

Rural Broadcasts—I.

ANTHRAX

Anthrax is an acute infectious disease of livestock and man, caused by a specific bacterium known as the Anthrax bacillus (*Bacillus anthracis*). The Anthrax bacillus was the first bacterium to be recognized as the cause of a disease of animals or man. Under the microscope, it appears as a tiny cylinder, not very different from some of the common non-pathogenic air and soil bacteria.

When exposed to conditions unfavourable to its existence, the Anthrax bacillus forms spores—that is, it changes from an active to a dormant state. Live, growing Anthrax bacilli that pass from the body of sick animals on to the ground, usually form spores. These spores, which develop within the body of the Anthrax bacillus, are extremely small, oval-shaped objects similar to seeds, remarkable for their viability and very resistant to heat, cold, chemical disinfectants and prolonged drying. Experimental evidence has shown that Anthrax spores can still germinate after being stored for more than fifty years. Anthrax spores are likewise very resistant to high temperatures and will withstand boiling for several minutes. Nevertheless under field conditions Anthrax usually dies out after a few years, except in areas particularly suitable for its propagation.

Anthrax occurs in many countries throughout the world in certain restricted areas, that is, as a continually recurring enzootic disease. In Europe the incidence is greater among cattle than among sheep, but in Australia and South America sheep are more frequently affected. In New Guinea, pigs are most frequently affected.

Practically all animals are susceptible in some degree to Anthrax. Generally speaking, the susceptibility of various domestic animals in decreasing order is—sheep, cattle, horse, pig, dog and cat. Adult dogs are not very susceptible, but puppies can be readily infected. In some countries the disease is known to occur naturally in buffalo and deer.

Birds are generally very resistant to Anthrax, but a few species including ducks, sparrows and young pigeons may be affected.

Anthrax rarely spreads directly from animal to animal. Infection usually results

from the ingestion of contaminated food. Infected animals may excrete the organism in the urine, faeces, milk, saliva or nasal discharge, and at the time of death, and for some time afterwards, bloody infected fluid exudes from the natural openings and soils the neighbouring ground. Animals ingesting pastures or drinking water contaminated in this way may then develop Anthrax.

In pigs and dogs infection commonly results from the ingestion of flesh from Anthrax carcasses.

Anthrax may spread from one country to another, or from an enzootic area to a free one through the interchange of infected objects closely associated with animal life, including hides, hair, wool, bonemeal, fertilizer, hay and other materials.

Following contact with infected food the bacilli are first found in the tissues of the throat. The chief factor determining the susceptibility of an animal species appears to be the speed of spread of the organism from this site to the rest of the body. In susceptible species such as sheep and cattle, the bacteria quickly invade the blood stream and cause sudden death of the host. In pigs, which are more resistant, the disease is less acute because the bacteria usually remain localized in the tissues of the throat, and it may be difficult to find the organism in the blood stream.

The actual cause of death in Anthrax is a debatable question. The Anthrax bacilli do not kill by toxin production, as many other bacteria do, but there is a certain amount of evidence that they interfere with oxygen supplied to the tissues.

The symptoms of Anthrax vary according to the species of animal affected and the acuteness of the attack. The average period of incubation (that is, the period of time

elapsing between exposure to infection and the appearance of symptoms), under natural conditions is not definitely known, but it is believed from experimental evidence to vary from twenty-four hours to five days or much longer.

The disease may occur in a per-acute, acute, sub-acute, or chronic form.

The per-acute form, sometimes called the fulminating type, is characterized by sudden death, as from a stroke. The onset of the disease is so sudden and the course so rapid, that few, if any, clinical symptoms are observed. The usual picture associated with this form is one of cerebral apoplexy—sudden staggering, collapse, a few convulsive movements, and death. A blood stained discharge from the mouth, nose and anus may also be observed. This form is most common in cattle and sheep, occurring at the beginning of an outbreak. The sudden death of cattle, sheep and horses in known Anthrax territory, should always be regarded with suspicion.

The acute form usually terminates in death in a day or two, while the sub-acute form may lead to death in three to five days or longer, or to recovery after several days. In these forms of the disease there is an early stage of excitement, which is soon followed by depression, stupor, spasms, evidence of respiratory and cardiac distress, staggering and death. During the course of the disease, the body temperatures may reach 107 degrees Fahrenheit, pregnant animals may abort, rumination ceases, and in milking cows the milk secretion is greatly reduced. Bloody discharges from the natural openings are common (although they may occur in other diseases too) and soft swellings that pit on pressure may develop in different parts of the body. Just before death the temperature falls below normal, respiration becomes extremely laboured, and the mucous membranes become dark blue in colour.

Chronic Anthrax may occur in pigs, affecting the lymph glands of the throat or gut, and this is usually recognized only at post-mortem examination. Usually, however, pigs show more acute forms of Anthrax in an outbreak. Some of the animals may be found dead without having shown any previous signs of illness, others of the group may show rapidly progressing swellings

about the throat, which in some cases cause death by suffocation. A relatively large percentage may become visibly sick for a few days, with or without swellings about the throat, and recover.

Any animals dying in known Anthrax areas after showing symptoms just described, should be suspected of having Anthrax. Such animals should not be submitted to post-mortem examination, as opening of infected carcasses exposes both the operator and the environment to dangerous Anthrax spores. The following specimens should be submitted for laboratory examination:—

From *pigs* or *horses*, forward smears of fluid from the swollen tissues of the throat; and

From *cattle*, *sheep* and *goats*, forward four blood smears from an ear vein, and remove an ear and place in a sealed tin for forwarding.

Treatment of affected animals with immune serum or with drugs has not been recommended in this country and will be the subject of investigations by the Department.

McGarvie Smith Vaccine is available for vaccination in the Territory. It is used for the prevention of Anthrax in sheep and cattle in Australia, and has proved effective for pigs in the Central Highlands of New Guinea. Full instructions are supplied with the vaccine and they should be strictly followed.

Vigorous hygienic measures should be adopted when an outbreak of Anthrax occurs. Every precaution should be taken to avoid contamination of the premises or pastures with blood or other fluid escaping from infected animals.

Prompt deep burial is quite a safe method of disposing of unopened Anthrax carcasses, where lack of fuel or danger of fires prevent cremation. Burning is, however, by far the better method when it can be adopted. In the absence of wood fuel for this purpose, carcasses can be effectively incinerated by spraying with waste sump oil. Burning must be complete; charred bones may contain living spores in the marrow. Care should also be taken to see that all the surface soil around the animal which may have become contaminated with discharges, is shovelled up and placed on the fire.