INFERTILITY

The term fertility is applied to cattle denote the desire and ability to mate, the capacity to conceive and to nourish the embryo and finally the power to expel a normal calf and fetal membranes.

Fertile cow: cow produce on viable calf each year. Sterility: an absolute inability to reproduce. Infertility: degree of reduced fertility.

ANATOMICAL FACTORS AFFECTING FERTILITY

A- CONGENITAL ANOMALIES

1- Ovaria agenesis or ovarian aplasia

Infantile genital tract and absence of cyclic behavior, hereditary condition.

2- Ovarian hypoplasia

Ovary: Small, narrow, functionless, furrowed, spindle like. Genital tract infantile no estrous cycles Inherited or autosomal recessive gene. Differential diagnosis: Functional anestrous.

3- Intersexuality or freemartin

Origin-Anastomosis of blood vessels of the adjacent allantoic sac of heifer-calf born as co-twins. This anastomosis allows male hormone from earlier differentiating fetal testicles to retard the development of the undifferentiated gonad and Mullerian system and to stimulate its Wolfian duct. The result is intersex with outward appearance of female and internal sex organs of mixed type. The ovaries remain hypoplastic. The vulva showed a prominent tuft of hair from the inferior commissure and clitoris is markedly enlarged. Cervix is absent and uterus is represented by two solid cords and at the neck of the bladder two well-formed seminal vesicles.

Diagnosis:

1- History; co-twins male and female.

2-Permanent clitoris and hair tuft

3- Lack of vaginal patency; using vaginal speculum

4- Anestrous.

5- Rectal palpation; vestigial female reproductive organs and rudimentary male organs.

4- Segmental aplasia of the Mullerian ducts" White heifer disease" Leads to various anomalies of the vagina cervix and uterus. Ovaries develop normally with normal cyclical behavior.

a- Persistence of hymen;

Vaginal constriction in front of urinary meatus or as partition with central aperture or complete partition between vulva and vagina this type usually discovered during parturition causing dystocia.

b-Hymen obstruction is complete; Discovered during insemination Accumulation of cyclic secretions in front the obstruction May become infected during insemination and become

infected during insemination and become pyogenic secretion- fever - straining. Treatment: Trocar and cannula.

Herditory origin

c- Segmental aplasia

Vagina, cervix, uterus

UTERUS DIDELPHYS; each uterine horn connect with the vagina by separate cervical canal causes dystocia due to Sex linked recessive gene with linkage to the gene for white color coat.(Inbreeding.)

5- Aplasia of oviduct

6- Paraovarian cyst

Commonly about 1cm in diameter with thick mucoid fluid present in bursa and mesosalpinx. Sometimes impinge on oviduct and reduce its lumen causing oviduct obstruction.

7- Atresia of vulva

Hereditary origin.

Infectious Diseases Affecting Reproduction

Brucellosis

Bovine brucellosis, or Bang's disease, is perhaps the best known and most controversial infection of the bovine reproductive system. Brucellosis generally has been thought of as a cattle disease, but it is also seen in swine, sheep, goats, dogs, horses, and wildlife, and can be readily transmitted to humans. The disease in humans is referred to as undulant fever and is one of the reasons for a national eradication program to remove the threat from cattle and human populations. The disease represents a real occupational hazard for veterinarians, slaughtermen, and cattle producers.

Brucellosis is caused by the bacterium Brucella abortus. The organism has an affinity for certain body tissues such as the udder, uterus, lymph nodes, testicles, and accessory sex glands. Because of its affinity for the uterus, abortion is the usual sign of the disease. However, other symptoms, primarily reduced milk production and reduced weight gain, are often seen. In bulls the most obvious clinical sign of this disease is epididymitis.

Brucellosis is a particularly difficult disease to work with for several reasons. First, there is no sure way to identify infected cattle by their appearance. All infected cattle do not abort. In addition, the incubation period for brucellosis is variable, ranging from 3

weeks to as much as 90 days and more. These characteristics all contribute to the problem of eradicating the disease.

Brucellosis is primarily transmitted to susceptible animals by direct contact with infected animals. Essentially, the only time an infected cow transmits the organism is at or around calving or abortion. Aborted fetuses, placental membranes, placental fluids, and the vaginal discharges that persist for several weeks after an infected cow has calved or aborted all abound with virulent Brucella organisms. The organism may be transmitted to other animals that contact the environment that has been contaminated with discharges from infected animals. Milk and colostrum from infected cows is a readily available source of infection for calves and the human population.

Infected cows seldom abort more than once, but calves born from later pregnancies may be weak and unhealthy. Such cows will probably continue to harbor and discharge infectious organisms, and have reduced conception rates.

Abortion is apparently associated with stage of pregnancy at the time of exposure to the disease. Cows that conceive soon after exposure, or in the first trimester of pregnancy after exposure, have a high abortion rate. Chances of abortion decrease in later stages of pregnancy, with cows in the third trimester of pregnancy at time of exposure rarely aborting.

Because brucellosis can easily be transmitted to people, aseptic procedures such as using disposable gloves when examining or assisting cows at calving are highly recommended.

A cooperative state-federal brucellosis eradication program has been in effect for many years. Although much maligned and often changed, this program has undoubtedly done much to finally near eradication of the disease in this country. States are classified as free, class A, class B, or class C. New Mexico became a free state in 1996.

Cattle can generally be moved interstate from free states without testing. However, cattle moved from non-free states must be tested before moving across state lines.

The old saying that "brucellosis is usually bought and paid for" is true more often than not. Just because an animal or group of animals has been tested and declared free of infection does not ensure that some are not in the incubation stage of the disease. Therefore, any newly purchased cattle should be quarantined and retested in 45-120 days. This may be the most important part of a preventive program, and one over which the buyer has complete control.

A relatively new RB51 vaccine has replaced the old Strain 19, the only vaccine

available for many years. The biggest advantage of the RB51 vaccine is the almost total elimination of false positives observed with use of Strain 19. Use of Strain 19 often resulted in antibody titers that were difficult to differentiate from actual infection titers. Heifer calves can be vaccinated between the ages of 4 and 12 month; about 6 months of age is best. Brucellosis vaccine only can be administered by licensed veterinarians.

A small percentage of heifer calves born to brucellosis-infected cows will harbor the organism until they are mature. Serological tests may be negative during the heifer's developmental period. However, once the heifer becomes pregnant, she may abort or she may become seropositive and a source of infection at calving time. Therefore, unknowing cattle producers may be buying the disease via serologically negative heifers carrying a latent infection. Calfhood vaccination of heifers will not prevent this from happening. Anyone buying replacement heifers should keep this in mind. Buying heifers in areas of high brucellosis incidence may be a risky venture, whether or not they were calfhood vaccinates.

Leptospirosis

Leptospirosis is a contagious, bacterial disease of animals and humans. In cattle, horses, pigs, sheep, goats, and dogs, it has been characterized by a wide variety of conditions including fever, icterus (jaundice), hemoglobinuria (bloody urine), abortion, and death. However, our concept of the disease has recently changed. It used to be considered a highly fatal disease, but is now thought to be a widespread, mostly subclinical infection of many species of wild and domestic animals.

Originally, Leptospira pomona was identified as the principal cause of the disease in cattle. However, in recent years, an increased incidence of other serotypes has been observed, including L. hardjo, L. icterohaemorrhagia, and L. grippotyphosa. Other serotypes, including L. canicola and L. szawajizak, have been isolated from cases of bovine leptospirosis.

Signs of leptospirosis in cattle range from mild, unapparent infections to acute infections that end in death. Clinical signs that precede abortions may suggest leptospirosis, but owners of beef herds often do not recognize any signs of disease until they find aborted fetuses. The highest abortion rate occurs in the last 3 months of gestation. High abortion rates have been observed among beef herds during the winter feeding period in herds utilizing seasonal breeding for spring calving. Hemoglobinuria (bloody urine) in either bulls or cows, or blood-tinged milk in lactating cows, may be observed. Milk production may nearly cease.

The acute form of the disease usually occurs in calves. Calves will have fevers from 104

to 107°F, and may have diarrhea followed by constipation, then again by diarrhea. Hemoglobinuria and a yellowing of the mucous membranes and tissues are common. Death may occur in a short time.

The only certain way to diagnose leptospirosis is through laboratory testing of serum, or cultural isolation of the organism. Generally, serum testing is used to diagnose lepto in a herd. Significant titers against a certain serotype indicate the disease is active in the herd, assuming the herd has not been vaccinated for the disease. Paired serum samples may be needed to demonstrate active infections. Rapidly rising or falling titers in paired samples probably indicate active infections. Antibodies first appear in the serum of infected animals by the sixth or seventh day, and titers rise rapidly to a high level. Titers then decline to a more or less constant level and may persist for months. Samples sent to the laboratory for culture must be collected and shipped as rapidly as possible because leptospires do not survive long in dead tissue.

Vaccination with killed bacterins protects against clinical leptospirosis for up to a year, but the bacterin must contain the antigens of the strain to which the cattle are exposed. An annual vaccination program with vaccine containing bacterins against L. pomona, hardjo, and gripotyphosa should be considered for most New Mexico cattle herds.

Campylobacteriosis, Vibriosis

Campylobacteriosis (vibriosis) is a venereal disease of cattle caused by the organism Campylobacter fetus subspecies fetus. Before 1973, this organism was known as Vibrio fetus subspecies venerealis, but was reclassified into the Campylobacter genus in 1973.

Campylobacteriosis is characterized by infertility with an increased number of services necessary for conception. Early embryonic deaths are common and late abortions from 4 months gestation to term are occasionally observed. Presence of the disease is often unsuspected until many nonpregnant females are found during fall pregnancy examination. Also, considerable differences in fetal age may be noticed, indicating reduced fertility and delayed conception in some females.

In a herd that has never been exposed, and where no immunity exists, an acute type of infertility problem develops. In this case, infertility caused by endometritis results in early embryonic death and a prolonged period (up to 120+ days) passes before successful conception occurs. Within this time, the female develops a local immunity and the organism clears from the uterus so conception can take place. Some heifers have a natural immunity, or develop immunity quickly, and conceive within 2 months. Others may conceive early but remain carriers of the organism for months, while still others remain infected for months, require many services, and may even abort after

conception.

The subacute or chronic form of the disease is expressed as a vague or intermittent infertility problem in older cows, but susceptible females added to the herd develop the more acute form.

Under natural breeding conditions, bulls transmit Campylobacter fetus from one female to another. Before the advent of properly handled and antibiotic-treated semen, the disease also could be spread by means of artificial insemination. Direct female-to-female spread is highly unlikely, but bull-to-bull transmission can occur among groups of bulls penned together where riding behavior is active. The organism establishes itself in the prepuce of the male, but does not interfere with semen quality or breeding ability.

Spread of the organism to the male is primarily by way of copulation with an infected female. Bulls can remain carriers for up to 18 weeks after infection. Older bulls tend to retain the infection more permanently than younger bulls, possibly because of the increase in number and size of the crypts in the epithelium of the penis.

A definite diagnosis of genital campylobacteriosis can be difficult and laboratory test results are often disappointing. Although blood tests are available, they are not reliable because it is not a systemic disease and antibodies are rarely found in the blood stream.

Most infected heifers rid themselves of the organism within 6 months of sexual rest, thus a reduction of demonstrable antibodies occurs. Therefore, at pregnancy evaluation or at calving time, when the owner first becomes aware of a problem, only a limited number of females may be infected and antibodies may have disappeared.

Bacteriological examination of aborted fetuses appears to be the only practical method of confirming the diagnosis later in gestation. Cultures of vaginal or cervical mucus from aborting females, or samples taken from the sheath of bulls, may be used, although diagnosis by this method is difficult because of the organism's fragile nature.

Without vaccination, control and prevention of this disease can be difficult. Use of artificial insemination that is successful in dairy herds and small farm beef herds may be impractical on larger ranches. Maintaining a clean, unexposed herd is possible only if virgin bulls are used, and if only clean, uninfected females are introduced. Serum antibody titers tend to decrease rapidly after vaccination; therefore, a corresponding reduction in immunity can be expected.

Maximum immunity in heifers can only be established if they are vaccinated twice before breeding. In one study, a vaccination given 4 1/2 months before the breeding season, followed by a booster injection 10 days before breeding, gave satisfactory

immunity in heifers. However, the single injection given 4 1/2 months before breeding did not. In most New Mexico herds, satisfactory protection can be obtained with single vaccinations before the breeding season followed by yearly booster injections.

Both killed and modified-live vaccines are available. Modified-live vaccines may cause abortions and should not be used in pregnant cows. Combination vibri-lepto vaccines are available.

Vaccination of bulls has been reported to be effective for both prevention and also as a cure for C. fetus infection. Initial vaccination should consist of two injections before breeding time. Annual booster vaccinations close to breeding time will help assure high immunity during the breeding season.

Trichomoniasis

Trichomoniasis, like vibriosis, is a venereal disease of cattle. It was formerly thought to be a relatively rare disease. However, in recent years, frequency of diagnosis of this disease in western beef herds has increased dramatically. Whether this increase is the result of an actual increase in the incidence of the disease, or better test procedures and increased awareness, can only be speculated.

Trichomoniasis is caused by the protozoan, Trichomonas fetus. These organisms are harbored in the reproductive systems of infected cows and bulls, and are transmitted from cow to cow by chronically infected bulls. Cows will generally rid themselves of the disease after 60 to 90 days of sexual rest, but infected bulls appear to be unable to develop immunity. Unless they are extremely valuable animals, they should probably be slaughtered because treatment can be a long and laborious procedure.

Infertility is the most common clinical sign of a trichomoniasis infection. Abortion generally occurs early in gestation (first 3 months). Because little tissue is shed during these early abortions, they often go undetected. The usual evidence that a problem exists is a lower percentage of pregnant cows in the fall, or a reduced calf crop or prolonged calving season.

Protecting the beef herd from exposure to the disease is the recommended management approach. Like many other diseases, trichomoniasis is usually introduced into the herd by purchase of infected cows or bulls. Maintaining a quarantined herd, adding only young bulls and heifers of prepuberal age, can greatly reduce the risk of infection. Diagnosis of the disease may be difficult, and one screening test of newly purchased animals will not guarantee they are clean.

Older bulls (4 years and older) are more likely to carry the disease. The disease is rarely

diagnosed in younger bulls and they are apparently less likely to become permanent carriers. The practice of purchasing older, used bulls should be used with much discretion. If there is any question about the origin and health status of such bulls, they should not be used.

Commercial vaccines are now available. Proper immunization requires two injections, usually administered two to four weeks apart. Annual revaccination may be recommended. The vaccine is given to cows only. As with any vaccination program, consult your veterinarian before beginning a trichomoniasis vaccination program.