

Animal Science 434

Lecture 15b: Sexual Behavior (cont.)

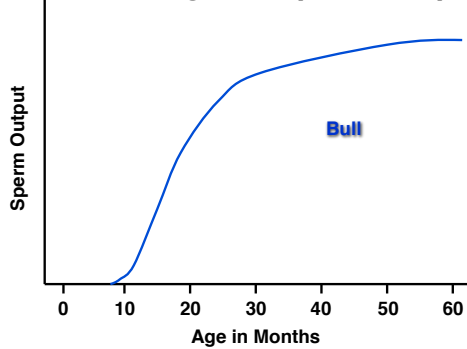
B. Applied Reproductive Behavior of the Male: Semen Collection and Processing

Text: Ch. 10 and 11

Age When Semen Can Be Collected

Bull	12 months
Boar	6 - 8 months
Ram	6 - 9 months
Stallion	20 - 24 months
Dog	8 - 12 months

Effect of Age on Sperm Output



Semen Collection

- Sexual arousal
 - » Sight, sound, smell, touch
 - » Best mount - **Live**

Collection on a Live Mount



Collection on a Live Mount

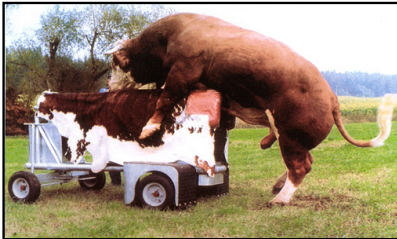




Semen Collection

- Sexual arousal
 - » Sight, sound, smell, touch
 - » Best mount - Live
 - » Alternative mount - dummies
 - Bull
 - Stallion
 - Boar
 - Ram

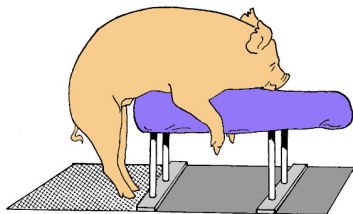
Collection of a Bull on a Dummy



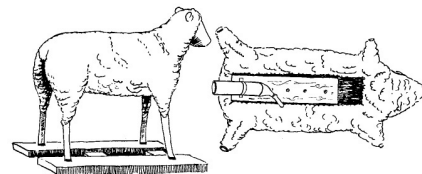
Stallion Collection on a Phantom



Boar Collection on a Dummy



Ram Collection on a Dummy



Semen Collection (cont.)

- **Sexual Preparation**
 - » **False mounts**
 - In bulls can increase sperm collected by 100%
 - » **Novelty**
 - Change mounts, location, other males present
 - » **Breed and species differences**
 - Beef bulls less libido than dairy bulls
 - Arab stallions more libido than Quarter horse stallions
 - Rams less libido than bulls or male goats

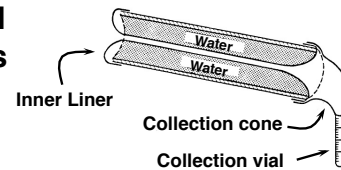
Semen Collection (cont.)

- **Frequency of collection**
 - » **As increase frequency/wk**
 - decrease sperm/ejaculate
 - Increase sperm recovered/wk

Effect of Collection Frequency on Sperm Output

Item	Dairy	Beef	Sheep	Swine	Horses
# of collections	1-6	1-6	7-25	2-5	2-6
Volume (ml)	5-8	3-6	0.8-1.2	150-300	30-100
Concentration (million/ml)	1000-2000	800-1500	2000-3000	200-300	200-400
Total sperm/ejac. (billion)	7-15	5-10	1.6-3.6	30-60	5-10
Total sperm/wk (billion)	15-40	10-30	25-40	100-150	15-30
Motile sperm(%)	50-75	40-75	60-80	50-80	40-75
Normal sperm(%)	70-95	65-90	80-95	70-90	70-90

Artificial Vaginas



Characteristics of AV

- **Temperature**
 - » Bull, stallion, ram - 45°C
- **Pressure**
- **Friction**
 - » Lubrication essential

Electroejaculation

- **Useful if male won't or can't mount**
 - » Get urine often
 - » Poorer quality ejac.
- **Used in rams and beef bulls**

Massage Method

- Stimulate by rectal massage
 - » Seminal vesicles
 - » Vas deferens

Semen Evaluation

- Appearance (color)
 - » No debris
 - » No puss
 - » No urine
- Volume
- Motility
- Concentration
 - » Hemocytometer, spectrophotometer
- Morphology

Preservation of Semen

- Extenders (7 components)
 - » Nutrients
 - Glucose, fructose
 - » Cold shock prevention
 - Milk, skim-milk, egg yolk
 - » Buffer
 - Citrate, Tris
 - » Osmotic pressure
 - The buffer component

Preservation of Semen (cont.)

- » Inhibit bacterial growth
 - antibiotics
- » Increase volume
- » Cryoprotectant
 - glycerol

Preservation of Semen (cont.)

- Liquid Semen
 - » Collect semen
 - » Semen quality exam
 - » Extend 1:3 (semen:extender)
 - Minimal extension rate
 - » Cool to 5°C over 2 hours
 - OK for bull, stallion, ram
 - Boar - cool to 15°C

Preservation of Semen (cont.)

- » Once cooled, extend semen to final amount
 - Bovine (inseminate 0.5 ml)
 - 2 to 5 million sperm/ml
 - Equine (inseminate 1 billion sperm)
 - 25 to 50 million sperm/ml
 - If don't cool then inseminate 500 million motile sperm
 - Swine (inseminate 1.5 to 6 billion sperm in 50 ml)
 - 30 to 120 million sperm/ml

Preservation of Semen (cont.)

- **Frozen semen**
 - » Follow instruction for collecting and cooling semen
 - » After cooling to 5°C, extend to 2X the final concentration desired
 - If want final concentration to be 40 million/ml then dilute to 80 million to ml at this time
 - » Hold semen for 4 to 6 hours at 5°C
 - Equilibrates semen to the cold

Preservation of Semen (cont.)

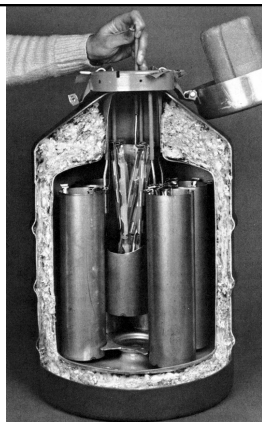
- » **Add the cryoprotectant**
 - Mix extender with 2X final cryoprotectant amount, 1:1 with extended semen
 - Do this in small portions to minimize cryoprotectant toxicity
- » **Package semen**
 - 0.5 ml French straws
 - Ampules
- » **Freeze semen**
 - Liquid nitrogen vapor
 - Static
 - Mechanically controlled
 - Dry ice depressions for pellet freezing



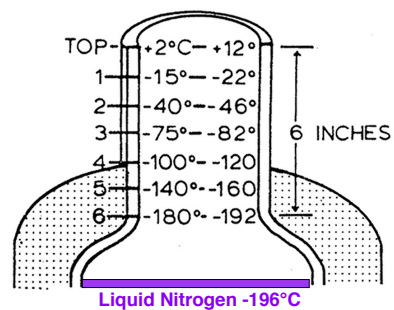
Preservation of Semen (cont.)

- **Storage**
 - » In a liquid nitrogen tank

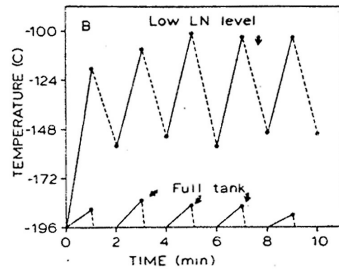
Liquid Nitrogen Tank



Temperature in Neck of Storage Tank



Temperature of Straws If Low LN



Conclusions on LN Tank

- Maintain LN level as high as possible.
- Keep extra tank (narrow neck) with only nitrogen so semen storage tank can be refilled when opened.
- Enter semen storage tank only when needed
- Do not hold canes above neck of LN tank

Thawing

- **Use the procedures recommended by the semen supplier!!!**
 - » 35°C water for 30 - 60 seconds
 - » Ice water for 3 minutes
 - » Pocket thaw
- Have thawing container near LN tank when removing semen