PLEASE ANSWER THE FOLLOWING QUESTIONS

1. *Sire is an important partner in improving farm profits by getting more pregnant cows with genetically superior calf.* Discuss fully how to select a well proven bull for a new farm. (10 marks)

2. **WRITE BRIEFLY ON:**
   a. Diagnosis and treatment of testicular degeneration in a bull (4 marks)
   b. Treatment and control of Brucellosis in a dairy herd (4 marks)
   c. Affections of the penis and prepuce causing impotentia coeundi (4 marks)
   d. Diagnosis and treatment of Aspergillosis as a cause of abortion in a cow (4 marks)
   e. Chemical constituents of semen (4 marks)

3. *Frozen semen is a wide world spread industry that helps in economic rising of herds and improving herd productive potential. However, it maybe a way of spreading many diseases.* Enumerate such diseases and discuss fully one of them? (10 marks)

4. **WRITE ON THE MECHANISM RESPONSIBLE FOR:**
   a. Cryptorchidism in a bull. (5 marks)
   b. Testicular functions. (5 marks)

Good Luck

Prof Dr Mahmoud Abou El Roos
Head Dept of Theriogenology
1. *Sire is an important partner in improving farm profits by getting more pregnant cows with genetically superior calve.* Discuss fully how to select a well proven bull for a new farm. (10 marks)

**Answer:**

In order to select a sire for breeding purposes, both the genotype and the phenotype characters of the sire should be examined:

**A-Genotype:**

Genetically, selection is the process of choosing which animals are superior and might be used for breeding. A variety of testing methods are used include progeny testing, performance testing and predicted difference:

**Progeny testing:**

It involves the mating of the bull under test to a number of cows in several herds using A.I. and recording the performance of the daughters in their first lactation. The performance of the daughters is compared with that of contemporary heifers which are daughters of other bulls in the same period of time.

**Advantages:** It is the most accurate selection test since it is a direct assessment of the performance of the parent’s progeny.

**Disadvantages:** it is very expensive and time consuming. The time between birth of the potential sire and its general usage as a sire may be five years or more.

**Performance testing:**

The live weight gain, feed conversion efficiency, wither’s height and back fat are monitored and the breeding value is calculated for bull in relation to the breeding average and to performance of contemporary bulls.

**Advantages:** It is shorter in time than a progeny test and consequently is much cheaper.

**Disadvantages:** differences in management and environment prior to the estimate and the continual risk of disease are the main disadvantages of the test.
Predicted difference (PD):

It is based on a comparison of the bull’s daughters with their contemporaries (herd-mates that are in similar lactation and calve in the same season), a predicted difference is calculated. This estimates a sire’s ability to transmit production to future daughters. A PD of +1200 milk means that mature daughters of this bull will produce 1200 pounds of milk more per lactation than mature daughters of a bull with a PD of 0 milk.

Disadvantages: it becomes very difficult to select a proven bull on the base of genetic qualification due to the absence of the sound breeding records for the local breeds of cattle and buffaloes.

B- Phenotype:

It refers to the external appearance and the visible expression of the genotype as modified by the environment. The external features of a sire may differ from one to another within the same herd, and even two animals may have the same phenotype but different genotype and vice versa. Selection of a bull for breeding based on the phenotype characters necessitates: Well developed and functioning genital organs, high libido and proper mating ability and good quality semen.

Examination of the selected bull:

In order to select a proven bull, its breeding soundness can be evaluated as follows:

A- General observations:

Masculine traits:

These are the secondary sexual characteristics which develop under the effect of testosterone. They include crest, muscling, behavior and development of the reproductive organs.

b- Feet and legs:

Sire should be examined for general features with special emphasis on feet and legs. An attention should be paid to examine weak pastern, damaged dew claws and corns between hooves. These are painful and discouraging mounting.

c- External genitalia:

i- Penis and prepuce:

Palpation of the penis posterior to the scrotum allows detection of injury, swelling and scar tissue from previous damage. Palpation of the prepuce assists in detecting any restriction in passage of the penis to the exterior. Upon erection and protrusion, the penis should be examined for the presence of malformations in shape, size and of abnormal deviations.

ii- Scrotum and its contents:
Initial observation of the scrotum and its contents should be made as the animal is standing normally without restraint or stress. The outer skin of the scrotum should be examined for indication of infections or earlier damage such as scratches, punctures, lacerations, etc.

Temperature of the testes should be recognized as infection will cause fever. Testes are usually medium-sized if the neck of the scrotum is the same as the testicular area, and generally will be small-sized if the scrotum to a point on the bottom. Scrotal circumference has a close relationship to the testis size and the sperm producing potential. Bulls having a scrotal circumference over 36cm are of larger testis size and higher sperm output.

**Scrotal circumference (cm) evaluation:**

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Age/ months</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12-14</td>
<td>15-20</td>
</tr>
<tr>
<td>Good</td>
<td>35</td>
<td>37</td>
</tr>
<tr>
<td>Fair</td>
<td>30-35</td>
<td>31-37</td>
</tr>
<tr>
<td>Bad</td>
<td>30</td>
<td>31</td>
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</tbody>
</table>

By hand, testes should be pulled firmly into the base of the scrotum and by using a flexible tape the scrotal circumference is measured. Breed, age and weight as well as condition must be considered when determining the scrotal circumference. Testes should be free in the scrotal sac without adhesion. The tone should be determined by palpation. Fibrous testes which are found particularly in older bulls should be identified since the spermatogenic tissue has been replaced by fibrous connective tissue and production is reduced in such instances. Soft spongy testes indicate poor production and that the tubular structures of parenchyma are not full turgid.

The epididymides should be palpated entirely to exclude the presence of aplasia or abnormalities which interfere with the sperm passage. As the tail of the epididymis is a good indication to the sperm production, its fullness and firmness, not hardness, should indicate abundant sperm, while soft or flaccid condition may indicate poor production or overuse.

**iii. Accessory genital glands:**

These glands should be palpated per rectum for normality. It is necessary to notice that the greatest difficulty lies in the vesicular glands where infection causes enlargement or hardness.

**d- Preputial washing:**

Before collecting semen, it is imperative to do the Preputial washing for laboratory examination against the most dangerous venereal disease like Trichomoniasis and campylobacteriosis.

**e- Semen collection and evaluation:**

It is conducted to determine the usefulness of a sire of a sire or to predict the sire’s value for
breeding in natural service or A.I. the best measurement for fertility testing of semen is the actual conception rate under field conditions and no one can argue with that. Scoring the scrotal circumference as an indication to the rate of sperm output, percentage of abnormality and motility of spermatozoa are useful in evaluating the breeding soundness of a bull as follows:

**Sperm abnormalities (%) evaluation:**

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Primary</th>
<th>Total</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>10</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>Good</td>
<td>10-19</td>
<td>26-39</td>
<td>24</td>
</tr>
<tr>
<td>Fair</td>
<td>20-29</td>
<td>40-59</td>
<td>10</td>
</tr>
<tr>
<td>Bad</td>
<td>29</td>
<td>59</td>
<td>3</td>
</tr>
</tbody>
</table>

**Sperm motility (%) evaluation:**

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Gross</th>
<th>Individual</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>Rapid swirling</td>
<td>Rapid linear</td>
<td>20</td>
</tr>
<tr>
<td>Good</td>
<td>Slower swirling</td>
<td>Moderately fast linear</td>
<td>12</td>
</tr>
<tr>
<td>Fair</td>
<td>Shaky</td>
<td>Slow linear</td>
<td>10</td>
</tr>
<tr>
<td>Bad</td>
<td>Weak</td>
<td>Weak</td>
<td>3</td>
</tr>
</tbody>
</table>

Based on this screening system bulls can be classified into three categories as follows:

<table>
<thead>
<tr>
<th>Classification</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfactory</td>
<td>60</td>
</tr>
<tr>
<td>Questionable</td>
<td>30-60</td>
</tr>
<tr>
<td>Unsatisfactory</td>
<td>30</td>
</tr>
</tbody>
</table>

2. **WRITE BRIEFLY ON:**

   **a. Diagnosis and treatment of testicular degeneration in a bull (4 marks)**

   **Answer**

   **Diagnosis:**

   - *History*: of once being normal and now having few to no sperm cells. Usually
4-8 weeks after onset of degeneration.

- **Testicular biometry:** The affected testes is slightly smaller than normal.
- **Testicular biopsy:** seminiferous tubules are severely distorted, and may be atrophied.
- **Manual palpation of the testes:**
  - Affected testes: small in size, soft in consistency, hot and painful.
  - In chronic case, with testicular fibrosis and calcification: the testes firm and hard, shrunken and irregular.
- **Semen picture:**
  - Semen: variable but mostly thick.
  - SCC: oligospermia with high percent of abnormal and dead sperm.
  - In sever atrophied testes: the semen will be thin, clear and watery and azoospermia of sperm cells with poor motility.

**Treatment:** only in early cases:

- To treat degeneration you must first remove the problem.
- Cool water hydrotherapy and sexual rest are also indicated.
- NSAIDs are also indicated.
- You should recheck the bull in 60 days.

b. Treatment and control of Brucellosis in a dairy herd (4 marks)

**Answer**

**Treatment:**

1. The removal or expulsion of placenta after abortion to minimize the secondary bacterial invasion.

2. Local antibiotic application to prevent the serious damage of the uterine wall by nonspecific organisms.

3. Symptomatic treatment but usually not effective because the brucella is an intracellular microorganism protected from antibiotics.

**Control and eradication of the disease:**
The control of bovine brucellosis is based upon the following:

**a) Hygienic measures.**

1- Slaughter the infected animals or carefully isolated at the time of parturition or abortion.

2- The aborted fetuses and placenta should be buried or burned and the contaminated areas must be disinfected with 4% of cresol or a similar disinfectant.

3- Newly introduced should be isolated and tested for 3-4 months and retested before joining the herd, unless they came from a known brucella free herd.

**b) Vaccination.**

<table>
<thead>
<tr>
<th><strong>a- Live vaccines:</strong></th>
<th><strong>b- Killed vaccines:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(1) Strain 19 vaccines (calf hood vaccination).</strong></td>
<td></td>
</tr>
<tr>
<td>- It is a stable a virulent strain of Br abortus biotype I with smooth intermediate colonial morphology.</td>
<td></td>
</tr>
<tr>
<td>- It given to the calves at 4-8 months age.</td>
<td></td>
</tr>
<tr>
<td>- It sufficient for life but in the presence of active infection cows should be revaccinated after the first calving.</td>
<td></td>
</tr>
<tr>
<td>- It causes a slight reaction at the point of inoculation and a short febrile response may follow. Also, it causes a temporary marked drop in milk yield.</td>
<td></td>
</tr>
<tr>
<td>- It is not recommended for bulls because may produce permanent infections in bulls with lesions similar to those of natural disease.</td>
<td></td>
</tr>
<tr>
<td>- In infected herds only 5% of calves from infected dams responded to strain 19 vaccine if vaccinated prior to 95 days of age due to the presence of colostral antibodies, Calves from infected dams should be vaccinated after 5 months of age.</td>
<td></td>
</tr>
<tr>
<td><strong>(2) Rev. I vaccine (Br. melitensis vaccine).</strong></td>
<td></td>
</tr>
<tr>
<td>- It is streptomycin-dependent mutant of Br. meiltensis, developed for use in <strong>sheep and goats.</strong></td>
<td></td>
</tr>
<tr>
<td>- It is safe to be used in cow and mature animals.</td>
<td></td>
</tr>
<tr>
<td>- Its immune production is better than strain 19.</td>
<td></td>
</tr>
</tbody>
</table>

There are two killed adjuvant vaccines which have been successfully developed:

1- *Br. abortus strain 45/20*: used mainly in cattle.

2- *Br. melitensis strain H 38*: used mainly in sheep and goats, but sometimes in cattle.
C. Testing and disposal of the reactors

The eradication programs vary with the incidence of infection:

a- During storm of abortion, test and disposal of the reactors is unsatisfactory because spread of the disease occur faster than eradication. In these circumstances, the vaccination of all non-reactors is recommended or if testing is impracticable vaccination of all cattle.

b- In heavily infection, in which few abortion are occurring the following steps undertaken: All calves should be vaccinated. The reactors should be culled as soon as possible. Prevention of introduction of newly purchased animals. Periodic test every 2-3 months on individual cows. One year after first –ve herd test, retest by agglutination test.

c- In lightly infection, the following should be taken: Vaccination of the calves. Immediately culling +ve reactors. When the herd become free from brucellosis on the basis of serum agglutination tests, introduce the -ve reacting animals. Annual serum agglutination test should be carried.

N.B: Bulls carrying the disease must be slaughtered, as they remain real or potential spreaders for life and even in deep frozen semen with addition of antibiotics brucella will remain infective.

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c. Affections of the penis and prepuce causing impotentia coeundi. (4 marks)

Answer

a. Inability of the penis to protrude.

b. Inflammation of penis and prepuce

c. Phimosis and paraphimosis

d. Deviation of the penis.

e. Persistence of the frenulum.

f. Tumors of the glans penis.

g. Ruptured, fractured or broken penis.

h. Injury to preputial mucosa.

a- Inability to protrude the penis:

The possible causes which prevent protrusion of the penis from the prepuces are:

- Congenital arrest in the development of the penis and prepuce or sigmoid flexure e.g.
  - Short penis, with protrusion of the penis for a short distance (3-6 inch=less than 20cm) during erection.
Very short penis opens through a defective prepuce anterior to scrotum.

Diphallus (Forked penis).

Congenital short retractor penis muscle.

- Insufficient relaxation of the retractor penis muscle preventing extension of the sigmoid flexure.
- Psychogenic disturbance as a result of the mistreatment of the bull in previous injuries at semen collection.

**Diagnose:**

1- It is vary from partial (about 4-6 cm) to complete failure of protrusion of the penis out of the prepuce unable to induce good intromission.

2- Observation of service attempts.

3- Measurement of the extended penis under general anaesthesia or Pudendal nerve blocking. If the cause is psychogenic, the penis is completely protruded out of the prepuce.

**Treatment** of such case involves:

- To discard the bull if the cause is hereditary.
- To change the mating stances if the cause is psychogenic.
- To allow a period of sexual rest about two months with regular training and exercise if there are previous injuries.

**b- Inflammation of penis and prepuce:**

Inflammation of the penis (*Balanitis*), the prepuce (*Posthitis*), the glans penis and preputial orifice (*Balanoposthitis*) are the sequelae of:

- Bacterial or viral infection e.g. IBR.
- Parasitic infestation e.g. Habronemiasis
- Mechanical injury due to trauma.
- Chemical irritation during preputial washing.
- Thermal irritation (burning) e.g. high temperature of A.V.

**signs**

- In acute affections the pain and irritation may be severe enough to induce failure in copulation. Mucopurulent discharges that may cover the preputial orifice. Inflamed with petechial hemorrhage, vesicles, ulcers and areas of necrosis.
- In chronic case, adhesion may develop between the penis and prepuce resulting in phimosis.
Treatment:

1- Local treatment:
   1) Douching of the preputial cavity with 120-150 ml of a mild warm aqueous or oily antiseptic solution e.g. Acriflavin 1/1000.
   2) Intra-preputial infusion with oily preparations of sulfanilamide / antibiotics preferable. repeating the treatment every 2-3 days.

2- Systemic treatment: treat the real cause e.g.
   → In Habronemiasis.....Neguvon® 80% (Trichlorfon; larvicidal) in dextrose saline 5% at dose 25mg/kg B.W. I.V. for 2 doses with one week interval.
   → In Bacterial infection.....systemic antibiotic.

3- Sexual rest with balanced ration.

4- Discarding from breeding in a case of adhesion.

c- Phimosis and paraphimosis:

In phimosis, the affected bulls are unable to protrude the penis more than 4-8 cm at service or not even through the preputial orifice in severe cases.

In stallion and jackass, paraphymosis insures mainly the bad kicking on the erected penis enough to be ruptured.

Treatment

- Surgical interference:
  1) Widening the narrow preputial orifice.
  2) Removing tumors or haematoma.
  3) Repairing the ruptured penis or retractor penis muscle.
- Local treatment with oily preparation of antibiotic solution.
- Sexual rest.
- Regular exercise of neuromuscular paralysis like that in rabies or in case of adhesions.

d- Penile deviation:

On mounting, the penis is shown to deviate laterally or ventrally because of penile flaccidity. Deviations are due to trauma-induced circumscribed areas of fibrosis on the body of the penis. These lesions may reasonably be rejected and the results are good. A clinical entity, spiral deviation may be regarded as a distention of the erect penis
severe enough to prevent intromission and sometimes even protrusion from the sheath. The presence of an ulcer towards the tip of the glans is strongly indicative of spiral deviation, but not all affected cases bear this lesion. Corrective surgical interference aimed at making an elliptical incision at the convex side and suturing the cut ends by catgut is described, but before treatment is undertaken the possibility of genetic predisposition should be considered. In such case animal should be discarded from breeding.

e- Persistence of the frenulum:

It is a congenital defect of the penis characterized by the presence of fibrous band attached between the ventral raphae of the glans penis and the preputial mucosa. It is commonly encountered in beef shorthorn and Aberdeen Angus bulls. At coitus, the deformity is noted as a ventral or downward deviation of the penis.

Treatment:

It can be corrected by legating and cutting the band of tissue. Oily antibiotic is applied after operation.

f- Tumors of the glans penis:

It may occasionally prevent protrusion of the penis. Fibropapilloma of viral origin are frequently noted on the glans penis of two-year old bulls. In young bulls tumors may result from early mating before complete cleavage of the ectodermal lamellae. Penile transmissible venereal tumors occurs in dogs. Tumor like masses on the ram penis and squamous cell carcinoma of the penile and preputial integument of bears usually develop. Penile tumors in horses, however, are not common.

The affected animals are reluctant to serve or are incapable of achieving intromission. Although spontaneous regression of the tumor can occurs, surgical extirpation or vaccination with a tissue vaccine is employed to control the condition.

g- Ruptured, fractured or broken penis:

It is a common and potentially serious disorder in active bulls generally attributed to vigorous copulatory thrusting before intromission. It may occur ensuring the very high pressures which develop within the corpus cavernous penis. Rupture of the corpus cavernous penis is usually accompanied by haematoma which develops in front of the scrotum.

Treatment: Spontaneous recovery occur in more than 50% with sexual rest for 3
months.

1- Systemic antibiotic course fro 1 week.

2- Local warm hydrotherapy for 2-3 weeks.

4- Sexual rest for 3 months.

5- Surgical interference: Should be performed 5-10\textsuperscript{th} after trauma.

h- Injury to preputial mucosa:

It is associated with aplasia or hypoplasia of the retractor muscle of the preputial sheath resulting in eversion of the preputial mucosa. Preputial lesions occur at two sites:

– The more common is that segment of mucosa close to the preputial orifice which is likely to be averted and therefore traumatized in bulls prone to prolapse.

– The less common site of injury is the area of attachment of preputial mucous membrane to the body of the penis. This lesion may be described as a preputial avulsion and is probably sustained at coitus or on thrusting into an A.V.

– The immediate application of emollient dressings and replacement and retention within the sheath usually result in complete resolution without significant fibrosis.

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d. Diagnosis and treatment of Aspergillosis as a cause of abortion in a cow. (4 marks)

Answer

Diagnosis

1. In case history.

2. Clinical symptoms:

   1- Abortion from 4-9 months of gestation and may be occur from 4 months up to the end of pregnancy.

   2- The aborted feti are expelled dead with some degree of autolysis, and sometimes a premature or lid term full are live but weak where it die shortly thereafter. Also, the fetus may be normal in appearance or show skin lesions in the form of patches.

   3- The aborted feti contain yellowish serous fluid in its body cavities with enlargement of liver and sometimes bronchopneumonia in the lung.
4- There are marked changes in the fetal membrane which more pronounced, whereas, the chorion is thick, edematous, leathery placentomes (cotyledon and caruncles are very large, swollen, edematous and necrotic).

5- Complete detachment of the placentomes may occur due to severe necrosis involves stalk

6- In some cases the increase of necrotic structures that remain in the uterus for several months following abortion leading to sterility of the animals.

7- In some cases occurs retention of placenta due to the adhesion between the placenta and uterus.

3. Isolation and identification of the fungus from the aborted fetus, uterus or the placenta after abortion Sabouraud dextrose agar media.

4. The histological examination of the placenta and uterus show the distribution of hyphae.

**Treatment and control:**

1. Irrigation of the infected uterus with Nystatin.

2. Avoid nutrition of the animals upon food polluted with molds and offering only good fodders.

3. Keeping and storage of food away from the wet places.

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**e. Chemical constituents of semen. (4 marks)**

**Answer**

1- *Inorganic matters:*

- Sodium, potassium and calcium make up most of the inorganic mineral elements in semen. The sperm cell is higher in potassium than it is in sodium, contrary to that in the seminal plasma.
- Magnesium, iron, copper and zinc have been reported in semen at relatively low concentrations. The form of these elements is a matter of speculation.

2- *Organic matters:*

- The dry matter content of whole bull semen, ranged from 5.58 to 11.02 percent, has a highly significant positive correlation to the sperm cell concentration.
- The principal reducing sugar of bull semen is fructose which is found also in case of ram, boar, stallion, rabbit, rat, guinea pig and human semen. Other carbohydrates present in bovine semen are inositol, sorbitol, mannitol, erythritol, glycerol and glyceryl-phosphorylcholine (GPC). Sorbitol is contained at very high levels in boar semen.
- There are some non-carbohydrate reducing substances found in semen like ascorbic acid, active sulfhydryl compounds, sulfite and iodine-reducing components. Bull semen contains no ergothioneine which is the primary source of reducing sulfhydryl groups in boar semen.

- The organic acids present in semen are propionic, acetic, formic, lactic, succinic, malonic, glycolytic, malic and citric-isocetic acids. Traces of butyric and larger chain-fatty acids as well as B-hydroxybutyric acids are also found.

- The free amino acids of semen, found in quantities sufficient to be measured, are glycine, alanine, serine, aspartic acid and glutamic acid. About 90 percent of the total nitrogen present in bull semen have been found to be protein in nature, of which three-fourths are heat coagulable. The amount of ammonia in fresh bull semen is reported to increase during incubation and low temperature storage. In bull with testicular hypoplasia, ammonium urate has been found to increase in semen.

- Bull semen contains relatively high levels of phosphorus, most of which is in an organic form e.g. the phosphorus-containing adenosine compounds including the energy-yielding adenosine triphosphate (ATP), cyclic adenesin-3-5-monophosphate (cAMP); the phosphorylated carbohydrate intermediary products like fructose –6- phosphate, fructose-1,6-diphosphate, phosphotriese, phosphoglyceric acid, phosphopyruvic acid; Nicetine adenine dinucleotide (NAD); phosphagens, phosphorus compounds linked to creatine (phosphocreatine) or to argenine (phosphateargenine), etc.

- Bull semen contains in addition to ascorbic acid a number of the B-complex water soluble vitamins mainly thiamine, riboflavine, pantthenic acid can niacin. They are found primarily in the sperm cells.

- Seminal plasma contains a number of enzymes like acid and alkaline phophatases and the energy yielding triphosphatases. Several of the enzymes reported to present in the seminal plasma such as GOT, GPT and lactic dehydrogenase are partially of sperm origin. It is also known to contain hyalurenidase contributed by the spermatozoa.

- A variety of hormonal substances including androgens, estrogens, prostaglandims, FSH, LH, LTH, insulin, glucagon, relaxin, adrenalin and noradrenalin have been reported in the seminal plasma. However, little is known about role of these hormonal substances in the seminal plasma.

- Antimicrobial constituents including seminal plasmin and immunoglobulins, mainly of the IgA class, have been reported as constituents of the seminal plasma.

3. Frozen semen is a wide world spread industry that helps in economic rising of herds and improving herd productive potential. However, it maybe a way of spreading many diseases. Enumerate such diseases and discuss fully one of them? (10 marks)

**Answer**

Diseases transmitted through semen: Leptospirosis – Brucellosis – Vibriosis – Trichmoniasis –
**Vibriosis**

**Definition**

It is a venereal disease of cattle, sheep and goats caused by vibrio fetus; the infection spread by coitus or by artificial insemination and characterized by infertility with increase the number of services per ~conception. Early embryonic death is common, though late abortions from 4 months of gestation to term are occasionally observed (2-5%). The cows develop immunity to the infection and will have a normal gestation period and may remain carrier for many months (3-6 months following abortion). Also, bull remain chronic earner,

**Causes:**

It caused by a gram-negative, pleomorphic cord, called vibrio fetus venerealis. The organism recovered from the tissue and cultures; appears as comma or S-shaped rods. Its multiplication on the artificial media needs the presence of 1% CO\(_2\).

**Mode of transmission:**

The only way of transmission is coitus or A.I. by contaminated semen, the infected bull spread the infection to the susceptible cows and heifers, and the infected females transmit the infection to bulls during breeding (mounting). In sheep the infection might be also transmitted via digestive system and this rarely occurs in cows. The vaginal and uterine secretion of infected and/or aborted females; fetal fluid; placenta as well as the aborted fetus consider a source of infection with vibriosis.

**Susceptibility for infection with vibriosis:**

Cattle, sheep and goat are susceptible for infection with vibriosis. Virgin heifers aged 1 year old are not susceptible for infection and the old cows are rarely infected due to the previous immunity. If a herd of animals infected with vibriosis might be remain a carrier for the disease without any symptoms. Also the bulls and rams usually remain carriers for the vibriosis.

**Pathogenesis:**

-Cows of all ages not exposed to vibriosis infection are susceptible to vibriosis. But cows which aborted - or - infected by vibriosis attain certain immunity after spontaneous recovery (3-6 months).

-The infected bull deposits the vibio fetus organisms with the semen into the female genital tract. The organism inter the uterus during 7 days after mounting or insemination from infected bull the organism remain in the vagina and uterine horn. Some cows will carry the organisms through the entire gestation period, delivery a normal calve and subsequently be a source of spread of infection to bulls during rebred after calving. In infected females the organisms concentrated in the uterus especially in the blood capillaries and placenta where it causes degeneration for the blood capillaries and the caruncles results in separation of the placenta and abortion (2 -5%) within 2-3 months of pregnancy or late 7-8 of gestation.
- The embryo killed in its early stage by the direct action of the organisms and the dead embryo can expelled unnoticed and the cow showed repeated breeder - or - infertility If abortion occur after 4 months of gestation. it accompanied by retention of the placenta.

- In sheep: The infected females aborted at any time especially in the last month of pregnancy and usually the infection disappear after the first abortion. But in non-pregnant ewes, the infection with vibrio fetus leads to repeat breeder as a result of failure of fertilization.

- In bulls: The organisms are confined to the prepuce without pathological lesions, It lie and protected in the epithelial crypts of the glans penis and prepuce.

**Symptoms**

1- Infertility or failure of conception with long estrous cycle which might be reached up to 40 days (25-60 days) and may last for 2-6 months is due to endometritis occur by infection of the female genital tract by vibrio fetus.

2- Increase abnormal vaginal and uterine secretion.

3- Decrease in the incidence of fertility and increase in the incidence of repeat breeder.

4- Inflammation in the vagina, cervix arid endometrium due to early death of the blastocyst or embryo.

5- Causes abortion of the fetus at the middle stage of pregnancy (10%) 4-6 months and retention of placenta may occur. Also, the abortion in cows infected with vibrio fetus may occur later at 4-8 months of gestation especially in the entrance of another animal to the farm.

6- In ewes the incidence of abortion due to vibrio-fetus may reached about 70.%

7- The infected animals return to its normal condition and the females may pregnant and parturient normally after some services or insemination,

8- The reproductive condition of the herd returns to its normal state.

9- In the male, no pathological condition appear and the seminal picture were normal

10- Rectal examination of no value because the endometritis is mild. Vaginal examination revealed catarrhal vaginal discharge which is copious and turbid in proestrous.

11- Ascites in the body cavities of the aborted fetus which found filled with thick bloody fluid.

**Diagnosis**

*A-Case history and clinical symptoms*

- Repeated breeder after introduction of new bull into a herd of cows.
- Sporadic abortion at 4-7 months pregnancy with retention of the placenta.
a- Sampling the samples for examination are . Taken in cows show repeated breeding from vaginal mucous by tampon method (tampon is left in the vagina at least 20 minutes). Also, the samples are taken from stomach content, lungs and heart of the aborted fetus arid the fetal membrane and amniotic fluid in small fetuses. In case of bulls and rams the samples for microscopical examination and culturing are taken from rare secretion, semen and preputial wash solution.

*b- Examination done on the samples are :

1. Microscopical examination after staining fresh samples from the fetus.

2. Culturing on semisolid Thiol media of samples from preputial smegma, fetal content and amniotic fluid.

3. Agglutination test (mucous agglutination), vaginal mucous gives a positive agglutination reaction in approximately 30-80 days following the infecting service and the reaction persist in most animals for about 7 months,

**Prognosis**

- Its favorable in cows because the infertility is temporal and the cows develops immunity after 3-6 months and conceive.

- Sexual rest for the aborted cows leads to recovery unless secondary infection produces permanent damage.

**Treatment and control:**

1. Prevent the entrance of any new animals to the herd or in the farm except after sureness it is free from vibriosis.

2. If the herd is infected with vibriosis, the best and easiest method to control the disease in a dairy herd is to breed only artificially with semen from non-infected bulls - or - with semen from infected bulls, that has been diluted at least 1:25 with extender to which 500 -1000 units of penicillin and 500- 1000 micrograms of streptomycin have been added to each 1 ml of extended semen should be kept in refrigerator at temperature 4-5ºC for at least 6 hours before use.

3. Sexual rest for 3 months after which breeding can be resumed is recommended.

4. Following natural infection a good immunity to vibriosis is produced that last from 3 years.

5. Treatment of the infected genital tract with antibiotics.

6. Treatment of the bulls.

- Young infected bulls are mostly have only a transient short-term infection and then spontaneously recover in a few weeks or months if the organism is not reintroduced.
into the prepuce.

- Bulls over 5 years age may remain permanently infected although occasionally even old bulls will recover from the disease spontaneously.

- Bulls do not develop immunity to the infection. Even if they cured, they still readily infected.

- Bulls infected with vibrio-fetus could be treated with 5g of dihydrostreptomycin sulfate in 10 ml (50% aqueous solution) into the preputial cavity and massaged through the skin for 5 minutes while the orifice is closed, repeated daily for 5 days. At the time of the 1st and 3rd treatment two S/C injection of dihydrostreptomycin 22 mg/kg body weight was given. The treatment produced mild local reddening and ulceration of the penile mucosa.

- Treatment of the glans penis and prepuce with antibiotic ointment.

7- Testing the bulls every 3 months to sure that it is free from infection. Also, testing the vaginal and uterine secretion of females to sure that it is free from infection. The females which free from infection (negative) mated from normal bull or inseminated using normal semen free from infection.

8- Some trials done to prepare vaccine injected for the cows and ewes S/C two months before mounting or in the early stages of pregnancy. This vaccine might be given for the male also.

9- Treatment of infected bulls using 10mg/lb body weight streptomycin injected subcutaneously - or - 5 mg/lb body weight put on the ration. These antibiotics are not useful largely in females.

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4. WRITE ON THE MECHANISM RESPONSIBLE FOR:

a. Cryptorchidism in a bull. (5 marks)

   **Answer**

   - first abdominal phase of TD is controlled by Insulin-like factor 3 (Insl3) and its receptor,

   - The inguinoscrotal stage of TD is controlled by the hypothalamic-pituitary-gonadal axis, and specifically by androgens. And believed to be through transcription factors, such as Hoxa10, Hoxa11 and causing developmental abnormalities of the gubernaculum.
b. Testicular functions.  
(5 marks)

**Answer**

**Hormonal control of the testis function:**

1- The hypothalamus secretes a hormone-releasing factor (GnRH), which stimulates the secretion of LH and FSH from the anterior pituitary gland.

2- The LH (ICSH) stimulates the interstitial cells of Leydig to produce androgens mainly testosterone.

3- The androgens suppress GnRH, LH and FSH secretion by negative feedback on the pituitary and hypothalamus.

4- The FSH interacts with receptors on the Sertoli cells to cause production of ABP, conversion of testosterone to dihydrotestosterone and estrogen, stimulation of spermatocytogenesis, completion of sperm release (spermeation) and secretion of inhibin.

5- Inhibin secreted into the bloodstream has a negative feedback effect on FSH, but not on LH secretion.