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**Practical Suggestions on the Control of Infectious
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Practical Suggestions on the Control of Infectious Abortion in Cows

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Abortion in cattle has become widespread and severe losses from this disease have been experienced by many breeders. The economic loss from abortion in cattle is possibly as great as that from any other single disease. The loss of calves from some of the best cows in the herd, decreased milk production and the fact that following abortion cows may become non-breeders mean a serious setback to the breeders, both from the standpoint of production and the building up of a herd.

During the past thirty-five years this disease has been studied and reported on by various investigators. Numerous published reports on abortion in cattle have appeared in livestock journals and the agricultural press. Not all reports are in full agreement on every point regarding the cause and nature of the disease. Enough fundamental information concerning the disease is available, however, for formulating quite effective methods for the prevention and control of the malady. In many cases where definite steps have been taken to control the disease in a herd, the results have been quite satisfactory. The purpose of this circular is to discuss the causes, symptoms, effects and control of the disease.

CAUSE OF THE DISEASE.

Abortion has been known for centuries to exist in breeding cattle. In 1896, Bang and Stribolt, of the Royal Veterinary College of Copenhagen, Denmark, found a germ that was apparently the active cause of abortion in cattle. This germ is known as *Bacterium abortus* (Bang).* The micro-organism was

*According to the new classification of bacteria as approved by the Society of Bacteriologists (see Bergey's Manual) the name *Bacterium abortus bang* is changed to *Alcaligenes abortus*.

found to be present quite uniformly in the aborted fetus, in the afterbirth and in the secretion from the womb following abortion. They reported that when injected into pregnant animals either intravenously or intravaginally it would cause abortion in a large per cent of the animals. Investigators have since duplicated the work of Bang and Stribolt and have further demonstrated that subcutaneous injections of live, virulent cultures of the *Bacterium abortus* (Bang) do not usually cause the animal to abort, but that abortion can be produced by feeding this particular germ to pregnant cows. In fact, it has been quite well proved that the main avenue of infection is by the mouth. From the digestive tract the germ is absorbed into the blood-stream, conveyed to the pregnant uterus where it may set up an inflammation of the fetal and maternal cotyledons, usually leading to the death and expulsion of the fetus. The Bang bacterium may be present in the maternal membrane of pregnant cows and not cause abortion. In from 30 to 60 days following an abortion the organism apparently disappears from the uterus. It is, however, frequently found in the udder and milk of cows, and it has been quite definitely proved that during the period of lactation or non-pregnancy the organism tends to become localized in the udder, where it remains for an indefinite period.

SYMPTOMS OF INFECTIOUS ABORTION IN COWS.

The first symptom that attracts one's attention to an approaching abortion in the heifer is the springing or signs of approaching parturition manifested by an increase in size of the udder and vulva before the time that this would occur were she to deliver a normal calf. There may be a slight odorless yellowish white discharge from the vagina, tinged at times with blood. Occasionally, just before the cow aborts, the discharge is very noticeable, and upon examination of the vagina a quart or more of this material may be found in the vaginal cavity. The individual often appears somewhat dull and has a tendency to remain away from the herd. If the cow is giving milk, a gradual falling off of the milk flow may be noted for some time

before the cow aborts, with an increase in the milk flow for a day or two just previous to the premature discharge of the fetus. Occasionally cows abort without giving much, if any, previous warning. The fetus is generally dead when expelled. However, if the cow carries it until in the eighth or ninth month of gestation, she may deliver it alive. Such calves are usually weak and are termed "living abortions." It has been observed by stockmen that a seven-months-old fetus has a better chance of living, as a rule, than one eight months along in gestation. A fetus at seven months is not usually completely haired over, tho different fetuses vary somewhat in their development at that stage of gestation. We are told of an instance, however, by an extensive breeder of purebred cattle, of a calf dropped in his herd so young as not to be completely covered with hair, that lived and developed into an excellent individual. What is usually meant, no doubt, is that a fetus dropped in the eighth month has a better chance of living than a premature delivery in the ninth month of gestation. Occasionally a well advanced fetus may appear dead when dropped, but upon examination one finds that one or both of the lungs have functioned. When the abortion occurs in the very early stages of gestation, the small embryo usually comes away enveloped in the inconspicuous fetal membranes and easily escapes detection, the cow showing no ill effects. If the cow aborts after the fetus has attained considerable size, the fetal membranes are usually retained. If these membranes are not passed in forty-eight to seventy-two hours, they should be removed as described on page 5.

As a result of the work on abortion in cattle, it has been demonstrated that there are cases of abortion that are not due to the presence and action of the Bang bacterium. Microorganisms that find their way into the genital tract of cattle and set up inflammatory changes may cause abortion. No doubt abortion may result from injury and from bad feed, but far less frequently than is generally thought. In case of an abortion in cows and other species, it is always advisable to exhaust every known means to determine the cause; that is,

to distinguish between so-called infectious or contagious abortion, in which the Bang bacterium is present, and those cases of abortion due to other causes.

AFTER-EFFECTS.

Two of the most serious after-effects of the disease of infectious abortion are retained placentas and sterility. Often as high as fifty per cent of the cases give trouble from these conditions. If a cow aborts any time up to the fifth month of pregnancy, it does not usually disturb her greatly. It is only after five months of gestation that the most serious disturbances occur. The development of the circulation and the firm attachment of the placental cotyledons from the fifth month on are apparently factors that tend to make late abortions more serious than those that occur earlier. After the fetus is expelled, the retained placenta becomes a mass of dead foreign matter and a favorable medium for the growth of different germs which find their way from the exterior to the uterus when once it is opened. Occasionally aborting cows die as a result of retaining the fetal membranes. If a cow aborts early in pregnancy and the placenta comes away of its own accord, it is best not to use uterine douches or manipulations. If a cow aborts later than the fifth month of pregnancy and the abortion is followed with retained placenta, the afterbirth should be removed under strict sanitary precautions and the uterus douched with two to three gallons of water that has been boiled and cooled to body temperature. It is best not to try to remove the afterbirth too soon after the cow aborts. In fact, no attempt should be made to clean the cow until forty-eight hours after the expulsion of the fetus. Some operators would even wait seventy-two hours before beginning the work. If some of the cotyledons are tightly attached, they should not be removed at the first treatment but should be removed later on after they loosen. To the water used as a douche, salt can be added at the rate of one teaspoonful to a quart of water. Creolin in a one-per-cent solution or potassium permanganate in a dilution of one to two thousand can be employed. These latter anti-

septics are probably as effective and safe preparations as any for the stockmen to use. There are many proprietary antiseptics on the market recommended for use as uterine douches which may be used strictly according to directions. Irrigation of the uterus in case of metritis following retained placenta may be of great value in particular cases; however, the best preparations available, improperly and carelessly used, may result in great harm. Before irrigating the uterus, wash thoroly the external genitals, tail and rump of the cow. Water used should be sterilized by boiling; buckets, irrigating apparatus and the hands of the operator should be clean and absolutely free from possible infecting micro-organisms. All the solution injected into the uterus should be drained out. In the case of metritis, it is often advisable to insert into the uterus one or two one-ounce gelatine capsules containing such agents as iodoform and boric acid or liquid petroleum containing 2 per cent of Lugol's solution of iodine. After the afterbirth is removed, the irrigation of the uterus as well as other treatment of this organ must be such as not to introduce infection. It is most economical in the long run to obtain the services of a veterinarian who has had experience in this line of work. In those cases where it is not possible to secure the right kind of help, the owner or attendant must of necessity do the best he can. Many cases respond to treatment readily and give no further trouble, while others may develop serious complications or puerperal septicemia and die, or become non-breeders thru the development of chronic centers of inflammation in some part of the reproductive organs.

The following suggestions should be observed in controlling the disease:

1. Remember first of all that the cow is usually infected with the disease thru the alimentary tract by eating pasture or other feed soiled with infected material of an aborting cow. If a cow aborts on pasture, remove her to the stable or yard at once and destroy the fetus and afterbirth and spray the place where she aborted with one of the coal tar dips, using 1 part of the dip to 30 parts of water; or the place may be covered with quicklime.

2. Burn or bury deeply the aborted fetus or afterbirth. If burying is resorted to, cover the calf and membranes with unslaked lime.

3. Endeavor to isolate each cow before she aborts.

4. The bull may be a source of infection; hence if he serves a cow which has aborted, his sheath should be irrigated with a solution of potassium permanganate in a dilution of 1 to 1,000 directly after the service and again before he is allowed to serve another cow.

5. A cow that apparently calves normally but has a retained afterbirth should be regarded with suspicion. The afterbirth should be destroyed, as has been described, and the cow kept in quarantine and treated.

6. A cow after abortion should be kept in quarantine until all discharge ceases, which usually requires from three to six weeks. Before she is returned to the herd, her rump and hind parts should be thoroly sprayed with one of the coal tar dips, using one part of the dip to thirty parts of warm water. The litter of the stall should also be sprayed with the same material. The attendant should not be allowed to go from an infected to a clean stable without first wiping the bottoms of his shoes on a gunny sack soaked with a coal tar dip diluted as mentioned above.

7. Haul all litter from the stall to a field on which no live stock is or will be kept until the material is plowed under.

8. If a live calf is dropped before full time, disinfect the coat of the calf before it is allowed to run with mature heifers or cows.

9. It is not advisable to breed a cow which has aborted, inside of sixty days following abortion.

10. The premature birth of a calf (slipping) is only one of a number of symptoms indicating infectious abortion. The presence of the Bang bacterium is accepted as a confirming proof of the disease; therefore, from each case of abortion (when possible) a bacteriological examination of the fetus, afterbirth or uterine discharge should be made.

11. Other means at our disposal for the diagnosis of infectious abortion are so-called blood tests. Of these the agglutina-

tion test is the simplest and most often used. Draw 10 to 15 c.c. of blood from the jugular vein and send it to a laboratory to be tested. The blood should be drawn into a sterile tube or bottle. Wash the needle in water (which has been boiled) between each bleeding so that blood from one cow does not come in contact with that of another cow. Immediately after drawing the blood, put it into a cool place, preferably on ice, for a short time, giving the receptacle some slant. Do not stir or shake the blood in the tube. As the blood clot forms, a clear serum will form or separate from the clot. It is the clear serum that is used in making the test. Blood sent by parcel post is often so badly shaken up and hemolyzed that it is impossible to make use of it. The Kentucky Experiment Station is prepared to test blood for abortion by the agglutination or complement fixation tests.

The Kentucky Agricultural Experiment Station has been experimenting with subcutaneous injections of both live and dead cultures in an endeavor to immunize cows and heifers against the disease. In some herds the results have been very encouraging, while in others very little benefit has been observed.

The method we now employ consists of three injections of bacterin subcutaneously, seven or eight days apart. The first dose consists of an injection of two cubic centimeters containing 216 billion killed germs per c. c. The second treatment, 2 cubic centimeters containing 325 billion killed germs per c. c., and the third treatment, 2 c. c. containing 432 billion killed germs per c. c.

There is some difference of opinion as to the value of and danger from the use of abortion vaccine (live organisms) in the immunization of cows against this disease. Until further experimental data are available we recommend that the use of live organisms as an immunizing agent be confined to non-pregnant, reacting individuals in infected herds only. Other cows in the herd—non-reactors and pregnant reactors—are to be given abortion bacterin (killed organisms). The latter, three injections one week apart, the former, three injections fifteen days apart. No cow receiving the live organisms is to be bred within sixty days from the last injection.