Small Ruminant Herd Health for the Mixed-Animal Practitioner

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The cornerstones for a solid preventive medicine or herd health program for small ruminants are sound nutrition and feeding management, parasite control, vaccination program, appropriate hoof care, biosecurity, and predator management.

Nutrition and feeding management – general considerations

Good quality forage/roughage should be the foundation for any small ruminant diet. Loose or block trace mineral salt should be available at all times. Goats are susceptible to copper toxicity but are much more resistant to it than sheep. Fresh, clean water should always be available. One big difference between sheep and goats is that goats are primarily browsers and have been used to clear brush for other grazing animals such as sheep and cattle. This is an important distinction as regards feeding behavior differences between sheep and goats. When managing larger production herds, for milk or meat, feeding balanced rations is of the utmost importance. Find out who your regional extension agents are or find nutritional consultants at local feed stores who can help you and your clients design an appropriate feeding program for the herd.

Some basic considerations that you need to keep in mind are feeding according to where the particular animals in a herd are in their production cycle and growth stage. Young, growing animals, late-gestation and lactating animals are going to need more protein and more mineral (particularly calcium) and late-gestation and lactating females will need more energy to meet the demands of musculo-skeletal growth and development of their young as well as to prevent a variety of metabolic diseases such as pregnancy toxemia, ketosis, milk fever and fatty liver disease. Breeding males will likely need increases in energy during the breeding season to avoid weight loss; some males require 1-2 lbs grain during the season. Starting the breeding season with a BCS of 3-3.5/5 is a good rule-of-thumb. To ensure appropriate feeding for physiologic state, separating animals according to their nutritional needs can be helpful. Supplementation of pasture and forage with concentrates may be necessary to help particular animals meet their energy demands. Any feed changes that do occur need to be gradual to allow for the rumen flora to adjust slowly overtime and not induce indigestion that could lead to a rumen acidosis and subsequent digestive upset and disease. Bucks, rams and wethers fed large amounts of concentrate are at risk of developing urolithiasis. Finally feeders need to be kept clean, appropriately spaced and well-designed to meet the needs of the numerous animals in a herd.

Good quality grass forage, minimal concentrate, trace-mineralized salt and a constant supply of clean, fresh water should meet the maintenance needs of most small ruminants. Having owners maintain every 2 week-monthly body weight estimates (weight tape and BCS) is recommended.
to monitor any inappropriate weight gain or loss as forage nutritional content varies widely and allows for the owner to take restrict or supplement intake as needed.

Animals that are being fed for maintenance require 1.5-2% BW in dry matter (DMI). Free access to pasture or 2.5-4 lbs grass hay, no grain and free choice minerals are all that is generally needed.

**Parasite control**

The type of control depends on the type of management system on the farm. Intensive, confinement housing controls most nematode infections but may set up for problems with coccidia. Semi-confinement with summer pasture can lead to nematode problems in summer and fall, especially in younger animals. With extensive grazing or year round pasture, parasite problems will depend on interactions between climate, stocking rate and type of vegetation. Currently, the three big parasites of concern are *Haemonchus contortus* (barber pole worm), *Teladorsagia circumcincta* (stomach worm), and *Trichostrongylus colubriformis* (black scour worm). For the past 10 years or so anthelmintic resistance (AR) in small ruminants has been well-documented and widespread in the US, with most resistance seen in the southeast (Kaplan 2004). The parasites are often resistant to multiple classes of anthelmintics, and widespread resistance to benzimidazoles (BMZ) and macrocyclic lactones (ML) is seen in small ruminants. Parasite biology, management and pharmacologic factors have all contributed to the development of AR. **Practices that increase selection pressure for AR include deworming too often, treating the whole herd, inadequate quarantine procedures, and under-dosing of anthelmintics.** Drug factors that increase AR include longer-acting dewormers that persist in the body allowing for parasites to be exposed to sub-therapeutic concentrations (MLs).

Preserving “refugia” (populations of parasites susceptible to anthelmintics) is the current goal of parasite control in small ruminants (Kenyon et al 2009). A selective approach to deworming is currently recommended in order to preserve refugia and slow AR. Some animals in the herd are left untreated (those with the least amount of egg-shedding and/or the ones least clinically affected based on fecal egg counts (FEC) or FAMACHA© scoring) and deworming occurs when there are more eggs and larvae on the pasture so the presence of susceptible parasite populations on pasture will “dilute” the resistant populations and preserve refugia. FAMACHA© is an on-farm test used to evaluate small ruminants for the load of *H. contortus* (barberpole worm) based on lower eyelid color as color correlates with anemia (van Wyk and Bath 2002, Kaplan et al 2004). 80% of parasite eggs are shed by 20% of the animals in a flock or herd and these are the ones we want to target in our deworming programs; FAMACHA© and FEC can help us identify these animals.

Certain classes of animals may require more frequent treatment with anthelmintics than others. The goal is not to be parasite-free; however, any animal showing clinical signs of parasitism should be treated. Young animals need some degree of parasite exposure in order to acquire gut
mucosal immunity; the key is finding the balance between exposure and clinical parasitism. Anthelmintic resistance is inevitable; the goal is to slow it down.

There are several classes of anthelmintics used in sheep and goats. One class is the benzimidazoles (BMZ) and includes fenbendazole (Panacur®, Safeguard®), oxfenbendazole (Synanthic) and albendazole (Valbazen®). Lots of AR has been shown to this class. The second class of anthelmintics for use in small ruminants is the imidazothiazoles. Levamisole (Tramisol, Levasole and Prohibit®) are examples of this drug class and are found as water soluble powders or in an injectable form. Levamisole is typically given to goats at 1.5 times the sheep dose but toxicity has been observed at twice the sheep dose (SLUDDE signs such as ataxia, ptyalism, epiphora, urination and defecation). Animals with signs of mild overdose reportedly recover in a few hours. Accurate assessment of body weight is essential. It is recommended that animals be observed for 30 minutes after being dewormed with this class of anthelmintic. Macroyclic lactones (MLs) include ivermectin (Ivomec®) doramectin (Dectomax®), eprinomectin (Eprinex®) and moxidectin (Cydectin®) and are the third class of anthelmintics. These drugs are fat soluble and therefore drug withdrawal periods can be prolonged. Cydectin® persists in the body for months, and resistance is rapidly developing to this drug because it has been used so frequently. Morantel tartrate (Rumatel®, Positive Pellet Dewormer) is a tetrahydropyrimidine and can be mixed with feed.

*Only a few anthelmintics are approved for use in goats, Rumatel, and Panacur/Safeguard, therefore use of all the other anthelmintics is “off-label”. Goats require 1.5-2 times the sheep dose of anthelmintics due to having a proportionately larger liver to metabolize them and due to a faster rate of passage through the digestive tract. The higher dosing in goats also requires a longer drug withdrawal period than for sheep.

The use of doramectin (Dectomax) in small ruminants has been discouraged due to its long persistence and no improvement in efficacy when compared with ivermectin, allowing it to select more rapidly for AR. Both drugs are in the same class and resistance to one results in resistance to the other. Moxidectin (Cydectin) is closely related to the aforementioned drugs but has an even longer persistence in tissues and is even more potent than ivermectin and doramectin. It will often kill parasites that are resistant to avermectins and it must be used carefully (as a last resort) to preserve its effectiveness. Increased to AR to moxidectin has been reported recently and it is reportedly no longer effective on many sheep and goat farms in the eastern and southeastern US (Kaplan 2013).
The following are some specific guidelines from the American Consortium for Small Ruminant Parasite Control and Dr. S. Schoenian (University of Maryland Extension Agent) to follow for parasite control in sheep and goats in order to slow down anthelmintic resistance:

- Suckling animals are less of a concern as they aren’t grazing yet and are less likely to ingest parasite larvae from pasture.
- Breeding males and mature ewes or does are a moderate concern. Risk for parasite transmission will be farm-dependent based on management practices and parasite history.
- Grazing sheep and goats are usually young and on pasture. These are considered high priority and are at greatest risk for parasitism.
- Use the FAMACHA© system to determine which animals should be dewormed (and which should not) for barber pole worm infection.
- Deworm all sheep and goats with bottlejaw, regardless of their FAMACHA© scores.
- Administer all anthelmintics orally using a syringe with a long metal nozzle.
- Do not inject or pour anthelmintics on a sheep or goat's back. Cattle pour-on anthelmintics should never be used in goats to treat internal parasites and their use is not permissible under extra-label use law. It is recommended to always use the sheep oral drench.
- Weigh animals to determine proper dosage of anthelmintics. Do not underdose.
- Give goats higher dosages of anthelmintics (typically 2x the sheep or cattle dose; exception: 1.5x dose of levamisole)
- Fast sheep and goats prior to administration of benzimidazole drugs and ivermectin.
- Do not move sheep and goats that have all been dewormed to a clean pasture.
- Don't overuse (or misuse) moxidectin or levamisole as these anthelmintics tend to be the most effective on most farms.
- Quarantine and deworm new sheep and goats with anthelmintics from two different chemical classes to prevent the introduction of anthelmintic-resistant worms.
- Seek veterinary approval and advice for extra-label use of anthelmintics.
- Extra-label drug use is permitted by the FDA when a valid client-patient relationship exists and an appropriate medical diagnosis has been made. For approved species and indications, see each drug’s label or check Animal Drugs @ FDA.
- The effectiveness of an anthelmintic should always be tested before being used by performing a fecal egg count reduction test (FECRT) or larval development assay.
Some common small ruminant anthelmintics with label information and drug withdrawal times

Modified from a document by Dr. Ray Kaplan at ACSRPC.org

Valbazen Suspension (11.36 % or 113.6 mg/ml): 20 mg/kg PO. Do NOT use in pregnant does in the first trimester of pregnancy. Meat withdrawal time is 9 days and 7 days for milk (FARAD).

Safe-Guard/ Panacur Suspension (10% or 100 mg/ml): The label dose in goats is 5 mg/kg, but 10 mg/kg dosage is recommended. At 10 mg/kg dosage, meat withdrawal is 16 days and 4 days for milk (FARAD). Add 1 day for each additional day the drug is used (i.e. if given 2 days in a row, withhold milk for 5 days after second dose.

Ivomec Sheep Drench (0.08% or 0.8 mg/ml): 0.4 mg/kg PO. Protect from light. Coughing may occur during and following drenching. Meat withdrawal time is 14 days (FARAD). Do not use in dairy animals during lactation.

Prohibit Soluble Drench Powder (Sheep): Note that this drug is also sold as Levasol and Tramisol. 12 mg/kg oral dose, meat withdrawal 4 days and milk withdrawal 3 days. Solution is prepared by dissolving 52 gm packet in 1 qt (943 ml) water, which yields 49.6 mg/ml. If dosing kids, dilute further (1 packet in 2 qt water) and give twice the amount listed on the chart. This widens the margin of safety.

Cydectin Sheep Drench (1 mg/ml): 0.4 mg/kg PO. For single dose, the meat withdrawal time is 23 days and milk withdrawal is 60 days.

Morantel tartrate (Rumatel): the recommended label dose is 10 mg/kg PO. Zero withdrawal time for milk in lactating dairy goats. Meat withdrawal time for goats is 30 days.
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<th>Ivomec Oral (ivermectin)</th>
<th>Prohibit Oral (levamisole)</th>
<th>Cydectin Sheep Drench Oral (moxidectin)</th>
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Integrated parasite management

Anthelmintics need to be thought of as a limited and valuable resource that we need to preserve. A concept referred to as “Smart Drenching” is an approach to parasite control that relies on the current state of knowledge regarding host physiology, drug pharmacokinetics, parasite biology, small ruminant genetic selection for resistance, as well as the resistance status of the worms on a particular farm (Kaplan 2013). The Five Point Check© is an expansion of the FAMACHA© system that includes evaluation criteria for animals with FAMACHA© scores of 3 (no treatment recommendation), as well as other parasites, such as coccidia and the scour worms by assessing the hind end of the animal looking for any fecal staining.

The five evaluation points are: 1) Nose, nasal bots; 2) eye, FAMACHA© score; 3) jaw, bottle jaw; 4) back, body condition score; 5) hindquarters, or “dag score” for fecal soiling.

Studies have shown that anthelmintic resistance can be delayed when two or more anthelmintic drugs are combined in the same product. Combination products slow resistance because fewer resistant parasites survive treatment than with a single-ingredient anthelmintic drug. Therefore, the number of resistant parasites left behind to pass on resistance genes to their offspring is reduced. Some parasitologists are recommending this approach on farms with serious AR problems, and it is also recommended by some in cases of new arrivals to farms to prevent contamination of the new farm with resistant worms. There is currently no approved combination product available in the US and this is being explored further as the down-side to combining anthelmintics is that these products may promote multi-drug resistance if used inappropriately by producers (and veterinarians).

Some of the other management strategies that have been recommended to aid in reduced dependence on anthelmintics for the control of internal parasites in small ruminants are: copper oxide wire particles (COWP), feeding high tannin forages such as lespedeza, nematophageous fungi (Terrill et al 2012). COWP can cause copper toxicity in sheep if dosed too frequently. It has been recommended to not treat with more than 2-4 gm/season. Mixed or multi-species grazing has been shown to decrease parasite loads in small ruminants. Sheep and goats are not infected by the same worm species as cattle and horses are affected by different parasites. Small ruminants that ingest worm larvae from infected cows and horses will not be affected. Cattle and horses will help to remove worm larvae that cause clinical infection in small ruminants by their grazing as they graze shorter pastures. Multi-species grazing also improves forage utilization, as sheep and cattle have complimentary grazing behavior.
VACCINATION

Essential vaccines:

Clostridial diseases (*Clostridium perfringens* type C,D and *Clostridium tetani*)

*Clostridium perfringens* type C (enterotoxemia type C, hemorrhagic enteritis, “bloody scours”) – affects lambs/kids typically < 1 month of age. *C. perfringens* type D (enterotoxemia or “overeating disease”) is caused by sudden changes in diet (increased concentrate or access to lush, green pasture) leading to rapid proliferation of *C. perfringens* type D and the generation of large amounts of epsilon toxin, which results in disease, typically in lambs/kids > 1 month of age. This vaccine is most critical for farms which feed a lot of grain or allow instant access to lush pasture. *Clostridium perfringens* is considered as part of normal flora in sheep and goats. Type D is a common cause of death in sheep and goats world-wide, and younger animals usually are the most affected.

Other vaccines:

Vaccinations to consider depending on specific herd/flock issues (most are not labeled for goats) include: **Contagious ecthyma (soremouth or orf)** but only in cases of infected herds, **footrot**, **Chlamydia or Campylobacter (vibrio)** in cases of infected herds, **rabies**, **caseous lymphadenitis**.

The sore mouth vaccine is a "live" virus and sore mouth is highly contagious to humans. Care must be taken when applying the vaccine and gloves should be used. Flocks which are free from sore mouth should not vaccinate as the vaccine will introduce the virus to the flock/premises. Once soremouth vaccination is incorporated, it should be continued annually.

There are two vaccines for **foot rot** in sheep. Neither product prevents the occurrence of disease, but when used in conjunction with other management practices such as selection/culling, regular foot trimming, foot soaking/bathing can help reduce infection levels. Foot rot vaccines should be administered every 3-6 months and especially prior to anticipated outbreaks of hoof problems (i.e. prior to the wet/rainy season).

There are vaccines (individual and combination) for several of the agents causing **abortion** in sheep: enzootic (EAE, *Chlamydia sp.*) and vibriosis (*Campylobacter fetus*). Abortion vaccines should be administered prior to breeding in infected herds. Risk factors for abortion include an open flock and a history of abortions in the flock. There is no vaccine in the US for toxoplasmosis, another common cause of abortion in sheep. Controlling the cat population by spaying/neutering and keeping cats from contaminating feed sources is recommended for prevention. None of the vaccines are licensed for goats.

Though the risk to sheep and goats is usually minimal, **rabies** vaccination may be considered if the flock is located in a rabies-infected area and livestock have access to wooded areas or areas
frequented by raccoons, skunks, foxes, or other known carriers of rabies. Frequent interaction with livestock may be another reason to consider vaccinating. The large animal rabies vaccine is approved for use in sheep, but no rabies vaccine is currently licensed for goats.

Vaccination for caseous lymphadenitis (*Corynebacterium pseudotuberculosis*) is not recommended in goats. There is no licensed vaccine for goats and the sheep vaccine has shown poor efficacy and safety when used in goats. Vaccination in sheep seems to reduce incidence of internal and external abscesses in sheep but does not prevent the disease.

**Vaccination program for mature goats and ewes**

*Does/ewes*: vaccinate 1 month prior to kidding for *C. perfringens* type C and D and tetanus toxoid. Two vaccinations are needed the first time an animal is vaccinated or if more than a year has elapsed since last vaccination. If you are in a selenium deficient area (Indiana), a BoSe injection should be given 1 month prior to kidding as well to prevent nutritional myodegeneration (white muscle disease) in kids/lambs.

*Bucks and rams should also be vaccinated annually with C, D and Tetanus toxoid*. Multivalent Clostridial vaccines exist (Co-vexin 8) to protect against Clostridia novyi, chauvoei, septicum, haemolyticum. Blackleg, bacillary hemoglobinuria and malignant edema are not typically common diseases in goats. Consider its use in small ruminants where these diseases are an issue.

*The efficacy of vaccination against caprine enterotoxemia has been questioned. Response to vaccination is variable, but it is unclear if vaccine-induced antibody levels are protective. In order to produce protective titers, 3 to 4 doses of vaccine annually were required to maintain a protective antibody level. It is also unclear if systemic immunity, mucosal immunity, or both are required to protect against enterotoxemia in goats, which is considered a predominantly enteric disease with systemic effects. Inadequate protection in goats, despite apparently adequate antibody levels, may be attributed to the mainly enteric expression of enterotoxemia in goats compared with the systemic effects seen in sheep and this may be due to involvement of other clostridial toxins in caprine enterotoxemia (Dray 2004).*

**Vaccination program for kids and lambs**

Maternal antibody should protect kids and lambs for up to 10-12 weeks. If dams were vaccinated, recommendations include vaccinating at 8-10 weeks with *C. perfringens* type C and D/tetanus toxoid, and then booster in 3-4 weeks. Vaccinate offspring from non-vaccinated dams at 2-4 weeks with a booster 3 to 4 weeks later. Anti-toxins can provide immediate short-term immunity if dams were not vaccinated or in the event of disease outbreak or vaccine failure. Lambs and kids whose dams were not vaccinated for tetanus should be given the tetanus antitoxin (150-250 U) at the time of docking, castrating, and disbudding, especially if elastrator bands are used.
**SOME AVAILABLE VACCINES LABELED FOR SHEEP AND LAMBS, GOATS**

*Table modified from an online resource by Dr Sue Schoenian, Maryland Small Ruminant Extension Specialist*

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Approved species</th>
<th>Disease specs</th>
<th>Dose</th>
<th>Meat Withdrawal</th>
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<td>Campylobacter (Colorado Serum)</td>
<td>Sheep</td>
<td>Vibrio abortion in ewes</td>
<td>5 ml SQ just before breeding, repeat 60-90 d, then annual vaccination (single dose)</td>
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<td>Case-Bac (Colorado Serum)</td>
<td>Sheep</td>
<td>Prevention and control of CLA</td>
<td>2 ml SQ, repeat 2 ml dose in 4 wk, then annual revaccination (single dose)</td>
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<td>Caseous D-T (Colorado Serum)</td>
<td>Sheep</td>
<td>CLA, Clostridium perfringens type D and tetanus</td>
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<tr>
<td>C and D antitoxin (Boehringer Ingleheim)</td>
<td>Sheep, Goats</td>
<td>Prevention and treatment of enterotoxemia</td>
<td>Suckling lambs, 5 ml SQ, feeder lambs, 10 ml SQ. If treating active disease double the doses</td>
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<tr>
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<td>Sheep</td>
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<tr>
<td>Bar-Vac CD-T (Boehringer Ingleheim)</td>
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<td>Tetanus and enterotoxemia</td>
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<td>Covexin-8 (Schering-Plough)</td>
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<td>Clostridium chauvoei, septicum,novyi type B, hemolyticum, tetani, perfringens type C, D</td>
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</tr>
<tr>
<td>Chlamydia psittaci bacterin</td>
<td>Sheep</td>
<td>Ovine enzootic abortion</td>
<td>2 ml SQ 60 d prior to breeding, repeat</td>
<td>60 d</td>
</tr>
<tr>
<td>(Colorado Serum)</td>
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<tr>
<td><strong>Clostratox BCD</strong> (Novartis)</td>
<td>Sheep</td>
<td>Prevent enterotoxemia</td>
<td>Feeder lambs 10 ml SQ, double dose for treatment</td>
<td></td>
</tr>
<tr>
<td>Footvax 10 (Intervet)</td>
<td>Sheep</td>
<td>Foot rot (B. nodosus)</td>
<td>1 ml SQ prior to anticipated outbreak, repeat 6 wk-6 mo, then revaccinate twice yearly</td>
<td></td>
</tr>
<tr>
<td>Imrab 3 (Merial)</td>
<td>Sheep</td>
<td>Rabies virus</td>
<td>2 ml IM/SQ, annual revaccination</td>
<td></td>
</tr>
<tr>
<td><strong>Ovine ecthyma vaccine LIVE VIRUS</strong> (Colorado Serum)</td>
<td>Sheep Goats</td>
<td>Contagious ecthyma/Orf (soremouth)</td>
<td>Apply one drop to wool-free scarified area. Do not use within 24 h of dip or spray</td>
<td></td>
</tr>
<tr>
<td>Tetanus antitoxin (Colorado Serum)</td>
<td>Sheep Goats</td>
<td>Protect against tetanus in un-vaccinated animal</td>
<td>1500 units (5 ml) SQ, IM for 7-14 d for passive immunity. 3000-15000 units SQ or IM for treatment. Repeat dose 7 days later.</td>
<td></td>
</tr>
<tr>
<td>Tetanus toxoid (Colorado Serum)</td>
<td>Sheep Goats</td>
<td>Tetanus</td>
<td>2 doses 1 ml/100 lbs IM, 30 days apart. Annual booster.</td>
<td></td>
</tr>
<tr>
<td>Volar footrot bacterin (Intervet)</td>
<td>Sheep</td>
<td>Chronic footrot</td>
<td>3 ml SQ or IM, repeat in 3-4 wk, then revaccinate annually prior to anticipated outbreaks</td>
<td></td>
</tr>
</tbody>
</table>
**Biosecurity:**

The diseases for which a biosecurity plan is designed will vary from region to region and from farm to farm. Ideally you want to start with healthy stock but many smaller farm owners acquire animals with health issues that are not clinically evident to them. Recommending they buy from reputable breeders in the area with strict biosecurity protocols already in place and a history of disease control is best. Review of medical records from the farm of origin is recommended as well as any pertinent history about specific disease such as abortion, neurologic disease, chronic weight loss, mastitis, or diarrhea. Any new stock should be isolated for at least 30 days (ideally 60 d) and maintenance of a closed herd is recommended, if possible. Having visitors and vehicle traffic limited to the farm is recommended and any visitors should wear barrier protection to minimize spread of disease. Cleaning and disinfecting equipment, vehicles, protective clothing and footwear before and after contact with any animals is essential as is control of insects, wildlife, rodent, bird and domestic animal populations.

Brief biosecurity considerations for incoming animals with an unknown history, or herd animals that may have left the premise for show but that re-enter the herd are listed below:

- Individually catch each animal and examine for health problems.
- Set up a separate isolation area for any sick goats (take a rectal temperature and record).
- Collect a fecal sample from ideally all or at least 10% of the animals for FEC.
- Anthelmintics should be administered to select animals based on FEC results and/or FAMACHA scoring.
- All animals should be vaccinated for *Clostridium perfringens* type C, D and tetanus.
- Feet should be examined for foot rot and trimmed.
- Consider testing for Johne’s disease, serologic testing for CAE (40-80% prevalence in US dairy goats), or OPP in the case of sheep, and CLA.
- Dairy production animals should be cultured for contagious mastitis.
- Assess these animals twice daily, while wearing barrier protection in the form of coveralls, rubber boots and gloves.
- After 30 day quarantine and a final physical exam animals can be released if disease free, and all pens should be cleaned and disinfected.

A word on kidding/lambing biosecurity. Does or ewes that become infected with certain pathogens for the first time while pregnant may abort, kid/lamb early, or have small or abnormal kids/lambs. Keeping first-time dams away from others until after parturition may reduce the risk of on-farm infection. Prompt removal of placentas and aborted fetuses is important as they can harbor thousands of infectious organisms that can spread infection and contaminate the environment.
Web resources for the most current information on parasite control in SRs (Kaplan 2013)

Veterinarians can get more information about FAMACHA© by sending an email to famacha@uga.edu or by visiting www.acsrpc.org. FAMACHA© is distributed under the auspices of the South African Veterinary Association. Distribution in the US is through the ACSRPC via the laboratory of Dr. Kaplan (University of Georgia). FAMACHA© cards are only sold directly to veterinarians or other trained animal health professionals. These individuals are expected to provide training in the proper use of the FAMACHA© system prior to re-selling the cards and must sign a statement indicating their acceptance of this responsibility.

Much of the research in integrated parasite control is being performed by members of the American Consortium for Small Ruminant Parasite Control. Updated information on novel approaches to parasite control can be found on their website www.acsrpc.org

Before developing an effective control program, it is essential to know if resistant worms are present on the property which can be done via the FECRT (fecal egg count reduction test) or a larval development assay. The FECRT is readily available but labor-intensive, and expensive in large numbers. An alternative to the FECRT is the LDA (DrenchRite©), however, the test can only be performed in a specialized parasitology diagnostic lab. A single DrenchRite test can detect and measure resistance to benzimidazoles, levamisole, ivermectin and moxidectin from a single fecal sample. The Kaplan laboratory currently offers this test for a fee ($450). This cost reflects the significant equipment and supply needs, as well as the great deal of technical expertise and labor required to perform the DrenchRite assay. Requests for information about the DrenchRite test and current pricing should be sent to Sue Howell at jscb@uga.edu
References


