

DEPARTMENT OF AGRICULTURE OTTAWA

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ANTHRAX AND SYMPTOMATIC ANTHRAX

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MEMO: *RE* ANTHRAX AND BLACKLEG.

As it would be impossible for departmental Veterinarians to undertake to vaccinate herds of cattle or flocks of sheep throughout the Dominion should many outbreaks of these diseases occur the accompanying Bulletin is being widely circulated so as to inform stockmen of their nature and how to deal with them.

The vaccinations hitherto performed by the Department of Agriculture were for the purpose of introducing these methods of prevention, but will no longer be continued.

The Minister of Agriculture would be glad, however, if owners would report all outbreaks of these diseases to his Department in order that a record might be kept.

ANTHRAX.

This disease, which is much dreaded in European countries on account of the sudden and serious losses which it occasions, has, fortunately, been scarcely known to exist in Canada till the present summer (1901) when several rather serious outbreaks occurred, as will be seen by referring to the reports of the Cattle Quarantine Inspectors published as appendices to the report of the Minister of Agriculture.

This bulletin is published with the object of informing stockmen of the nature of this disease and its cause, of how it is spread among herds, and of the measures necessary for its prevention. A careful study of it will convince the reader that if the disease is left unchecked and preventive precautions are neglected, not only may present serious losses be experienced, but the land itself may be rendered infective for fifty or a hundred years; already certain farms and districts both in the east and in the west are known to be anthrax infected, and the disease breaks out on them at irregular periods, the animals dying with alarming suddenness.

It is well known that the spores of the bacillus in some way get into the ground, and that they may remain there in a dormant state for many years. According to Crookshank: 'By some means or other the spores contaminate the grass, and hay imported from an anthrax infected district may start the disease at a farm on which it had never been known to occur.'

'The skin, hair, wool, hoofs and horns of infected animals, if soiled with blood, are contaminated by the bacillus.' It is an infection which is the very reverse of that of contagious pleuro-pneumonia, which requires the contact of living diseased with living healthy animals, whereas anthrax infection rarely takes place from living animals, unless the blood containing bacilli is allowed to contaminate the food, or inoculate a wounded surface. It is the carcass that is to be dreaded as the source of infection.

ANTHRAX BACILLUS.

The immediate cause of the disease is the entrance into the bodies of healthy animals of rod-shaped bacilli or their spores, either in food or water or by inoculation through an abraded surface or open wound.

The bacilli themselves are easily killed, but their spores resist ordinary germicides and even such degrees of heat as kill all other spores of bacteria.

The effect of the entrance of these virulent spores into an animal body, by whatever channel they enter, is to soon destroy the subject by their rapid indefinite multiplication and their pernicious action on the blood, which they deprive of its life-sustaining properties by absorbing the oxygen and obstructing the minute capillary circulation, death taking place in most cases instantaneously and without noticeable symptoms of illness.

Bollinger recognizes three different forms of anthrax as affecting the domestic animals:

1. Apoplectiform, which kills in from a few minutes to several hours.
2. Acute anthrax, lasting from a few hours to a few days.
3. Sub-acute forms of anthrax; all cases of a longer duration.

In the first and second forms the disease runs its course with remarkable rapidity, and animals so affected frequently die as if stricken by lightning, without having given rise to any previous suspicions regarding their condition.

In the third form the mortality exceeds 70 per cent.

The disease seldom affords opportunities for even experimental treatment.

In cattle and sheep the post mortem lesions consist of a black tar-like appearance of the blood which teems with bacilli, ecchymoses in most of the internal organs, especially the small intestines, mediastinum and mesentery, with great enlargement of the spleen which is distended with black tar-like blood. This organ is found in this condition in all cases of internal anthrax.

External anthrax is occasionally seen in horses and sheep, rarely in cattle, and is usually due to inoculation by flies. It is attended by local swelling which is hard and painful, and spreads rapidly to the surrounding parts, general infection takes place and the animal usually dies, the post mortem lesions being similar to those of intestinal anthrax.

The manner in which anthrax is spread should be well known. The bacilli require oxygen to sporulate, hence if the carcass is cut open and exposed to the air, spores form readily in the blood, and whatever is smeared with it immediately becomes infective; and ignorance of this fact is accountable for the careless disposal of carcasses of animals which have died from anthrax. It is too frequently the practice of farmers and others to drag a dead animal away from the buildings, perhaps across a pasture or hay field, and leave it unburied or only partially covered in a swamp or wood where it is easily reached by dogs and vermin, by which portions are dragged across fields, smearing the ground or grasses with spores of the bacillus.

PREVENTIVE MEASURES.

On no account should the body of an animal which has died of anthrax be opened or skinned. If the blood is confined within the body, and discharges from the natural openings prevented by plugging them with tow saturated with a 20 per cent solution of carbolic acid, and the carcass carried, not dragged, to the place prepared for burning it, no infection can take place from it. As a precautionary measure, however, the stall and surroundings where the death occurred should be thoroughly disinfected, as well as the cart or wagon which it has been carried in.

By all means burn the carcass—and bury the ashes deeply with lime. Just think of the risks that are run by any carelessness in dealing with a carcass from which millions of millions of infective spores may be given off, and in some way reach the surface years after to infect and destroy cattle, sheep, swine and horses, and enormously reduce the value of the farm. Some authors state that horses are not particularly susceptible, but such is not our experience in Canada, for in nearly every outbreak we have had to deal with, horses have died from it, as well as cattle and sheep.

IMMUNIZATION AGAINST ANTHRAX INFECTION.

The method of vaccination by an attenuated virus as a preventive of anthrax, discovered by Pasteur, has been extensively employed, especially in France and Russia, for many years, and for some years back in the United States and Canada. So long as the vaccine could not be obtained within a few days of being manufactured, its use was found to be impracticable, as it will not keep long under any conditions, and deaths have been produced by using vaccine when too long kept, or where it has been carelessly prepared and tested. Two cultures of different degrees of virulence are used, Vaccine No. 1 kills mice, but not guinea pigs; Vaccine No. 2 kills guinea pigs, but not rabbits.

The sheep, cattle, swine or horses to be inoculated are given by subcutaneous injection a dose of No. 1 Vaccine, and in 12 days thereafter a dose of No. 2.

Protective lymphs are supplied by the manufacturers, the Pasteur Institute, Chicago, and Messrs. Parke, Davis & Co., Walkerville, Ont. Printed directions are given with these.

During the past summer protective inoculation has been extensively employed with satisfactory results in several outbreaks, both in the east and west; fourteen thousand sheep on one ranch having been inoculated by officers of the department.

The vaccination, however, should not be undertaken by any inexperienced person, and on no account should old or doubtful lymph be used.

SYMPTOMATIC ANTHRAX.

Black leg, or black quarter, occurs occasionally in various parts of Canada from ocean to ocean. It is a disease which principally affects young and thriving cattle, and is seen more rarely in sheep and goats. It occurs at irregular intervals in certain districts, especially during the summer months, sometimes extensively, and at other times causing the deaths of only a few fat calves here and there within a limited area; it will prevail for a few months, especially when the calves are thriving best, and then disappear perhaps for some years. It is, like anthrax, a disease the germs of which emanate from the soil, but it is also seen in stabled animals when fed on hay grown on infected land.

It also is a bacterial disease, but although the bacillus is a spore bearer it is not identical with that of anthrax, and can be distinguished by being shorter and having rounded ends; the bacilli do not form chains as do those of anthrax, besides they have flagellæ having the power of movement, and, being anærobic, cannot be cultivated in an atmosphere containing oxygen. They form spores which are usually seen at the end of the rod, are ovoid in form, and are larger than those of anthrax. The bacilli are not found in the blood during life, but may be found in it after oxygenation ceases when death occurs. As the name indicates, the pathological manifestations are mostly confined to the quarter; which may be the hind or may be the fore, the calf becomes lame and unable to move the limb, except in a dragging manner, the quarter swells and the swelling crackles under the hand as if it contained confined air or gas. The animals may die suddenly or linger from twelve to forty-eight hours. Treatment is useless, and the remarks made as to the disposal of carcasses of animals dying of anthrax apply also to animals dying of black leg.

Setons in the dewlap are empirically recommended, but are of doubtful utility. It is well to check too rapid fattening by moving the calves to poorer pasture, and by giving them exercise by driving, and they should be prevented from eating grass grown over the graves of dead cattle; all graves of dead animals should be fenced.

Vaccination by means of an attenuated virus of the disease is now extensively and successfully practiced throughout Canada, more especially in the stock-raising districts of the west.

Vaccinating outfits can be procured from the Pasteur Vaccine Co., Limited, 56 Fifth Avenue, Chicago, or Messrs. Parke, Davis & Co., Walkerville, Ont., who manufacture the vaccines and furnish full directions for using them.

The vaccines are of two kinds, viz., single vaccine requiring only one application, and double vaccine requiring two application; first and second lymph.

The double vaccine especially has proved highly successful in the immunization of young stock both in the United States and Canada. Another form of vaccination is that

of a cord saturated in the vaccine, which is inserted but once by means of a needle; should it be found as effective as the lymph injection it will prove a great boon in saving labour to the owners of large herds of range cattle.

Cattle and horses are usually vaccinated on the neck or shoulder; sheep on the inside of the thigh. Vaccination may be done at any time, but the spring is the most favourable, and it is more necessary then as the disease prevails most during early summer.

It should be done at any time should an outbreak be discovered in a herd.

The immunization lasts for about twelve months.

Young bulls brought on to ranches from the east should be vaccinated before being turned out, and in districts where the disease is known to have existed, eastern stockers should be similarly protected.

