Artificial Insemination of Goats

Charles Estill, OSU Extension Veterinarian
Estill’s qualifications - I like goats!
Seminar Outline

- Why AI?
- Synchronization of estrus
- Semen handling
- Semen storage and shipping
- AI equipment
- AI techniques
- Questions
Why AI your does?

- Eliminate or reduce the cost and bother of maintaining bucks.
- Increase the rate of genetic improvement through maximal use of superior sires.
- Increase the number of does to which a buck could be bred.
- Reduced disease transmission
- Estrous synchronization allows several does to be bred the same day.
- Easy transport of genetics.
Disadvantages of AI

- Costs for equipment and liquid nitrogen
- Increased labor for estrus detection and insemination
- Lack of standard protocols for packaging and quality control
- Potential for spread of undesirable traits
## Goat semen costs

All American A.I.

America's pioneers in the artificial insemination of goats.

**ALL AMERICAN A.I.**

(541) 396-3448  
58894 Old Railroad Grade Rd  
COQUILLE, OR  97423

- **EMAIL US.** Please place the word "AI" in subject line.

### NUBIAN SIRE LIST

<table>
<thead>
<tr>
<th>Sire Name</th>
<th>Father</th>
<th>Production</th>
<th>Age</th>
<th>Status</th>
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<tbody>
<tr>
<td>COPPER-HILL GRAND SLAM *B</td>
<td>N08644477</td>
<td>$200.00</td>
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<td>4-EVER-R'S BLAISENAY</td>
<td>N0897349</td>
<td>$20.00</td>
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<tr>
<td>1st CHOICE COMMAND PERFORMANCE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st CHOICE MIDNIGHT RIDER</td>
<td></td>
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<tr>
<td>++B CADDILLAC PIEGAR 7-06 FS90</td>
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<tr>
<td>++B CADDILLAC GERONIMO</td>
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<td>Capricorn Three Hoag Buck</td>
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<td>$15.00</td>
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<td>*B CAR AVELLE'S EXACTA</td>
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<td>CARAVILLE'S JACK FROST</td>
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<td>CEDARSHAGE ETERNAL CONQUEST</td>
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<td>$20.00</td>
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</table>
So you want to try AI!

Doe selection

- Good health
- BCS 2.5-3
- Be on improved nutrition for 2-5 weeks prebreeding
- Disease free
- Good mothers
AI success depends on:

- Fresh vs. frozen semen
- Number and timing of inseminations
- Insemination method
- Quality and quantity of semen
- Semen handling practices
- Management of animals to be inseminated
Goats can be bred based on signs of heat

- A buck does it best!
- Presence or odor of buck causes most does to display heat signs
- Vulva may be swollen, reddened, and moist during heat
- Tail flagging
- Restlessness, vocalization, increased urination
Vaginal mucus changes during heat (need to use a speculum to see this)

- At beginning of heat, very little mucus is present
- As heat progresses, mucus is transparent and found on floor of vagina
- Towards the end of heat the mucus is cloudy- **best time to breed**
- At the end of heat the mucus is cheesy and white
Mucus turns cloudy at optimal insemination time

Photo courtesy Dr. Sherrill Fleming
Estrus synchronization

- Progestogen implants work better than PGF-based programs
-Inject 200-500 IU eCG when sponge or CIDR is removed
-Evaluate semen before use
-Does ovulate around the end of standing estrus
-Examination of cervical mucus is best guide to AI timing
Goat synchronization program
for use during the "natural" season

<table>
<thead>
<tr>
<th>Day 0</th>
<th>Day 7</th>
<th>Day 9</th>
<th>Day 10</th>
<th>Day 11</th>
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</thead>
<tbody>
<tr>
<td>CIDR-G in</td>
<td>Lutalyse</td>
<td>CIDR-G out</td>
<td>Tease + 200 eCG</td>
<td>Breed</td>
</tr>
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</table>
Inserting CIDR

Trimming CIDR tail
Vaginal sponge
AI timing

- Mucus changes from clear and thin to cloudy and stringy late in mid- to late-heat.
- AI should be just before or when the mucus turns cloudy-usually 12-15 h after start of heat.
  - Breed again if still in heat 12 h later
- TAI- best with fresh semen
  - 50-55 h after CIDR removal
Timed insemination

- 50-55 h after removal of progestin
- Fresh semen dose - 150 million pms
- Frozen semen dose - 200 million pms
- Conception rates = 50-85%
Cooled Shipped Semen

- Keep for several days?
- Semen survival
- Conception rates
- Ease of handling
- Common in some countries/areas
Frozen Semen

- Tanks
  - "Shipper tanks"
    - Wet
    - Dry
    - Length of "hold"
  - "Storage tanks"
    - Liquid nitrogen
    - Size
    - Length of hold (rating)
Dewar (Tank) Considerations

- Cost
- Size
- Holding time
- Service
- Measure LN2 weekly
Store dewar off concrete
Handling Frozen Semen

- RECORDS
  - Which tank?
  - Which canister?
  - Which cane?
  - Markings
    - ID
    - codes
    - Name
    - Etc.
Identify cane with desired straw
Lift canister only enough to read canes
Getting the straw out

- Tweezers
- Forceps
- Keep in neck of tank
  - Out for < 10 seconds
  - If in doubt, put it back
  - Take your time
  - Don’t panic/rush/recheck the record
- You need at least 3 hands to do properly!
Lift straw from cane and quickly replace cane
Thawing the straw

- From tank to thaw water ASAP
  - Put thaw cup next to tank
  - Make sure it is correct temp
  - Out of sun
  - From temperature extremes

- Thaw 30-45 seconds minimum
  - Can hold at thaw temp for short period of time, longer than 15 minutes, reduce temp to 90°F
  - Best if used right away
Place into thaw bath
Straw Handling

☐ Remove straw from thaw water
☐ Wipe dry
☐ Shake air bubble to end of straw that you are going to cut off
☐ Cut end of straw off with straw cutter or sharp scissors
☐ Load into AI gun
  ■ Warmed, clean and dry
Cut end of straw
Place straw into Al gun
AI guns

- Cassou gun
- "needle" gun
- Hoegger gun
- ET gun
- others
Preparing the doe for AI

- Restraint
- Preparation: clean perineum
  - Soap and water
  - Disinfectants: NOT unless you can rinse off completely
  - Just water
- Dry thoroughly
Positioning doe in a cradle
Goat Al kit
Goat AI – equipment list

- Liquid nitrogen tank
- Speculum (25 x 175 mm for doelings or 25 x 200 mm for does)
- A.I. light
- Straw tweezers
- Sterile lubricant (non-spermicidal)
- Insemination gun (for straws)
- Breeding stand or facilities to restrain the doe
- Thaw box
- Paper towels
- Straw cutter
- Thermometer
Lube on speculum

- Non spermicidal!!!
- Enough for the job, but not too much
  - On vulvar lips or on speculum
  - May want to warm lube
  - Won’t block view of the cervix
Use non-spermacidal lube
Insert vaginal speculum
Insert light into speculum
Visually locate the cervix.

Cervix should have a red-purple color and white mucus will be present if the doe is in heat and at the proper stage for insemination.
Press speculum against cervix
Place Ai pipette into cervix
Place Al pipette into cervix
AI technique

- Vaginal insemination
  - Generally poor conception rates
  - Use 3 billion PMS/insemination

- Cervical insemination
  - Elevate rear legs in bale of hay
  - Place lubed speculum into vagina
  - With aid of a light, place pipette as far into cervix as possible
  - Deposit semen in cervix
  - MID 200 million PMS
Goat AI

- Insert the insemination gun into the speculum and thread it into the opening of the cervix.
- Use a circular motion and slight pressure to work the insemination gun through the rings of the cervix.
- Do not penetrate the cervix more than 1.5 inches.
- Deposit the semen slowly by pushing the plunger forward.
### Table 15.2  Kidding rates in relation to depth of cervical insemination in crossbred Angora does

<table>
<thead>
<tr>
<th>Depth of cervical insemination</th>
<th>Fresh diluted semen</th>
<th>Frozen-thawed semen</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. does kidded per inseminated (%)</td>
<td>No. does kidded per inseminated (%)</td>
</tr>
<tr>
<td>up to 1 cm</td>
<td>37/88 (42.0%)</td>
<td>17/63 (27.0%)</td>
</tr>
<tr>
<td>1.0 to 3.0 cm</td>
<td>74/127 (58.3%)</td>
<td>39/85 (45.9%)</td>
</tr>
<tr>
<td>into uterus</td>
<td>56/81 (69.1%)</td>
<td>70/102 (68.6%)</td>
</tr>
</tbody>
</table>
S-L-O-W-L-Y inject semen
Withdraw speculum
How the equipment fits together
Clean equipment
Rinse, rinse, rinse
Deep intrauterine AI

Figure 1. Equipment required for transcervical deep cornual insemination of goats: duckbill speculum and penlight, uterine tenaculum forceps, catheter and stylet, and thin polyethylene tube with a 1-mL syringe attached.
Laparoscopic insemination

- Visualize uterus so semen is placed directly into lumen
- Held of feed and water for 24h
- Does is sedated and placed on her back with head down
- Laparoscope and insemination pipette are placed through separate openings in the abdomen
- Place 20 X 10^6 PMS in both horns
Transcervical insemination
Next Spring