

# Setting Up a Herd or Flock Management Program and How Your Veterinarian Can Help: Baseline Information, Setting Goals and Monitoring Progress

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## **Locate a veterinarian who works with sheep and goats before you have an emergency**

Ask nearby producers

Call the nearest large animal practices

Consult <[www.aasrp.org](http://www.aasrp.org)> and click on 'Find a Vet'. These are veterinarians who are members of the American Association of Small Ruminant Practitioners. They have access to a listserv where they can ask more than 500 veterinarians for advice on difficult cases.

Consult <[myveterinarian.com](http://myveterinarian.com)> - do an advanced search to select sheep and goats and enter your zip code; the goat icon will show with the practice name.

## **Herd information**

The production goals for a herd and the health and management programs that will aid in reaching those goals must be customized for the herd. Thus any discussion of such programs with your veterinarian must begin with a description of the herd or flock, including the numbers and breeds of sheep or goats and the purposes for which they are being kept (commercial vs. hobby; meat, wool, dairy, or other; organic or ethnic markets, etc). The breed will have important effects on prolificacy, maternal aptitude, growth rate of lambs and kids, and disease susceptibility.

## **Geographic location**

The location of the herd is very important, as local climate and rainfall will determine the carrying capacity of the pasture as well as the need for housing and stored forages. Trace minerals in the soil and thus the feeds grown locally will affect general health through selenium and iodine availability and determine the risk of copper poisoning or deficiency, depending on the copper and molybdenum availability. Poisonous plants that grow locally need to be taken into consideration when planning pasture use. Parasite control programs will depend heavily on the length and severity of the winter and the existence of flukes in the region. The proximity to slaughter facilities, feed lots, special religious or ethnic markets and small ruminant veterinarians or extension agents will all have important effects on the profitability of various sheep and goat enterprises and the design of health and production programs.

*Your veterinarian may be able to help with plant identification and will know if flukes are reported locally. The Northeast is selenium deficient and your veterinarian can prescribe*

*injectable selenium if indicated.*

## **Housing and facilities**

The buildings currently available to house the animals must be taken into consideration as they affect the health of the flock in many ways. Improvements in health and profitability often require better designed or larger buildings or a rethinking of how the buildings are used. In northern climates, shelter during the winter, at least for lambing and kidding, is imperative. The housing area needs to be easy to clean and to keep dry, with the choice of bedding depending on local prices and availability. Ample bedding will help to protect lambs and kids from coccidiosis, pneumonia, and paratuberculosis (Johne's disease). Ventilation can be natural or mechanical, as long as the air at sheep and goat level remains good and moisture is removed. Air inlets should be adjustable according to the season, and exhaust or mixing fans may be needed at some times of year.

*Your veterinarian can help you assess ventilation and air quality.*

Herds often grow faster than the facilities available to house them. If the space available for the animals is not adequate, stress and respiratory diseases will increase and it will be difficult to keep the pens dry. If feeder space is not adequate, some animals will overeat while others obtain little concentrate or are killed in the melee that ensues when feed is delivered. Improperly designed big bale feeders kill sheep by tipping over or allowing upper portions of the bale to collapse on the sheep. If feeders do not keep the feed off the ground and feet out of the feeder, coccidiosis, paratuberculosis, and abortion diseases can spread rapidly. It should be possible to fill the feeders easily without entering the pen, to save on labor and avoid injuries to workers. The feeders must be easily cleaned, and this will be especially important if fermented feeds are fed, because of the risk of listeriosis associated with feeding spoiled silage.

The buildings also need to be subdivided to allow proper separation of age groups. This will limit the build up of coccidiosis and the spread of respiratory disease and avoid trampling or competition by larger animals. Creep areas must be provided and a large supply of sheep panels will ensure the availability of jugs for bonding. If the prolificacy of the flock increases, more jugs will be needed as an appropriate time in the jug in a large herd is one day per lamb or kid being raised. There needs to be an isolation/quarantine area with concrete floor that is easily cleaned and completely separate from the main flock. Without such a dedicated space, quarantine protocols will not be implemented.

Finally, handling facilities and raceways need to allow one person to vaccinate, deworm and sort easily without injury to the sheep or goats. A roll-over or trimming table and a footbath will help the larger flocks deal with both mundane foot trimming and the control of footrot.

*Your veterinarian can advise of footrot control and eradication protocols.*

## **Pasture**

Sheep can usually be raised very economically on pasture, and in some areas grazing, at least for mature sheep that are not late pregnant or lactating, can extend well into the winter. A windbreak of trees, hay bales, or snow fence may be needed, especially in winter. The nutritional value of the pasture will depend on the plants present, time since last cutting or grazing, fertilization, and liming. Spreading manure from the barn onto pasture will increase the risk of paratuberculosis transmission. Soil testing will give guidance as to fertilizer needs, and sampling herbage for forage analysis will put the provision of supplements on a scientific basis. Carrying capacity can be determined but will obviously need to be adjusted according to temperature and rainfall or irrigation of the current year. Pasture is a trickier business for goats, as they have less natural resistance to parasites than sheep do and do best when browsing instead of grazing.

The pasture needs to be accessible to the caretaker for at least daily checks, on a welfare basis for the animals and for the economics of the flock. A 4-wheeler may be the most important tool at the shepherd's disposal when pastures are scattered or far from the home. Sheep dogs, if properly trained, will make it possible for the animals to be assembled when one needs treatment or the herd needs to be checked for signs of parasitism or moved. If a dog is not available, training the sheep to come to the sound of a bell is a viable alternative that permits timely treatments.

*Your veterinarian can provide on farm care for herding and guard dogs.*

The fencing available for the pasture serves several purposes. The perimeter fence keeps the sheep in and hopefully keeps predators and wildlife vectors of sheep diseases (such as deer, carriers of *Parelaphostrongylus tenuis*) out. If predators or deer remain a problem, a guard animal may be helpful. Subdivision fencing allows strip grazing for better use of available forage and better parasite and footrot control. Hay fields and grain fields can be fenced temporarily to provide nematode free grazing of regrowth and aftermath utilization. Similarly gullies and roadsides can be grazed with minimal expense. A welcome pasture, unused for two winters and the intervening summer, provides relatively nematode-free grazing for weaned lambs. Solar activated battery chargers are helpful.

*Your veterinarian can prescribe treatment (often off label) for these parasitic diseases and advise on meat and milk withdrawals for drugs used.*

## **Nutrition**

Feeds are a major expense in sheep and goat production, and if to be economical, the cost of the feed must reflect its nutritional value, tempered by any increased risks of disease. Pasture has already been discussed and has associated costs in terms of land purchase or rental fees, taxes, fertilizer and lime, and fencing. Early cut hay is an excellent forage, if possible to make (or buy) in the region. Poor quality, late cut hay will contribute to poor growth, pregnancy toxemia, and vaginal prolapses. Hay quality should be determined by laboratory analysis from core samples,

preferably before purchase. Hay should be stored off the ground and under cover, preferably a roof rather than just netwrap. The typical spoilage layer of a big round bale stored outside in the northeastern USA is 10 cm, which is 25% of the volume of the bale. If hay is so cheap that it is economical to store it outside, the bales can be placed on top of tires to keep them off the ground. The amount of hay needed for the indoor feeding season should be known and necessary purchases arranged for before prices sky rocket in late winter.

*Your veterinarian can advise you on proper hay sampling techniques, using bale corers.*

Silages and haylages, preserved by fermentation, can also be fed but carry a high risk of listeriosis if not made properly or if spoilage occurs. If feeding ensiled forage is necessary and listerial abortions or neurologic cases occur, an inoculant or preservative may be cost effective. Baylage should be wrapped where it will be stored, to avoid puncturing the wrapper. Forage analysis is again important for design of the feeding program.

*Your veterinarian can advise you on testing the pH of silage or haylage to be sure it is safe (below 5.5).*

Grain is often but not always more expensive than forage. The protein and mineral content of the concentrate should complement the protein and minerals in the forages fed. Trace minerals and vitamins are typically supplied with the concentrate. A reasonable grain feeding level for ewes is 1 pound per day per lamb being raised. If more than 1 pound is needed, dividing the grain into two feedings a day will decrease the risk of acidosis. Whole grains rather than ground feeds are also safer. If grain storage areas are not secure, the sheep or goats will feed themselves and suffer from toxic indigestion. With adequate trough space, grain can be fed on pasture. Trace mineral supplements appropriate for the region, using salt as the carrier, should be available free choice on pasture and in the barn.

*Your veterinarian can help you interpret the labels on concentrates and mineral supplements, to select products appropriate for your species and herd.*

Flocks producing organic meat or dairy products will have special, often expensive needs for feeds produced without the use of man-made fertilizers or pesticides or genetically modified disease-resistant plant varieties. The selling price of the product must more than cover the additional feed costs.

Water needs to be available clean and free choice to housed small ruminants. Sheep on lush pasture will drink little water, but as the pastures dry down in summer, provision of a water source is important. A tank with attached drinking cup can be moved around subdivided pastures, avoiding the buildup of mud and parasites such as coccidia around the water source. In fluke regions, animals should be fenced out of streams and ponds. Ample clean water is especially important to promote lactation and to prevent urolithiasis in males.

Most intensive operations will need creep feed for the lambs or kids, to permit distribution of

coccidiostats and trouble free early weaning. Older lambs on pasture get little from their dams other than worms. If lambs are finished in a feedlot setting, the rate of gain and feed efficiency can be measured to aid in fine tuning of the nutrition program. Urolithiasis control by the use of salt, urinary acidifiers such as ammonium chloride, and proper mineral concentrations will be important to prevent losses.

*Your veterinarian can advise you on feeding programs to prevent urolithiasis. Mature pets usually should not be fed grain, to decrease the risk of urinary obstruction.*

The nutrition of the flock prebreeding will have important effects on reproduction. Flushing, or improving the nutrition to increase ovulation rate, can be accomplished by moving to better pasture, increasing grain feeding, or deworming, depending on the circumstances.

Rates of occurrence of the following metabolic and nutritional diseases should be recorded and appropriate actions taken in consultation with a veterinarian or nutritionist if excessive.

- pregnancy toxemia = twin lamb or kid disease
- hypocalcemia
- polioencephalomalacia = cerebrocortical necrosis
- grain overload = toxic indigestion
- urolithiasis = water belly
- laminitis = founder

*Your veterinarian can help you to establish treatment and prevention protocols for these conditions.*

## **Breeding program**

Profitability of the herd is strongly influenced by its reproductive rate, as more live lambs and kids will be available for sale or as replacements. Even dairy animals benefit from larger litter sizes, as the placental hormones from twins increase the udder development of the ewe or doe.

Breeding should not be left to chance. Ideally, breeding soundness exams should be done on all rams and bucks before the beginning of the breeding season and while there is still time to acquire and quarantine additional males if necessary. At the very least the producer should palpate the scrotal contents, including the tail of the epididymis, for abnormalities and record body condition, FAMACHA score, and scrotal circumference. A minimum scrotal circumference is 30 cm for ram lambs weighing more than 155 pounds, 33 cm for 12- to 18-month-old rams, and 36 cm for adults weighing more than 110 kg. Larger (undiseased) testes usually produce more sperm. Subfertile rams, if dominant, can have a serious detrimental effect on reproduction even when multiple rams are used. The ram percentage needed will vary with the age of the ram and the terrain. Young rams that have passed a breeding soundness exam can handle 25 ewes, while adults can serve 50 to 100, depending on how flat the pasture is. Equivalent numbers for bucks are less well established, but a larger scrotal circumference is again desirable.

*Your veterinarian can perform breeding soundness exams, including semen evaluation.*

Use of teasers to stimulate onset of cyclicity and increase ovulation rate by the ram or buck effect will influence the lambing/kidding percentage as well as the tightness of the lambing or kidding period. Natural mating is the norm, but if artificial insemination is necessary for the introduction, disease free, of new genetics, hormonal treatments will be necessary for synchronization. Selecting for the aptitude to breed out of season is important in accelerated lambing systems which permit production of more lambs per ewe per year. Controlled lighting will also permit out of season breeding but electricity is expensive and the protocol must be followed every year.

*Your veterinarian can surgically prepare teaser animals for your herd.*

Ultrasound pregnancy diagnosis permits timely monitoring of breeding success. A yes/no answer can be used for early culling of open animals, including ewe lambs or doelings that might be kept as replacements or sold for meat. Determining litter size with a sector scanner is worthwhile if the females will be sold, grouped or fed according to litter size.

*Your veterinarian can ultrasound for pregnancy, if he or she has or can borrow the equipment.*

When the breeding program is designed to produce a higher lambing percentage, the producer must be able to provide the management at lambing time to save the extra lambs. This will include use of claiming pens and supplemental colostrum or artificial rearing. With a higher lambing percentage also come relatively more lambs to sell after replacement needs are met. Breeding a proportion of the ewes to a terminal sire will be economically advantageous.

### **Vaccination and deworming programs, other routine management events**

The flock manager should know which vaccines are used on what schedule and why. Protocols for use of syringes and needles should be designed to prevent abscess formation and disease transfer (OPP or CAE). Vaccines obviously need to be stored in a refrigerator and only sterile needles introduced into the vials to avoid contamination.

A combination tetanus and enterotoxemia vaccine is the mainstay in the Northeast, but an 8 way clostridial vaccine such as Covexin-8 will be needed where liver flukes are a problem. Replacement animals need two doses about a month apart and boosters at least annually, more often if there is heavy grain feeding or lush pasture for much of the year. Boosters for the females are given 3 to 4 weeks before parturition, to produce the greatest colostrum protection for lambs and kids. The youngsters can then start on their own vaccination sequence at 2 and 3 months of age, if they are not being marketed early (21 day meat withdrawal for vaccines). Show and especially valuable animals will need rabies vaccine. Some herds with ongoing abscess problems may choose to use a caseous lymphadenitis vaccine in replacement animals.

*Your veterinarian can advise on vaccinations and provide rabies vaccinations when needed.*

The deworming program should be customized to fit the herd. All except the fattest and pinkest ewes and does should be dewormed at the time of lambing or kidding. The timing of additional treatments and choice of dewormers, including possible rotation every 1 to 3 years, should be based on quantitative fecal flotations and FECR tests (fecal egg count reduction from time of treatment to 10 days later). The need to deworm can be judged also by monitoring BCS (body condition score from palpation of loin), presence or absence of diarrhea, and anemia (inside of lower eyelid). In youngsters, poor growth rates may indicate parasitism and should be investigated by fecal testing. Slow growing animals often require treatment for worms or coccidia. The youngest animals will benefit from pastures that are parasite free because they have not been previously grazed that year. In warm, wet seasons, the time to return to a pasture for regrazing will need to be extended to avoid massive infections with barberpole worms (*Haemonchus*). More advice on parasite control, including smart drenching practices and possible use of copper oxide wire particles (COWP), can be found at <<http://acsrpc.org>>.

*Your veterinarian can perform fecal analyses to monitor parasite load and anthelmintic resistance. He or she can provide instruction in body condition and FAMACHA scoring. Liver samples can be submitted to the diagnostic laboratory to monitor copper accumulation if COWP are used to control *Haemonchus*.*

Growth and profitability of lambs and kids is usually improved by the use of coccidiostats, except in organic operations where this is not allowed. How these drugs are distributed, including use in creep and trace mineral salt mixtures should be noted.

Shearing is necessary for all except hair sheep and can be profitable with astute marketing. Shearing prelambling will increase space and dryness in the barn. It will also permit easier monitoring of body condition, the approach of lambing, and the udder. Lambs will encounter less fecal material on their way to the udder. Shorn ewes will also eat more in cold weather and seek out a sheltered place to lamb or rest, to the benefit of their lambs. Treatments to control external parasites are best done off shears. Shearing can spread caseous lymphadenitis, so the shearer's equipment should be sanitized on arrival and each time an abscess is opened. If wool sales are important to the economics of the flock, weight and quality of fleeces from breeding animals should be recorded for selection purposes. Estimated breeding values can be determined through the NSIP (National Sheep Improvement Program, <<http://nsip.org/>>). Weak fibers or wool break may indicate a need for improved nutrition or parasite control programs.

Foot trimming will need to be done on a regular schedule, dictated by the housing or range conditions. Foot bathing will become necessary if footrot is endemic or introduced to the flock.

Although docking of lambs is usually performed to avoid fly strike and satisfy market demands, castration may not be necessary or desirable. Intact ram lambs and bucklings will grow faster and leaner than wethers and may be required for certain ethnic markets. Early separation at weaning

according to sex is imperative to avoid mismating.

*Your veterinarian can provide the drugs to abort young animals if mismating occurs. Training in proper methods to dock and castrate can also be supplied.*

### **Disease history of flock**

Flock health programs obviously must be tailored to address the diseases present in the flock. Owners and consultants need to know how the following diseases, amongst others, are diagnosed and monitored. Records of treatments, death losses, necropsy findings on acutely dead and wasted animals and even slaughter checks of animals killed for home use will help determine priorities relative to vaccination or eradication programs.

Johne's disease (paratuberculosis)

CLA (caseous lymphadenitis)

Ovine progressive pneumonia or Caprine arthritis encephalitis  
footrot

*Brucella ovis* = ram epididymitis (not of concern for goats)

abortion diseases including chlamydiosis and campylobacteriosis

pneumonia of lambs and kids

soremouth (contagious ecthyma)

pinkeye

Scrapie is a special case, subject to governmental intervention. For more information on scrapie see:

<[http://www.aphis.usda.gov/wps/portal/footer/topicsofinterest/applyingforpermit?urlile=wcm%3a%2Faphis\\_content\\_library%2Fsa\\_our\\_focus%2Fsa\\_animal\\_health%2Fsa\\_animal\\_disease\\_information%2Fsa\\_sheep\\_goat\\_health%2Fsa\\_scrapie%2Fct\\_scrapie\\_home](http://www.aphis.usda.gov/wps/portal/footer/topicsofinterest/applyingforpermit?urlile=wcm%3a%2Faphis_content_library%2Fsa_our_focus%2Fsa_animal_health%2Fsa_animal_disease_information%2Fsa_sheep_goat_health%2Fsa_scrapie%2Fct_scrapie_home)>

*Your veterinarian can assist with clinical diagnosis, necropsies, and laboratory submissions for these diseases. Your veterinarian can provide a prescription antibiotic for pneumonia that has no meat or milk withdrawal in sheep or goats (Naxcel).*

### **Biosecurity**

Preventing the introduction of infectious diseases will prevent future losses. A closed flock is ideal from a biosecurity standpoint but rarely exists. Owners need to be sensitized to the risks associated with buying replacements, trading or purchasing rams or bucks, and showing any animals. Other livestock on the farm can also introduce diseases, such as paratuberculosis from cattle.

A biosecurity plan will include quarantine and testing protocols for all incoming or returning animals. Sanitation of pens and feeders between groups, and manure management are also important. Visitors to the farm, including shearers, should wear clean clothes and footwear, and shearing equipment should be sanitized. Footbaths for people do almost nothing to kill germs, while plastic boots or provision of thoroughly sanitized rubber overboots for visitors will avoid



the introduction of fecal-transmitted diseases. Disposal of deadstock, including aborted fetuses and placentas, should be prompt, by burial or composting.

### **Further training**

While devising ways to improved the flock health, the contribution of the owner or manager should not be forgotten. His or her time available to work with flock may be the most limiting factor, and profitability and pleasure will increase if the flock size is reduced. The level of education of the owner will also affect understanding and implementation of the flock health program, so additional specific sheep/goat or agricultural training may be beneficial.

An excellent meat goat training program is available on line at

<<http://www.luresext.edu/goats/training/QA.html%20>>.

Much information on sheep production, including the Sheep Production Handbook, is available from the American Sheep Industry Association at <<http://www.sheepusa.org/shop>>.

### **Record keeping** - you treasure what you measure

Progress in profitability and flock health cannot be made without keeping and analyzing records. They can be handwritten or computer records, but will require permanent ID of adults, by tag or tattoo. In New York State, scrapie tags can be obtained by calling 518-858-1424 (as of 8/14). For other states, call 866-873-2824 (866 USDA TAG). Lambs and kids also need to be identified, along with their dams and their birth dates.

Most herds can benefit from keeping track of most if not all of the following items:

- conception rate - pregnant females as a percentage of females exposed to the ram or buck
- abortion rate - aborting females as a percentage of pregnant females
- prolificacy - number of lambs/ewe lambing, also captured as lambing percentage
- birth weight, at least of the first 10 to 20 lambs (kids) in a lambing period, as an indication of nutrition (in the absence of abortion diseases)
- number delivered alive
- number alive at weaning
- number alive to market age
- death rates for various ages
- causes of mortality, as determined by on-farm or diagnostic laboratory necropsy
- culling rate and reasons
- average age to reach market weight
- feed costs per lamb or kid marketed
- feed costs per ewe or doe per year
- price for products sold, and how the price varies with the season and the quality and whether animals are sold at the farm gate, to a feedlot, to an auction, or direct to the slaughter house.

*Your veterinarian can assist with or train you to do field necropsies, to determine causes*

of death, especially in neonates.

Once these numbers are known for the most recent year, goals can be set and appropriate plans can be formulated to address the most important impediments to production and profitability or other concerns of the owner. Some targets for sheep, as published in Herd Health Food Animal Production Medicine, 2<sup>nd</sup> edition by Radostits, Leslie, and Fetrow, W. B Saunders Co, 1994 are given below. The herd records will need to be reviewed on at least an annual basis.

*Your veterinarian and nutritional advisor can assist with the annual review of herd records.*

Parameter	Definition	Target
Lambing rate	% ewes mated that lamb	>95%
Abortion rate	% pregnant ewes that abort	<5%
Stillbirth rate	% of term lambs born dead or dead within first 24 hours	<2%
Perinatal lamb mortality rate	% lambs born alive that die from birth to weaning	<5% (this is optimistic in a large commercial flock)
Ewes weaning lambs	% of ewes weaning at least one lamb	>90%
Average daily gain, birth to weaning	adjusted for sex and litter size	0.66-1.1 pounds/d (0.3-0.5 kg/d)
Weaning rate	lambs weaned per female exposed to ram, per breeding period	1.5 - 1.7
Ewe death rate	% ewes dead per year	<5%
Culling rate	% of ewes culled out of average number of ewes in flock per year	20%

