Artificial Insemination in Beef Cattle

Advancing the quality of the herd.

Lynn Searcy
Steps involved in AI

- Selection of the bulls
- Tools used
- Facilities
- Heat detection and timing
- Handling of the Semen
- Insemination
Bull selection

- AI allows for an enormous range of options in the bulls that you use.
- Bulls are listed in catalogs and their pedigree and EPDs are provided to help with the selection.
EPD

Expected Progeny Differences
These are used to estimate how future progeny of an animal will compare to progeny of other animals within the breed.
EPDs account for:

- Genetic value of cows to which the bull is bred.
- Environmental differences affecting contemporary groups.
- Genetic differences of other parents in the contemporary group.
- Genetic trend.
EPDs and Accuracy

- Accuracy is the reliability of the EPD numbers.
- Low: 0.0 to .25
- Medium: .25 to .50
- High: .50 to 1.0
## EPD example

### G A R Grid Maker

<table>
<thead>
<tr>
<th>Production</th>
<th>Birth</th>
<th>Wean</th>
<th>Milk</th>
<th>Herds</th>
<th>Year</th>
<th>Yr Ht</th>
<th>Mwt</th>
<th>Mht</th>
<th>Scr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acc</td>
<td>Acc</td>
<td>Acc</td>
<td>Daus</td>
<td>Acc</td>
<td>Acc</td>
<td>Acc</td>
<td>Acc</td>
<td>Acc</td>
<td>Acc</td>
</tr>
<tr>
<td>5.8</td>
<td>65</td>
<td>24</td>
<td>6</td>
<td>119</td>
<td>0.6</td>
<td>I -2</td>
<td>1 +.5</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>0.99</td>
<td>0.99</td>
<td>0.74</td>
<td>15</td>
<td>0.98</td>
<td>0.98</td>
<td>0.25</td>
<td>0.27</td>
<td>0.99</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Carcass</th>
<th>Ultrasound Body Composition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cwt</td>
<td>Mrb</td>
</tr>
<tr>
<td>Acc</td>
<td>Acc</td>
</tr>
<tr>
<td>38</td>
<td>-0.1</td>
</tr>
<tr>
<td>0.88</td>
<td>0.9</td>
</tr>
</tbody>
</table>
Tools used in AI

- Liquid Nitrogen tank
- Long gloves
- Insemination rod
- Paper towels
- Straw cutter
- Sheath

- Semen straw
- Warm water bath
- Thermometer
- Rubbing alcohol
- Clock
- Record books
Facilities

- Proper working facilities are a must when AI-ing cattle.
- It eases stress and helps to prevent injury of all involved.
Heat detection

- This is the most limiting factor in an AI program.
- The cow or heifer must be seen in standing heat or active Estrus, this is indicated by an altered behavior.
- The female that is in “heat” will become immobile when another animal, bull or cow, mounts her.
Heat detection and Timing

- Standing heat occurs every 18-24 days, and lasts for 10-14 hours.
- Timing is imperative when AI-ing a cow, to achieve the highest rate of conception, a cow seen standing in the am will be AI-ed in the pm, and if seen in the pm will be AI-ed in the am.
- This is done because the cow ovulates after standing heat.
Handling of the semen

- Semen is stored in a plastic straw
- Straws are stored inside of a cane.
- Canes are suspended in a canister which is inside the liquid nitrogen tank.
- The liquid nitrogen keeps the temperature of the semen at -320F
Handling of the semen

- When preparing the semen for AI-ing a cow, the canister is lifted to the neck of the liquid nitrogen tank the selected cane is lifted and a straw is removed within 10 seconds.

- The straw is pulled from the cane and deposited into the warm water bath that is 90-98 degrees, and left for 45 to 60 seconds.

- It is then wrapped in a paper towel and shaken so the sperm is on one end and an air bubble is at the other.
Handling of the semen

- The straw cutter is then used to make a square cut end on the straw which is then fitted into the sheath.
- The sheath is then fitted onto the insemination rod.
- The insemination rod is then tucked into the AI-er’s clothing for transport to the cow.
- Insemination of the cow should occur within minutes of the semen being thawed.
- This should not exceed 15 minutes.
Insemination process

- The outside of the cow’s reproductive tract should be wash before insemination.
- This prevents the introduction of manure and other contaminants to the reproductive tract.
- The gloved arm is inserted into the rectum and the cervix grasped.
- The insemination rod is then introduced into the vagina and passed through the cervix into the uterus.
Insemination

The radiographs above are from extirpated cow reproductive tracts (dorsal view). In cornual insemination, one-half of the semen is deposited in each uterine horn. In both examples, the inseminant volume is 0.5-ml. Cornual insemination minimizes the possibility of cervical deposition that results in significant retrograde loss of spermatozoa (See Figure 12-3). RUL = Right Uterine Lumen; LUL = Left Uterine Lumen; RO = right ovary; LO = left ovary; S = semen; AIS = artificial insemination syringe; CX = cervix.