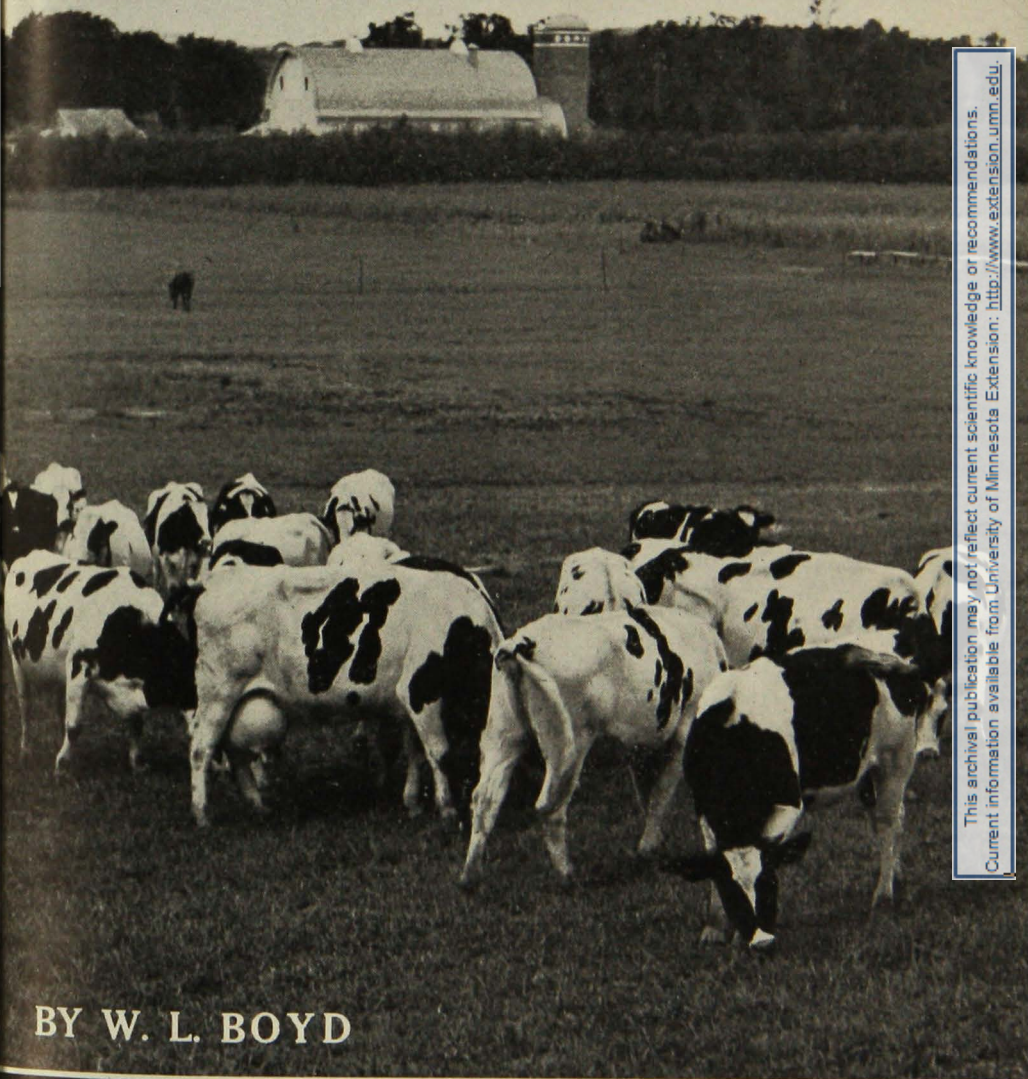


BANG'S DISEASE



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Questions About Bang's Disease

What Causes Bang's Disease?

A small microscopic germ causes Bang's disease or contagious abortion not only in cattle but also in sheep, goats, and swine.

What Are Some of the Symptoms of the Disease?

Slipping of a premature calf is the common sign, but retained afterbirth and failure to reproduce are other important symptoms.

How Does the Disease Spread?

Cattle usually get Bang's disease from licking infected animals, eating infected afterbirths, or eating grass or hay soiled by infected milk. Horses and other animals sometimes spread the disease also.

Does Vaccination Cure Bang's Disease?

No, it does not. There is no cure for Bang's disease. Vaccines may develop temporary immunity, but they keep the disease alive on the farm. Vaccines are not recommended at present.

What Can I Do About the Disease?

The only thing you can do is rid your herd of all infected animals. In the long run this will pay you in increased income from your cows. Your milk production will increase and you will save many more of your calves. Besides this, the State and Federal governments will help bear the expense of ridding your farm of the disease right now.

Bang's Disease

W. L. BOYD

BANG'S disease, or infectious abortion, exists in nearly all countries where cattle are raised. It appears to be world-wide. The disease has spread in the United States to the extent that many herds, either purebred or grade, show evidence of the disease. The testing campaign so far conducted in Minnesota has shown that 30 to 40 per cent of the herds are infected. In other words, about one herd out of every three has the disease. From 10 to 12 per cent of the animals so far tested in this state show the infection. This is a little more than twice the amount of tuberculosis present in Minnesota.

Annual Loss Great

It is very difficult to estimate actual losses from this disease because losses are mostly indirect loss of calf, lower milk yield, aborting cows, sterility, etc. Undoubtedly \$25,000,000 is a very conservative estimate of the annual loss from this disease in the United States. In Minnesota the annual loss caused by infection with the Bang germ exceeds \$500,000. It was found that the total loss resulting from abortion in the University Farm herd over a period of 29 years was \$12,760. This did not include losses from cows giving birth to dead calves over 260 days' calving period. It has also been found that the annual loss resulting from abortion in a good commercial-grade

herd of cows in this state was \$135 and in a typical purebred herd, \$486.

The cause of Bang's disease is a small germ, so small in fact that thousands of them piled one on top of the other cannot be seen with the naked eye. A powerful microscope is necessary to observe this organism. This germ was first found by Professor Bernhard Bang of Denmark, and the disease has been named for its discoverer. The germ may be found in the udder, in the pregnant uterus, and in the discharges from the vagina of the infected cow a short time after calving whether it is an aborted or a full-term calf.

The Bang germ not only causes abortion in cattle, but it occasionally produces abortion in sheep, goats, and swine. It is commonly found in cases of fistula and poll evil of horses.

Germ Dangerous to Man

The relation of Bang's disease to human health cannot be ignored. Bang's disease in man is called undulant fever. It is not a dominant public health problem. Individuals, however, do become infected with the Bang germ usually from handling infected animals, but sometimes from drinking unpasteurized milk containing the germ. The germ acts differently in man, producing an intermittent fever, as a result of which the patient may be laid up for a long time (three to twelve months).

There Is No Cure

Science has not been able to develop a cure for the disease. Vaccination has been disappointing. Prevention of infection by keeping clean animals from contacting infected ones is the only method of preventing losses.

Freeing the herd of Bang's disease infection in many ways makes the herd more profitable. The clean herd will produce more calves and stronger calves, have fewer calf diseases, produce more milk, have less breeding trouble, and have fewer big knees and swollen joints. All these are important in profitable dairy or beef production.

SYMPTOMS

Symptoms are like signposts that point the way to a solution of the puzzles or riddles of disease. Symptoms or signs are the earliest evidence of the presence of disease and are therefore very important from the standpoint of treatment, either medicinal or preventive.

Animals React Differently

Not all animals react alike when exposed to the Bang germ. There are varying degrees of susceptibility. Much the same is true of humans. For example, not all children exposed to scarlet fever contract the disease.

If Bang's disease is introduced into a clean herd, many of the animals become infected as determined by blood test, and some abort. Not all, however, show reactions to the test, and a smaller number drop their calves before time. Some animals recover in a year or two and occasionally in a shorter time. Those that recover cease

reacting to the test. This group, however, is small because most cows that become infected with Bang's disease after reaching breeding age do not recover, and many may even spread the infection through milk as long as they live.

Some animals that recover become normal breeders and to all appearances are normal. Some of these, however, still remain spreaders. These are the dangerous but apparently healthy animals. A much larger number of infected animals become unproductive breeders and may abort several times. Some may fail to conceive when rebred and are a total loss so far as reproduction is concerned.

Abortion Most Common Sign

The most significant symptom of Bang's disease is **abortion or slipping of a premature calf**. This symptom is so constant and definite that upon its occurrence the affected animal or animals should be regarded as suffering with Bang's disease and treated as such until otherwise determined.

That the act of abortion should be a constant symptom theoretically is not difficult to understand when it is known that the Bang germ grows best in the presence of embryonic tissue such as the developing calf and its membranes (coverings within the uterus [womb] of the mother). The Bang germs destroy the islands and button-like structures existing between the calf and the lining of the womb of the mother. This asphyxiates or smothers the calf which is then expelled or cast off.

Abortions caused by Bang's disease occur mainly in heifers carrying their

first or second calves. Older cows may abort also, but they do so less frequently. The act of abortion or slipping of the calf may occur shortly after breeding, or it may not take place until shortly before birth. The largest number, however, occur when the cow is between five and seven months with calf. Heifers and cows that abort early after breeding and up to the fourth month of pregnancy may often do so without warning or notice. The presence of a dead calf in the barn or pasture is the first evidence of disease.

EARLY ABORTIONS—Early abortions are characterized by the calf being expelled or slipped while still surrounded by its coverings. The affected heifers or cows often show signs of heat on the same day or within a few days following the disaster. Cows aborting early in their pregnancy rarely become visibly ill; there is no interference with

appetite or rumination, and their temperature remains normal. Not infrequently abortions at this period are not entirely completed. The dead calf, approximately the size of a small rabbit, may be found lodged within the external genital tract, the vagina; the only signs of a suspected abortion may consist of a copious vaginal discharge and the presence of estrum (heat).

LATE ABORTIONS—When the calf is slipped at a later period, the fetal membranes or coverings are frequently retained or withheld within the uterus. This condition is popularly known as failure to clean or retention of the afterbirth. Abortions occurring during the advanced stages of pregnancy often, though not always, forecast their approach by certain signs. These signposts are very similar if not identical with those exhibited by the heifer or cow preparing to give birth to a healthy



FIG. 1. BIG KNEES OF CATTLE ARE OFTEN ASSOCIATED WITH BANG'S DISEASE.

calf. Warnings of this nature enable the owner to isolate the affected animal and thereby protect the other animals from exposure.

The fluid in the water bag of cows aborting as the result of disease produced by the Bang germ is usually yellowish brown in color and contains tremendous numbers of the germs. Once they contact the bedding or floors they may then easily spread throughout the stable. The discharge of fluids following the slipping of the calf continues for variable periods of time, depending largely upon the severity of the inflammation within uterus and whether or not the afterbirth is retained.

Retained Afterbirth Common

Signposts as described above are quite constant and therefore very suggestive of the presence of Bang's disease, but we cannot always regard them as being sure or definite because similar, if not identical signs, will be found in animals aborting from causes other than Bang's disease. Bang's diseased heifers or cows that abort in the late stages of pregnancy or that calve at full term do not always retain their fetal membranes (afterbirth). This, however, is the exception and not the rule. Therefore, failure to clean is one of the most important signs of the presence of Bang's disease.

Before aborting, cows seldom show signs that would lead one to believe that anything is wrong with their general health. In fact, the normal habits of such animals are identical with those of cows free of the disease. Following the loss of the calf the cow may become ill, especially in cases where the afterbirth is retained. Cows thus affected

do not eat as well and, therefore, do not milk as profitably as do cows that give birth in a normal way. Cows that fail to clean show a marked rise in temperature, they lose weight rapidly, and not infrequently develop mastitis (garget). Retention of the afterbirth is a serious problem, and too often its importance is overlooked.

Sterility Important Sign

Retained afterbirth is a forerunner of sterility (failure to reproduce). Therefore the condition known as sterility, particularly after a cow has aborted, constitutes an important sign of Bang's disease.

Herds free of Bang's disease may experience breeding troubles, many of which are temporary in nature, but the calf crops of such herds, insofar as numbers and health are concerned, are definitely superior to the calf crops obtained in Bang's diseased herds and in which nothing is done for control.

Calf scours should not be regarded as an important symptom of Bang's disease, but there are good reasons to believe that calves in infected herds are not as resistant to the infectious type of scours as are the calves in healthy or Bang free herds.

Bang Infected Bulls

Bang's disease, when present in the bull, may or may not produce visible signs. As in the case of the female, the germ grows best in the reproductive or breeding organs, especially the testicles, and very frequently causes permanent sterility. Sudden, painful swellings of one or both glands should be regarded as highly suspicious of this

infection. Since other causes may produce identical conditions, we are unable to definitely determine the true cause on the basis of symptoms alone. Bang infected bulls may harbor the germs within certain accessory breeding glands. Because of the hidden position of such structures, there exist no visible signposts.

Steers are only slightly susceptible, but occasionally they are infected. The Bang germ, when present in these animals, prefers to grow within certain joint cavities, especially those of the knee and stifle.

SPREAD OF BANG'S DISEASE

Cattle usually become infected by taking the germ into the mouth, especially through licking infected animals,

devouring infected afterbirths, or eating grass or hay that has been soiled by infected milk.

Experiments have recently shown that the germ may also enter through the skin and probably through the unbroken skin. In other words, a wound in the skin is not necessary for the germ to get into the body. It has been shown experimentally that the germ readily enters the body through the eye. Whether this is a common way for the organism to get into the body under natural conditions we do not know, but the possibility must be kept in mind.

Bulls Not Important Spreaders

The vagina is not an important channel for introducing the germ into the body, which means that the disease is

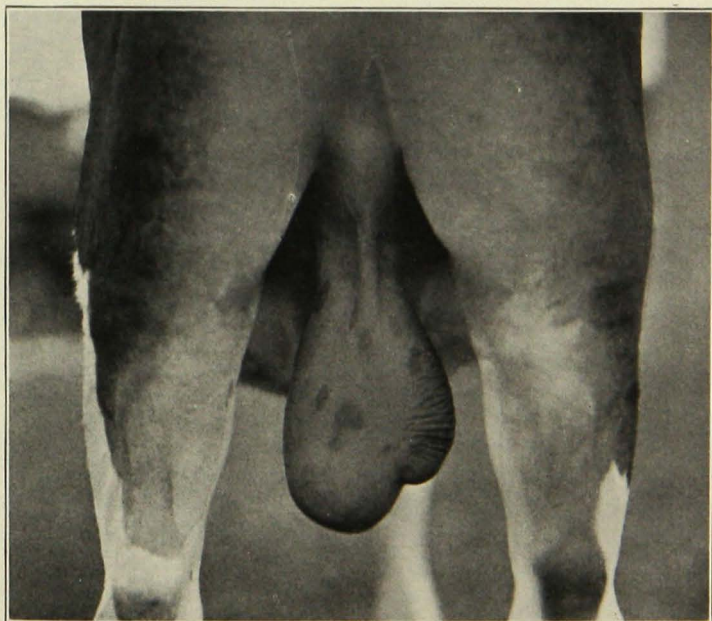


FIG. 2. BANG'S DISEASE SOMETIMES CAUSES ENLARGED TESTICLES IN BULLS.

not likely to be spread by the bull during breeding service. Many farmers as well as veterinarians formerly believed this to be the chief source of spread.

However, since there is some possibility that bulls may spread the disease, especially between herds, the breeding of healthy bulls to both infected and non-infected groups is dangerous and should be avoided.

Bang's disease may spread in many other ways. The addition of diseased cattle to clean or Bang's disease free herds is probably the most common way in which the disease spreads. Because Bang's disease strikes slowly and quietly, it gains a well fortified position in a herd before its presence is discovered. Newly purchased animals, particularly heifers in their first pregnancy, frequently will abort soon after arriving at destination and in so doing establish new centers of the disease. Unless several abortions occur in rapid succession, the owner is not especially interested and promptly dismisses the incident, charging his losses to supposed injuries occurring in transportation.

Buy Cattle From Clean Herds

Cattle purchased for replacement purposes should be selected whenever possible from known clean herds. This is highly important in maintaining a Bang's disease free herd. Cattle purchased from infected herds, even though they are at the time of purchase negative to the test, may give a positive reaction within a few weeks. The reason for this is that animals, after picking up the infection, require a certain period of time to build up their

defensive forces. These forces are detectable only by the blood test. Cattle sold at private and auction sales may at times serve as a means of distributing the disease.

The disease may spread where cattle are collected for sale or exhibition purposes. This method is at present not as serious as in former years because of commendable efforts of the breeders of purebred cattle, in cooperation with various livestock organizations and local and state fair boards, who have insisted on the strict observance of regulatory measures prescribed for Bang's disease control.

Diseased Cows Very Dangerous

Diseased cows of mature age are very dangerous, especially at the time of calving. Even though they are able to withstand the disease to the extent that they can carry their calves to full term, they do, however, give off large numbers of the germs in the calf and in the fluids surrounding the calf. With this in mind, it is not difficult to understand why calves from infected dams may be carriers of the disease. Calves from infected dams will for a time give off the germ in their manure. Later this ceases, and if such calves are placed in Bang's disease free herds, they will remain free of the disease.

Keep Young Calves Away From Herd

One too common way in which calves play a part in the spread of Bang's disease is by being allowed to run loose in cow alleys where they are prone to lick the discharges from their mothers or other diseased animals and then

spread the germs to other cows by their continual nosing about. Young calves should stay in box stalls or otherwise be kept away from the cow herd.

Calves do not usually harbor the infection for more than six or eight weeks after birth even though they may be nursing mothers which are giving off the germ through their milk. The germ, however, may be carried in the digestive tract of calves and discharged with the manure. Calves of this kind are active spreaders of the disease to susceptible animals. Males and females which have reached the age of puberty, or sexual maturity, are susceptible. This is particularly true of heifers which have begun to come in heat, and they should be carefully kept from material that might possibly be contaminated by the abortion germ.

Isolate Aborting Cows

A cow that has recently aborted passes out great numbers of abortion disease germs in the discharges that so commonly follow the loss of the calf. This cow, therefore, is extremely dangerous as a spreader of the disease to other healthy members of the herd. She should be isolated as long as there is any evidence of discharge from her hind parts. When this is not done and she is allowed to remain with the herd, open heifers or heifers carrying their first calves may become infected by licking the discharges which may soil the litter, grass, feed, water, or even the tail and hocks of the animal itself. A maternity stall would be an especially suitable place to keep the recent aborter from contact with the rest of the herd.

Milk Spreads Bang's Disease

Since the mammary gland or the udder is regarded as the chief permanent residence of the Bang germ, milk from diseased herds usually contains the germs, and, therefore, serves as a medium for spreading the disease.

Rented pastures where all kinds of cattle are taken regardless of the problem of disease may become a hotbed of infection. Healthy cattle kept under such conditions are apt to become diseased before the end of the pasture season.

The infection also may be spread during the pasture season by stray dogs and certain predatory animals. These animals, if permitted access to aborted calves and their coverings (afterbirth), will carry or drag these coverings from place to place. Improperly fenced pastures become a source of danger when cattle break out of their enclosures and mingle with each other.

Horses May Carry Disease

Recent studies have shown that Bang's diseased horses may be carriers and spreaders of the disease, particularly when stabled or pastured with cattle. Animals suffering from fistula and poll evil may spread the disease by soiling the pastures or the forage used for cattle. Horses may, even though not suffering with the above described diseases, spread the disease by passing the germs in their manure.

Immunity and Susceptibility

Calves under six months are especially resistant although there are some exceptions. Young heifers in their first and second pregnancies are

the most susceptible, and if exposed to the infection, usually contract it, and many abort. Older cows are by no means immune. Bulls seem to be less susceptible than females but occasionally are infected. No one breed or type of cattle is any more resistant to this infection than another, and the disease is no more prevalent in one breed than in another.

DIAGNOSIS OR RECOGNITION

The history of abortion in a herd may strongly indicate Bang's disease, but a definite diagnosis cannot be made without a laboratory examination. We have stressed before (1) certain cows may never abort, yet they are dangerous spreaders of Bang's disease; (2) some cows that are not infected abort. We cannot rely entirely on the history and symptoms for an accurate diagnosis

of Bang's disease. Only approximately 85 per cent of abortions are due to the Bang germ.

An accurate diagnosis can only be made by a blood test or a bacteriological examination to find the Bang germ in such material as milk, aborted calves, or afterbirths. It takes considerable time to make a bacteriological examination, and the results are not always satisfactory. The blood test is a much more accurate and simpler method for making a diagnosis of this infection.

Blood Tests Reliable

The agglutination blood test is a safe, reliable, and practical method for the diagnosis of Bang's disease. This test will not determine which of the diseased females will abort, but it will determine which are or have been



FIG. 3. A SIMPLE AND EFFICIENT WAY OF COLLECTING BLOOD FOR TESTING BANG'S DISEASE.

harboring the Bang germ and are consequently sources of infection. It is not claimed that the agglutination test is 100 per cent reliable, but it is sufficiently reliable to permit the successful control of abortion disease.

The results of the agglutination test divide animals into three groups: first, positive or reactor; second, a suspicious animal in which the results are not clear-cut; and third, a negative individual. Suspicious animals are those in which a single blood test does not give sufficient information for classifying them either as positive or negative. These represent approximately 2 per cent of the animals tested. They should be retested in about 30 days. Negative animals are those that either have not become infected with the organism or else have recently been infected and are in the incubative period. Sometimes an animal will be negative to the test and actually abort from the effect of the germ in a week to ten days following the test. Agglutinins or substances in the blood for which the blood is tested have not, in this instance, had an opportunity to develop after infection. Usually this period is from two to three weeks. Animals of this kind will be positive a few days after aborting.

There are two methods for conducting the agglutination test:

(1) The so-called test tube method is done by trained technicians in the laboratory of the State Live Stock Sanitary Board, University Farm, St. Paul. Blood samples are collected by veterinarians and sent to this laboratory for testing.

(2) The plate test is usually carried out in the field by veterinarians specially trained and instructed in the

application of this method. The plate test is also carried out in the laboratory.

Both tests involve similar principles and are equally reliable when carefully carried out and properly interpreted.

METHODS OF CONTROL

No Satisfactory Cures

Although numerous drugs and medicines are recommended and sold as cures for Bang's disease, not one has proved satisfactory. It is apparent that if we are to overcome its ravages, we must do so by prevention. Successful preventive measures consist of using the agglutination blood test to find reacting animals and then getting rid of them. Once a Bang free herd has been built up it should not be difficult to keep it clean. Many examples of such accomplishments can be cited.

A further word about so-called cures may be desirable here to explain why such treatments often appear to work. It is characteristic of Bang's disease that a large share of affected cows and heifers will slip their first calf or two and after that will breed and calve normally. This does not mean that these animals actually recover from the disease because many of them continue to harbor the germs and to spread the disease as long as they live. This behavior of the disease misleads many farmers into believing that some so-called cure has worked. They try the "cure" at a time when Bang's disease is sweeping through their herds causing a high percentage of abortions. As abortions become fewer and cow after cow begins to calve normally

again, the "cure" gets the credit because the farmer did not realize that the same thing would have happened if no "cure" had been used. Worse yet, he may not realize that his herd is still full of the disease so that many oncoming heifers will abort, many calves will be born weak, and clean animals brought into the herd will immediately be exposed to the disease.

Vaccines Not Recommended

There is evidence of resistance or immunity to Bang's disease in certain animals under special conditions. This tendency toward immunity has stimulated an attempt to produce a satisfactory artificial immunity by means of vaccines.

Various vaccines and serums are on the market for the prevention and control of Bang's disease. We have conducted numerous experiments at University Farm with these agents. As a result of our experiments and those conducted elsewhere, we wish to state:

(1) The living vaccine produces some resistance or immunity to Bang's disease. The degree of immunity varies according to the individual, and the variations are great.

(2) Abortions occur in animals that have been treated with vaccines. This applies not only to calves that have been treated, which is by far the most reliable method, but also to adults that have been treated.

The Federal Bureau of Animal Industry at Washington, D. C. is experimenting with calfhoo vaccination on a large number of herds all over the United States. The results in some instances have apparently been encouraging, but in many other cases

have been disappointing. The lack of uniformity prevents any endorsement or recommendation.

This vaccination plan of control provides that calves between four and eight months old shall be vaccinated with a living vaccine of reduced strength. Remember this program involves the expense of continued vaccinations. The calves are tested when they become of breeding age, and if positive, are eliminated from the herd. The negative animals are bred. This vaccination method is still in the experimental stage.

A breeder can rarely expect to eradicate the disease from his farm if he employs living vaccines. It should be clearly borne in mind that the disease is kept alive on the farm where living vaccines are used. The resistance resulting from vaccination is not consistent, and the results have not yet been sufficiently satisfactory to justify recommending this method of control.

Rid Herd of Reactors

The only sure method for controlling Bang's disease with our present knowledge is based on the agglutination blood test, the elimination of reacting animals, and the maintenance of a herd free of the disease. This test and slaughter method has been in active operation in Minnesota since 1934, when owing to extraordinary drouth conditions, several million dollars were set aside by the AAA to provide indemnity for cattle slaughtered because of infection with Bang's disease. Nearly 30 per cent of all cattle in Minnesota has been tested since this time. This represents nearly 60,000 herds. In general the results have been satisfactory.

Testing and Indemnity Payments

The 1939 session of the Legislature passed a law appropriating money for indemnity purposes and providing for area testing. This work is being carried out under the direction of the State Live Stock Sanitary Board in cooperation with the Federal Bureau of Animal Industry. Area work for Bang's disease control has been in operation in the State of Wisconsin for more than a year, and area work started in Minnesota early in November, 1939. This work is being conducted like the area work in tuberculosis control with the county as the unit. Since this law has gone into effect five counties have been tested with less than one per cent reactors.

Under our present State law a maximum of \$15 indemnity is provided for grade cattle and \$30 maximum for purebred animals. The salvage value is deducted from the appraised value in order to determine the amount of indemnity. For example, an animal found infected with Bang's disease is condemned, tagged, and branded. She is appraised for \$60. She is a grade animal and is sold at a place where Federal meat inspection is available. The carcass nets the owner \$45. This amount is deducted from the \$60 leaving \$15, the maximum indemnity, which is paid by Federal and State agencies. If the animal brings \$50 for salvage, only \$10 indemnity will be paid. There are several classes of cattle for which indemnity is not paid. The most important of these are steers and grade bulls.

The testing and removal method of controlling Bang's disease has received the general endorsement of cattle

owners. At the present time only two states, California and Colorado, will accept cattle that have not been tested and found free of Bang's infection. It is to the economic advantage of every cattle breeder to maintain a herd free of this disease.

CARE OF COW AND CALF AT CALVING

The proper handling of pregnant cows that have reached the stage of springers is a most important part in the general campaign against Bang's disease. Place such cows in clean, well bedded box stalls. Where such stalls are not available, provide temporary stalls large enough to permit the act of calving. During the pasture season cows may be permitted to calve outdoors. All calves should be permitted to remain with their mothers for the first day in order that they may get enough colostrum (first milk) which contains certain properties that aid in protecting the young animals against disease.

Cows that have given birth to strong, healthy appearing calves, yet retain their afterbirth, should not be returned to the herd until all signs of discharges from the genital tract have disappeared. Likewise all cows that have aborted should not be returned to the herd until there are no longer any discharges from the vagina. All aborting animals should be retested and held in isolation until it can be determined that they are not infected with Bang's disease.

Retention of the afterbirth is an important problem, and the manual removal of it should be performed by the veterinarian. Retained afterbirth

is not only a source of danger to the general health of the cow but also a source of danger to the person who attempts to remove it by hand. Man has been known to have become infected with Bang's disease (undulant fever) through the handling of diseased after-births of cows and sows.

When the newly or recently calved cows are returned to the herd, all stalls wherein calving occurred should be cleaned and disinfected. The bedding of such stalls should be placed where it will be inaccessible to other animals. All females that have aborted and those that have calved at term yet failed to clean should not be bred again until all signs of unnatural discharges from the genital organs have ceased.

Ordinary Disinfectants Kill Germ

As a rule the germ does not live long in pastures or barnyards and is killed in four to five hours when exposed to direct sunlight. When protected from the air and the effects of drying and sunlight, as in manure, it will survive for many weeks. It is readily destroyed with the ordinary disinfectants such as lysol or cresol in 2½ per cent solution. It is also easily killed by boiling.

ABORTIONS IN BANG'S DISEASE FREE HERDS

Authorities on the subject of Bang's disease have frequently stated that 85 per cent of all abortions in cattle are caused by the Bang germ. Fifteen per cent of abortions must then be attributed to other causes of which there are many.

One or two abortions occurring in well managed herds of average size during a period of one year and in which blood testing has been regularly performed are not uncommon, but they are nevertheless alarming, especially when they occur in heifers and in cows that are between the fifth and seventh months in calf. It is at this time that abortions caused by the Bang germ occur most frequently. Animals thus affected must be isolated or separated from the herd and retested within a short time. The aborted calf and after-birth should be disposed of in such a manner that they will not be a source of danger to other animals. The stall and surroundings should be cleaned and disinfected.

Our observations indicate that diseases causing abortion in Bang's disease free females are self-limiting and, therefore, not especially serious. Abortions caused by disturbances in which bacteria play no part are less significant and may to a large extent be prevented by careful herd management with special emphasis being placed upon selection of feed and methods of feeding.

PRACTICAL CONTROL STEPS FOR THE FARM

What are the steps a farmer should take in order to get rid of Bang's disease and maintain a clean herd?

First, he must keep in mind that Bang's disease is a specific, contagious disease caused by a germ which spreads from one animal to another and may affect not only cattle but also sheep, goats, hogs, and even man. Cattle usually take the germs in through the

mouth by licking infected animals, drinking infected milk, devouring infected afterbirths, or eating grass, hay, or bedding that has been soiled by infected milk or by the vaginal discharges of infected animals. By all odds, the most dangerous source of spread is the discharge from diseased cows at the time of calving or the slipping of their calves.

There is no known cure for Bang's disease and no satisfactory method of vaccinating or immunizing animals to keep them from catching the disease. Therefore, the only way to control Bang's disease is to establish a Bang free herd and then take constant care to prevent reinfection.

Control should begin by having the herd tested under supervision of the State Live Stock Sanitary Board and getting rid of all animals that react to the test. One or more retests will be needed to catch all the reactors.

If it becomes necessary to buy or replace animals lost in the test, they should be secured from accredited herds. Buying an animal that has merely passed one clean test is not safe. The herd should not be allowed

to come in contact in any way with untested animals at shows or sales, in rented pastures, along line fences, or in other ways by which they might pick up the germs from diseased animals.

Springer cows should be watched, and when they show signs of calving should be separated from the herd, preferably in a box stall, and kept entirely away from other cattle until all discharges from the hind parts have stopped. Then the stall should be thoroughly cleaned and disinfected, and the old bedding, manure, and other refuse placed out of reach of other cattle and livestock.

Similar precautions should be taken with any animals that abort. Get them away from the herd at once and take special care that the dead calf and the afterbirth are promptly disposed of so that other animals will not be infected. Aborting animals should be retested before being returned to the herd and then only when all discharges have stopped.

No cow or heifer should be bred, either after calving normally or after aborting, until all signs of discharging are gone.



Bang's Disease

You can't afford to neglect Bang's disease on your farm. Once Bang's disease gets a good start, it is hard to stamp out. In fact, you have to dispose of all your infected cattle before you really are rid of this disease. Of course, it does seem unprofitable to weed out some of your best producing cows just when they are bringing in large cream or milk checks.

In the long run, however, it's going to pay you to get rid of your infected cattle—the sooner the better. For one thing you won't lose your calves through abortion. Your milk production will increase. And when you finally sell your stock they will bring in larger checks.

Besides this, the government will help you bear the cost of cleaning out your herd of infected cattle. Under our present state law, a maximum indemnity payment of \$15 is provided for grade cattle and a maximum \$30 payment is provided for purebred animals under the state testing program. This bulletin fully explains how this works.

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