Breeding Management of Sheep and Goats

- Reproductive characteristics
- Synchronization of estrus
- Pregnancy diagnosis
- Specific conditions of goats
- Management of pregnancy & abortion
- Ram and buck BSE
- Teasers

Comparison of Reproductive Characteristics

<table>
<thead>
<tr>
<th></th>
<th>SHEEP</th>
<th>GOAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Puberty</td>
<td>Ram: 6 months</td>
<td>Buck: as young as 3 mo.</td>
</tr>
<tr>
<td></td>
<td>Ewe: 5 – 7 mo &amp; 50% of mature bw &amp; season</td>
<td>Doe: as for ewes, Pygmy does - 3 mo.</td>
</tr>
<tr>
<td>Age @ 1st breeding</td>
<td>6 – 8 mo or 60-70%</td>
<td>60-70%</td>
</tr>
<tr>
<td>Pregnancy P4</td>
<td>Secreted by CL but mostly placenta after day 75</td>
<td>Secreted only by CL</td>
</tr>
<tr>
<td>Gestation length</td>
<td>144-151 days</td>
<td>147 – 155 days</td>
</tr>
<tr>
<td>Cervical Anatomy</td>
<td>Complex 7 rings &amp; offset</td>
<td>3 to 6 rings &amp; aligned</td>
</tr>
<tr>
<td>Chromosomes</td>
<td>54 N</td>
<td>60 N</td>
</tr>
</tbody>
</table>

Comparison of Estrous Cycle Characteristics

<table>
<thead>
<tr>
<th></th>
<th>SHEEP</th>
<th>GOAT</th>
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</thead>
<tbody>
<tr>
<td>Length estrous cycle</td>
<td>17 days (14-19)</td>
<td>21 days (18-22)</td>
</tr>
<tr>
<td>Duration of estrus</td>
<td>30 hrs (15-45)</td>
<td>36 hrs (24-72)</td>
</tr>
<tr>
<td>Duration of ovulation</td>
<td>Towards end of estrus, e.g 18-24 hrs</td>
<td>At acceptance of buck (24 hrs) &amp; again in 12 hrs</td>
</tr>
<tr>
<td>Ovulation rate</td>
<td>Breed dependent – multiple common</td>
<td>As for sheep – most breeds prolific</td>
</tr>
<tr>
<td>Behavioural estrus</td>
<td>Anorexia; vulvar swelling; small amounts of mucus; follow ram; more subtle than goats</td>
<td>Restless; wag tail; vocalize; swollen vulva; clear vaginal mucus; follow buck – very demonstrative</td>
</tr>
</tbody>
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Ram “ewe seeking” behaviour

This presentation is designed to augment the notes and aid in understanding of sheep & goat breeding management.
Estrous cycle:

Hormonal events:

- Pineal gland
- Hypothalamus
- Pituitary
- Ovary
- Short days

PROGESTERONE

Why manipulate the estrous cycle of sheep and goats?

- Benefits of Synchronization of Estrus
  - Concentration of breeding and lambing
  - Lambing management
  - Neonatal management
  - Uniform market animals
  - More efficient use of labour & facilities
  - Pregnancy diagnosis
  - Health management procedures

Why manipulate the estrous cycle...

- Benefits of induction of estrus during the transition or anovulatory season
  - Milk supply
  - Off-season higher priced markets
  - Accelerated lambing programs

Hormones to synchronize estrus

- Prostaglandin F2α
- Dinoprost (Lutalyse, Pfizer)
  10 mg i.m.
- Cloprostenol (Estrumate, Schering-Plough)
  125 µg i.m. or 75 µg i.m. / 45 kg bw

ELDU – sheep & goats

Progestagens

- Intravaginal polyurethane pessaries
  - Medroxyprogesterone acetate (MAP)
    - Veramix (Pfizer)
    - No longer available but maybe some residual stock
  - Flugestone acetate (FGA)
    - Only available on an Emergency Drug Release from the VDD
    - 30-40 mg / pessary
    - Chronogest (Intervet – UK)
    - 5 day slaughter for sheep in UK
    - Approved for lactating animals with 24 milk

Hormones

- Melengestrol acetate
  - 220 mg/kg of premix
  - MGA 100 Premix (Pharmacia Animal Health)
  - Approved for beef heifers only
  - ELDU – sheep and goats
  - Withdrawal meat – 48 hrs
**Hormones**

- Natural progesterone impregnated in medical silicone elastomer over a nylon core
  - CIDR-S & CIDR-G (Pfizer Australia)
  - 0.33 g progesterone
  - Available on an EDR from VDD
  - USA – CIDR-G under MUMS consideration
  - VDD approval
    - Withdrawal meat & milk 24 hrs

- Melatonin
  - Used to advance breeding season
  - Incorporated into feed or as an implant
  - Regulin
    - UK, Australia, NZ

**Issues regarding induction of estrus outside of the ovulatory period**

- During anovulatory period – no progesterone secreted
- Exogenous progestagens given during this time will not induce ovulation
- eCG is required for follicle maturation and ovulation
- FSH and LH activity
- Dose is important to assure proper level of fertility and prolificacy

**Prostaglandin program - ovulatory season only**

- Single PGF2α = 60-70 % synchronization of estrus.
- Double PGF2α 9 to 11 days apart = virtually 100 % synchronization of estrus

- CL
- Estrus

- Day 0
- Day 10
- PGF2α 9-11 d interval

**Pessary Program**

- Leave pessary in:
  - Sheep 14 days
  - Goat 17 days

- Synchronize estrus
  - Single PGF2α
  - Double PGF2α

- Fertility lower than other methods
  - Sheep: estrus 24-72 hrs after injection
  - Goats: estrus 56-72 hrs after injection

- Prolongs luteal phase
- All females will enter estrus same time

- Males introduced 24 hrs after sponge removal
**Pessary Program**

- Evidence to suggest that rams should not be near ewes until 24 hrs after sponge removal
  - Lower # of ovulations but earlier onset of estrus
- Use of PG at pessary removal during ovulatory season may tighten and improve estrus.
- Time to estrus generally 24 to 48 hrs
  - Don’t put males in earlier – exhaust selves breeding too early

**CIDR program**

- Leave pessary in: Sheep & Goat 12-14 days

- CIDR In CIDR out

- Leave pessary in:
  - Sheep & Goat 12-14 days
- Ovulatory season:
  - Before pessary removal is optional (300 IU)
  - Anovulatory season or transition:
  - Ovulation required (~ 500 IU)

- Males introduced 24 hrs after CIDR removal

**Melengestrol Acetate (MGA) program:**

- Start 0.125 mg / head every 12 hours
  - Ovulatory season: eCG 8 hrs after last feeding optional (300 IU)
  - Anovulatory season or transition: eCG is required 8 hrs after last feeding (~ 500 IU)

- Rams introduced 24-36 hrs after feeding stopped

**MGA Programs**

- May see lower fertility and prolificacy than with MAP (PEI) but other studies show similar results
- Some evidence that goats respond similarly to sheep
- Important to mix and feed so consumption is even (fewer fluctuations in P4 levels)
- Link to increased risk of 3-methylindole induced pulmonary edema
- Poor response during hot, humid weather
- More work needs to be done during transition period

**Melatonin – transition period - sheep**

- Mimics light effect
- Available in the UK but not Canada
- Advances breeding season 4 weeks
- Implant or feed to dry open ewes
  - Seasonality of breed affects when start
    - E.g. Suffolks mid-May to mid-June to induce estrus mid-July to mid-August
  - Introduce rams 35 days after start on melatonin
  - Breeding will start 15 to 20 days after ram introduced
    - 50 to 60 days post implantation

**“Green” solutions to manipulating estrus**

- Suitable for lactating dairy sheep and goats
- Lower technology required
  - Lower cost?
  - Lower risk to operator, environment
- Manipulating length of daylight
  - “Male” effect
    - Dormitory effect
Light-Induced estrus – anovulatory - sheep

Must be in complete darkness, i.e. total confinement

Include rams

Ewes will start to cycle in March – 40 to 70% successful

Light-Induced estrus – anovulatory - goats

Suitable for lactating dairy goats

Include bucks

Does will start to cycle 60 to 75 days after turn lights off – 60 to 70% fertility

Light-Induced Estrus

- Great for lactating dairy animals
- Must have total darkness during light restriction phase – sheep?
  - Short periods of light may effect
- May be no better than male / dormitory effect
Male Effect

- Use teasers or fertile males
- New to male at this time
  - Increase in LH = ovulation
  - But heat is silent
  - CL forms
    - But regresses prematurely
  - Next cycle is behavioral and of normal length
- Introduction of ram / buck / teaser
  - Must be new to ewe at least 30 days
  - Smell most important
  - Introduce abruptly
  - 48 hrs to work

Male Effect

- Best during transition season
  - Very good synchronization without hormones
- Poor during ovulatory season when already cycling
- Variable during anovulatory season
  - Breed dependent
  - Other conditions

RAM or TEASER EFFECT

Teaser effect is used 2-3 days prior to onset of natural breeding season
No sight, sound, smell of rams for at least 30 days
Rams can be used to stimulate estrus in ewes to ovulate within 2-3 days of joining with teasers

Factors affecting success

- Very seasonal breeds less fertile out of season
- Ram:ewe ratio is critical
  - Unsynchronized in season 1:40
  - Synchronized in season 1:10-15
  - Synchronized out of season 1:6-10
  - Age
- Pessary loss
  - higher in ewe lambs / doelings
- Nutrition
  - Body condition score
  - Flushing pre-breeding

Dormitory Effect

- When ewes / does start to cycle
- ~ 25% of anestrous group will start to cycle too
- Rest may respond within a few weeks
- Pessary insertion to only a proportion of flock if synchronization not that crucial?
Factors affecting success

- **Timing of Male Introduction**
  - If introduced too early, males will breed females not in estrus
    - Sheep – 24 hrs after P4 removal
    - Goats – 36 hrs after P4 removal or hand breed at 36 & 48 hrs.
  - If introduced before withdrawal of P4, earlier onset of estrus but lower pregnancy rates

What is success

<table>
<thead>
<tr>
<th></th>
<th>UNSYNCHRONIZED IN SEASON</th>
<th>SYNCHRONIZED</th>
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<tbody>
<tr>
<td>Pregnancy rate to first cycle</td>
<td>70 – 80%</td>
<td>Pregnancy rate in season</td>
</tr>
<tr>
<td>Pregnancy rate over breeding period</td>
<td>95 – 100%</td>
<td>Pregnancy rate during anovulatory season</td>
</tr>
</tbody>
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Pregnancy Diagnosis

- Ram marker harness
  - male, teaser male, androgenized female
  - Only in season
  - Poor predictive value
- Udder palpation
  - Last few weeks of gestation
- Abdominal ballottement
  - After 110 to 120 days gestation

Goat specific

- Digital palpation of cervix
  - After 30 days gestation can no longer feel
- Estrone sulphate in urine
  - After 50 days gestation
  - UPEI AVC

Pregnancy Diagnosis

- Doppler
  - A mode U/S
  - Linear probe good for diagnosis – flank or rectal

Counting Fetuses Important

42 days after rams are removed (50 to 90 days pregnancy)
- hold off feed overnight
- dry wool & good handling facilities
- sector scanning – double headed
**Caprine False Pregnancy**
- Cloud burst / pseudocyesis
- Common – up to 10%
- Presentation
  - Anestrus
  - Enlarged abdomen
  - May be no breeding history
- Diagnosis
  - U/S – no placentomes or fetus
- Treatment
  - PG – single or double treatment

**Caprine Intersex**
- Linked to polled condition
- Polled is dominant
- XXPP = polled intersex (sex reversal)
- XXPp = polled fertile female
- XYPP = polled fertile male
- Problem with polled X polled mating
  - 2-5% of kids true hermaphrodites
  - 5-10% of kids pseudohermaphrodites
  - Phenotypic females with or without masculinized sex organs to phenotypic males.
- XYPP = polled male often sterile with sperm granulomas

**Caprine Cystic Ovarian Disease**
- Presents as anestrus / persistent estrus / irregular cycles
- Treatment
  - HCG (500iu) or GNRH (100 to 250iu)
  - PGF2α 9 days later
- Irregular cycles are also common in goats
  - Shortened or lengthened / split heats
  - Worse at beginning & end of season
  - Teaser doe or buck will improve

**Sheep X Goat Breeding**
- Rams will breed does
- Bucks will breed ewes
- Only does will conceive
- Most abort < 60 days
- True geeps are very rare!

**Managing pregnancy**

**Induction of parturition**

- Concentrated lambing / kidding
- Improves lamb / kid survival

**SHEEP: Induction of parturition**

- Glucocorticoids
  - 15-20 mg dexamethasone
  - Within 3 days of expected lambing, e.g. day 142 post-breeding
  - Lambing occurs ~ 36 to 72 hrs later

- PG alone won’t work ~ No corpus luteum at term
- Does not cause retained placenta
Managing pregnancy:

**GOATS - Induction of parturition:**

- Glucocorticoids: 15-20 mg dexamethasone within 7 to 10 days of expected kidding, inconsistent results
- Prostaglandins: Last 5 to 6 days of pregnancy. After day 142, will kid 42 to 72 hrs later
- Does not cause retained placenta

Managing pregnancy - mismating:

**SHEEP: Induction of abortion:**

- PGF2α < 50 days: Dinoprost 15 mg
- PGF2α + Dexamethasone (20 mg) > 50 days but may have to use once/day for 2 to 3 days
- Variable success

**GOATS: Induction of abortion:**

- At any stage of gestation: abortion in 50 to 72 hrs

Managing pregnancy - diseases of pregnancy:

- Pregnancy Toxemia
- Hypocalcemia
- Vaginal prolapse
- Uterine prolapse
- Covered in VETM*4460 Food Animal M&S & VETM*4530 - Small Ruminant module

Managing SR Abortion

- Expect < 2%
  - > 5% = problem
  - 15 – 70% in a storm
- Usually 2 weeks prior to first expected lambing date
  - Aborted fetuses
  - Macerated / mummified fetuses
  - Stillborn & weak lambs / kids
  - Open ewes
  - Bloody vaginal discharge
- Many of disease agents are zoonotic

Common Causes of SR Abortion

- Infectious
  - Chlamyphilia abortus
  - Campylobacter spp
  - Sheep only
  - Toxoplasma gondii
  - Border Disease virus
  - Mostly sheep
  - Brucella ovis
  - Sheep only
  - Coxiella burnetii
  - Mostly goats
  - Cache Valley virus
  - Sheep only
  - Listeria monocytogenes spp
  - Salmonella spp

- Non-Infectious
  - Iodine deficiency
  - Selenium deficiency
  - Stress
  - Trauma
  - Toxic plants (locoweeds)
  - Not in Ontario

Covered in Advanced HM Module (VETM*4530)

Male Breeding Soundness Evaluation

- When?
  - Prepurchase
  - Prebreeding - annual
  - Questionable fertility

Poorly done by industry
Male Breeding Soundness Evaluation - Physical Examination

- **Feet**
- **Legs**
- **Teeth**

**Conformational Disease**

- Foot rot
- External parasites
- Contagious Ecthyma
- Caseous Lymphadenitis
- Pinkeye
- Other signs of general ill-health

Male Breeding Soundness Evaluation - Examination of Testicles & Scrotum

- **Testes**
  - Scrotal circumference
  - Symmetry of size
  - Tone

- **Epididymides**
  - Symmetry of size
  - Tone
  - Evidence of inflammation

- **Scrotum**
  - Choriotic mange
  - Hernia
  - Haematoma

Male Breeding Soundness Evaluation - Scrotal Circumference

- > 70 kg > 30 cm SC
- > 110 kg > 36 cm SC

Palpation will reveal many abnormalities

Male Breeding Soundness Evaluation - Examination of Penis & Prepuce

- **Balanoposthitis (Pizzle rot)**
- Corynebacterium renale + high levels of urea in urine (high protein diet)

- **Vermiform appendage**

- **Urolithiasis**

- **Balanoposthitis (Pizzle rot)**
  - Corynebacterium renale + high levels of urea in urine (high protein diet)
Male Breeding Soundness Evaluation

- **Semen Collection Techniques**
  - Electroejaculator
  - Artificial Vagina

- **Semen characteristics**
<table>
<thead>
<tr>
<th>Volume (ml)</th>
<th>Sheep</th>
<th>Goat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total sperm/ejaculation (x10^9)</td>
<td>3</td>
<td>1.9</td>
</tr>
<tr>
<td>Sperm concentration (x10^9/ml)</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>Mobile sperm (%)</td>
<td>75</td>
<td>80</td>
</tr>
<tr>
<td>Normal morphology (%)</td>
<td>90</td>
<td>85-90</td>
</tr>
</tbody>
</table>

Libido not often assessed in sheep

Homosexual behaviour is common in group housed rams
Ascending orchitis / epididymitis

Buck Libido

A buck with poor libido is unusual!

Teasers:
- Need good libido & extended season breed
- Vasectomy / Epididectomy
- Penile deviation – not recommended
- Androgenized castrate or female
  - 100 mg testosterone propionate once/wk for 3 wks
  - good for 4 - 8 wks
Questions?