



جامعة الإخوة منتوري قسنطينة

UNIVERSITE DES FRERES
MENTOURI CONSTANTINE



SEMEN COLLECTION IN DOMESTIC ANIMALS

THERIOGENOLOGY II LECTURES – A5

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SEMEN COLLECTION

- ▶ **Sperm collection** is a **fundamental step** in the subsequent application of all **assisted reproduction techniques**
- ▶ The method of sperm collection depends on **the type of species and its management**

SEMEN COLLECTION

- ▶ Once the semen has been collected, it is necessary to carry out a simple evaluation in order to discard those samples that cannot be used

SEMEN COLLECTION

- ▶ The obtained samples must be of optimum quality
- ▶ To be used later in assisted reproduction techniques
- ▶ **To be preserved in germplasm banks**



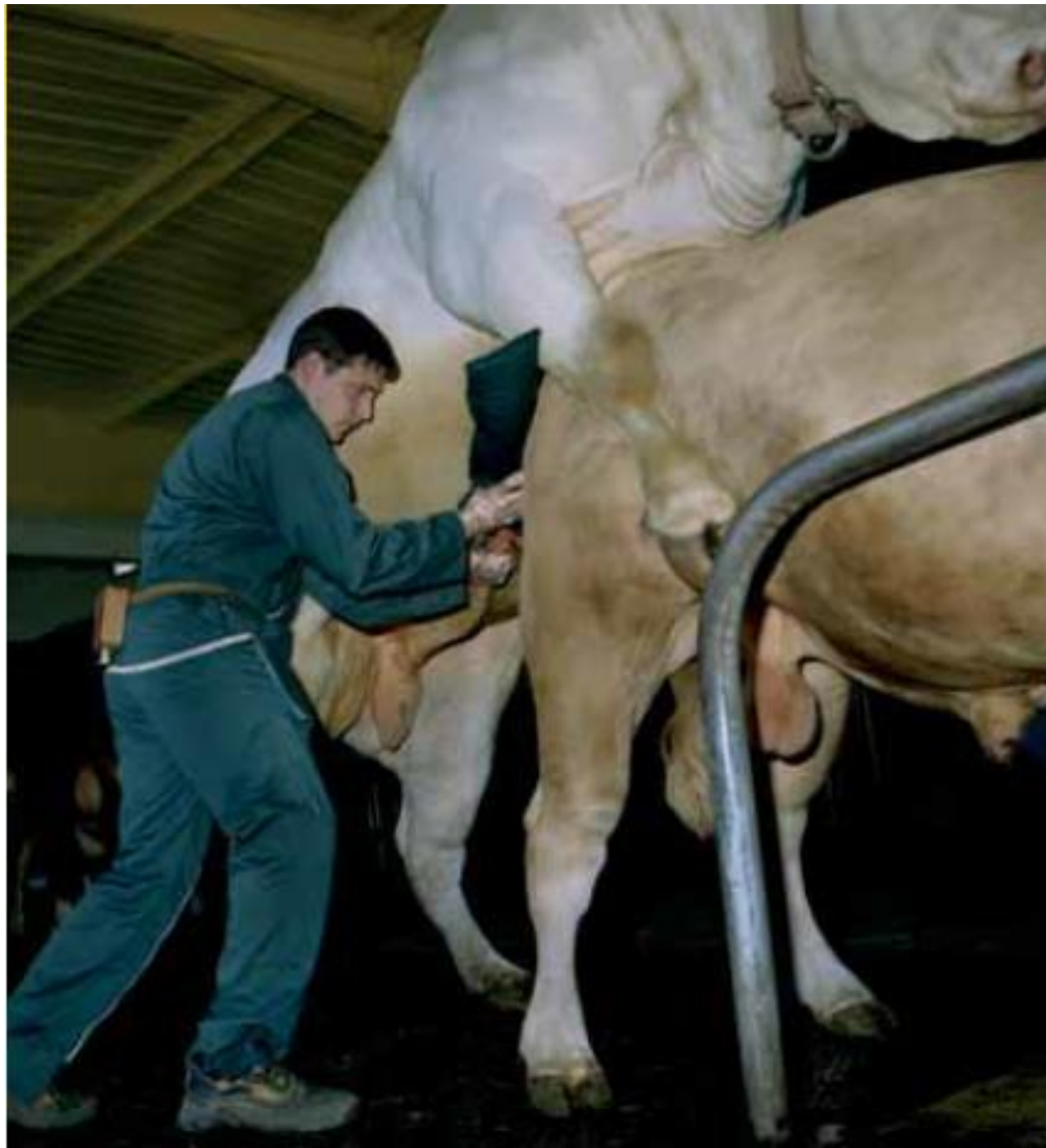
National Animal Germplasm Program coordinator Harvey Blackburn and technician Ginny Schmit place germplasm samples into a liquid nitrogen tank for long-term storage.

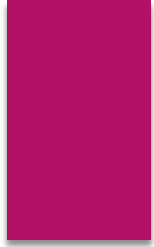
COLLECTION WITH ARTIFICIAL VAGINA (AV)



COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ The artificial vagina can help to obtain **optimum quality ejaculates** without any stress for the animal
- ▶ One of the main **drawbacks** is that **the animals must be trained to be able to ejaculate into this device**





COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ The procedure basically involves allowing the donor bull to mount or “jump” another steer, bull, or cow and diverting the penis laterally in order to introduce the extended penis into the AV

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Usually, once bulls are familiar with the technique, they will readily mount and serve the AV
- ▶ Training them to do this is an art, particularly when dealing with less docile mature beef bulls and bucking bulls

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Steers are the most common mount animal unless the facility prefers the use of a phantom (dummy structure designed for supporting a mounting bull)
- ▶ Using cows as mount animals is discouraged because of the potential for penetration and contamination by the bull

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Mount animals should have their hair closely clipped from the hindquarters, allowing for ease of cleaning and disinfection, which should be accomplished after every use

PROPER TECHNIQUE FOR COLLECTION OF BULL SEMEN



Collection area.



COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Several bulls are usually penned separately along a “bull alley” facing the collection area
- ▶ Mount animals are allowed to move along in front of the bulls in order to initiate some arousal

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ The bulls are allowed to observe other bulls mounting and being collected from this vantage point
- ▶ It can be very evident that bulls in the bull gallery are aroused by the amount of vocalization that occurs as a bull is being collected

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Once it is time for a bull to be collected, he is allowed to leave his pen and enter the mount area
- ▶ At this time, the mount handler will move the mount animal to prevent the bull from mounting
- ▶ This may continue for several minutes until such a time as the semen collector is satisfied the bull is properly aroused

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ The semen collector may further determine that the bull needs to “false mount” to further his arousal and thus increase the quality and quantity of semen he produces

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ This is accomplished by the bull handler allowing the bull to mount but the semen handler diverting the penis away from the mount animal as the mount is withdrawn from under the bull

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ When the semen collector believes the bull is properly stimulated, the bull is allowed to mount for collection
- ▶ After collection the bull is either returned to housing or is placed back in the bull alley for another collection attempt

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ The preparation of the AV is important as the tactile sensation received by the bull is paramount to his semen production
- ▶ It should simulate the natural breeding act as closely as possible
- ▶ The AV is constricted, with a ridged tube that has a port allowing water to be added between the rigid structure and a latex liner

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Within this liner another is placed to facilitate collection of the semen from the bull
- ▶ This liner has a tapered end that allows the inclusion of a glass or plastic receptacle that will serve to hold the collected semen sample
- ▶ Water added to the water jacket should be in the temperature range 40–60 °C and varies according to the preference of the bull. This has to be determined by the semen collector

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Also, the amount of water within the jacket determines the rigidity of the liner, which can impact the bull's reaction to the AV
- ▶ It is very important that a sterile non-spermicidal lubricant be applied to the upper one-third of the AV
- ▶ This improves sensation and reduces the possibility of abrasive injury to the bull's penis

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ For those bulls that are too fractious or are incapacitated and unable to jump a mount animal, the collector has the option to use an electroejaculator
- ▶ Although it is discouraged in the semen production industry, it may be used when all else fails

COLLECTION WITH ARTIFICIAL VAGINA (AV)

- ▶ Usually the bull will produce a slightly less concentrated ejaculate and with the potential for a somewhat higher abnormal sperm count
- ▶ However, with proper stimulus (rectal massage of the ampulla and seminal vesicles) adequate semen may be collected for processing

COLLECTION WITH ARTIFICIAL VAGINA (AV)

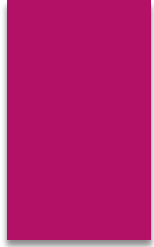
- ▶ Massage of the pelvic genitalia alone usually does not produce adequate semen product for processing and is discouraged in the industry

COLLECTION WITH AV IN SHEEP

- ▶ Fill the AV with air and hot water to mimic the female vagina, keeping it **at 40 °C**
- ▶ Insert a pre-warmed graduated glass tube at the end of the AV and cover it to avoid temperature changes

COLLECTION WITH AV IN SHEEP

- ▶ Use sheep in estrus as dummies. Once the males mount the females, deflect the penis into the artificial vagina until ejaculation occurs
- ▶ After ejaculation, the sample is **kept at 30 °C** until evaluation and processing



SPERM COLLECTION BY ELECTROEJACULATION

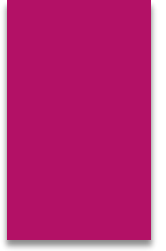
- ▶ The technique produces nonphysiological ejaculates with a greater amount of seminal plasma and even urine contamination
- ▶ The animals must be anesthetized or sedated because electroejaculation is a stressful procedure with a consequent risk

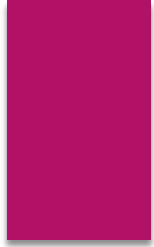
SPERM COLLECTION BY ELECTROEJACULATION

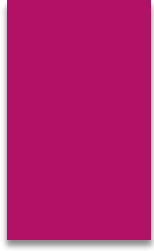
- ▶ In ruminants, anesthesia has to be reversed for normal rumination function

Semen collection techniques

- ▶ **Electroejaculation (EEJ)** has been a reliable method of obtaining a semen sample for many years
- ▶ Alternatives to EEJ include using an **artificial vagina (AV)**, **transrectal massage (TM) of the accessory sex glands**, and **aspiration of semen from the vagina of a cow following a recent natural service**







Electroejaculation

- ▶ Sedation is induced with 0.5 mg/kg of 0.5% ketamine plus 0.05 mg/kg of 2% xylazine administered by jugular vein injection
- ▶ The rectum is cleaned of feces and the penis with a physiological saline solution.
- ▶ The probe is inserted into the rectum covered with ultrasound gel

Electroejaculation

- ▶ The voltage to be applied starts at 1 V incremented by 0.5 V up to a maximum of 5 V
- ▶ The electrical pulse regime consists of 5 s pulses of similar voltage, separated by 5 s break. Each series consists of a total of four pulses

Electroejaculation

- ▶ Ejaculates are collected in fractions to avoid contamination with urine in pre-warmed tubes incorporated into a cone
- ▶ Fractions with similar motility are mixed in a glass tube and treated as one ejaculate

Electroejaculation

- ▶ This “ejaculate” is kept at 30 °C until evaluation and processing
- ▶ After collection, the anesthesia is reversed by jugular vein injection of 0.01 mg/kg of 1% yohimbine hydrochloride

