Introduction to laparoscopic AI and embryo transfer in small ruminants

2023 CORNELL SHEEP & GOAT SYMPOSIUM
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Outline
- Demands & reasons for advanced reproductive techniques
- Laparoscopic artificial insemination (LAI)
- Laparoscopic assisted embryo transfer (ET)
- Considerations for electing to do these procedures in your herd or flock

Demand for SR ART
- Why?
  - Advance genetics
  - Decrease cost and facility needs to maintain a ram/buck
  - Import genetics
  - Synchronize lambing/kidding

Clientele

Why Laparoscopically?

Laparoscopic Artificial Insemination
When to AI?
- Natural heat
- Timed AI following estrus synchronization

Characteristics of Small Ruminant Reproduction

<table>
<thead>
<tr>
<th>Species</th>
<th>Length of Estrus Cycle</th>
<th>Estrus</th>
<th>Timing of Ovulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>21 days</td>
<td>6-30 hours</td>
<td>24-32 hours after onset of estrus</td>
</tr>
<tr>
<td>Goat</td>
<td>21 days</td>
<td>36 hours</td>
<td>9-72 hours after onset of estrus</td>
</tr>
<tr>
<td>Sheep</td>
<td>17 days</td>
<td>24-36 hours</td>
<td>24 hours after onset of estrus</td>
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</tbody>
</table>

So, how do we time this just right?

Estrus Synchronization
- Most protocols use some combination of:
  - CIDR
  - Prostaglandin
  - PG600
  - GnRH

- Exact protocol details vary with:
  - Veterinarian
  - Species
  - Time of year
  - Type/breed
  - Etc.

Laparoscopic AI Procedure
Post-procedural care

- NSAIDS / antibiotics
- Return to natural environment ASAP
- No stress for at least 10 days
- Remove staples @ 14 - 30 days
- 50-60% conception with frozen semen
- 70+ conception with fresh semen

Laparoscopic Assisted Embryo Transfer
Procedure
- Similar to LAI, but more complicated
- Confirm presence & location of CLs
- Pull out tip of uterine horn associated with best CL
- Load embryos into tom-cat catheter
- 1 vs. 2 vs. 3 embryos per transfer
- Transfer & close

Direct Transfer Embryos:
- Ethylene glycol
- Often U.S. derived
- 20 second thaw

Long Thaw Embryos:
- Glycerol
- Non-U.S derived
- 20 minute thaw
Embryo Transfer

Post-procedural care

- Yes to NSAIDs & antibiotics
- Return to natural environment ASAP
- No stress for at least 10 days
- Remove staples in 14-30 days
- Remember, the embryo was already 6 days old when you put it in
- 45-55% conception with frozen embryos

Considerations for Producers

- Hauling to ART facility or having procedures done on farm
  - Covered, warm, and flat area with access to electricity
  - Stress of travel
  - Expense – most services require a minimum financial commitment to perform these services on-farm
  - Comfort with protocol & the ability to carry it out ACCURATELY – major commitment
  - Semen/embryo acquisition & subsequent storage
  - Amount & quality
  - Value of teaser ram/buck
  - Cost
Necessity = A GOOD TEAM!

Questions?
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