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ABORTION DISEASE
OF CATTLE

By

GEO. H. GLOVER



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ABORTION DISEASE OF CATTLE

(By Geo. H. Glover, Head of Veterinary Division)

There is no way of accurately estimating the losses from the abortion disease. We do know that it is widely spread thruout the State and nation both in dairy and range cattle. Among all of the diseases affecting cattle in Colorado this must now be looked upon as the greatest menace to our animal industry.

Almost every mail brings requests for information about abortion and has made quite necessary the publication of a circular of information. It is not the purpose of this publication to report the results of experimental findings, or observations, nor to enter into a discussion of recently developed theories, it is only thru an understanding of the nature of this malady that we can ever hope to bring it under control, and since the cooperation of breeders is necessary to this end, it is highly desirable that available information be placed in their hands.

The title "Abortion Disease" is used in preference to "Contagious Abortion" for the reason that it is in every way more appropriate. It is a well-known fact that an animal may be affected with the abortion disease and yet not abort. Abortion is only one symptom of the disease. Abortion, sterility, retained afterbirth, disease of the uterus, fallopian tubes, and ovaries, are now looked upon as symptoms of, or conditions incident to the disease. White scours, mammitis, (garget), calf pneumonia, and other calf diseases, are intimately associated phenomena that must be taken into consideration. In naming the disease, "Sterility" would perhaps be as appropriate as "Contagious Abortion" for the reason that sterility following the disease marks as great an economic loss as the actual abortions.

EXTENT OF ABORTIONS

The abortion disease is widespread thruout the State. The majority of dairy herds are affected and the loss of calves on the ranges is a common experience. The disease is hard to trace, for while there may be a loss of more than 50 per cent of the calf crop one year, the following season the loss may become almost nil. Such an experience is liable to lead to the assumption that the disease had disappeared as suddenly as it came, when in reality it is only smoldering and will appear again from time to time until practically the whole herd has been infected.

The cow population of Colorado, according to the last census report, was 721,420. It is estimated that about 8 per cent of all milk cows abort each year. On the basis of \$20.00 a head,

which would certainly be a conservative estimate, the annual loss to the State of Colorado would be \$1,154,267.20.

CAUSE OF ABORTION

The abortion disease is caused by a minute germ, the abortion Bacillus of Bang. We cannot expect to grow a crop of wheat without sowing wheat seed, neither is the abortion disease possible unless the specific germs of the disease gain entrance to the animal body. These germs are so small that it takes a very powerful microscope to see them. They can be grown on artificial media in the laboratory and by inoculation will produce the disease. Once having invaded the tissues and caused the disease, other microorganisms become active and are in a large measure responsible for sterility and other complications.

In the laboratory, fetal tissue and milk are best suited for the growth of the abortion bacillus. In nature, germs as well as animals and animal parasites, have their natural habitat, or in other words, conditions under which they thrive best. This organism finds conditions favorable in the uterus and udder of the cow and it follows that these organs would naturally become first infected. However, infectious abortion is essentially a disease of the uterus. If the diseased area spreads far enough in the uterus the fetal membranes are separated from its wall by the accumulation of inflammatory exudates, which interrupts the food supply to the uterus, and kills the fetus. It is then cast out like any other foreign body.

While the disease located in the uterus is responsible for most of the disastrous consequences of infection, yet Schroeder and Cotten believe that while the germs live but a few weeks in the empty uterus they may survive for months or even years in the udder. After the infection has subsided in the non-pregnant uterus, recovery should take place rapidly without complications, and this might be expected in most cases, were it not that pus producing, and other germs, complicate the infection. An accumulation of pus in the womb, chronic catarrh of the inner wall of the same, disease of the fallopian tubes, and of the ovaries, are mostly responsible for sterility. Infection is always most active after the cow has become pregnant and the uterus sealed. Conditions are now most favorable for the germs to multiply and do their greatest damage.

At first, cows that have aborted may be expected to come in heat regularly or at certain intervals, but may fail to conceive; later they reach a stage in the progress of disease where they may never come in heat, and sterility is permanent.

Outside of the body, the germs if exposed to sunlight and air, soon die, otherwise they may survive for months or even years. Living germs have been isolated from a fetal calf that had been solidly frozen for 24 hours. (Hadley). Bang and Stribolt isolated the abortion bacillus from a fetal calf that had been dead nine months. While the germ may survive such untoward conditions, they do not greatly increase in numbers.

ABORTION FROM OTHER CAUSES

It is now quite generally believed among investigators that practically all abortions result from infection. At least abortions that result from continuous high fever, from ergot, poisonous foods, and accidents, is relatively insignificant. Experimentally the feeding of moldy, smutty, or spoiled foods to pregnant cows has failed to produce abortion.

RELATION OF ABORTION IN COWS TO OTHER FARM ANIMALS

Abortion in mares, sows and ewes appears to be on the increase. It was believed until quite recently that each animal species had its own specific germ of abortion and that under natural conditions they were not intertransmissible. In other words that there was no danger of cattle abortion being transmitted to other animal species on the farm. At the present writing there, is strong evidence in favor of the transmission of cattle abortion to hogs and possibly sheep.

NATURAL TRANSMISSION

The germs may enter the body thru any one of four channels: 1. Thru the digestive tract, with food or water. 2. The genital tract, especially by copulation. 3. Thru external wounds. 4. Thru the udder, mostly by way of the natural opening in the teat.

In a sense the disease is inherited, for an infected cow always gives birth to an infected calf. The abortion germs have been found in the intestinal tract of calves born prematurely

from infected cows. This no doubt resulted from the calf swallowing the placental fluid which is common in uterine life. A new born calf of an infected cow will react to blood tests the same as the mother indicating that it was infected before it was born.

Heifers acquire the disease more easily than cows. It seems likely that when a cow aborts early in the period of gestation, (from three to five months) she must have become infected prior to or about the time of breeding. If the fetus was carried seven or more months she probably became infected subsequent to conception.

Calves when fed on the milk of infected cows may become carriers of infection. Where the milk from many sources is mixed in creameries, cheese factories, condensaries, and the by-products returned to the farms, there is the greatest liability of spreading the infection. Some states require that such products be pasteurized.

Blood tests indicate that while bulls may become mildly infected they have a high degree of sexual immunity and transmit the disease in a mechanical way only.

SYMPTOMS

There are no wellmarked symptoms of approaching abortion or of other phases of the disease. This is true especially of abortion in the early months of pregnancy. In the later stages of pregnancy there is usually swelling of the udder, and just before parturition the vulva becomes swollen and somewhat relaxed. More or less mucous usually of a yellow tinge may be discharged. The animal may become restless and manifest other evidences of uneasiness but these are usually overlooked. If abortion occurs in the early months of gestation, the fetus is usually expelled in its membranes. In the later stages the membranes (afterbirth) are usually retained and may cause serious complications. In cases where abortion is caused by the specific virus of abortion disease the placental membranes are usually retained and there is a yellowish, odorless, exudate found on the cotyledons (buttons) of the membranes.

SYSTEM OF MANAGEMENT

The practice of doing nothing gets one nowhere in the control of infectious diseases or in any other enterprise. It is the argument of the indolent and the practice of the shiftless.

Altho reliable statistics are not available, it is estimated that about 80 per cent of infected cows abort but once, 15 per cent twice, leaving but 5 per cent that abort three or more times. Cows that abort but once are most liable to become normal and thereafter produce normal calves. However, these same cows that have become immune and are again producing normal calves, may be carriers of the infection, and spread the disease to other animals. Investigators seem to have shown that the milk may remain infected for several months or even years, and that apparently healthy calves may be diseased at birth. At this time we have no definite information as to the proportion of cows that are carriers of infection.

Eternal vigilance is the price of a clean herd. The fact that a period of many abortions is followed by a cessation of abortions, has led many to assume that the disease will die out if left alone. The practice has been to vaccinate and do nothing more. It should not be forgotten that while some cows seemingly recover without treatment, all of them are more or less impaired, with quite a large percentage of sterility. It is impossible to conceive of the disaster that would have followed from the ravages of foot-and-mouth disease, yellow fever, and bubonic plague, if a **do nothing** policy had been adopted. Success will depend upon herd management and this again upon eternal vigilance in the application of certain scientific principles which have brot results in the control of infectious diseases.

THE ABORTING COW

The dropping of a calf prematurely is sufficient to warrant the taking of immediate steps to control possible infection in the herd. When a cow manifests symptoms of abortion, or has aborted, she should be removed immediately to an isolated stall, or shed for observation and treatment. The fetal calf, afterbirth, and litter shuld be destroyed by fire and the ground or floor where the cow stood should be saturated with a disinfectant. At least once a day the cow's thighs, vulva and tail should be cleaned and disinfected. This should be continued as long as there is a vaginal discharge.

The afterbirth is usually retained and its removal at the right time is of the utmost importance. If it is removed forcibly, or left too long, acute or chronic inflammation of the uterus, fallopian tubes or ovaries, may follow with serious consequences. This is the most prolific cause of sterility and blood poisoning. Because of the inflammation in the uterus, incident

to infection, the membranes have adhered to the cotyledons and after the fetus has been expelled these attachments hold the afterbirth. When the afterbirth has been retained it can best be removed on the second or third day in most cases. If possible a veterinarian should be employed for this purpose. There is great danger in using force to remove the placenta.

The first day after the calf has been dropped, if the afterbirth has been retained, the womb should be flushed with a warm one per cent salt solution. This is made by dissolving two level tablespoons of common salt in a gallon of freshly boiled water. This solution may also be used for cleansing the external genitals as previously described. The injection can best be made by use of a pump but a rubber tube with a funnel attached will suffice. Some veterinarians are recommending a 0.5 per cent solution of sodium hypochlorite but if this is used, it should be followed immediately by the salt solution. The womb should be drained as thoroly as possible after each injection. The douching should be continued twice daily until the afterbirth has come away and once a day thereafter until the discharges have ceased. After the womb has closed, irrigation of the outer passage only, should be attempted.

TREATMENT OF THE BULL

The herd bull should be disinfected before and after each service. First cut the tuft of long hair from the opening of the sheath, then disinfect the inside of the sheath with the salt solution mentioned above or with a 1-4 per cent Lugol's solution. To do this a soft rubber tube, with funnel attached, will be convenient. The hand should be used to prevent the immediate escape of the fluid. With the other hand the parts may be manipulated until the fluid has reached every part of the cavity.

WHEN TO BREED

After abortion breeding should not be attempted for at least two months after discharges have ceased. It is true that experience has shown that the earlier a cow is bred the more likely she is to conceive, but it is also true that she is equally liable to abort the second time.

KEEP THE HERD INTACT

Do not sell the cow that has aborted. It is not fair to the purchaser and spreads infection. This cow has had her experience and if properly handled is liable to be more valuable than other members of the herd that have not as yet been af-

fect. Healthy susceptible cows should of course not be added to a diseased herd.

DISINFECT

Not only should the animals be disinfected as previously described but there should be a general "cleaning-up" of the premises. Chemical disinfectants can be used to advantage. The walls, ceilings, stall partitions, and floors, should first be swept, and scraped if necessary to remove accumulated filth. The surface earth to a depth of at least three inches, in the stables and cow yards, should be removed and replaced with fresh earth. A concrete floor should be placed in the stable if possible. The entire interior of the stable, feed boxes, milking stools, drains, walls, everything, should be saturated with a disinfectant, such as cresol compound, 6 ounces to every gallon of water. This should be followed by a coat of whitewash, to each gallon of which should be added four ounces of chloride of lime. All refuse from the stables and barnyards should be raked up and burned, and the manure taken to the fields and plowed under. The yards that have not been replaced by fresh earth should be sprinkled liberally with a solution of copper sulphate, five ounces to a gallon of water.

DIAGNOSIS

By diagnosis is meant the art of determining the nature of a disease. Every intelligent effort in preventing and treating disease must be preceded by diagnosis. Aside from the clinical symptoms, which are not very reliable, diagnosis must depend upon the history of the case, blood tests, and the isolation of the specific germs of abortion. The blood tests most used are the complement fixation and agglutination, and while not absolutely reliable, they constitute the only practical method of diagnosing the disease where many animals are to be tested. The isolation of germs requires much time and is attended with many difficulties.

A reaction to the test merely demonstrates the presence of antibodies which have resulted from the infection, and this may or may not be accomplished by actual abortion. The veterinary laboratories at the Agricultural College are available for these tests without charge until further notice.

IMMUNITY

Immunity is a relative term and with respect to microbial disease conveys the idea of protection against disease. Im-

munity in this sense may be natural or acquired. The horse is naturally immune to blackleg and hog cholera. Immunity may be acquired in susceptible animals in many cases by a natural attack of the disease, or by being inoculated with the living germs. The disease stimulates the production of antibodies which protect the animal against this particular disease in the future.

Germ diseases become chronic because they are not self limiting. Immunity may be produced slowly or not at all. With the abortion disease of cattle it takes place slowly but that it does follow there can be no doubt. It is a matter of common observation that cows do not continue to abort year after year but do recover from the disease and unless sterility intervenes they produce healthy calves.

Some herds, like some individuals, have a naturally higher degree of resistance than others. This accounts for the fact that in some herds there will be many abortions while in others there will be very few. There is also a wide difference in the virulence of the germs.

VACCINATION

There are two methods used to immunize cows against the abortion disease. The first is the injection of the abortion bacterins, which are the dead organisms of the disease. The other is the use of the live organisms which constitutes a vaccine. The killed organisms (abortion bacterins) have not given satisfaction. The live organisms (abortion vaccine) give promise of being more effective. Considering the slowness with which diseased animals naturally acquire immunity it can scarcely be expected that vaccination will give as decisive results as are obtained by immunization for certain diseases of a more acute nature. There is also to be taken into consideration the danger of introducing the disease. However, the results thus far obtained, warrant the use of the live organisms. They should be used only in virgin heifers and non-pregnant cows in infected herds. If tested during pregnancy there is of course danger of causing abortion.

After first disinfecting the thin skin in the region of the shoulder, 30 c. c. of a heavy suspension of the live organisms is injected subcutaneously. The length of the time that an animal is rendered immune is variable. At the Wisconsin Station, it was found that the protection afforded was effective for at least two years. The vaccination does not cure the disease but simply hastens immunity.

The policy of, vaccinate and do nothing more, will surely lead to failure. The system as outlined if conscientiously followed will bring results. It means work, and a little expense, but experience fully justifies both. If possible a veterinarian should be employed to supervise the work and treat the diseased animals. The layman is not qualified either by experience or training for such work, neither has he the necessary equipment, or a knowledge of how to use it. It should be distinctly understood that no effective cure has been found. Do not spend money on proprietary remedies.