Sheep and Goat 101

Know how. Know now.

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Start with the right animals

- Select healthy, sound animals from reputable breeders.
  - Be wary of hoof problems, respiratory problems, chronic digestive problems, abscesses, abortions etc.

- Select the appropriate breeds or breed cross(es) for your operation.
  - Crossbreed for meat production.

- Start with mature females.
- Start small and grow the size of your operation gradually.
- Do not get more animals than your pasture, facilities, and labor can support.
Production Considerations

- Most expensive part of any livestock operation?
  - Feed
- Aspect of production that controls income?
  - Number of kids weaned and sold/doe exposed (reproduction)
- Nutrition and Reproduction cannot be separated in a production setting!!

Differences: Nutrition

- Feed sheep ~2% BW
- Sensitive to copper
- Higher protein requirement

- Feed goats ~3% BW
- Need 2-3x Cu level
- More sensitive to P levels
FACTORS AFFECTING NUTRIENT REQUIREMENTS

- Sex
- Age
- Weight
- Stage of production – maintenance, early or late gestation, lactation
- Level of production – high production rate vs. low, lactating for twins vs. singles.
- Climate and environment – temperature, humidity, wind velocity, length and density of fleece, travel distance, land topography, exercise
- Body Condition

WATER

- Most critical of all nutrients.

- Primary roles – maintenance of body temperature, transport of nutrients and waste, establishment of an appropriate medium for the many chemical reactions that must take place.

- 1.0 to 1.5 gallons of water for each 4.0 pounds of dry matter consumed
ENERGY

- Most common limiting nutrient
  - Grains and protein supplements – high
  - Hay – intermediate
  - Silage and fresh forage – low

PROTEIN

- Quantity more important than quality
- Blood, feather, fish, poultry by-products, and meat meals – 50 to 90%
- Soybean, cottonseed, sunflower, linseed, and peanut meals – 35 to 50%
- Legume hays – 15 to 25%
- Grains – 8 to 13%
- Urea – non-protein nitrogen
**Know how. Know now.**

### Nutrient Requirements of Goats

<table>
<thead>
<tr>
<th></th>
<th>% TDN</th>
<th>% Protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weanling</td>
<td>68</td>
<td>14</td>
</tr>
<tr>
<td>Yearling</td>
<td>65</td>
<td>12</td>
</tr>
<tr>
<td>Dry Pregnant</td>
<td>55</td>
<td>10</td>
</tr>
<tr>
<td>Dry late pregnant</td>
<td>60</td>
<td>11</td>
</tr>
<tr>
<td>Lacating Ave</td>
<td>60</td>
<td>11</td>
</tr>
<tr>
<td>Lacating High</td>
<td>65</td>
<td>14</td>
</tr>
<tr>
<td>Buck</td>
<td>60</td>
<td>11</td>
</tr>
</tbody>
</table>

### Nutritional Requirements of Sheep

<table>
<thead>
<tr>
<th></th>
<th>% TDN</th>
<th>% Crude protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ewes Mild</td>
<td>54.3</td>
<td>9.4</td>
</tr>
<tr>
<td>Ewes late</td>
<td>65.2</td>
<td>11.1</td>
</tr>
<tr>
<td>Ewes lactation</td>
<td>64.4</td>
<td>13.2</td>
</tr>
<tr>
<td>Early weaned</td>
<td>78.8</td>
<td>12</td>
</tr>
<tr>
<td>4 to 7 months</td>
<td>77</td>
<td>10</td>
</tr>
<tr>
<td>Replacements</td>
<td>63</td>
<td>9.5</td>
</tr>
</tbody>
</table>
Foraging behavior of sheep

- Prefer forbs (weeds)
- Eat grass and browse
- Like clover
- Graze close to the ground
- Inclined to graze higher, drier areas
- Shy away from wet areas.
- Tolerant of salt.

Foraging behavior of goats

- Browsers – prefer woody plants, shrubs, vines and leaves.
- Top-down grazer, graze evenly (first grazer)
- Tend to select grass over clover
- Inclined to graze steeper, higher, drier areas.
- Like to graze fencelines
- Have a tolerance for tannins and other bitter compounds.
- Tend to have fewer problems with plant toxicities.
How much pasture do you need?

- It depends on season, rainfall, forage species, grazing management, etc.
- Common rule of thumb is that two acres of permanent pasture will support one animal unit (1,000 lbs.) through the grazing season.
  - 1 AU = 1 cow = 5 to 7 sheep/goats
- Too much pasture can be a problem as too little, unless you can cut hay or clip pastures.

Reproduction
Affected by photoperiod, short-day breeders

<table>
<thead>
<tr>
<th></th>
<th>Goats</th>
<th>Sheep</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of estrus cycle</td>
<td>21 days</td>
<td>17 days</td>
</tr>
<tr>
<td>Duration of estrus</td>
<td>24-72 hours</td>
<td>20-48 hours</td>
</tr>
<tr>
<td>Time of ovulation</td>
<td>30-36 hrs. after onset of estrus</td>
<td>24-36 hrs. after onset of estrus</td>
</tr>
<tr>
<td>Gestation</td>
<td></td>
<td>142-150 days</td>
</tr>
<tr>
<td>Out-of-season breeding</td>
<td>Less seasonal</td>
<td>More seasonal</td>
</tr>
<tr>
<td>Prolificacy</td>
<td>More prolific</td>
<td>Less prolific</td>
</tr>
<tr>
<td>Artificial insemination</td>
<td>Trans-cervical</td>
<td>Laparoscopic</td>
</tr>
<tr>
<td>Heat detection</td>
<td>many signs</td>
<td>difficult to detect</td>
</tr>
<tr>
<td>Teat structure</td>
<td>2 - 4 functional</td>
<td>2 functional</td>
</tr>
<tr>
<td>Males</td>
<td>Buck odor</td>
<td>No ram odor</td>
</tr>
<tr>
<td>Male : Female ratio</td>
<td>1: 15-25 males &lt; 1 year; 1: 35-50 mature males</td>
<td>Buck and ram effect work</td>
</tr>
</tbody>
</table>
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**Puberty in the Female**

- **Rate to puberty will impact the female’s lifetime productivity**
  - Ewes 6 – 12 months
  - Impacted greatly by season of birth
  - Does 3 – 5 months
  - Provided nutrition is adequate and they are 60 – 70% of their mature weight
  - Breeding Doe kids and ewe lambs????
  - When she is large enough and old enough to get pregnant, carry her pregnancy to term and give birth to live offspring!!!

**Production Facts**

- **Goats**
  - Temperature
    - 101.7 – 104.5° F
  - Heart Rate
    - 70 to 80 per minute
  - Respiration Rate
    - 12 to 15 per minute
  - Male = Buck
  - Female = Doe / Nanny
  - Castrated Male = Wether

- **Sheep**
  - Temperature
    - 102 to 103° F
  - Heart Rate
    - 60 to 90 per minute
  - Respiration Rate
    - 12 to 20 per minute
  - Male = Ram
  - Female = Ewe
  - Castrated Male = Wether
Body Condition

- Overly thin females will often not breed
  - Biologically she is concerned with self survival rather than reproducing
- Overly Fat females will often not breed
  - Maintenance requirements increase
  - Fat is negative toward reproductive hormones
Estrogen content of pastures

Phytoestrogens

- The estrogen content of legumes can interfere with reproduction.
- Ewes and does should be kept off of pastures containing high amounts of legumes 2 to 4 weeks before breeding.

Weaning

- Lambs and kids can be weaned as early as 30 days and as late as 6 months or more.
- There are numerous advantages and disadvantages to early and late weaning.

<table>
<thead>
<tr>
<th>Early weaning (2-3 mos.)</th>
<th>Late weaning (&gt; 3-6 mos.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Save best pasture for lambs and kids</td>
<td>More natural</td>
</tr>
<tr>
<td>Can market cull ewes/does earlier</td>
<td>Less stressful to lambs/kids</td>
</tr>
<tr>
<td>Focus parasite control on young stock</td>
<td>Less problems with mastitis</td>
</tr>
<tr>
<td></td>
<td>Ewes/does contaminate pastures with worm eggs</td>
</tr>
<tr>
<td></td>
<td>Need to castrate males</td>
</tr>
</tbody>
</table>
Predators

- 3-4% of total number of sheep lost to predation in 1994
- Number of sheep lost = 368,050 or 38.9% of all losses
- Loss of $17.7 million in revenue
- West and Mountain states lost 91.8% of sheep to coyotes

- Coyotes were biggest cause of predation losses at 66.2%
- 29.3% of goats lost to predation by coyotes = $5.48 million lost revenue
- 45% of sheep farms employ livestock guardians.
  - Guardian dogs (29.6%)
  - Llamas (14.2%)
  - Donkeys (11.4%)

PREDATION - PREVENTION

- Livestock husbandry practices – penning at night, dispose of dead animals, fall lambing/kidding, barn lambing/kidding
- Frightening tactics – lights, bells and radio, vehicles, propane exploders, strobe lights
- Aversion – repellants, aversion conditioning
- Fencing – net wire, electric, electric modification of existing fences, portable electric
- Guarding animals – livestock guard dogs, donkeys, llamas, bonding with cattle, etc.
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Predator Control

- Guardian dogs
- Donkeys
- Llamas
- Fence

Infectious Diseases

- Foot rot
- OPP
- Caseous lymphadenitis
- Paratuberculosis (Johne’s)
- Pneumonia
- Sore mouth
- Pink eye
- Scrapie
Foot Rot

- Prevention – do not bring onto farm!
- Two anaerobic bacteria: *Dichelobacter nodosus* and *Fusobacterium necrophorum*
- Control during wet season
- Eradicate during dry season – foot paring, foot bath (zinc sulfate), cull

Ovine Progressive Pneumonia/ Caprine Arthritis Encephalitis

- Lentivirus
- Transmitted by colostrum, milk, nasal secretions, needles, surgical equipment
- Animals infected for life
- No treatment/cure
- Signs include weight loss, difficulty breathing (adults), cheesy udder/mastitis, arthritis, neurological syndromes
Ovine Progressive Pneumonia/

Caprine Arthritis Encephalitis
Caprine Arthritis Encephalitis

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Caseous Lymphadenitis

- *Corynebacterium pseudotuberculosis*
- Abscesses in external lymph nodes, internal organs
- Spread by shearing, close confinement, respiratory secretions
- Infected animals are condemned at slaughter
Johne’s

• Chronic intestinal infection with *Mycobacterium avium subsp. paratuberculosis*
• Spread through feces and orally
• Signs include weight loss, poor production, increased parasitism, occasional diarrhea
• Early culling essential

Pneumonia

• *Mannheimia (Pasteurella) haemolytica*
• Cranioventral lung lobes
• Found dead or with difficulty breathing
• Poor growth if chronic
• Colostrum is a preventative in newborns
• Control through good ventilation
Contagious Ecthyma – Sore Mouth

- Parapox virus
- Sores on and around mouth
- Can spread to teats while infected lambs/kids nurse – leads to mastitis
- Can build immunity after infection
- Vaccine is a live virus
- Zoonotic – can spread to open sores of people

Pink Eye

- Mycoplasma or chlamydia
- Tearing, squinting, corneal ulcer
- Temporary response to tetracycline
- Develop immunity but relapse if stressed
- Different from entropian

Entropian
# Health and Diseases

Goats and sheep are generally affected by the same diseases.

<table>
<thead>
<tr>
<th><strong>GOATS</strong></th>
<th><strong>SHEEP</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Internal parasites</strong></td>
<td>Use selective deworming (FAMACHA©), FEC's, and management to control parasites</td>
</tr>
<tr>
<td></td>
<td>Goats require higher dosages of anthelmintics</td>
</tr>
<tr>
<td><strong>Coccidiosis</strong></td>
<td>Include coccidiostat in water, feed, or mineral</td>
</tr>
<tr>
<td><strong>Clostridial diseases</strong></td>
<td>Vaccinate for Clostridium perfringens type C &amp; D (overeating) and tetanus</td>
</tr>
<tr>
<td><strong>Other vaccinations</strong></td>
<td>Varies by flock/herd, location, situation (soremouth, CL, abortion, rabies, foot rot)</td>
</tr>
<tr>
<td><strong>Common diseases</strong></td>
<td>Foot rot, foot scald, Caseous Lymphadenitis (CL), sore mouth, ketosis, urinary calculi</td>
</tr>
<tr>
<td></td>
<td>OPP</td>
</tr>
</tbody>
</table>

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## Gastro-Intestinal Parasites

### Stomach Worms
- *Haemonchus contortus***
- *Ostertagia*
- *Trichostrongylus*
- *Nemotodirus*

### Coccidia
- *Eimera spp.*

- Good pasture and animal management
- Selective deworming using the FAMACHA© system
- Fecal egg counts to monitor pasture contamination and measure drug resistance.
Life Cycle of *H. contortus*

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Anemia

Bottle Jaw
FAMACHA CARD

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Selection for Drug Resistance

Drug Treatment

Next Generation

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Susceptible

Resistant

Parents

Classes of Anthelmintics (Dewormers)

Drug Class

Benzimidazole

Imidazole/Pyrimidine

Macrolide

Trade Names

Safeguard / Panacur

Synathic / Benzelmin

Valbazen*

Levasole / Tramisol

Rumatel

StrongidT

Ivomec

Dectomax

Eprinex

Cydectin**

*Do not use in first trimester pregnancy

**Minimize use to preserve efficacy
### Commonly used dewormers in goats (Oral route of administration only)

<table>
<thead>
<tr>
<th>Dewormer</th>
<th>Approval</th>
<th>Dosage/100 Lbs</th>
<th>Measuring Time</th>
<th>Milk Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fenbendazole (Safeguard/Panacur)</td>
<td>Approved</td>
<td>2.3 ml</td>
<td>14 days</td>
<td>4 days</td>
</tr>
<tr>
<td>Morantel tartrate (Rumatel)</td>
<td>Approved</td>
<td>1 ml / 10 lbs</td>
<td>30 days</td>
<td>0 days</td>
</tr>
<tr>
<td>Albendazole (Valbazen)</td>
<td>Extra-label</td>
<td>8 ml</td>
<td>7 days</td>
<td>5 days</td>
</tr>
<tr>
<td>Levamisole (Levasol, Tramisol)</td>
<td>Extra-label</td>
<td>12 ml</td>
<td>10 days</td>
<td>4 days</td>
</tr>
<tr>
<td>Ivermectin (Ivomec for Sheep)</td>
<td>Extra-label</td>
<td>24 ml</td>
<td>14 days</td>
<td>9 days</td>
</tr>
<tr>
<td>Moxidectin (Cydectin)</td>
<td>Extra-label</td>
<td>4 ml</td>
<td>23 days</td>
<td>56 days</td>
</tr>
</tbody>
</table>

Source: Meat Goat Production Handbook

*Extra label use requires a veterinarian-client-patient relationship and an appropriate medical diagnosis has been made by the veterinarian.*
### Differences: Behavior

<table>
<thead>
<tr>
<th>GOATS</th>
<th>SHEEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curious and independent</td>
<td>Aloof, flock mentality</td>
</tr>
<tr>
<td>Stronger social hierarchy</td>
<td>Stronger flocking instinct</td>
</tr>
<tr>
<td>More agile</td>
<td>Less agile</td>
</tr>
<tr>
<td>Shelter seeking</td>
<td>Shade seeking</td>
</tr>
<tr>
<td>Rear and butt</td>
<td>Butt head on</td>
</tr>
</tbody>
</table>

Goats tend to dominate sheep when they are kept together.
Anthelmintic Choices for *Haemonchus*

- **Moxidectin (Cydectin)** – resistance becoming common where used frequently
  - Same mechanism of killing as ivermectin
  - Ivermectin-resistant worms are also moxidectin-resistant
  - How used will determine how long it will remain effective
  - Treatment of choice for severely clinically ill animals if no resistance
  - Must be used carefully and with prevention of resistance as a goal

- **Ivermectin** – least effective of all drugs
- **Albendazole** – high prevalence of resistance
  - Withhold feed and re-dose for improved efficacy – do not use in first 3 wks of pregnancy
  - More effective than fenbendazol
- **Levamosole** – low prevalence of resistance
  - Weigh goats – watch for toxicity
  - Do not use in debilitated animals or during last 3 wks of pregnancy in goats
Know how. Know now.

Books

- Managing Your Ewe (1993) and Lambing Problems (1991) by Laura Lawson
- Small Ruminant Production Medicine and Management Notebook and CD by InfoVets.com
- Goat Medicine (1994) by Smith and Sherman
- Sheep and Goat Medicine (2002) by D.G. Pugh
- Veterinary Book for Sheep Farmers (2002, UK) by David Henderson
- Extension Goat Handbook (National Goat Database at www.adds.org)

Web Sites

- Educational - .edu
- Information - .info
- Government - .gov
- Organization - .org
- Commercial - .com
- Business - .biz
- Network - .net
- Other countries - .au
Good Websites

- www.sheepandgoat.com
- www.sheepgoatmarketing.info
- www.sheep101.info
- www.sheep101.info/201
- www.sheepandgoat.com/bestoftheweb.html
- http://muextension.missouri.edu/howell/ag/goat_information.htm
- http://www2.luresext.edu/goats/index.htm
- http://www.extension.org/goat

Thank you!

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