healthy kids from adapting and therefore does more harm than good. As long as the kids have a draft-free place to curl up and sleep, they should be fine. In the coldest weather, a small doghouse provides the kids a place to sleep where their own body heat will keep them warm.

A newborn kid has a bloody umbilical cord hanging from its navel. If the cord is long enough for the kid to step on, reduce its size by cutting it with a clean, sharp knife or scissors a few inches from the body, where the cord starts to thin. Do not cut through the cord close to the body, where it is thick and pink, and do not pull the cord off. To prevent bacteria from invading through the navel area, coat the cord and navel with a tamed iodine solution, such as Betadine, or chlorhexidine (Nolvasan) solution.

Folded Nubian Ears

Nubian kids are sometimes born with folded ears that don't straighten out right away. If you don't flatten them, the ears will remain permanently folded. Keep a supply of ear splints cut from stiff cardboard in this pattern. You will need two splints for each folded ear. As soon as the kid is dry, sandwich the folded ear between two splints, keeping their narrow ends upward. Tape the splints firmly together. Remove the splints in 3 or 4 days.

Ear splint pattern

If a kid tries for several minutes to stand up but can't, its legs may be weak. Strengthen a weak leg by sandwiching it between two Popsicle sticks and wrapping tape firmly (but not tightly) around the splint. Remove the splints after 2 or 3 days. Replace them only if the kid has trouble walking without them.

Keep the doe and her kids apart from the herd for a few days while they learn to respond to one another's calls. The kids need time to learn where the udder is and to grow strong enough to scamper away when they get butted for trying to steal milk from the wrong doe.

Colostrum

The first milk a doe produces after kidding is called colostrum. It is thicker and yellower than regular milk, because it contains extra nutrients. It also contains antibodies that help protect a newborn kid against disease.

Some kids are ready to nurse as soon as they can stand. Others want to rest first. A newborn kid can absorb antibodies from colostrum for only about 24 hours; it should have taken in several helpings by then. Don't let more than 2 hours go by without ensuring that a kid gets its first colostrum.

The easiest way to feed colostrum is to let the kid nurse. Clean the doe's udder with a clean cloth and warm soapy water, and dry it with a paper towel. Make sure the teats are functioning by gently milking a stream from each side. Getting the milk started may also help remove the waxy plug that seals each teat, making it easier for the kid to start nursing. If the doe is a heavy milker, the pressure from her milk-swollen udder may already have caused the plugs to pop out.

After you squirt a bit of colostrum into a kid's mouth, the kid should start sucking right away. Some kids, however, don't initially have a strong sucking instinct. If a kid won't suck, milk the doe and put the colostrum into a small flexible bottle, such as a clean single-serving soft drink bottle. Fit the bottle with a nipple, such as the Prichard Teat designed for this purpose; it is available at some farm stores and all mail-order goat supply outlets. Warm the filled bottle in hot water for a few minutes until a squirt of colostrum placed on your wrist feels neither hot nor cold.

Put your finger into the kid's mouth and rub gently back and forth along the length of its tongue. As soon as you feel the kid attempt to suck, squeeze a little warm colostrum onto the back of its tongue and stroke the throat until it swallows. Keep at it until the kid drinks 1/2 cup of colostrum. After a nap, the kid should be stronger and ready to nurse on its own.

Bottle Feeding

Bottle feeding can be a nuisance, since kids need to eat every few hours around the clock. The milk must be warmed before each feeding, and the bottles and nipples must be scrupulously cleaned afterward. These conditions may not sound intimidating until it's 2 A.M. on a cold winter morning.

Sometimes you have to bottlefeed kids because the doe won't let them nurse. She may try to get away from the kids or butt them, injuring or killing her own offspring. A doe that will not accept her kids was probably herself raised on a bottle. Think about the long-term ramifications before starting your kids down the bottle-feeding trail.

Despite the drawbacks, some goat owners choose to bottlefeed their babies. One reason is to keep their goats friendly and people-oriented. Kids raised by hand

TREATING COLOSTRUM AND MILK TO PREVENT CAE

Colostrum is sensitive to heat. If it gets too hot, it turns into a thick pudding and its antibodies are destroyed.

To properly heat colostrum, put it into a double boiler (to prevent scorching), clip on a candy thermometer, and stir steadily. Have a thermos bottle filled with hot water ready. While heating colostrum, do not remove the thermometer or stirring spoon and then return it to the pot, or you may reinfect the colostrum. When the colostrum reaches 135°F, pour the water out of the thermos and pour in the colostrum. Screw on the lid and wrap the thermos in towels.

After 1 hour, open the thermos and test the colostrum with a clean thermometer. The temperature must be no less than 130°F. If the temperature dips below 130°F before 1 hour is up, you'll have to start over.

Milk is far easier to treat than is colostrum, since pasteurization destroys the CAE virus. Directions for pasteurizing milk are given on page 223.

Cool the colostrum or milk to 100°F before feeding it to the kids. The temperature is just right when you can't feel a drop placed on the inside of your wrist. Some pasteurizers have a setting for colostrum, making heat treatment easy and foolproof.

are like puppies — always happy to see you. Kids raised by a doe, on the other hand, tend to be shy unless you take time every day to work at socializing them.

Another reason to bottlefeed kids is to keep some of the doe's milk for yourself. An alternative to bottle feeding for this purpose is to house the doe at night separately from the kids when they reach 2 weeks of age. Milk the doe in the morning for yourself, then put the kids in with her so they can nurse the rest of the day.

Yet another reason to bottlefeed kids is to avoid spreading caprine arthritis encephalitis (CAE), a virus for which no cure and no preventive measures are known except to break the disease cycle. (The disease does not affect humans.) The best way to avoid this virus is to purchase only certified CAE-free goats. A doe that is not certified may be infected with the virus and pass it on to her kids. Kids usually get CAE by nursing from an infected doe (although they may also be infected before they are born or through contact with infected goats after birth).

Bottlefeeding kids colostrum and milk known to be CAE-free helps break the disease cycle. Colostrum and milk from cows, as well as milk replacer available from the farm store, are virus free and may be fed to kids instead of goat milk. Kids raised on cow milk or milk replacer, however, don't grow as well as kids raised on goat milk. CAE is more likely to be transmitted through colostrum than through milk. Goat colostrum and milk must be heated to destroy the CAE virus.

Each kid should get milk or milk replacer amounting to not less than 15 percent nor more than 25 percent of its body weight each day. Kids kept at the maximum of 25 percent of their body weight will grow fast and sleek. Kids kept closer to the 15 percent minimum will start nibbling on hay and other forage earlier and be easier to wean.

To make sure kids are getting the right amount of milk, weigh them at least every other day and increase their ration accordingly. Divide the total daily amount into four or five evenly spaced feedings for the first couple of days. By the time the kids are 1 week old, they may be fed three or four times daily. Gradually work down to two feedings per day at evenly spaced intervals.

Kids may be fed from individual bottles or from a community bucket with several nipples around the bottom. Using separate bottles ensures that each kid gets the right amount. If you have more kids than you can feed with a bottle in each hand, you can make or purchase a rack that holds multiple bottles, allowing all kids to nurse at the same time. A bucket is easier to handle than multiple bottles and reduces the amount of time needed to clean the bottles, but slow eaters may not get their full share.

To keep track of feeding times and amounts, make a chart showing what time the kids are scheduled to be fed and how much each should get. Update the chart each time you weigh the kids. Place a checkmark on the chart after each feeding — an important procedure if you are busy and forgetful, or if more than one person helps feed the kids.

Weaning

When a kid is born, only one of its four stomach chambers — the abomasum — functions. A newborn kid therefore digests milk like a puppy, kitten, or human baby with a single-chamber stomach. By the time the kid is 1 week old, it begins nibbling on hay, grain, and grass. The more solid feed it eats, the more quickly the three other chambers develop. Keeping bottlefed kids on the hungry side encourages early eating of solid foods, provided free-choice hay or browse is available. As soon as your kids start eating solid foods, make sure they have access to clean drinking water at all times. They may not drink any at first, but they should have the option to do so.

How much concentrate kids need is influenced by the quality of their hay; the lesser the quality, the more concentrate they need for proper nutritional balance and growth. The proper amount for each kid also depends on the animal's size and growth rate. Cut back on the concentrate if a kid is getting too fat — if you can't feel the ribs of a large-breed kid or you can grab a handful of flesh from behind the elbow of a miniature breed. Like milk, concentrate should be divided into two evenly spaced feedings. As a general guideline, by weaning time, regular-sized kids may be gradually worked up to 1 pound of concentrate per day, miniatures to 1/2 pound.

Most kids no longer need milk by the time they reach three times their birth weight or 8 weeks of age, whichever comes first. Angoras grow more slowly than other breeds and are usually not weaned until they reach 4 months of age.

Weaning a bottlefed kid encourages early rumen development and frees up your time for other things. To start weaning bottlefed kids, substitute water for a small portion of the milk. Gradually decrease the amount of milk and increase the amount of water. The kids will be weaned without even noticing.

If your kids nurse, weaning can be upsetting for the kids, the doe, and you. When you separate a kid from its mother, both parties will carry on dramatically. They won't get so upset if you put them in side-by-side stalls where they can see each other. After a few weeks, the kids will be weaned and may be put back with their mother.

If you raise meat goats or fiber goats by nursing, don't worry about weaning. Your doe will produce only as much milk as her kids need. When her milk is no longer needed, she will dry off naturally and her kids will be automatically weaned.

Raising Kids for Meat

When raising kids for meat, your goal is to get the fastest weight gain at the least cost. The meat that is the least expensive to produce and has the mildest flavor comes from milk-fed kids that are 6 to 8 weeks old and weigh less than 35 pounds.

Raising grain-fed kids is more costly, but their meat is more flavorful. In addition to their milk ration, these kids get a small amount of grain from the age of 6 weeks to about 12 weeks, when they weigh 50 pounds or more and are ready for market.

The least expensive way to get full-flavored meat is to wether your bucklings and let them nurse as long as they like (and the doe will allow), and then put them on pasture. By the time a wether is 1 year old, it should weigh 80 pounds or more.

If you are raising Boer goats for meat, the best marketable live weight is about 85 to 95 pounds, yielding a carcass weighing 45 to 50 pounds.

Although goat meat is delicious, it has never caught on in mainstream America, perhaps in part because the English language has no one-word name for it. "Goat meat" is a more direct term than such words as "beef" and "pork," and people in the goat meat industry are trying to come up with a suitable name for their product. Meanwhile, those who market goat meat borrow words from Spanish or French. The meat of a 2- or 3-month-old kid weighing less than 50 pounds is called cabrito or chevrette. The meat of a 1-year-old wether weighing about 80 pounds is called chevon. Meat from older goats is called chivo or mutton.

For information on butchering goats, cuts of meat, and meat storage, consult a comprehensive book (see Recommended Reading, page 379).

Tracking Weight

The average newborn kid weighs about 7 pounds. Doelings may weigh less, bucklings more. Triplets and quads weigh less than twins or singles. Miniature kids weigh about half as much as full-size kids. Weigh each kid at birth, as soon as it is dry but before it has its first meal. Track each kid's growth by weighing it every other day for the first 4 weeks, then once a week until it reaches maturity. Record the dates and weights on a chart. (For instructions on how to weigh a kid, see page 209.)

After the first week, a kid should gain 1/4 to 1/2 pound per day. Some grow faster than average; some grow slower. Except briefly during weaning, at no time should a kid lose weight.

If a kid fails to gain weight or loses weight, look for a reason. Perhaps it is not getting enough milk. If the kid is nursing, make sure that the mother is producing sufficient milk. Check her udder: Perhaps a teat is plugged, or the udder is infected and sore, causing the doe to push the kid away when it tries to nurse.

If the doe is nursing more than two kids, she may not have enough milk for them all. A strong kid may push a weaker kid aside at nursing time. In that case, you may have to bottlefeed the slow-growing kid.

If a kid you are bottlefeeding grows slowly, you may not be feeding it enough. Charts apply only to the average goat. In real life, no average goats exist. Make adjustments to suit the needs of your individual animals.

Take care not to go overboard by feeding your kids too much milk at once, or they will get diarrhea. Diarrhea, also known as scours, is a dangerous cause of weight loss.

Scours

A kid's first bowel movement is black and sticky. Then, for the next few days, the kid passes yellow, pasty material that may stick to the hair around the hind legs and rear end and need to be cleaned off. When a kid is about 1 week old, it starts dropping small brown pellets that resemble the droppings of mature goats, only smaller. Droppings that are loose and white, light yellow, or light brown indicate diarrhea.

Diarrhea, or scours, is a fairly common problem, especially during a kid's first few days of life. It more often strikes bottlefed kids than kids that nurse naturally. Scours may be caused by chilling, erratic feeding, dirty bedding, dirty milk bottles, overeating, and milk that is too rich. If the problem is not corrected immediately, the kid will die.

Avoid scours by washing bottles and nipples after each feeding and rinsing them in warm water mixed with a splash of household chlorine bleach. Feed kids small amounts at a time, and space feedings evenly throughout the day.

If a kid gets diarrhea, stop feeding milk. Substitute an electrolyte fluid in an amount equal to the amount of milk the kid would otherwise drink. Some goat supply outlets sell electrolytes mixed specifically for goats. In a pinch, you can use Gatorade or mix up a homemade electrolyte drink from the following ingredients:

- 2 tablespoons table salt (sodium chloride)
- 2 tablespoons Lite salt (potassium chloride)
- 2 1/2 gallons water

The scours should clear up within 2 days of substituting electrolyte fluid for milk. If not, consult your veterinarian. The kid may have a disease.

Scouring in a 3- or 4-week-old kid is probably due to coccidiosis, caused by microscopic parasites called coccidia that are always present in the soil. Properly managed kids are exposed to coccidia gradually and develop immunity. Kids that live in filthy conditions or that must drink water with manure in it are exposed to too many parasites at once. The main symptom of coccidiosis is diarrhea, which is sometimes tinged with blood. Treatment is with a coccidiostat; this medication is available from farm stores, goat supply outlets, and veterinarians. Even if a kid recovers from coccidiosis, it may never grow to be fully productive. Since coccidia flourish in warm, humid weather, careful scheduling of breeding may help prevent infection. Manage your does to give birth during the cold days of winter, which gives the kids time to grow and develop immunity before warm weather comes.

Identification

Even if your goats are not registered, each animal should have a unique means of identification to help you sort out the look-alikes and help your veterinarian keep track of health tests. Federal regulations require the identification of goats in certain categories (see the box on the facing page). If you plan to do any pedigree breeding or to register your goats, you need a way to positively identify each animal. Different registries recommend different systems of identification, so before you mark your goats, check with the appropriate breed organization. Some registries recommend using two methods to ensure that at least one endures for the animal's life. The most common forms of identification are ear tags, tattoos, and ear notching.

Ear Tags are commonly used for meat and Angora goats. Tags are sold at farm supply stores; they come in plastic or metal and in a variety of shapes and sizes. Goats

IDENTIFICATION REGULATION

The United States Department of Agriculture requires certain categories of goat to bear some means of identification, especially if they are involved in interstate travel. The purpose of this program is to eradicate a relatively rare disease called scrapie.

Ear tags are the preferred method of identification, although some states allow tattoos. For details, contact your state's U.S. Department of Agriculture (USDA) Animal and Plant Health Inspection Service office, which you may locate by calling the federal office toll free at 1-866-873-2824. Information is also available online at www.aphis.usda.gov/vs/nahps/scrapie.

are so active that some styles are easily torn off, injuring the goat's ear. The safest tags for goats are round button tags that attach to the center of the ear, where they are less likely to be torn off than tags that attach to the edge. Another option that is easier to read than a button tag is a small rectangular tag that clips to the front of the ear.

Ear tags come in various colors and may be preprinted or blank. Depending on the manufacturer, preprinted tags may be numbered sequentially (you assign the next available number to the next kid born) or may include other information, such as your name or initials, your herd or farm name, or your city and state. If you use blank tags, you must mark them yourself with an indelible marker. Over time, the information wears off; unless you check often, the original information may be lost before you get around to renewing the markings.

For your goats to comply with federal and state scrapie regulations, you must use USDA-approved ear tags. Along with any other information you wish to include, each tag must bear your premises number (which you will be assigned) and the animal's unique identification number.

Tattooing. Proper tattooing as a means of permanent identification is used for dairy goats, and sometimes in combination with ear tags for meat and Angora goats. Tattoo kits with goat-sized numbers and letters are available from any goat supply catalog. Instructions come with the kit. Additional instructions may be obtained from registry associations. All dairy breeds, except LaMancha, are tattooed in the ear. Since LaManchas have no external ears, they are tattooed in the tail web, the hairless area under the tail.

A common system for dairy goats is to tattoo the right ear with three letters designating the herd name. If you join the American Dairy Goat Association, three letters will be assigned to you. If your herd designation is XYZ, for example, all your kids will have "XYZ" tattooed in their right ears.

The left ear has a letter indicating the year of birth and a number indicating the kid's birth sequence. All kids born in 2004, for example, would have the letter T. The first kid born in your herd in that year would be "T1," the second kid "T2," and so forth.

Not all breeds have such well-organized tattooing systems, nor do they all tattoo both ears. Angora herd owners, for instance, make up their own herd's numbering system. Whereas no two dairy goats could have the same tattoo combination, Angoras belonging to neighbors may conceivably be tattooed with the same identification

Tattoo Year Code

R = 2002
S = 2003
T = 2004
V = 2005
W = 2006
X = 2007
Y = 2008
Z = 2009
A = 2010
B = 2011
C = 2012
D = 2013
E = 2014
F = 2015
H = 2016
J = 2017
K = 2018
L = 2019
M = 2020

(To avoid confusion, G, I, O, Q, and U are not used.)

number. Furthermore, some owners tattoo the left ear and some tattoo the right, so you have to look in both ears before you can be sure the goat is tattooed at all.

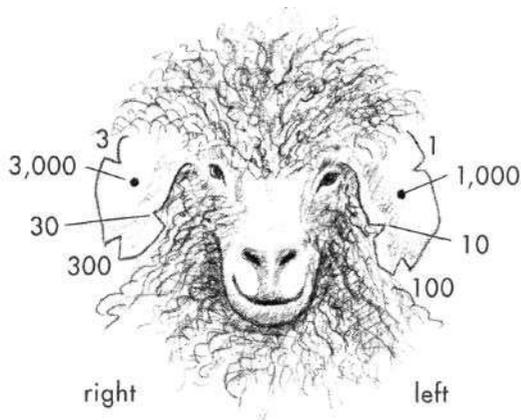
If your goats must comply with federal and state scrapie regulations, you may be allowed to identify them with tattoos. Regulations vary from state to state; find out what regulations pertain in your state.

If you expect few kids each year, you may not wish to purchase your own tattoo kit or ear tag applicator. Goat clubs sometimes hold demonstrations where you can take your kids to be tagged or tattooed. A neighboring goat keeper may be willing to tag or tattoo your kids for a small fee.

Ear notching. Angora goats may have their ears notched as the sole means of identification or in combination with being tagged or tattooed. Notches are made using a hog ear notcher, available from farm stores. Each notch location is associated with a numeric code, as recommended by the American Angora Goat Breeder's Association and shown in the illustration above. The number of notches appearing in any one location on the goat's ear is multiplied by the numeric code for that location. The sum obtained by adding the various notched locations together equals the animal's identification number, which may or may not be tattooed in the goat's ear.

Referring to the drawing, let's say a goat has two notches in the middle of its left ear (2 x 1,000), two notches on the inside of its left ear (2 X 10), and three notches on the outside of its right ear (3x3). These notches would correspond to an identification number of 2,029. The numeric code allows you to be economical with your notching; note, for instance, that one notch on the inside of the right ear (30) has the same numeric value as would three notches on the inside of the left ear (3x10).

No system of identifying the goats in your herd makes sense unless you keep careful records for each animal. Your records should include information and identification details not only for the goats currently in your herd but also for those you no longer have, including how they were disposed of, such as to whom they were sold and when.



Angora ear notches



Angora, notched and tattooed

Disbudding

All kids are born without visible horns. Some kids have horn buds that develop into horns. Other kids are polled, meaning they have no horn buds. You can tell the difference between a horned kid and a polled kid from birth. The wet hair on the head of a polled kid lies smooth, whereas the hair on a horned kid is twisted at the two spots on its head where horns will grow.

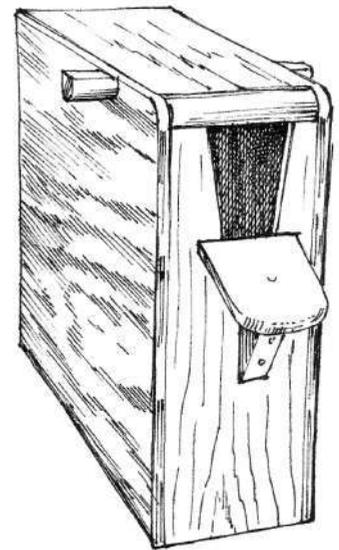
Wild goats use their horns for protection. When goats are raised in a barn, their horns can become dangerous weapons. Without meaning to, a goat with horns can injure herdmates, or you, simply by lifting or turning its head at the wrong time. For that reason, a dairy goat kid born with horn buds should be disbudded. Calmer breeds such as Angora and African Pygmy, and goats that roam outdoors in herds, usually have their horns left on.

Disbudding should be done as soon as you see little horns, since the procedure becomes more difficult as the horns grow. Different breeds grow horns at different rates. Most dairy goat kids are ready for disbudding between the ages of 1 and 2 weeks. Older goats may have their horns surgically removed by a veterinarian, but the procedure is painful and the resulting wound takes a considerable amount of time to heal. Disbudding is painful in young kids as well, but the kids forget so quickly afterward that within a few minutes they may start butting heads in play.

Disbudding requires a disbudding iron and a box to hold the kid. For just a few kids each year, you may wish to invest in these items jointly with another goat keeper, or you might seek a nearby goat keeper who is willing to disbud your kids for a small fee. Often the same person who tattoos kids will also disbud them.

Do not attempt to disbud a kid without first having an experienced person show you how. Use the following tips to help the kids through the ordeal:

- Give each kid a baby aspirin, or half an adult aspirin, to dull the pain,
- Place a small bag of crushed ice on the kid's head immediately after both buds have been burned.
- If you are disbudding bottlefed babies, give each one a small amount of warm milk as soon as you remove it from the disbudding box.
- To prevent infection, give each disbudded kid an injection of tetanus antitoxin — 500 IU under the skin. One bottle holds 1,500 IU, or enough for three kids. Tetanus antitoxin is available from any farm store or veterinarian.



A disbudding box may be purchased or made and used to confine a kid for tattooing and disbudding.

Castrating Bucklings

Unless you have a prime buckling you plan to keep or sell for breeding, any buckling kept past weaning age should be castrated. Because a castrated buck is called a wether, castrating is sometimes also called wethering. A wether makes a better pet than an intact buck; is easier to train for pack or draft; and, if raised for meat, grows faster and tastes better. Castrating your bucklings simplifies management, since wethers need not be separated from does or doelings to avoid unwanted mating.

Castrate a buckling as soon as his testicles descend into the scrotum, usually between the ages of 1 and 3 weeks. To do the job, you will need a 9-inch lamb Elastrator. Before trying it for the first time, have an experienced person show you how to use it. If you raise only a few kids each year, you might seek a nearby goat or sheep owner willing to castrate your bucklings for you.

Saying Goodbye

One of the hardest things about raising goats is giving up the kids. It's easy to get attached to the cute little guys. But unless you have a plan for disposing of excess kids, you will soon find yourself with more goats than you need, want, or can afford to keep in terms of management time and the cost of expanding your goat facilities. The longer you keep kids and get to know their individual personalities, the more difficult becomes the decision about which ones to sell.

Your plan for disposing of excess kids might include contacting a local meat goat buyer about selling your kids when you can expect the greatest return — usually around the Christmas and Easter holidays. If you are selling goats to other breeders, they may wish to arrange to purchase a buckling or doeling from a certain mating before the kids are even born. By having a plan, you will find it easier to give the kids up, because you'll know from the start they aren't yours.

Of course, if you plan to expand your herd or replace older or less productive animals, you have the happy situation of getting to keep at least some of the kids your does produce.

KEEPING GOATS HEALTHY

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Each goat herd is unique in its combination of breed, age, local climate, prevalent pathogens, and other elements that influence health. Your health care plan must therefore fit your particular situation and cannot be developed by blindly following a formula established for another herd elsewhere.

The most important health care measure is disease prevention, which must start when you acquire your first goats. Purchase only healthy animals. If you feel unsure about how to tell a healthy goat from a sick one, take along an experienced person to coach you. You'll avoid a lot of future expense and heartbreak.

Sickness in goats is usually caused by poor management. Good management includes protecting your goats from illness and watching for early signs of problems. Take care not to allow your goats to become crowded, because crowding causes stress and stress decreases resistance to disease. Transporting and showing goats are stressful and may bring your goats into contact with potentially unhealthy animals. If your goats regularly come into contact with others outside your herd, you will need a stronger routine health care program and greater attention to keeping vaccinations current than someone whose herd is isolated from other goats.

All herds require a health care routine that includes weighing, hoof trimming, and regular worming, as well as vaccinations and booster shots as determined by the diseases that are prevalent in your area. Consult your veterinarian and other goat owners to develop a suitable health care program for your herd.

Weighing

Each time you have a goat confined for hoof trimming, weigh it and record the date and weight on a chart. Your weight records will tell you such things as that a young goat is growing properly, a young doe is big enough to breed, or a pregnant doe is getting enough to eat. Loss of weight is often the first sign that something is wrong.

Measuring heart girth



Estimating Your Goat's Weight

Heart Girth (in inches)	Weight (in pounds)	Heart Girth (in inches)	Weight (in pounds)	Heart Girth (in inches)	Weight (in pounds)
10.75	5	21.75	37	32.75	105
11.25	5.5	22.25	39	33.25	110
11.75	6	22.75	42	33.75	115
12.25	6.5	23.25	45	34.25	120
12.75	7	23.75	48	34.75	125
13.25	8	24.25	51	35.25	130
13.75	9	24.75	54	35.75	135
14.25	10	25.25	57	36.25	140
14.75	11	25.75	60	36.75	145
15.25	12	26.25	63	37.25	150
15.75	13	26.75	66	37.75	155
16.25	14	27.25	69	38.25	160
16.75	15	27.75	72	38.75	165
17.25	17	28.25	75	39.25	170
17.75	19	28.75	78	39.75	175
18.25	21	29.25	81	40.25	180
18.75	23	29.75	84	40.75	185
19.25	25	30.25	87	41.25	190
19.75	27	30.75	90	41.75	195
20.25	29	31.25	93	42.25	200
20.75	31	31.75	97		
21.25	35	32.25	101		

Small kids are easy to weigh. Pick up the kid and hold it while you stand on a bathroom scale. Then weigh yourself without the kid. Subtract the second number from the first; the difference is the kid's weight.

If you raise dairy goats, use a dairy scale to weigh kids. Place a kid in a grocery bag with handles and hang the bag from the scale. Be sure to keep the kid's head outside the bag so it can breathe.

When a goat gets too heavy to lift, the best you can do is estimate its weight. Even though the estimate is not 100 percent accurate, it will tell you whether the animal is gaining or losing weight. To estimate a weight, measure the goat's heart girth — the distance around the goat's middle, just behind its front legs, over its heart. Measure an Angora after shearing, or its long hair will make it seem heavier than it really is. Have the goat stand on a level surface with its legs solidly beneath it.

Use a dressmaker's tape measure or a weigh tape from a goat supply catalog. The weigh tape automatically converts heart girth to estimated weight. If you use a dressmaker's tape, the chart above will help you convert inches to pounds.

Hoof Trimming

Hooves are made of keratin, the same material your fingernails are made of. Like fingernails, hooves grow uncomfortably long if they aren't trimmed. Wild goats generally live in rocky areas, where abrasion wears down their hooves as they move about seeking fresh forage. When a goat spends its days in a barn or on pasture, however, its hooves keep growing. Unless they are trimmed, eventually the goat will be unable to walk properly. Hooves left untrimmed for too long fold under, trapping dirt and moisture that create an ideal environment for bacteria that can cause foot rot. Excessive growth also alters an animal's stance, eventually crippling the animal permanently.

To learn what a properly trimmed hoof looks like, study the feet of a newborn kid. Note how its hooves are flat on the bottom and look boxy. When a hoof has been properly trimmed, the bottom is parallel to the growth rings and the two toes are of equal length.

How often you need to trim hooves depends on how fast they grow. Some hooves need trimming every 2 weeks; others may not need to be trimmed more often than every 2 months. The rate of growth of a particular goat's hooves is influenced partly by genetics and partly by environment. Like wild goats, domestic goats can wear off some hoof growth if they have access to an abrasive surface, such as a rock outcrop or a concrete pad on which to play.

A goat that is not used to having its hooves trimmed may struggle and kick. Avoid this problem by training kids to the procedure early and by continuing to check and trim hooves often throughout each animal's life. Frequently trimming small amounts at a time is easier than infrequent major trimming.

You will need a pair of sharp shears, such as good garden pruning shears or hoof trimmers designed specifically for the purpose; the latter are available from any livestock supply store or catalog. Keep the shears sharp by periodically rasping the blades with a file.

You'll need to confine the goat so it doesn't attempt to wander away while you're trimming its hooves. If you have dairy goats, use the milk stand to hold each goat during the trimming. Otherwise, fasten the goat's collar to a wall or a fence and crowd the animal with your body so it can't move around. Face the goat in one direction to trim the two hooves away from the wall, then turn it around to trim the other two hooves.

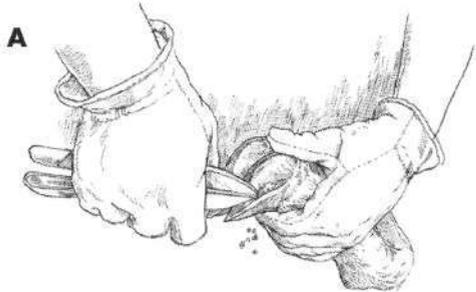
While a kid is still small, you can trim its hooves by turning it on its back and holding it firmly on your lap. A kid's hooves shouldn't need much trimming, but starting early is a good idea to get the animal accustomed to the procedure.

Angoras, too, may be set on their backs for hoof trimming. Place the Angora on a clean floor with its head between your legs. An Angora will lie quietly when set on its rump — a position used to shear mohair as well as to trim hooves. However, don't try this with a mature dairy goat or meat goat, or you're likely to get kicked in the face.

Trim when hooves have been softened by rain or dewy grass. To prevent injury to the goat, work in good light and trim away a small amount at a time. Here's the procedure:

1. Grasp one leg by the ankle and bend it back to see the bottom of the foot.
2. Use the point of the shears to scrape away dirt (A).
3. Cut off long growth at the front of the hoof (B).
4. Snip off flaps that fold under the hoof
5. Trim the bottom, one tiny slice at a time, cutting toward the toe. Stop trimming when the hoof looks pink, indicating that you are getting close to the blood supply. Do not keep cutting, or the foot will bleed. If that happens, pour hydrogen peroxide over it.

6. If you reach the blood supply before an overgrown hoof is properly trimmed, avoid causing damage by continuing the trimming a few days later.
7. Optional: Smooth the hoof with a woodworker's rasp (C).



Scrape away dirt



Cut off long growth



Smooth hoof

Signs of Illness

Take time to study your goats while they are healthy so you will readily notice any changes in the way they look, eat, or move. The sooner you realize a goat is getting sick, the quicker you can do something about it, and the greater the chance it will recover.

Notice the size, shape, firmness, color, and smell of your goats' droppings. Any change may indicate a dietary imbalance, the beginning of a disease, or an infestation of parasites. Parasites may be internal, such as worms and coccidia, or external, such as lice and ticks.

Listen for teeth grinding, a sign the goat is in pain. Look for changes in the color of the gums and the lining around the eyes. These areas should be bright pink. If a goat is in shock or has lost blood, these areas may turn pale. A purple or blue color may indicate damaged airways or other breathing problems. If the color is pale gray or blue and the goat has a hard time breathing, call your vet immediately.

Before calling a veterinarian about any goat's health, first take the animal's temperature and be prepared to relay the information to the vet. Inexpensive digital thermometers, complete with instructions for their use, are available through veterinary supply catalogs. Restrain the goat as you would for hooftrimming and insert the thermometer into its rectum. If you know the animal's normal temperature at rest, you will have a better idea when its temperature is abnormal. A good idea is to take each goat's temperature whenever you weigh the animal, and record the temperature along with the weight. Any time you note a change from normal, look for the reason.

Before calling the vet, you might also take the goat's pulse by using one of the following two methods:

- Place your fingertips on both sides of the lower rib cage and count the beats for 1 minute.
- Place your finger on the big artery on the upper inside part of one of the rear legs and count the beats for 1 minute.

Signs of Health in Adult Goats*

Pulse rate: 70 to 80 beats per minute

Breathing rate: 12 to 20 breaths per minute

Rumen movements: 2 or 3 every 2 minutes

Rectal temperature: 101.5°F to 105°F

*Kids have higher pulse and breathing rates than adult goats

Signs of Illness in an Adult Goat

Behavior	Inactive Grinds teeth Makes complaining sounds Coughs frequently Takes quick, shallow breaths Any change in normal behavior
Digestion	Eats less or not at all Urinate more or less than usual Manure changed in color or consistency
Milk	Inexplicable drop in production Change in color, odor, or consistency
Coat	Becomes rough or dull Hair falls out or scabs appear Goat scratches or bites itself
Body temperature	Above or below normal

Common Goat Problems

If one of your goats becomes sick, don't try to treat it yourself unless you know for sure what the problem is. Giving medications incorrectly can do more harm than good. The first time you give your goat a shot or a drench (liquid medication given through the goat's mouth), have an experienced person show you how.

The following list describes the most common problems in goats. Alternative names are included to help you discuss the problem with others or look up the condition in a comprehensive veterinary manual, such as *The Goat Health Handbook*.

Abscesses

Also called: Caseous lymphadenitis, pseudotuberculosis.

Symptoms: Firm swellings under the skin.

Cause: Bacterial infection of lymph nodes by *Corynebacterium pseudotuberculosis*. Bacteria most likely enter through skin wounds.

Prevention: Provide a safe environment to reduce the risk of skin wounds (see page 179). Cull affected animals.

Treatment: Antibiotics are not effective. Surgical removal can be attempted for valuable animals.

Bloat

Also called: Acidosis or ruminal tympany.

Symptoms/effects: Swelling on left side, kicking at stomach, grunting, slobbering, lying down and getting up; can lead to death.

Cause: Excess gas in rumen.

Prevention: Feed balanced rations. Make any dietary changes gradually. Prevent overeating of concentrate or lush pasture.

Treatment: Keep the goat on its feet (propped between hay bales, if necessary). Rub its stomach to eliminate gas. Drench with 2 cups of mineral oil followed by 1/4 cup of baking soda dissolved in 1 cup of water. Call veterinarian immediately.

Caprine Arthritis Encephalitis

Also called: CAE or CAEV.

Symptoms: Weak rear legs in kids; stiff, swollen knee joints in mature goats.

Cause: Infection by caprine arthritis encephalitis virus.

Prevention: Purchase certified CAE-free goats. Do not feed kids raw colostrum or milk from infected does.

Treatment: No effective cure.

Chlamydiosis

Also called: Chlamydial abortion, enzootic abortion.

Symptoms: Abortion during last 2 months of pregnancy, or kids stillborn or very weak.

Cause: Infection by *Chlamydia psittaci*.

Prevention: Vaccinate. Avoid contact with infected goats. Burn or deeply bury dead newborn kids and afterbirth (or submit to a pathology lab for diagnostic testing); isolate aborting does until birth discharge stops. Antibiotic as prescribed by a veterinarian may control the spread of this disease to uninfected does.

Treatment: None.

Human health risk: Contagious to humans. Wear plastic gloves when attending a birth or disposing of birthing materials.

Coccidiosis

Also called: Cocci, coccidia.

Symptoms/effects: Loss of appetite, loss of energy, loss of weight, diarrhea (sometimes bloody); can cause death.

Cause: Infection by Eimeria species of protozoal parasites.

Prevention: Keep bedding, feeders, and water pails scrupulously clean.

Treatment: Coccidiostat (sulfa drug) used as directed on the label.

Enterotoxemia

Also called: *Clostridium perfringens* infection, overeating disease.

Symptoms/effects: Twitching, swollen stomach, teeth grinding, fever; can lead to death.

Cause: Infection by *Clostridium perfringens* bacteria

Prevention: Avoid abrupt changes in diet. Vaccinate.

Treatment: No effective cure.

Foot Rot

Also called: Hoof rot.

Symptoms/effects: Lameness, ragged hoof, grayish discharge, smelly feet, foot deformity, loss of weight, tetanus; can cause death.

Cause: Infection by *Fusobacterium nodosum* bacteria.

Prevention: Keep bedding clean and dry. Trim hooves regularly.

Treatment: Trim hoof to healthy tissue. Soak foot in copper sulfate solution (1/2 pound per gallon of water) for 2 minutes. Severe cases may require antibiotics, as recommended by your veterinarian.

Ketosis

Also called: Pregnancy disease, pregnancy toxemia (the disease occurs in does just before or after kidding).

Symptoms/effects: Sweet-smelling breath, urine, or milk; loss of appetite; doe lies down and can't get up; can cause death.

Cause: Metabolic disorder triggered by a sudden change in diet, overfeeding during early pregnancy, or underfeeding during late pregnancy.

Prevention: Proper feeding.

Treatment: Drench with 1 tablespoon of baking soda dissolved in 1/4 cup of water, then drench with 2 ounces of propylene glycol (or, in a pinch, 1 cup of honey or corn syrup) twice daily. If the doe is weak or can't swallow, call vet immediately.

Lice

Also called: Pediculosis, body lice, external parasites.

Symptoms: Scratching, loss of hair, loss of weight, reduced milk production.

Cause: Contact with infested animals, living in damp housing.

Prevention: Avoid contact with infested animals. Spray or dust fiber goats 6 weeks after every shearing.

Treatment: Powder, dip, spray, injectable, or pour-on insecticide approved for livestock. (For milk goats, use an insecticide approved for dairies.) Repeat in 2 weeks to kill newly hatching lice eggs. If infestation is severe, repeat again in 2 weeks.

Mastitis

Also called: Infected udder.

Symptoms: Doe stops eating; may have a fever; udder is unusually hot or cold, hard, swollen, or painful; milk smells bad or is thick, clotted, or bloody (slightly pink milk at freshening is normal).

Cause: Various bacteria, often following injury or insect sting to the udder.

Prevention: Keep bedding clean. Remove objects from facilities that could damage the udder. At each milking, check udder and milk for symptoms. Use proper milking techniques, and apply a teat dip after milking. At least once a month, check the first stripping from each side with a mastitis test. The California Mastitis Test kit is sold by most farm stores and dairy suppliers. The test is designed for cows, which have four teats, so you will use only two of the four cups in the kit.

Treatment: Isolate the doe. Apply hot packs four or five times a day. Milk three times a day. Milk the infected doe last. Contact your veterinarian about antibiotic treatment.

Human health risk: Do not drink infected milk or feed it to goat kids. Do not drink milk from treated does until the time span specified on the drug label or by your veterinarian has passed.

Orf

Also called: Contagious ecthyma, sore mouth.

Symptoms/effects: Crusty sores on the lips and muzzle of young animals can cause difficulty nursing and eating and loss of condition.

Cause: Viral. The virus can survive for years in the environment.

Prevention: A vaccine is available but should be used only in infected herds under a veterinarian's supervision.

Treatment: Sores will heal by themselves in 1 to 4 weeks. Give extra milk or feed to kids that aren't eating well.

Human health risk: This virus will also cause skin infection in people. Use gloves when handling affected kids and sterilize nipples, bottles, and feed tubs after use.

Pinkeye

Also called: Conjunctivitis, infectious keratoconjunctivitis.

Symptoms/effects: Red-rimmed, watery eyes; squinting; may cause blindness.

Cause: Various bacteria; less commonly viruses, or other microorganisms.

Prevention: Avoid dust, eye injuries, and contact with infected goats.

Treatment: Antibiotic drops or ointment under the eyelids. Treat all goats, even those without symptoms.

Plant Poisoning

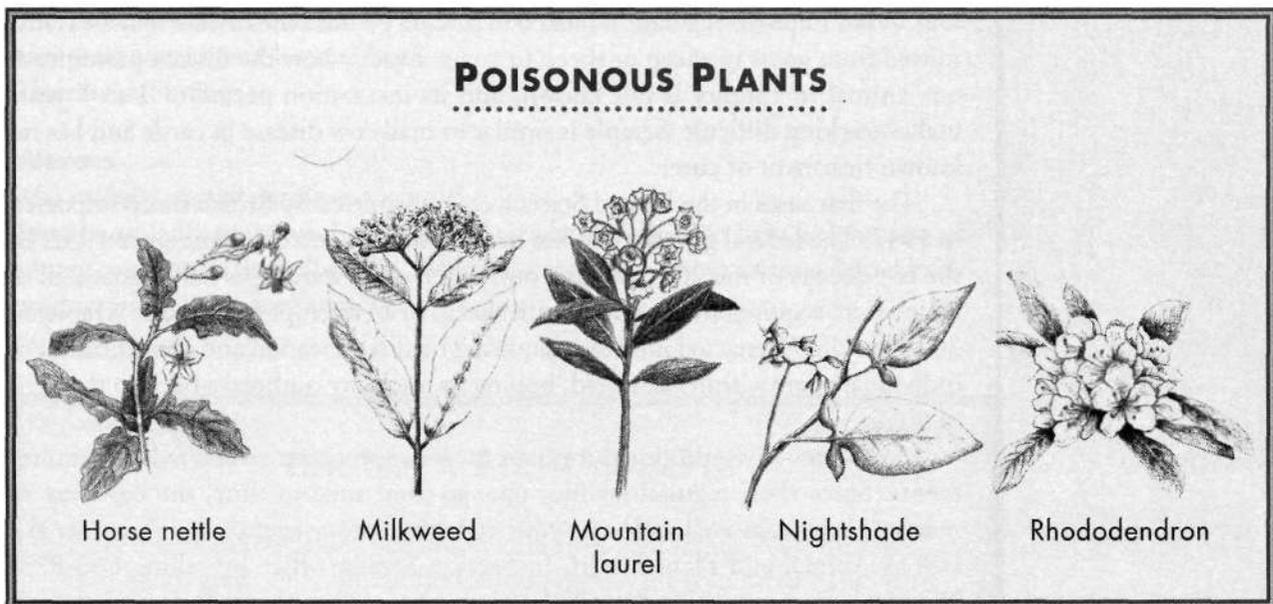
Also called: Toxic Reaction

Symptoms/effects: Frothing at the mouth, vomiting, staggering, trembling, crying, rapid or labored breathing, altered pulse rate, convulsions; can lead to death.

Cause: Ingestion of plants sprayed with pesticides or toxic plants such as black nightshade, bracken fern, death camas, hemlock, horse nettle, laurel, Japanese yew, milkweed, oleander, and rhododendron, as well as the wilted leaves of trees that produce stone fruit — cherry, peach, and plum. Limp leaves that are still green or are partially yellow are the most dangerous; fully dried leaves are no longer toxic. Ask your county Extension agent for an illustrated list of poisonous plants in your area.

Prevention: Feed a balanced diet, including free-choice hay. In autumn, keep goats away from stone-fruit trees that are dropping their leaves.

Treatment: Try to figure out what the goat ate. Place 2 tablespoons of salt on the back of the goat's tongue to induce vomiting. Call the veterinarian.



Pneumonia

Also called: Lung sickness.

Symptoms/effects: Coughing, runny eyes and nose, fever, loss of appetite, fast breathing, fever; may cause death.

Cause: Various bacteria and viruses (usually after exposure to drafts and dampness), parasites, allergies.

Prevention: Provide dry, draft-free housing with good ventilation. Do not heat housing.

Treatment: Contact your veterinarian about antibiotic treatment.

Human health risk: None.

Ringworm

Also called: Dermatophytosis.

Symptoms: Circular hairless patch, usually on the head, ears, or neck, sometimes on an udder.

Cause: Various fungi in the soil.

Prevention: Avoid contact with infected animals.

Treatment: Scrub area with soapy water, and coat with iodine or fungicide (be careful not to get any in the goat's eyes).

Human health risk: Can infect humans. Wash your hands after handling infected animal.

Scours

Also called: Diarrhea.

Symptoms/effects: Watery, bad-smelling diarrhea, loss of appetite, loss of energy; can cause death.

Cause: Various bacteria.

Prevention: Feed kids properly. Disinfect containers after each feeding, especially when feeding milk. Keep housing clean.

Treatment: Substitute electrolyte fluid for milk ration for 2 days (see page 204). Call your veterinarian if diarrhea does not clear up right away.

Scrapie

A neurologic disease called scrapie is not a significant problem in goats, but the USDA has imposed regulation related to scrapie because the disease may be transmitted from goats to sheep or sheep to goats. Exactly how the disease passes from one animal to another is not known, and its incubation period of 1 to 7 years makes tracking difficult. Scrapie is similar to mad cow disease in cattle and has no known treatment or cure.

The first cases in the United States were transmitted by British sheep imported in 1947. The federal government has been trying to control scrapie since 1952. In the last decade of the 20th century, only seven cases were reported in goats, all of which were acquired from contact with sheep. In an attempt to eradicate scrapie, in 2001 the USDA enacted measures requiring herd certification and identification of individual goats within each herd, hoping to trace any outbreaks back to the herd of origin.

Most states have additional regulations, some of which exceed federal requirements. Since these regulations may change from time to time, the best way to remain current, as well as locate your state regulatory agency, is to contact the USDA Animal and Plant Health Inspection Service office by calling 866-873-2824 (toll-free) or visiting their Web site at www.aphis.usda.gov/vs/scrapie.htm.

Tetanus

Also called: *Clostridium tetani* toxemia, lockjaw.

Symptoms/effects: Stiff muscles, spasms, flared nostrils, wide-open eyes; results in death.

Cause: *Clostridium tetani* bacteria entering a wound.

Prevention: Vaccinate kids with 1/2 mL of tetanus toxoid at 4 weeks of age (or before disbudding). Repeat in 30 days and annually thereafter.

Treatment: No effective cure.

Human health risk: You cannot get tetanus from your goats, but you can get it from the same sources that they do. Talk to your family doctor about immunization.

Ticks

Symptoms: Rubbing, scratching, loss of hair, loss of weight.

Carne: Browsing in wooded areas.

Prevention: Check goats daily during tick season.

Treatment: Dust or spray with pesticide approved for livestock (for milk goats, use a pesticide approved for dairies). Treat Angoras after shearing; repeat in 15 days. To remove an attached tick, grasp the tick carefully with tweezers near the point of attachment and lift firmly. Wrap the tick in a tissue and flush it down the toilet.

Human health risk: Ticks transmit diseases such as Rocky Mountain Spotted Fever and Lyme disease. During tick season, check your body for ticks after handling your goats.

Urinary Stones

Also called: Calculosis, bladder stones, kidney stones, urinary calculi, urolithiasis, water belly.

Symptoms/effects: Difficulty urinating, kicking at abdomen, loss of appetite; can lead to death.

Cause: Sandlike crystals (calculi) in the urinary tract due to dietary imbalance or drinking too little water.

Prevention: Keep a wether's diet low in concentrate and the leaves from beets, mustard, and Swiss chard, and keep it high in free-choice hay, salt, and clean water. Feed him grass hay, never a legume hay.

Treatment: Surgery.

Worms

Also called: Internal parasites.

Symptoms: Paleness around eyes, loss of weight or failure to gain weight, loss of energy, weakness, poor appetite, diarrhea, coughing, rough coat, reduced milk production, strange-tasting milk.

TAKING A FECAL SAMPLE

Place a self-sealing plastic bag, inside out, over your hand. With the covered hand, grasp a handful of fresh droppings. With your other hand, turn the bag right side out to enclose the droppings. Seal the bag and take it to your veterinarian as soon as possible.

Your vet will examine the sample through a microscope. Ask if you can take a look, too. If your goats have worms, the vet will tell you what kind they are and recommend the proper treatment.

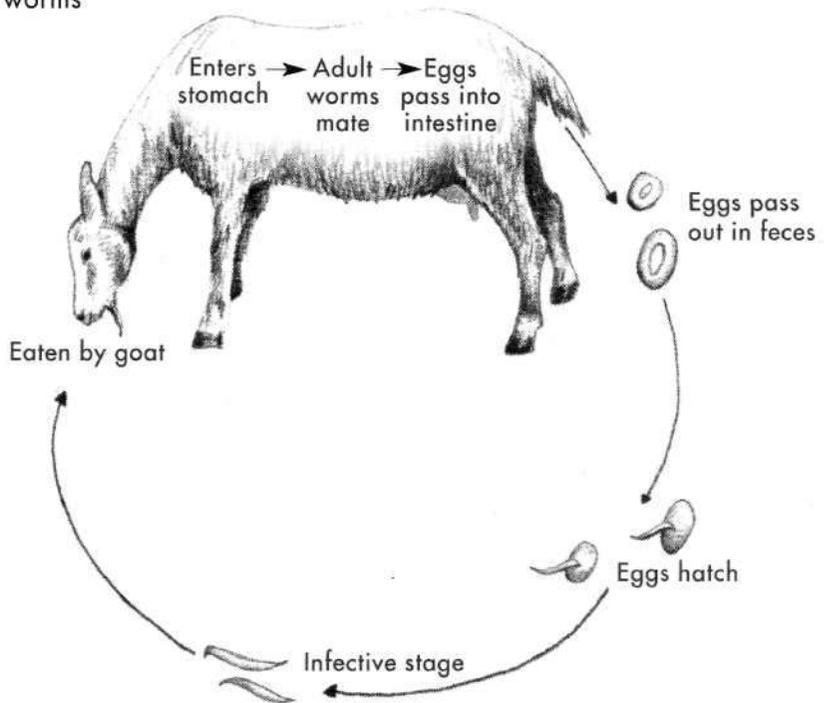
Take a fecal sample in fall around breeding time, and then again in spring after kidding. On the basis of these samples, your vet may recommend a routine worming program.

Cause: Eating worm eggs from manure, as may happen when feed is thrown onto the ground or pasture is grazed without frequent rotation. Worm egg numbers can get very high after a particularly mild winter or in areas with a mild climate.

Prevention: Keep feed and water free of manure. Move goats to fresh pasture often. Isolate and worm new animals.

Treatment: Take a fecal sample to your vet and obtain a wormer.

How a goat gets worms



Wounds

Curiosity can get a goat into all sorts of trouble, including serious injury. If one of your goats is wounded, clean the wound with hydrogen peroxide so you can see how serious it is. Cuts on the udder usually look worse than they are because they bleed a lot.

Stop the bleeding by pressing a folded clean towel, cloth, or disposable diaper against the wound; if possible, tape it on tight. If the bleeding does not stop, call your vet. Keep the goat quiet and continue to apply pressure until the vet can take a look.

If the wound is a simple cut or scratch, clip away the hair around the wound. Wash the area with warm, soapy water and rinse with clean water. Pour hydrogen peroxide over the cut, dab it with a clean tissue, and coat the area with an antibiotic ointment (such as Neosporin). Clean the cut daily and coat it with iodine or antibiotic ointment until it heals completely.

Watch for signs of infection, such as redness, swelling, tenderness, and oozing. If infection occurs, call your vet. A cut is not likely to become infected if you keep it clean while it heals.

First-Aid Kit for Goats

If you assemble a first-aid kit ahead of time, you will be ready to handle most emergencies. Keep the items listed below clean and dry in a large lunch box, tackle box, ammunition case, or any sturdy plastic or metal container with a tight lid. Inside the cover, tape the names and phone numbers of at least three goat-oriented veterinarians. In an emergency, you may not be able to reach your regular vet.

Include the following items in the first-aid kit:

- 1 rectal thermometer, to take temperatures
- 1 quart isopropyl alcohol, to sterilize thermometer
- 6 disposable syringes (3 mL and 5 mL), to give shots
- 6 needles (18 gauge), to go with syringes
- 3 clean towels or diapers, to stop bleeding
- 1 bottle tetanus antitoxin, in case of wounds
- 1 pint hydrogen peroxide, to clean wounds
- 1 tube antibiotic ointment, to dress wounds
- 1 container tamed iodine (such as Betadine), to treat wounds
- 1 quart mineral oil, to treat bloat
- 1 quart propylene glycol, to treat ketosis
- 1 package powdered electrolytes, to treat scouring kids
- 1 jar udder balm, for chapped udders (and hands)
- Worming medication, as recommended by your vet
- Pesticide spray or powder, if needed to treat lice and ticks

Health Records

Keep a health maintenance chart for each goat so you can track its medical history, recognize recurring problems, and keep worming and vaccinations up to date.

Health Maintenance Chart				
Date	Name of Goat	Medication Used	Dosage	Remarks

GOAT MILK

Milk from a properly cared for doe tastes exactly like milk from a cow. Although most people in the United States drink cow milk, around the world more people drink goat milk than cow milk. Goat milk, like all milk, contains solids suspended or dissolved in water. Goat milk is made up of approximately 87 percent water and 13 percent solids. The solids are:

- Lactose (milk sugar), which gives you energy
- Milk fat, which warms your body and gives milk its creamy smooth texture
- Proteins, which help with growth and muscle development
- Minerals, for your general good health

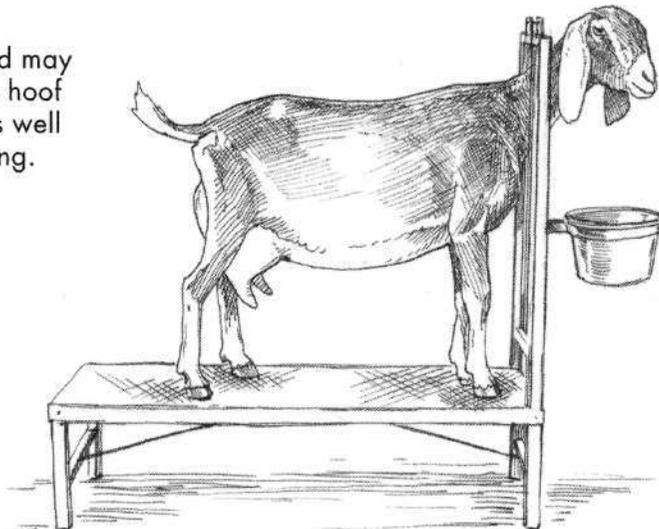
Milking Equipment

Goats are milked in a milk room or milk parlor, which may be built into a corner of your dairy barn or in a separate building. Some people milk their goats in their garage or laundry room. Wherever your milk room is, it should be easy to clean and big enough to hold a milk stand and a few necessary supplies.

A milk stand, homemade or purchased from a dairy goat supplier, gives you a comfortable place to sit while you milk. At the head of the milk stand is a stanchion that locks the doe's head in place so she can't wander away while you are still milking her. Most people feed a doe her ration of concentrate to keep her from fidgeting during milking, but it's better to train your does to be milked without eating. A doe that's used to eating while she's being milked tends to get restless if she finishes eating before you finish milking.

Keep your equipment scrupulously clean to ensure that your milk is healthful and good tasting. Every time you use any of your dairy equipment, rinse it in lukewarm (not hot) water to melt milk fat clinging to the sides. Then scrub everything with hot water mixed with liquid dish detergent and a splash of household chlorine bleach. Use a stiff plastic brush — not a dishcloth (which won't get your equipment clean) or a scouring pad (which causes scratches where bacteria can hide). Rinse your equipment in clean water, then in dairy acid cleaner (which you can obtain from a farm or dairy supply store), then once more in clear water.

A milk stand may be used for hoof trimming as well as for milking.



You will need the following equipment and supplies for milking.

Equipment . These items are a one-time purchase:

- Spray bottle (for teat dip)
- Strip cup
- Stainless-steel milk pail
- Dairy strainer or funnel
- Milk storage jars
- Pasteurizer
- California Mastitis Test kit
- Milk scale

Supplies. These items must be replaced as you use them:

- Baby wipes
- Teat dip
- Bag Balm or Corn Huskers lotion
- Milk filters
- Chlorine bleach
- Dairy acid cleaner

Milking a Goat

When a doe gives birth, her body begins producing milk for her kids, a process called freshening. If the doe is a milking breed, she may give more milk than her kids need and continue to produce milk long after the kids are weaned. The amount of milk a doe gives increases for the first 4 weeks after she freshens, then levels off for about 15 weeks, after which production gradually decreases and eventually stops until the doe freshens again to start a new lactation cycle.

A doe's milk is produced and stored in her udder. At the bottom of the udder are two teats, each with a hole at the end through which the milk squirts out. The two most important things to remember when you milk a goat are to keep her calm and not pull down on her teats, both of which can be tricky when you're first learning. Keep the doe calm by singing or talking to her and by remaining calm yourself. Not pulling her teats takes practice. The doe will kick the milk pail if you pull her teat, pinch her with a fingernail, or pull a hair on her teat. To avoid pulling a doe's hair during milking, and to keep hair and dirt out of the milk pail, use clippers to trim the long hairs from her udder, flanks, thighs, tail, and the back part of her belly.

To get milk to squirt out the hole, you must squeeze the teat rather than pull it. The first time you try, chances are milk will not squirt out but will instead go back up into the udder. To force the milk downward, apply pressure at the top of the teat with your thumb and index finger. With the rest of your fingers, gently squeeze the teat to move the milk downward. If you are milking a miniature goat, her tiny teats may have room for only your thumb and two fingers.

After you get one squirt out, release the pressure on the teat to let more milk flow in. Since you will be sitting on the milk stand and facing the doe's tail, work the right teat with your left hand and the left teat with your right hand. Get a steady rhythm going by alternating right, left, right, left. Aim the stream into your pail beneath the doe's udder. At first the milk may squirt up the wall, down your sleeve, or into your face, while the doe dances a little jig on the milk stand. Keep at it and before long you will both handle the job like pros.

How to Milk



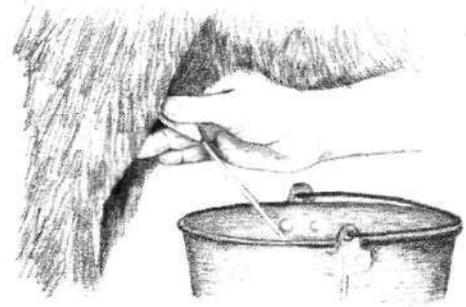
Apply pressure with your thumb and index finger to keep the milk from going back up into the udder.



Use your remaining fingers to move the milk downward into the milk pail.



Milking a large goat



Milking a miniature goat

When the flow of milk stops, gently bump and massage the udder. If more milk comes down, keep milking. When the udder is empty, the teats will become soft and flat instead of firm and swollen.

If you milk more than one doe, always milk them in the same order every day, starting with the dominant doe and working your way down to the meekest. Your goats will get used to the routine and will know whose turn is next.

As you take each doe to the milk stand, brush her to remove loose hair and wipe her udder with a fresh baby wipe to remove clinging dirt. While you clean the doe's udder, watch for signs of trouble — wounds, lumps, or unusual warmth or coolness. Squirt the first few drops of milk from each side into a cup or small bowl, called a strip cup because it is used to examine the first squirt or stripping. Check the stripping to see whether it is lumpy or thick, two signs of mastitis.

When you finish milking each doe, spray both teats with teat dip so bacteria can't enter the openings. Use a brand recommended for goats — some dips used for cows are too harsh for a doe's tender udder. In dry or cold weather, prevent chapping by rubbing the teats and udder with Bag Balm (available from a dairy supplier) or Corn Huskers lotion (available from a drugstore).

Milk Output

Exactly how much milk a doe produces in each cycle depends on her age, breed, ancestry, feeding, health and general well-being, and how often you milk. The more often you milk, the more milk the doe will produce. Most goat keepers milk twice a day, as close to 12 hours apart as possible. If milking twice a day gives you more milk than you can use, milk only once a day. Do it every day at about the same time. If you don't milk regularly, your doe's udder will bag up, or swell with milk. Bagging up signals the doe's body that her milk is no longer needed, and the doe dries off.

Milk sold at the grocery store is measured by volume: 1 pint, 1 quart, or 1/2 gallon. Milk producers measure milk by weight: pounds and tenths of a pound. One pint of water weighs approximately 1 pound, giving rise to the old saying "A pint's a pound the world around." Milk also weighs approximately 1 pound per pint, although its exact weight depends on the amount of milk fat it contains, which varies by goat and by season.

During the peak of production, a good doe in her prime should give at least 8 pounds of milk (about 1 gallon) per day. She will then gradually taper off to about 2 pounds (1 quart) per day by the end of her lactation cycle. During the entire

lactation, the average doe will give you about 1,800 pounds (900 quarts). A miniature doe averages one third as much milk as a large doe.

Weighing each doe's output helps you manage your goats properly. A sudden decrease in production may mean the doe is unhealthy, is not getting enough to eat, or is in heat.

Weigh milk by hanging the full pail from a dairy scale. A dairy scale has two indicator arms. Set the arm on the right to zero. With your empty pail hanging from the scale, set the left arm to zero. When you hang a pail of milk on the scale, the left arm automatically deducts the weight of the pail. Use the right arm to weigh other things, such as newborn kids.

If you don't have a scale, you can keep track of each doe's output by volume, although this method is not as accurate as weighing, because fresh milk has foam on top and it's hard to tell where the foam stops and the milk starts.

Keep a record of each doe's milk output, noting not only the amount of milk obtained from each milking but also anything that might affect output, such as changes you've made in the doe's ration, rainy weather that has kept your herd from going out to graze, or the time of day you milked (whether earlier or later than usual). At the end of each month, add up each doe's milk output. At the end of her lactation cycle, add up each doe's total output.

A standard cycle lasts 10 months, or 305 days. To accurately compare the annual output from each doe, or to compare the output of one doe against another, adjust production to a 305-day cycle: Divide the total output by the actual number of days in the cycle, then multiply by 305.

Pasteurizing Milk

Pasteurizing destroys harmful bacteria that may be in milk. Milk is pasteurized by making it hot enough for a long enough time to destroy bacteria. Pasteurize your milk in a home pasteurizer or on top of the stove.

Home pasteurizers, which come with full instructions, are sold through dairy supply catalogs. They are expensive but easy to use, because they automatically control the time and temperature.

If you have only a few quarts of milk to pasteurize at one time, you can do it on top of the stove. (Milk cannot be safely pasteurized in a microwave oven.) To get the right temperature, use a candy thermometer. To keep the milk from scorching, use a double boiler or a clean pail set in a large pot of water.

Heat the milk to 165°F, stirring to distribute the heat evenly. Do not take the thermometer or stirring spoon out of the milk and put it back in during pasteurization, or you will recontaminate the milk. When the milk reaches 165°F, continue heating it for 30 seconds more.

Cool the pasteurized milk quickly for best taste. Set the pan or pail of milk in a basin of ice or cold water and stir until the milk is cool. Pour the milk into clean jars with tight-fitting lids. Store the jars on the bottom shelf of the refrigerator, where the temperature is coolest and milk keeps the longest.

Milk Sensitivities

Milk gets its sweet taste from the complex sugar lactose. For your body to digest lactose, it needs the enzyme lactase to break down the lactose into two simple sugars, glucose and galactose. About 75 percent of all adults are lactase deficient. They cannot digest lactose, and when they ingest it, the result is bloating, cramps, gas.



Home pasteurizer

Making a Milk Compress

Milk protein is good for soothing sunburns and rashes from poison ivy, poison oak, and poison sumac. To make a milk compress, combine 1 cup of cold milk with 4 cups of cold water. Soak a clean cloth in the mixture. Lay the wet cloth on the sunburn or rash for 15 to 20 minutes; resoak the cloth whenever it feels warm. Repeat every 2 to 4 hours.

nausea, and diarrhea. The problem may be resolved by taking a lactase concentrate, available at most drugstores. Fermentation reduces lactose content by as much as 50 percent, so if you have a problem drinking milk because of lactose intolerance, you may not have a problem eating yogurt.

Not all problems associated with milk are caused by lactose deficiency. About 5 percent of the population is allergic to milk protein. In children, symptoms of milk protein allergy are eczema and digestive problems, including diarrhea, vomiting, and colic. In adults, milk protein allergy causes a feeling of being bloated and gassy. Since the protein in goat milk is not the same as the protein in cow milk, someone who is sensitive to cow milk protein may have no trouble drinking goat milk. Besides having a different protein makeup, goat milk has proportionally more small fat globules, making it easier to digest than cow milk and therefore leaving less undigested residue in the stomach to cause gas and cramps.

Whole and Skimmed Milk

After goat milk has been refrigerated for a day or two, its milk fat rises to the surface. Milk fat thinned with a little milk is cream. The milk fat content of goat milk ranges from 2 to 6 percent, depending on genetics, diet, and other factors. An average of 4 percent will give you about 5 tablespoons of milk fat per quart. The milk from Nubians and African Pygmies contains more fat than other milk, and the milk from all does varies in fat content during the lactation cycle. Milk fat content is important in making ice cream, butter, and certain kinds of cheese.

If you are trying to limit the amount of fat in your diet, you may remove the milk fat to create skimmed milk. Store fresh milk in a widemouthed container. In about 2 days, most of the milk fat will rise to the surface, and you can skim it off

Making Yogurt

Yogurt is easy to make from fresh goat milk and tastes better than any yogurt you can buy. You'll need a candy thermometer. Heat 1 quart of milk to 115°F or, if you have just pasteurized the milk, let it cool to 115°F. Meanwhile, sprinkle one packet of unflavored gelatin over a little cold water. Allow the gelatin to soften for 1 minute. Heat the water and gelatin in a small saucepan or in the microwave oven until the gelatin thoroughly dissolves.

Combine the dissolved gelatin with the warm milk and stir in 2 tablespoons of store-bought unflavored yogurt. Make sure that the yogurt label says "live culture," indicating that it contains the live organisms needed to start fermentation. You can purchase yogurt culture from a cheese-making supplier, but it is expensive.

Place the cultured milk in an electric yogurt maker and turn it on, or place the milk in a glass casserole dish, wrap the dish in towels, and put it in a warm place, such as on a heating pad or an electric hot plate set on "warm." In about 9 hours, your milk will ferment into yogurt. It is ready when it thickens and tastes right to you. The longer you let it ferment, the more tart it will be, so adjust the time according to your taste. Store the yogurt in the refrigerator. Fermentation stops when yogurt is refrigerated.

Making Cheese Spread

Make a delicious cheese spread from fresh yogurt by straining it through a yogurt strainer or through a kitchen strainer or colander lined with cheesecloth (available

from a supermarket, kitchen supply store, or cheese-making supply catalog). Place the strainer over a sink or deep bowl.

Remember Little Miss Muffet, who sat on a tuffet eating her curds and whey? When you strain yogurt, the liquid that drains off is whey. The thick part left in the strainer is curds. In 8 to 12 hours, 1 quart of yogurt will give you about 1 1/2 cups of curds, which you can use to make a soft cheese spread to serve on crackers or toast.

For a sweet spread, stir 1/8 teaspoon of salt and honey or maple syrup to taste into the curds. Flavor the spread with bits of chopped pear or apple, drained crushed pineapple, grated lemon or orange zest, or raisins and nuts. For an herbal spread, stir in 1/8 teaspoon of salt, your favorite herbs, cracked pepper, and perhaps a little crushed garlic. Either spread will keep in a covered container in the refrigerator for up to 3 weeks.

Making Soft Cheese

You can make soft cheese in a hurry without making yogurt first. Place 1 quart of milk in a stainless-steel or enamel (not aluminum) pan. Heat the milk to 170°F. Squeeze two lemons and stir the juice into the milk.

Continue stirring gently for 15 minutes. If stringy curds do not form, add a little more lemon juice. Pour the mixture into a strainer or colander lined with cheese-cloth. Drain over a bowl for at least 2 hours. Save the whey — combined with a little sugar or honey and chilled, it makes a delicious drink.

The drained curds will give you about 1/2 cup of mild cheese to use as a cream cheese spread or to serve like cottage cheese. Refrigerated in a covered container, this cheese will keep for up to 1 week.

Making Hard Cheese

You can use lemon juice to make a hard cheese. This time, start with 4 quarts (1 gallon) of raw milk. Stirring constantly, heat the milk to 185°F and cook for 5 minutes. Gradually stir in 1/2 cup of lemon juice. If curds and whey do not form within 15 minutes, add a little more lemon juice.

Drain the whey. Stir in 1/2 teaspoon of salt. Press the drained curds into a cheese mold, which you can easily make by carefully drilling small holes into the sides and bottom of a 1-pint plastic freezer container. Set the mold into a strainer or colander, and let the curds drain until the dripping stops.

In about 2 hours, you will have 1 1/2 pounds of mild-tasting hard cheese to grate on top of stew, pasta, or soup or to slice for sandwiches. Wrap the cheese in plastic wrap and keep it in the refrigerator for up to 2 weeks.

These simple recipes are offered to get you started. If you are seriously interested in learning to make cheese, take a class on the subject or get a good beginner's book (see Recommended Reading, page 379).

Selling Goat Milk

In most states, if you wish to sell milk for human consumption, you must have state-approved (and expensive) equipment for storing, processing, and packaging the milk. You might, however, develop a nice little business selling milk for feeding orphaned animals such as deer, puppies, llamas, foals, bear cubs, and many other kinds of livestock and wildlife. Let your local veterinarians, horse stables, zoos, and wildlife parks know you have raw goat milk for sale.

FIBER GOATS

Most goats have two kinds of hair: primary and secondary. Primary hairs are usually straight, and secondary hairs are usually curly. The main coat on most breeds, including dairy goats, contains mostly primary hairs. Goats originating in cold climates have long primary hairs, giving them a shaggy look.

As insulation against cold weather, some goats grow a coat of secondary hairs. Short, downlike secondary hairs are known as cashmere. The long, densely packed secondary hairs of an Angoras coat are called mohair; the primary hairs, called kemp, are undesirable.

Mohair and cashmere are wonderful fibers for spinning, knitting, and weaving. Fabrics made from mohair are exceptionally soft and silky and are warm but lightweight. Although spinning these fibers is time-consuming, many people enjoy the quiet work and the pleasure of transforming a fleece into an article of clothing or other useful item. Even spinners who do not care to knit or weave take great pleasure in the quiet enjoyment of spinning fiber into yarn.

Mohair

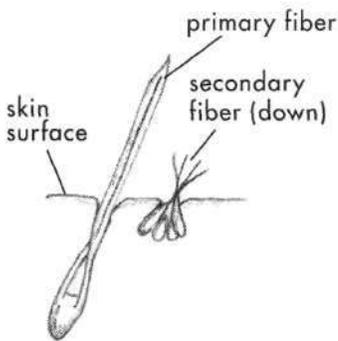
Mohair makes a lustrous, luxurious, fuzzy yarn used in products ranging from fine clothing to carpets. Mohair yarn is stronger and warmer than wool, does not shrink like wool, and does not burn as easily. Mohair yarn holds dye well and therefore may be readily dyed into brilliant colors. A mohair fleece should start out creamy white. Colored fibers are undesirable to commercial buyers because they limit the use of dyes. Colored fibers are also an indication that the goat is not pure Angora. Colored fleeces of good quality, however, are valuable to hobbyists who enjoy working with the natural colors.

A fleece consists of all the hair obtained from one goat at one shearing. A shearer doing a less than perfect job may not get the fleece all in one piece; rather, he or she may have to go back and take a second cut. The result shows up as short clumps of hair on the back of the fleece that, if not removed, cause undesirable fuzzy bumps, or noils, when the fleece is spun into yarn.

All the hair from one goat in one year, or all the hair from one herd at one shearing, is called the clip. First clip is the soft, fine hair of kids that have been sheared for the first time. Fineness is determined by the thickness or diameter of individual fibers, measured in microns. One micron equals about 4/100,000 of an inch, a value so thin it must be measured in a laboratory. The thinner and finer the hair, the better its quality. First clip produces the finest hair, which may weigh only one fifth as much as adult clip but is worth up to three times more. First clip is nice for making clothing that touches the skin and is soft enough for baby clothing. Coarser, more durable adult mohair is perfect for making cushions and floor mats.

The individual fibers or hairs of a fleece are called staple. The longer the staple, the easier it is to spin. Experienced spinners like to work with staple that's at least 3 1/2 inches long. A group of fibers or hairs clinging together is a lock. Ideal locks are well formed and free of defects, such as urine stains and dry, brittle tips.

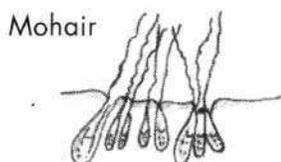
How much mohair each goat produces depends on its age, size, sex, genetic background, nutrition, health, and general management. The best coat growth occurs in goats 3 to 6 years old. Thereafter, as a wether ages, its fleece loses character and becomes coarse. As a doe ages, her ability to continue producing both mohair and kids decreases.



Dairy goat hair



Cashmere



Mohair

On average, one goat will yield 3 to 4 pounds of first-clip mohair, 4 to 5 pounds in the second shearing, and 6 1/2 to 7 1/2 pounds each year thereafter. A well-managed purebred may give you 12 pounds or more. By way of comparison, 1/4 pound of mohair will make a scarf and 3/4 to 1 pound will make a sweater.

Shearing

Angoras are sheared twice a year: in February or March (just before kidding) and in July or August (after kids are weaned but before does are rebred). Don't be tempted to skip the fall shearing, thinking the retained coat will keep your goats warm during winter. The hair will grow back fast enough to keep them warm.

Goats, like sheep, are usually sheared by traveling crews. If you have only a few goats, it can be hard to get a crew to come. You might arrange to combine your goats with a larger herd of goats or sheep. You might also learn to do your own shearing by taking a class or asking an experienced person to show you how. For only a few goats, shearing with hand shears (or even scissors) is an option.

Manage your goats so their fleeces remain free of dirt, matted or tangled hair, and burrs or other vegetation. Keep your goats indoors for 2 days before shearing, to keep their fleeces dry. Wet mohair is difficult to shear and may turn moldy. Just before shearing, clean the floor of the shearing area so foreign fibers won't stick to your fleeces and reduce their value.

After shearing, the fleece must be skirted, which involves picking out stained locks, short cuts (anything under 2 1/2 inches), matted clumps, and kempy areas. After the fleece has been skirted, roll it inside out and place it in a clean cloth bag, paper bag, or cardboard box. Do not store mohair in a burlap sack or woven plastic bag, and don't tie the fleece with twine; bits of fiber from the burlap or twine may stick to it.

For up to 6 weeks after shearing, or until your goats grow at least 1 inch of new coat, they can get sunburned in sunny weather or catch pneumonia in cold weather. Snug housing and proper nutrition will help your goats rapidly replace their protective coats.

Preparing Mohair for Spinning

Different parts of a fleece handle differently in terms of length and softness. Before spinning, sort the fleece into groups of similar-quality fibers that will result in a uniform yarn. Hold the fleece with one hand and pull out one lock at a time with the other hand. Because bits of dirt and vegetation will fall out, work outdoors or spread newspapers on the floor around you. After handling each lock, place it with locks of similar quality.

Once the fleece is sorted, it must be washed to remove the natural grease. Fill a basin with hot water and add a liquid soap designed for washing wool or use any gentle liquid soap, such as Ivory. Drop about a pound of sorted fleece into the water and gently push down until it is soaked through. Let the fleece soak for a short while, but not long enough for the water to get cold, then gently squeeze out the water and refill the basin for a second washing. Repeat until the water remains clear, then rinse the fleece in hot water and lay the fibers on a towel to dry.

Once the mohair is clean and dry, the fibers must be aligned parallel before they may be spun. Kid fleece needs only teasing, which involves gently pulling apart each lock to separate the fibers. The more carefully you work the fibers apart, the less lumpy your yarn will be. Tease a big pile at once so that you won't have to stop spinning to tease more.

The coarser fleece from adult goats needs the help of some device to get the fibers properly aligned before they may be spun into a smooth yarn. The easiest way to align the fibers is to comb each lock with a tough metal comb, such as that used to comb pets. Grasp a lock at one end and comb out the fibers at the other end, then change sides and comb the uncombed end. A combed fleece is called top.

If you will be doing a lot of spinning, you may want to invest in a set of cards with metal teeth. Fine-toothed cards are used on first-cut mohair, and medium-toothed cards are used on adult fleeces. The method shown on page 279 for carding sheep wool is the same as for carding mohair. Learning to use cards can be frustrating; try to find an experienced person to show you how. A fleece that has been carded is called roving.

Spinning Mohair

To spin teased, combed, or carded mohair, pick up a handful in one hand. With the other hand, pinch a small clump of fibers and pull gently until they form a fan 3 to 4 inches long. This little fan-shaped bunch of fibers is called the draft.

Twirl the pinched end of fibers between your thumb and forefinger to twist them together. Soon the twist will run along the draft toward your other hand. To keep the twist from running into the teased mohair behind the draft, press firmly against it with your finger and thumb, release just enough to pull out more fibers, and continue twisting. Your hands will get farther apart as the yarn grows longer.

When the first bunch of teased mohair is nearly all spun, lay a second bunch over it. Don't wait until the first bunch runs out.

As your hands get farther apart, pretty soon you won't be able to draft and twist anymore. You'll need a spindle to wind the finished yarn onto so that you can keep spinning. A drop spindle consists of a smooth, tapered shaft and a light weight that slips on and off the weight, called a whorl, keeps the spindle turning like a top, automatically putting in twist while you concentrate on drafting.

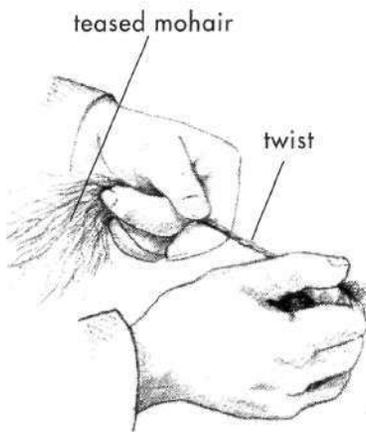
Buy an inexpensive wooden drop spindle, or make your own. Whittle down a wooden dowel to taper it, and slip it into a circular wooden base with a hole in the center. The base must be well balanced, and the hole dead in the center, for the spindle to spin evenly. Smooth down all edges with sandpaper, leaving no rough spots for fibers to get caught in.

To get your spindle started, tie on a couple of feet of yarn, as illustrated on the facing page. Fuzz up the end so the yarn will grab your teased mohair. Hold some teased mohair in one hand. Pull out a few fibers and wrap them around the fuzzed-up yarn. With your free hand, give the spindle a gentle spin. Let go of the spindle and draft out a few fibers. Release the draft and give the spindle another gentle turn.

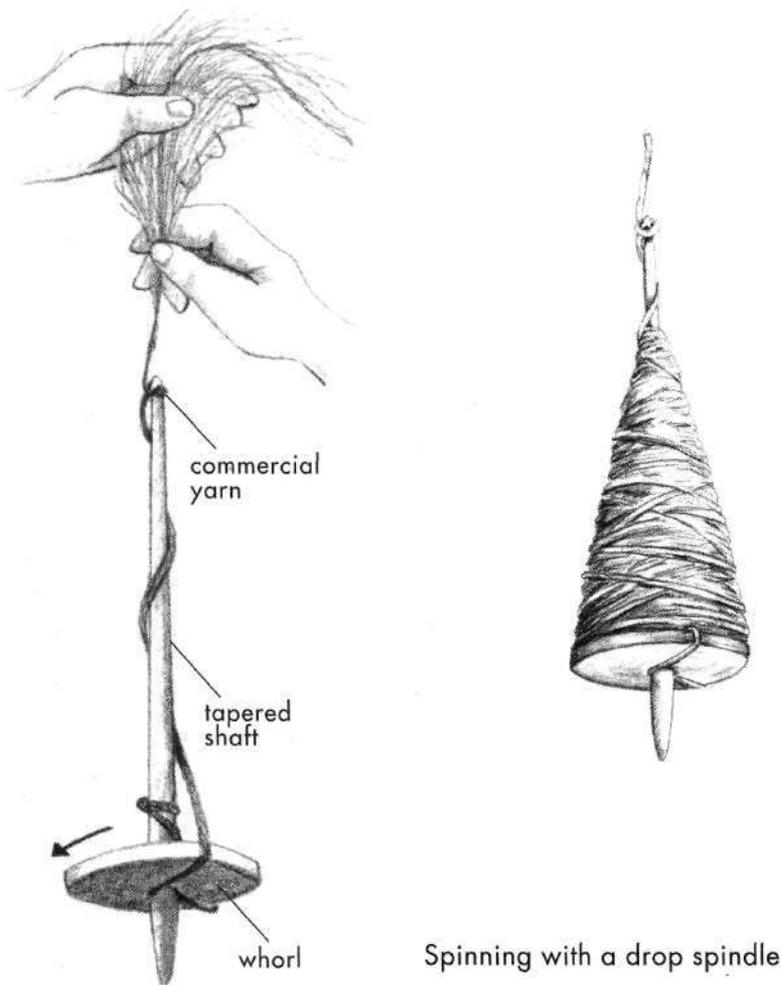
The trick is to keep turning the spindle and drafting fibers with a steady rhythm. The spindle should turn freely at the end of the yarn. Pretty soon, your yarn will be so long that the spindle reaches the floor. Untie the yarn from the top of the shaft: and beneath the whorl. Wind the yarn onto the shaft; in a cone shape and reattach it as before.

When you have no room to wind on more yarn, remove the cone. Untie the yarn, push up on the whorl, and slip the cone off the shaft. Store the finished cones on a piece of wood or heavy cardboard with long nails or knitting needles stuck through it until you have enough to spin or weave.

If you enjoy spinning, you may eventually wish to purchase a spinning wheel. Spinning on a wheel is quicker than working on a spindle, but a wheel is not as portable as a spindle. Learning to first control twist and draft on a spindle makes learning to spin on a wheel much easier.



Drafting and twisting



Spinning with a drop spindle

Cashmere

Cashmere, like mohair, is soft, warm, and light. Unlike mohair, cashmere has short fiber and comes in colors other than white. The value of cashmere is based on several properties, including fineness. To qualify as cashmere, the diameter of the fiber must be 19 microns or less; cashmere is one of the world's finest animal fibers. Like mohair, cashmere becomes coarser as a goat grows older. You can get some idea of the fineness of a goat's cashmere by examining its primary hairs. The more primary hairs you find and the coarser they are, the finer the down. The fewer hairs you find and the finer they are, the coarser the down.

Cashmere grows during the time of year when the length of days decreases, between the summer solstice around June 21 and the winter solstice around December 21. When cashmere stops growing, it starts shedding.

Commercially, cashmere is harvested by shearing before shedding starts. If you have only a few goats, you can harvest cashmere the traditional way — by combing it out as it sheds. Since the fibers do not all shed at the same time, comb your goats daily for 2 or 3 weeks until all the down is harvested.

Cashmere that has been harvested by combing has fewer coarse primary hairs than sheared cashmere. Before either may be spun, however, the hairs must be removed, a process called dehairing. Shake out as many hairs as you can, then pick out the rest.

A commercial grade goat averages 1/3 pound of down per year. A good wether may produce as much as 1 pound.

Cashmere may be teased and spun like first-clip mohair. Since the fibers are shorter, draft with your hands closer together and put in more twist.

Income Opportunities

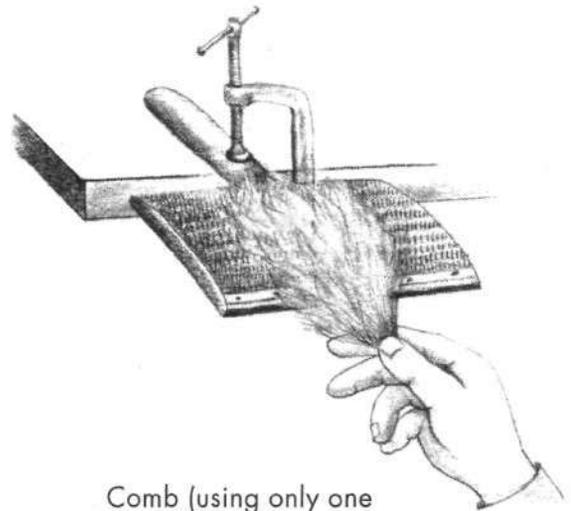
Commercial buyers prefer to purchase large numbers of fleeces at once. If you have only a few goats, you might try finding someone with a large herd who will sell yours for you. Spinners, on the other hand, often buy one or two fleeces at a time. Locate buyers through your county Extension agent, farm store, local spinning and weaving supplier, and yarn shops. If spinning classes are offered in your community, ask the instructor if you may come and exhibit your fleeces.

How much you charge per pound depends on local demand, current commercial prices, and the quality of your fleeces — the finer they are, the more you can ask. Your fleeces will be worth more if they are uniform in length, clean (no weed seeds, dirt, or excess grease), and pure (no stains or off-colored fibers, and low percentage of kemp).

How much you can ask is also determined by how you sell a fleece. The easiest way to sell a fleece is raw or "in the grease," which means it hasn't been washed. You'll get more per pound, however, if you wash the fleece and sell it as scoured. You can charge more yet if you take time to comb your mohair and sell it as top, or card mohair or cashmere and sell it as roving. You will get the best price of all from knitters and weavers by selling well-spun yarn.



Align fiber for spinning by carding the fleece. Carded mohair or cashmere is known as roving.



Comb (using only one card) your mohair and sell it as top.