EXAMINATION AND EVALUATION OF SEMEN.

Evaluation of Semen.

A. Macroscopic and Physical tests:-
1. Volume
2. Colour
3. Consistency and cloudiness
4. Osmotic pressure
5. Specific Gravity
6. Electro Conductivity

B. Microscopic tests:-
1. Counting of sperms
2. Motility of spermatozoa
3. Live and dead count

C. Chemical tests:-
1. Fructolysis
2. Respiration Co-efficient
3. Methylene blue reduction
4. Hydrogen ion concentration
5. Catalase test.

D. Bacteriological test:-

A. Macroscopic and physical tests:

1. **Volume:**
The volume is measured directly with the help of the graduated pipette or cylinder. The average per ejaculate from

- **Bull:** 5 to 8 ml
- **Stallion:** 100 ml
- **Boar:** 200 ml
- **Cock:** 0.6 ml
- **Ram/Buck:** 1.0 ml
- **Jack:** 50 ml
- **Dog:** 10 ml

2. **Colour:**
Colour is not necessarily a criterion of good quality but gives a check during collection. Pathological indication in colour:
- **Yellow** - pus and urine;
- **Pinkish or reddish** - admixture of fresh blood;
deep red and brownish colour probably indicates degenerative blood tissue; greenish - purulent degeneration.

3. Consistency and cloudiness: Gives an indication of colour and consistency:

<table>
<thead>
<tr>
<th>Consistency</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thick creamy</td>
<td>Excellent</td>
</tr>
<tr>
<td>Thin creamy</td>
<td>Very good</td>
</tr>
<tr>
<td>Thick milky</td>
<td>Good</td>
</tr>
<tr>
<td>Thin milky</td>
<td>Fair</td>
</tr>
<tr>
<td>Watery</td>
<td>Extremely poor</td>
</tr>
</tbody>
</table>

B. Microscopic tests.

1. **Motility of spermatozoa:**
   A drop of sample is taken just after collection and after properly mixing on a clean dry hollow ground slide kept at body temperature. It is then examined under the low power microscope and rated on the basis of the swirling currents.

   **Interpretation:**
   
   0 = No motility  
   + = Less than 20% of the sperm showing progressive motion 
   ++ = 20 - 40% showing progressive movement but no wave 
   +++ = 44 - 60% showing progressive movement with slow wave 
   ++++ = 60 - 80% showing progressive movement with wave more intense. 
   ++++++ = 80 - 100% showing progressive movement with rapid waves. 
   
   As a rule +++ or more are recommended for A.I. purposes.

   The movement of sperm may be:
   
   1. Progressive or rapid 
   2. Rotary 
   3. Oscillatory 

2. **Live and dead count:**
   One drop of semen is mixed with 2 drops of 50% Eosin solution in distilled water, one drop of 10% Nigrosin added and mixed. A film is then made from the mixture. Living spermatozoa appear unstained and dead stained pink against a brownish purple background. Care should be taken to ensure that the semen and stain are at the same temperature as otherwise artifacts may be produced.

3. **Morphological abnormalities.**
   The sperm may be abnormal with regard to:
Head:
Micro - head; mega head; altered shape including narrow pear-shaped head; double head; detached galea capitis; abnormal staining reactions.

Neck:
Rupture or absence of attachment to the head; fixation misplaced to one side; presence of protoplasm droplet.

Middle Piece:
Enlarged, narrowed, adherent protoplasmic droplet coiled at anterior end.

Tail:
Coiled at anterior end, split, broken at junction with mid piece, looping.

It is the general view that in normal bull semen the percentage of abnormal forms should not exceed 15 to 20%. The presence of more than 2 to 4% of spermatozoa with proximal protoplasmic droplets is also considered abnormal.

The number of abnormal sperm is influenced by a variety of reasons,

(1) Season of the year - very high in the rains during May and June, with young bulls it is high in summer but in old ones it is so in winters.

(2) Previous coitus or collection- when the sexual rests between the ejaculations is long there will be an abnormal numbers.

(3) Method of collection - among different methods of semen collection, it is minimum with AV and maximum with sponge method.
Normal and abnormal types of bovine spermatozoa

Diagrammatic representation of Sperm abnormalities.