SWINE ARTIFICIAL INSEMINATION

INTRODUCTION TO AGRO-FISHERY ARTS

REASONS FOR USING ARTIFICIAL INSEMINATION

- Boar Replacement
- Disease Control
- Breeding Stock Improvement

BOAR REPLACEMENT

- AI allows a greater degree of choice of sire;
- access to use top boars;
- provides a complementary service during periods of peak boar usage; and,
- Allows batch farrowing/weaning as a system of production.

DISEASE CONTROL

- Fewer diseases are transmissible through semen than through boars.
- AI stud boars are subject to much more stringent health monitoring than in stock boars.
- Greater reliance on AI means fewer purchases of stock boars, hence reduced likelihood of disease introduction.

BREEDING STOCK IMPROVEMENT

- Different terminal sires can be experimented with to assess their effect on growth rate, grading and other parameters.
- Pedigree breeders and breeding companies have access to top sires for their genetic improvement programs.

LIMITATIONS OF ARTIFICIAL INSEMINATION

- It needs a properly trained technician.
- There is difficulty in storing diluted boar semen over a prolonged period.
- There are additional costs for equipment and laboratory chemicals.
- The use of semen from infected boars will spread infection faster as compared to that of natural mating because of the higher number of sows inseminated.

HOW A.I. CAN BE IMPLEMENTED?

- Do-it-yourself (DIY)
- On-farm AI
- Commercial AI

DO-IT-YOURSELF (DIY)

- Farmer himself does the heat detection, insemination, semen storage, cleaning and sterilization of the catheter and recording.

ON-FARM AI

- The farmer himself selects and collects semen from the boar, processes and inseminates.
- The whole AI procedure is performed within the farm.

COMMERCIAL AI

- The farmer just orders the semen from an AI breeding center.
- The breeding center will designate a technician to collect, process and store the semen and inseminate the sows.

MANAGEMENT OF BOARS

- Puberty in Boars
- Selection of Boars
- Transporting Newly Purchased Boars
- Boar Usage
- Regular Boar Activities
- Most Common Reasons for Culling

PUBERTY IN BOARS

- Puberty in male pigs is considered to have occurred once free spermatozoa are present in the semen. The boar reaches puberty at around 6-8 months.

A boar is ready for breeding when it is:

- 7.5 months old
- 130 kg or more (controlled feeding) large enough to cover a normal-sized female
- good quality and quantity of semen
- sufficient libido

SELECTION OF BOARS

- Sex Character
- Age
- Traits to Overcome Defects in the Herd
- Reproductive Soundness
- Body Conformation

SEX CHARACTER

- Masculinity in appearance and action should predominate in the make-up of any boar.
- The primary sex organs should be clearly visible and well-developed.
- They should always hang uniformly. Select boars whose testicles are of equal size.

AGE

- Generally, boars should be 5 - 6 months at the time of selection. At this age, they should be developed enough to reveal some serious faults in conformation as well as desirable traits. However, the best is to select a boar which has been tested for fertility.

TRAITS TO OVERCOME DEFECTS IN THE HERD

- Before deciding on which boars to select, determine the weaknesses of the gilts and sows in the herd so that proper adjustments can be made.

REPRODUCTIVE SOUNDNESS

- Number, spacing and presentation of live teats (at least 12).

BODY CONFORMATION

- Body length, depth and height should be well-proportioned.

TRANSPORTING NEWLY PURCHASED BOARS

- Boars should be transported with proper care.
- should ensure maximum safety to minimize stress, injury and diseases.

BOAR USAGE

- This depends on the practice of the farm.
- Is it natural or artificial method of breeding, combined system (AI on first service then natural as follow-up service or vice-versa) or sandwich system (natural-AI-natural, Natural-AI-AI or AI-Natural-AI) of breeding or is it purely natural or AI?

FOR BOARS USED FOR NATURAL MATING, THE FOLLOWING TABLE MAY SERVE AS GUIDE:

No. of services /sow Per heat period	Boar < 1 year old (Junior Boar)	Boar ≥ 1 year old (Senior Boar)
Two services	2 boars:15 sows	1boar:15 sows
One service	1 boar:20 sows	1 boar:30 sows

REGULAR BOAR ACTIVITIES

AGE	ACTIVITY
4 – 6 months	Selection
6 – 7 months	Acclimatization
6.5 – 7.5 months	Training
7.5 – 12 months	Breeding schedule and utilization Once a week utilization
13 months and above	Two times a week utilization with 3 – 4 days interval
30 – 36 months	Peak production period. Two times a week utilization with 3 – 4 days interval
38 - 44 months	Planned culling (2.5 – 3 years of service)

MOST COMMON REASONS FOR CULLING BOAR

- low libido
- leg defects
- inability to mount
- poor semen quality & quantity
- wrong mounting position
- too aggressive
- old boars
- diseases & injuries

ARTIFICIAL INSEMINATION PROCESS

- Training of Boars
- Semen Collection
- Laboratory Evaluation
- Physical Evaluation
- Microscopic Evaluation
- Semen Dilution
- Semen Storage
- Heat Detection
- Insemination

I. TRAINING OF BOARS

- The main objective is to keep the boar focused on the dummy sow. If the boar does not mount after 20 minutes, return him to his pen and try again the next day.
- PATIENCE is the key word in boar training.

2. SEMEN COLLECTION

- One of the important points to remember is to avoid temperature shocks. The semen should be collected in a pre-warmed container that will maintain its temperature.

SEMEN COLLECTION

REMEMBER:

- Boars differ in characteristics and attitude. The same is true among different breeds.
- Always check the semen quality and quantity.
- Check for any abnormalities like small testicles and insufficient erection.

COLLECTING PEN

SEMEN COLLECTION

SEMEN FRACTIONS

- **first gel with clear fluid fraction:** Do not collect this fraction as it contains very few sperm cells;
- **sperm-rich fraction:** This is grayish and milky. This fraction is collected as it contains viable sperm cells ideal for insemination;
- **clear fluid fraction:** One-third of this fraction can be collected to add volume to the collected semen.
- **gel-rich fraction (tapioca):** This fraction is not collected because it clogs the catheter and causes death of sperm cells.

FREQUENCY OF COLLECTION

- For junior boars (8-12 months old), once-a-week collection is advisable. This will ensure that the semen will be of good quality.
- For adult boars (13 months and up), twice a week collection with 3 - 4-days interval.
- The frequency of collection will affect the volume and concentration of semen to a certain extent.
- Over-used boars have low semen concentration and volume.

3. SEMEN EVALUATION

- SEMEN EVALUATION:

  AN INDISPENSABLE TOOL IN ARTIFICIAL INSEMINATION!

PHYSICAL EVALUATION

- **Volume or Weight Measurement**
  - a normal boar ejaculates 150-250 mL.
  - The usual range is from 50 to 500 ml or 50 to 500 grams (1 ml : 1 gram)

PHYSICAL EVALUATION

- **Smell**
  - A clean ejaculate has little odor. An ejaculate that has been contaminated with preputial fluid has a very distinctive odor.

PHYSICAL EVALUATION

- **Color**
  - varies from grayish-white to creamy white
  - A reddish to brownish color suggests blood contamination.
  - A yellowish ejaculate may be due to urine contamination.

MICROSCOPIC EVALUATION

- Sperm Motility
- Sperm Morphology

SPERM MOTILITY

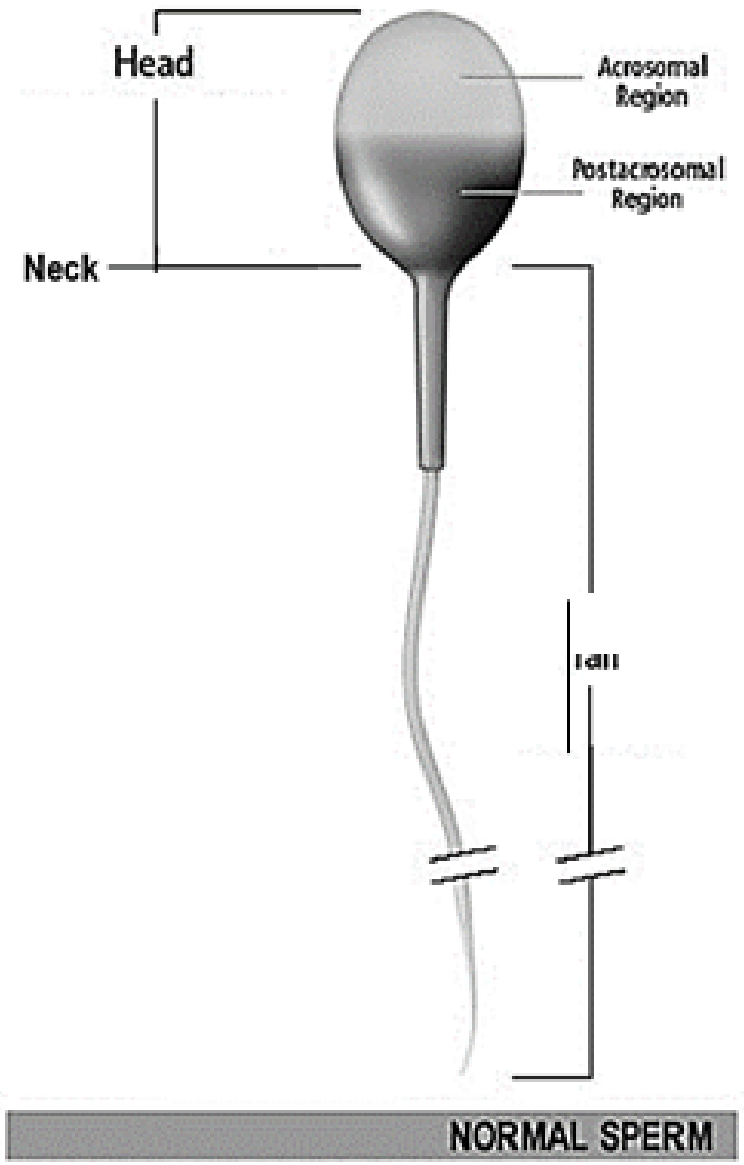
- Motility is a measure of the viability of the semen.
- A motility examination involves assessing the proportion of sperms showing progressive forward motion.

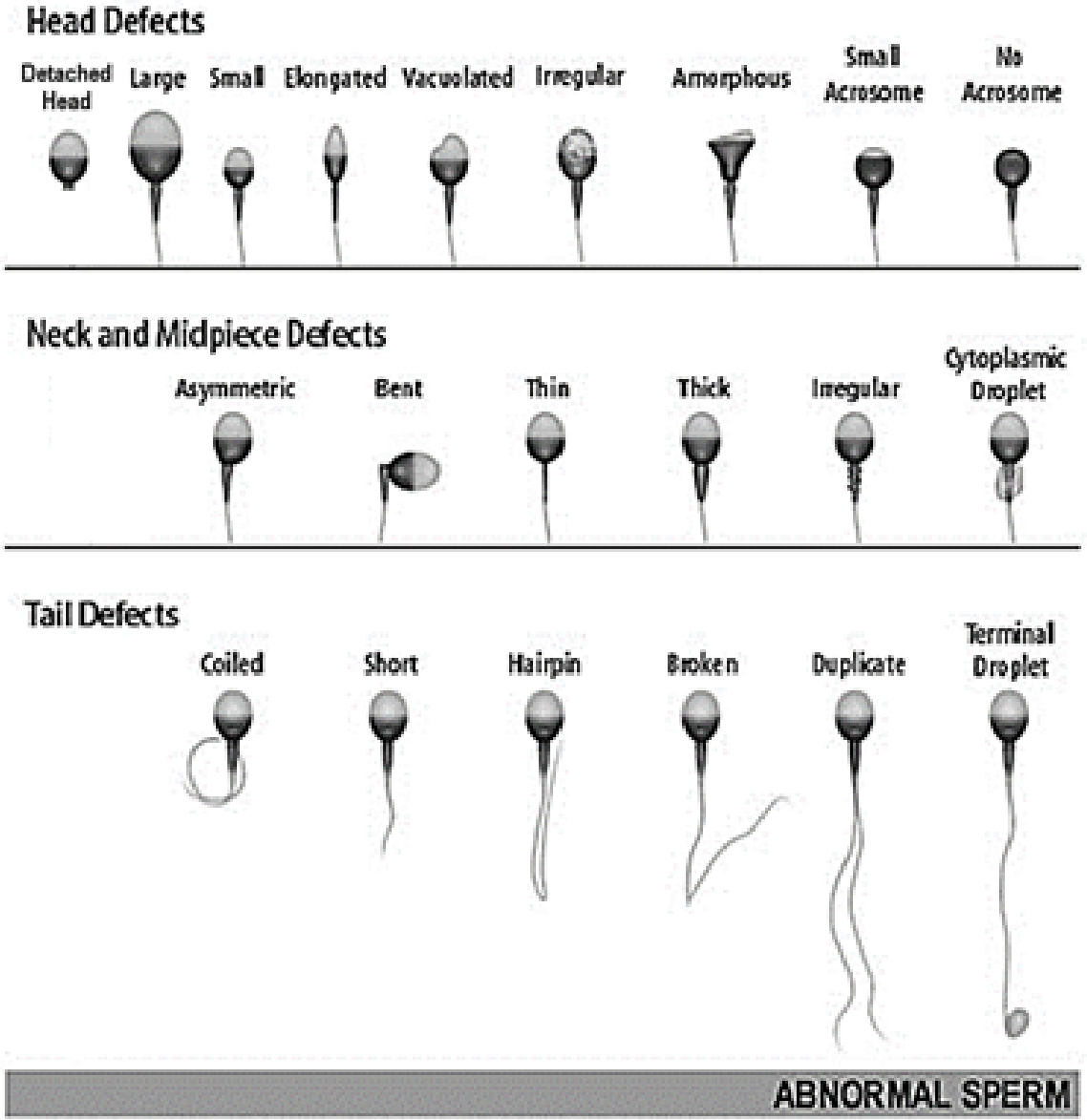
SPERM MORPHOLOGY

- another way to assess semen viability.
- size and shape of sperm examined to evaluate male infertility.

ALLOWABLE SPERM DEFECTS

- Abnormal head shape: 5%
- Abnormal acrosome: 5 %
- Cytoplasmic droplets: 10 %
- Coiled tails: 5 %


Head
Acrosomal Region
Postacrosomal Region
Neck
Tail
NORMAL SPERM


Head Defects
Detached Head
Large
Small
Elongated
Vacuolated
Irregular
Amorphous
Small Acrosome
No Acrosome
Neck and Midpiece Defects
Asymmetric
Bent
Thin
Thick
Irregular
Cytoplasmic Droplet
Tail Defects
Coiled
Short
Hairpin
Broken
Duplicate
Terminal Droplet
ABNORMAL SPERM

ABNORMALITIES OF THE HEAD

- The head is normally oval and flat. Different shapes can be observed which can be considered abnormal. Defects of the acrosome are often observed because it affects the fertilizing capacity of the sperm cell

ABNORMALITIES OF TAIL

- The tail is important to the movement of the sperm cell. The common damages are coiled or folded and bent/corkscrew tails.

CYTOPLASMIC DROPLETS

- It denotes immature spermatozoa. The droplet is a remainder of the cytoplasm eliminated during spermatogenesis.

- Any semen ejaculate that has 30% abnormality is regarded as suspect for culling.
- Check the ejaculate every collection. If in two consecutive evaluations it has less than 30% abnormality, then the semen can be used, but with increased concentration.
- Semen with 50% or more abnormality should be automatically rejected.

4. SEMEN DILUTION

- Why is there a need to dilute/extend the semen?

Semen is diluted for two reasons:

- ¨To extend the volume of the ejaculate, so that more doses of semen are produced; and,
- To provide sperm cells with an environment that keeps them alive for a few days.

5. STORAGE AND HANDLING OF DILUTED SEMEN

- The best way to store semen is in a temperature-controlled cabinet.
- The shelf life of the semen can be prolonged by storing it at 16-17C.

- Semen dose should be transported and handled in a manner that protects the semen from temperature fluctuations and ultraviolet light.
- Insulated container such as Styrofoam box with cool packs or battery-operated thermostatically-controlled box can be used to transport semen.

HEAT DETECTION

- Heat detection can be done through:
  - External signs of estrus
  - Haunch pressure test
  - Riding-the-back test
  - Sex odor aerosol test
  - Teaser boar method

EXTERNAL SIGNS OF ESTROUS.

Signs	Pre-Heat	Standing Heat	Post-Heat
standing heat	she will not stand still if you try to sit on her back, so she fails the "sit on the back" test	stands still with arched back when ridden by other sows or farm caretaker	does not stand still when being pushed
vulva	• red • swollen • with little mucus	• pink • less wollen • with clear, sticky mucus	• pale • almost no swelling • no mucus
behavior	• restless and nervous • mounts other animals • does not allow herself to be mounted • frequent urination • less feed intake	• calm • allows mounting by other animals • mounts other animals • clear, cocking ears • actively seeks the boar, stands arched back in the presence of the boar	• normal
Service	☒ NO ☒	☑ YES ☑	☒ NO ☒


SOA
SOA

7. ACTUAL INSEMINATION