Artificial Insemination

Floron C. Faries, Jr., DVM, MS
Discuss estrous synchronization
Discuss timing of artificial insemination
Describe procedures for artificial insemination of mares and cows
Definition

Place semen into the uterus by some other method other than physical sexual contact
Purpose

- Superior sires
- Superior offspring
- Reduce disease transmission
History

- 14th century
  - Arabians – horses
- 18th century
  - Italians – dogs
- 1949
  - Way to freeze semen
  - -320°F

Used early but no preservation
Proper freezing techniques for bull semen

Problems with semen freezing

- Boars
- Stallions
- Dogs and cats
- Toms and roosters
Dairy cattle
- Common use in cows and heifers

Beef cattle
- Uncommon use in cows
- Common use in heifers
Definitions

- Estrous – entire cycle
- Estrus – when in heat
  - Receptive to sexual service
- Anestrus – not in heat
  - Not receptive to sexual service

<table>
<thead>
<tr>
<th>Species</th>
<th>Estrous cycle</th>
<th>Duration of Estrus</th>
<th>Estrus to Ovulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>21d</td>
<td>15 h</td>
<td>24-32 h</td>
</tr>
<tr>
<td>Pig</td>
<td>21 d</td>
<td>50 h</td>
<td>36-44 h</td>
</tr>
<tr>
<td>Sheep</td>
<td>17 d</td>
<td>30 h</td>
<td>24-30 h</td>
</tr>
<tr>
<td>Horse</td>
<td>21 d</td>
<td>7 d</td>
<td>1-5 d</td>
</tr>
</tbody>
</table>
Normal cycle
Estrous synchronization

- Aids in AI programs
- Breed many animals at one time
- Induce estrus with hormone drugs
- In heat 3-5 days post treatment (cattle)
## COMPARISON OF PROTOCOLS FOR BEEF COWS

<table>
<thead>
<tr>
<th>HEAT DETECTION</th>
<th>COST</th>
<th>LABOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Synch</td>
<td>Low</td>
<td>Medium/High</td>
</tr>
<tr>
<td>Select Synch + CIDR®</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>MGA® Select</td>
<td>Medium</td>
<td>Medium/High</td>
</tr>
</tbody>
</table>

### HEAT DETECT & TAI

<table>
<thead>
<tr>
<th>HEAT DETECT &amp; TAI</th>
<th>COST</th>
<th>LABOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Select Synch (TAI non-responders 72-84 hr after PG)</td>
<td>Low</td>
<td>Medium/High</td>
</tr>
<tr>
<td>Select Synch + CIDR® (TAI non-responders 72-84 hr after PG)</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>MGA® Select (TAI non-responders 72-84 hr after PG)</td>
<td>Medium</td>
<td>Medium/High</td>
</tr>
</tbody>
</table>

### FIXED-TIME AI (TAI)

<table>
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<tr>
<th>FIXED-TIME AI (TAI)</th>
<th>COST</th>
<th>LABOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO-Synch + CIDR® (TAI at 66 hr after PG with GnRH at TAI)</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>MGA® Select (TAI at 72 hr after PG with GnRH at TAI)</td>
<td>Medium</td>
<td>High</td>
</tr>
</tbody>
</table>

- The times listed for “Fixed-time AI” should be considered as the approximate average time of insemination. This should be based on the number of cows to inseminate, labor, and facilities.

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Cystorelin®, Factrel®, Fertagyl®, OvaCyst®

Estrumate®, In-Synch®, Lutalyse®, ProstaMate®
**Heat Detection**

**Select Synch**

- GnRH: 0
- PG: 7
- Heat detect & AI: 13

**Select Synch + CIDR®**

- GnRH: 0
- PG: 7
- CIDR®: 7
- Heat detect & AI: 13

**MGA® Select**

- MGA: 0
- ... 12 d ...
- GnRH: 26
- ... 7 d ...
- PG: 33
- Heat detect & AI: 39
HEAT DETECT & TIME AI (TAI)

Select Synch & TAI
Heat detect and AI day 4 to 10 and TAI all non-responders 72 – 84 hr after PG with GnRH at TAI.

Select Synch + CIDR® & TAI
Heat detect and AI day 7 to 10 and TAI all non-responders 72 - 84 hr after PG with GnRH at TAI.

MGA® Select & TAI
Heat detect and AI day 33 to 36 and TAI all non-responders 72 - 84 hr after PG with GnRH at TAI.
**FIXED-TIME AI (TAI)**

**CO-Synch + CIDR®**
Perform TAI at 66 hr after PG with GnRH at TAI.

![Diagram showing GnRH and PG at 0 and 7 days, respectively, with CIDR® lasting for 66 hr.]

**MGA® Select**
Perform TAI at 72 hr after PG with GnRH at TAI.

![Diagram showing MGA, GnRH at 14 and 26 days, PG at 33 days, and AI at 36 days.]

D.J. Schafer and D.J. Patterson
Division of Animal Sciences - University of Missouri - Columbia
These protocols are recommended by the North Central Region Bovine Reproduction Task Force.
Detection of estrus

- Observation
  - Paint/chalk
- Computerized
- Chin-ball marker
- Heat mount detectors
Procedures for AI in cattle

- Collect semen
- Freeze semen
- Identify cow in heat
- Thaw semen
- Rectal palpation
- Pass inseminating gun
- Deposit semen
Heifer AI – Frozen semen

- Thaw semen straw and inseminate heifer in estrus.
Gilt AI – Fresh Semen

- Collect boar and inseminate gilt in estrus
Mare – Fresh Semen

- Collect stallion and inseminate mare in estrus