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Research-Based Information That You Can Use

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Goat Production Basics in Nebraska

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This publication provides some basic information frequently requested by youth who are considering 4-H goat projects, or by people interested in commercial or hobby goat production. Goats also can be an added source of income for a beef cattle operation.

Raising goats can be pleasurable and profitable, but knowledge of the breeds, nutrition, forage, diseases, and marketing is needed to make goat production successful.

Goat Facts

- Goats are referred to as small ruminants, meaning they have a four-chambered stomach like sheep and cattle.
- Labor requirement for goats (five hours per doe per year) is higher than for beef cattle.
- Goats do not like to get wet and will seek shelter in the rain.
- Goats like to climb and jump.
- Goats can be contained in properly constructed fences. More strands of electric wire will be needed to control goats than are needed for cattle. The fence should have two or three strands for division fences and at least five strands for the perimeter. If barbed wire or woven wire fencing is already in place, it might be necessary to add a strand or two of electric wire offset from the existing fence.
- Goats do not flow through handling equipment as well as cattle.
- Goats prefer to browse brush and trees. They will get on their hind legs to eat.
- Male goats have an offensive odor, especially during the mating season.
- Male goats are aggressive and can be difficult to manage. Children should stay out of pens with male goats, and adults should proceed with caution when entering those pens.
- Goats are seasonal breeders, but some breeds will breed out of season.
- Goats seem to be more susceptible to parasites in grazing situations than cattle.
- The demand for goat meat is almost entirely ethnically or religiously based.
- Goats are just as susceptible to predators as other livestock.
- Both sexes are naturally horned in most goat breeds.

Novice goat producers need to learn about the physiology and reproductive system of goats to successfully manage them (*Table 1*).

Table 1. Physiological data and reproductive aspects of goats.

Body temperature	101.5–103°F
Heart rate	70–80 beats/minute
Respiration rate	12–15 breaths/minute
Age at puberty	7–10 months
Length of estrous cycle	18–22 days
Gestation (pregnancy) length	146–155 days
Kidding rate (births per doe)	1–3
Doe death loss (breeding age)	1–6%
Kid death loss (birth through market age)	10–20%
Breeding bucks required	1 per 30 does serviced

Breeds and Types

Goat breeds are generally divided into three primary types: dairy, meat, and fiber.

Common meat goat breeds are the Boer, Kiko, Savanah, and Spanish. Crosses between these breeds have resulted in very good performance and hardy kids with a desire to survive. *Table 2* lists some of the breeds, their breed type, and important traits to consider.

Table 2. Goat breeds, types, and important traits.

Breed	Type	Traits of Importance
Alpine	Dairy	High milk production
Angora	Fiber	Mohair yield; light muscling; must be sheared
Boer	Meat	High growth; heavy muscling for meat production
Cashmere	Fiber	Fiber production
Kiko	Meat	Hardy; large frame
LaMancha	Dairy	High milk production; very small ears
Myotonic (Fainting Goats)	Meat	Smaller frame; very heavy muscling; hardy
Nigerian Dwarf	Dairy	Provide a surprising amount of milk for their small size
Nubian	Dual Dairy/Meat	Good milk; large frame; more meat than most dairy breeds
Pygmy	Meat	Small frame; heavy muscling; currently not desirable in the open market
Saanen	Dairy	Good milkers; hardy; moderate frame
Savanah	Meat	Large frame; heavy muscling
Spanish	Meat	High survivability; moderate frame; good milkers

Nutritional Requirements

The nutritional requirements for goats can often be met with forages. However, feed supplementation may be needed, depending on forage quality and desired animal performance (e.g., lactation, growth, or maintenance). On average, dry matter intake for a mature doe is 2 to 5 percent of her body weight per day (*Table 3*).

Table 3. Nutrient requirements for meat and fiber producing goats.

Nutrient	Young Goats[1]		Does (80 lb)		
	Weanling 30 lb	Yearling 60 lb	Dry	Pregnant Early	Pregnant Late
Daily Feed, lb	2.0	3.0	4.5	4.5	4.5
TDN, %	68	65	55	55	60
Protein, %	14	12	10	10	11
Calcium, %	.6	.4	.4	.4	.4
Phosphorus, %	.3	.2	.2	.2	.2

Nutrient	Does 80 lb Lactating		Bucks
	Avg. Milk	High Milk	80–120 lb
Daily Feed, lb	4.5	5.0	5.0
TDN, %	60	65	60
Protein, %	11	14	11
Calcium, %	.4	.6	.4
Phosphorus, %	.2	.3	.2

Derived from: Nutrient Requirements of Goats. 1981 National Research Council and Pinkerton, F. 1989. Feeding Programs for Angora Goats. Bulletin 605. Langston University, OK

[1]Expected weight gain >.44 lb / day

Fig. 1. Goats will consume leaves off the lower branches of the tree.

Forages

The most common forage species for grazing goats in Nebraska are listed in *Table 4*. Goats will also graze a large number of weeds and understory plants found in Nebraska. The productivity, persistence, and nutritive quality of these species will vary, based on the stage of plant maturity and grazing pressure.

Goats prefer to graze above their shoulder height. When given a choice, goats prefer shrubs, saplings, and brambles over common pasture grasses and legumes.

Table 4. Common grass and legume species for grazing goats.

Perennial Cool-Season Grasses	Smooth Bromegrass
	Orchardgrass
	Crested Wheatgrass
	Reed Canarygrass
	Intermediate Wheatgrass
	Western Wheatgrass
	Prairie Junegrass
Perennial Legumes	Red Clover
	Alfalfa
Perennial Warm Season Grasses	Sand Lovegrass
	Little Bluestem
	Indiangrass
	Prairie Dropseed
	Hairy & Blue Grama
	Big Bluestem
	Sand Bluestem
	Switchgrass
	Sand Dropseed
Summer Annual Grasses	Pearl/Foxtail Millet
	Sorghum Sudangrass
	Corn
Winter Annual Grasses	Rye
	Wheat
	Triticale
	Oats
Others	Chicory
	Brassicas
Common Weeds, Brush, and Understory Plants for Grazing Goats	Small Soapweed
	Common & Western Snowberry
	Prairie Wild Rose
	Skunkbrush Sumac
	Smooth Sumac
	Thistles
	Lead Plant
	Prairie Coneflower
	Serrateleaf Evening Primrose
	Purple & White Prairie Clover
	Eastern Cedar

Fig. 2. Goats like shade to lay under during the hot part of the day.

Mineral Supplementation

Many minerals and vitamins are not available in forages at the levels needed to support optimum growth, reproduction, lactation, and the health of the kids, mature does, and bucks. Minerals are divided into two categories, macro and micro, depending on the amount required in the diet. The major macro minerals are calcium, phosphorus, potassium, magnesium, sodium, chlorine, and sulfur. The micro minerals, which are required in smaller quantities, include copper, zinc, iron, iodine, manganese, and selenium.

Both the macro and micro minerals must be provided in the proper amounts. Providing either too much or not enough of these minerals and vitamins can cause problems. The most important thing to remember when considering mineral supplementation is that goats have a higher copper requirement than sheep. Use a good-quality trace mineralized salt to meet the goats' needs. Do not feed both a complete feed with minerals added and free choice minerals at the same time. This wastes money and can potentially cause toxicity. Most common feeds do not contain a complete package, so read the feed label. The local extension office should be able to provide information about recommended minerals for the operation.

Stocking Rate

Stocking rate refers to the total number of goats per unit area over a given time period. To figure stocking rates, two terms must be understood:

- Animal Unit (AU) equals a 1,000 pound mature cow.
- Animal Unit Month (AUM) equals the forage or feed necessary to carry an animal unit for one month (about 780 pounds of air dry forage or 680 pounds of dry matter).

If a goat weighs 150 pounds: 150/1,000 = .15 AU or six to seven goats per AU.

The stocking rate will depend on the vegetative zone and condition of the range. Check with the local extension office for stocking rate guidelines for the pasture type and location. Most producers have been able to add one goat per cow to their existing operation without having to change their stocking rate for cattle.

Fencing

Options for Constructing New Fences:

The fence that offers the most security for goats is constructed of woven wire with horizontal and vertical stays approximately 4 inches by 4 inches. This type of fence prevents goats from getting their heads stuck in the fence while providing excellent predator control. Treated wood, steel, or cedar fence posts should be placed 15 feet apart for maximum strength. *Table 5* lists specifications, approximate costs, and recommendations for fences. Install all types of woven wire fences as close to the ground as possible to eliminate escape routes for kids or small goats. It helps to fasten barbed wire at ground level under the woven wire.

Cattle woven wire may be used in place of goat woven wire by installing one strand of electric wire along the interior of the fence approximately 10 to 14 inches off of the ground to prevent goats from getting their heads stuck in the larger fence squares.

New fences may also be constructed with high tensile electrified wire. Perimeter fences should be constructed using five or six alternating hot and ground wires approximately 9 to 11 inches apart to provide maximum control.

Fig. 3. Woven wire goat fence works well to hold goats.

Options for Renovating Old Fences

Existing fences can be "goat proofed" by adding barbed or electric wire. Plank-type wooden fences can be upgraded by adding electrified wires between the planks. Any fence that is too high off the ground may be fortified by using either barbed wire or electric wire. Remember that goats are excellent climbers and will climb out of even the best constructed fence if objects (e.g., stumps, logs, rocks) are too close to the fence. Also, gates should be constructed with goat-proof latches. Corner braces should not be positioned so that goats can walk up them to escape.

Health Issues

The No. 1 cause of death in goats in the United States is the blood-sucking gastrointestinal parasite Haemonchus *contortus,* or barber pole worm. The reproductive capacity of this parasite and its resistance to many dewormers make

Table 5. Specifications, approximate costs, and recommendations for fences for goats.

Fence Type	Specifications	Approximate Cost	Recommendations
Sheep and goat fence	48" tall with 4" square openings	$.067 per foot	Install close to ground and keep tight. A standoff electric wire will decrease maintenance and increase longevity of the fence.
Woven wire fence (field or cattle type)	47" tall with various size square openings (most larger than 4")	$.056 per foot	Install close to ground and keep tight. May need electric standoff wire on the interior of the fence to eliminate the possibility of heads getting caught in large square openings.
Treated wooden posts	5' by 8'	$10 each	No more than 15' apart Use for corner and line braces.
Metal T-posts	6'	$3.20 each	No more than 15' apart.
High tensile fence	12.5 gauge	$0.11 per foot @ 6 strands	At least 6 strands.
Non-electric barbed wire fence	15.5 gauge	$0.14 per foot @ 6 strands	At least 6 strands.

parasite control one of the limiting factors in goat production. Internal parasite management includes:

- Proper and rotational grazing allowing at least five weeks between each grazing.
- Frequent and timely animal inspection using the FAMACHA© system to aid in diagnosing anemia resulting from the internal blood-sucking parasite Haemonchus contortus and to determine the need for deworming, *http://www.wormx.info/*. FAMACHA—developed in South Africa by Dr. Fafa Malan—involves examination of the level of redness of the mucus membranes of a goat's eyes, correlating the shade of red on a scale of 1 to 5 with the level of anemia.
- Selective deworming products and correct dosages.
- Eliminating animals from the goat herd that need frequent deworming treatment.

Table 6. Commonly used dewormers in goats (oral route of administration only).

Athelmintics	Brand Name	Approval Type	Dosage/ 100 lb	Withdrawal Time	
				Meat	Milk
Fenbendazole	Safeguard Panacur	Approved	2.3 ml	14 days	4 days
Morantel Tartarate	Rumatel	Approved	1 ml/10 lb	30 days	0 days
Albendazole	Valbazen	Extra Label	8 ml	7 days	5 days
Levamisole	Levasol Tramisol	Extra Label	12 ml	10 days	4 days
Ivermectin	Ivomec for sheep	Extra Label	24 ml	14 days	9 days
Moxidectin	Cydectin	Extra Label	4 ml	23 days	56 days

Use of anthelmintics as "Extra Label" is legal only if prescribed by your veterinarian in the context of a valid client relationship (Meat Goat Production Handbook, page 131).

Foot scald/foot rot is another common health issue that results in lameness and often develops into a major economically significant disease. Frequent foot trimming helps reduce the incidence of foot scald by keeping mud from packing into foot crevices. Spot treatment with antibiotic sprays has limited benefits. Foot baths using zinc sulfate are the most effective treatment of foot scald. Special facilities must be constructed to hold goats for the 15-minute treatment. Goats with chronic foot scald/foot rot should be eliminated from the herd.

Abortion occurs when a female loses her offspring during pregnancy or gives birth to weak or deformed babies. There are vaccines (individual and combination) for several of the agents that cause abortion in sheep, including enzootic (EAE*, Chlamydia sp.*) and vibriosis (*Campylobacter fetus*). Abortion vaccines should be administered prior to breeding.

Risk factors for abortion include an open flock and a history of abortions in the flock. Unfortunately, no vaccine is available in the United States for toxoplasmosis, another common cause of abortion in sheep and goats. Since the disease-causing organism is carried by domestic cats, the best protection is to control the farm's cat population by spaying or neutering and keeping cats from contaminating feed sources.

Vaccinations

A good health plan centers on a solid vaccination program that protects the goats from the common diseases *Clostridium perfringens types* C and D (overeating disease) and tetanus. Animals are vaccinated for two main reasons: to prevent disease and to reduce the recovery period if an animal is exposed to and contracts the disease. A basic vaccination program should include vaccinating kids at 1 month of age, booster vaccinations three to four weeks later, followed by booster buck and pregnant doe vaccinations 30 days prior to the start of kidding (*Table 7*).

Predator and Predator Control

The control of predators often requires a combination of methods, e.g., a guardian animal and a good fence. Dogs (e.g., Great Pyrenees, Komondor, Akbash, Anatolian, and Maremma), donkeys, and llamas are commonly used. The choice of a guard animal is a personal decision.

Fig. 4. Great Pyrenees dog guarding goats as they graze.

Fig. 5. Great Pyrenees make good guard dogs for goats.

Table 7. Suggested health practices for bucks, does, and kids.

Stage		Suggested Health Practice	Additional Practices
Pre-breeding (30–60)	Bucks	Be aware of heat stress. Do breeding soundness evaluation. Vaccinate for *Clostridium perfringens* types C and D, plus Tetanus Toxoid; Chlamydia, Campylobacter, and Leptospirosis, if necessary. Check Body Condition Score, and adjust management accordingly. Deworm based on fecal egg counts or FAMACHA score. Trim feet.	Put bucks next to doe pens. The buck effect will bring transitional does into heat.
	Does	Vaccinate for Chlamydia, Campylobacter, and Leptospirosis if abortions are a problem. Always vaccinate for *Clostridium perfringens* types C and D, plus Tetanus Toxoid.	Give Vitamin E and Selenium to does 30–45 days before breeding in selenium-deficient areas.
Breeding	Bucks	Provide additional feed. Be aware of heat stress and provide shade.	Make sure cats are not defecating in feed to prevent toxoplasmosis. Perform fecal egg count or check FAMACHA score and deworm if necessary.
	Does	Observe for heat. Check for pregnancy at 45 to 60 days with ultrasound.	Perform fecal egg count or check FAMACHA score and deworm if necessary.
Pre-kidding (30 days before)	Does	Booster for *Clostridium perfringens* types C and D plus Tetanus Toxiod. Deworm based upon fecal egg count. Body Condition Score, adjust management accordingly. Watch for pregnancy toxemia.	Perform fecal egg count or check FAMACHA score and deworm if necessary. Begin to collect supplies for kidding.
Kidding	Does	Observe 3 to 5 times per day. Assist if needed. Strip small amount of milk to make sure teat ends are open.	
	Kids	Clip navel cord to 2–4 inches. Dip navel in 7% iodine.	
Nursing/lactation	Does	Feed extra feed to does with multiple kids.	
	Kids	Observe daily for signs of diarrhea or respiratory disease. Vaccinate for *Clostridium perfringens types* C and D, plus tetanus at 5 to 6 weeks of age, revaccinate at 3 to 4 weeks after first injection. Castrate males before 2 months of age. Start creep feeding by 2 weeks of age.	With uncertain vaccination history of doe or questionable colostrum ingestion, kids should be vaccinated at 7 to 21 days of age then given a booster 3 to 4 weeks later, or 150–205 units of tetanus antitoxin can be given at birth or castration.
Weaning		Wean at 3 to 5 months or when marketed as young kids. Check for internal parasites and deworm if needed.	May want to use coccidiostat in creep feed and post-weaning feed.
Post-weaning/drying	Does	About every four weeks, check for internal parasites and deworm as needed. Reduce feed to does just before weaning. May want to reduce water availability for a day or two after weaning to reduce milk flow.	

Vaccinate for Chlamydia, Campylobacter, and Leptospirosis if abortions are a problem.
Clostridium perfringens types C and D, plus Tetanus Toxoid; Chlamydia, Campylobacter, and Leptospirosis, if necessary.
Check Body Condition Score, and adjust management accordingly.
Deworm based on fecal egg counts or FAMACHA score.
Trim feet.

Markets

In general, the demand for goat meat in the United States is greater than the domestic supply so the market for meat goats continues to improve. *Table 8* provides an annual basic goat budget per breeding doe.

In Nebraska, most meat goats are sold at livestock auction markets or by private treaty. The livestock markets that sell goats are limited in Nebraska so plan the marketing of them accordingly.

Websites of livestock auctions that sell goats include:

- http://www.palmyralivestockmarket.com/
- http://www.norfolklivestock.com/
- http://colbylivestock.com/
- http://www.loupcitycommissionco.com/
- https://www.verdigrelivestock.com/
- http://www.belleville81.com/
- http://cla.casauction.com/
- http://columbussalespavilion.com/

Table 8. Annual basic goat budget per breeding doe.

Costs			
Input	Amount Needed/Year	Cost Per Unit	Cost Per Year
Pasture	1.3	$20/acre	$26
Corn	2.5 bu	3.60/bu	$9
Hay	500 lb	.04/lb	$20
Mineral	20 lb	.38/lb	$7.60
Veterinary			$6.00
Protein Supplement	28 lb	.10/lb	$2.80
Labor	5 hr	$25 per hr	$125
Costs/Doe/Year			$196.40
Returns			
Kids Weaned/ Year	Weight of Weaned Kid	Average Price/lb	Returns/Year
1.5	70 lb	$2.50	$262.50
Breakeven Price $1.87			
Profit Per Doe/Year, Including Labor			$66.10
Profit Per Doe/Year, Excluding Labor			$191.10

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