



Anthrax Information for Producers

► Anthrax - the disease

Anthrax is an environmental disease caused by the spore-forming bacterium *Bacillus anthracis*. Animals on pasture acquire the disease by ingesting soil contaminated with anthrax spores. There is no direct animal to animal transmission of the disease.

Bacillus anthracis bacteria exists in two forms: a vegetative form that only survives inside a living animal and a spore form that can exist in the environment for prolonged periods of time. When an animal dies from an anthrax infection, the vegetative form of the bacteria in blood and body fluids escapes from the body and will form spores when exposed to oxygen (the ambient temperatures must be over 20° for this process to be completed). The vegetative form of the bacteria is fragile and easily inactivated by disinfectants or temperatures less than 4° or greater than 58°C. The spore form of the bacteria is markedly resistant to temperature and disinfectant and can survive for prolonged periods of time in the environment. Control measures for anthrax are aimed at interrupting the infection cycle by reducing or eliminating the environmental contamination with spores.

► There are four components to Canada's anthrax control program

1. Quarantine
2. Vaccination
3. Disposal
4. Decontamination

1. Quarantine:

- Quarantines will be placed on all premises for which a positive laboratory diagnosis of anthrax has been made for an animal that died on the premise.
- The quarantine will restrict the movement of susceptible animals on and off the premise.
- Land that will be included in the quarantine will be determined by the District Veterinarian based on an evaluation of the geography and environmental conditions. Contiguous premises under single ownership may not all be subjected to the quarantine.
- The producer will be required to supply information on all animal movements on and off the quarantined premises for the 21 days prior to the first diagnosed case of anthrax.
- Where possible it is recommended that owners remove animals from the contaminated site. (This should only be done when the facility/pasture that the animals will be moved to offers the potential to prevent exposure to spores - e.g. a pasture that has not flooded, better grass condition, a facility that has feed bunks and water troughs/bowls.)
- Pastures with dense bush should be avoided as animals should be checked and accounted for twice daily until vaccine immunity is achieved (14 days).



- Summer anthrax: The quarantine will be released from the premises following vaccination and 21 days after the last mortality associated with anthrax. For example, the quarantine period could be 35 days if mortality due to anthrax is seen 14 days after vaccination. Or, in the event the animals are not vaccinated, quarantine will be released after November 15.
- Winter anthrax: The quarantine will be released 21 days after vaccination if no further mortalities occur or 21 days after removal of the contaminated feed source if no further mortalities occur. The contaminated feed must not be fed to any animals not vaccinated for anthrax.

2. Vaccination:

- All susceptible animals as listed on the vaccine product insert on a positive premise will be vaccinated. The vaccine will be provided by the CFIA.
- In the event that the producer has vaccinated his or her animals prior to a positive anthrax diagnosis on that premise, CFIA will provide the owner with an amount of vaccine equivalent to that used for the initial vaccination. The timing of the use of this vaccine is at the discretion of the owner and will be done by the owner. **It is recommended that animals on premises positive for anthrax be vaccinated annually.** Vaccination schedules should be discussed in consultation with the producer's private veterinarian.
- A protective level of vaccine-induced immunity is reported to be achieved within 8-10 days of vaccination in most situations; however, full protection is achieved 14-21 days after vaccination.

Note: In some situations deaths can occur up to 14 days post vaccination. Animals should be monitored twice daily for a minimum of 14 days post vaccination.

3. Disposal:

This is an extremely important component of the anthrax program. Prompt disposal will limit or prevent further contamination of the environment with anthrax spores and thereby reduce the risk to animals grazing on these sites in the future.

- Owners/Managers must take steps to ensure carcasses are found as soon as possible to prevent scavenging:
 - * Check animals at least twice daily for the first 14 days after vaccination;
 - * Move animals to pastures (with CFIA approval) that promote easy monitoring of the herd for deaths - e.g. avoid heavy bush.
- Owners/Managers should have formalin or bleach on site to apply to the carcass to inactivate spores on and around the carcass. Formalin sprayed on the carcass also discourages scavenging. Formalin can be obtained from various hardware stores, farm supply stores or local veterinary clinics. Follow product insert or label for dilution and safe handling instructions. A supply of quick lime should also be on site to add to burial pits when carcasses are buried. Quick lime is available from farm supply stores.



Carcass Management/Control

When anthrax is suspected, carcass management should begin immediately and continue until a negative laboratory diagnosis is received or the carcass is disposed of in accordance with CFIA guidelines.

- Steps should be taken to prevent bloody from escaping the carcass:
 - * Plug all body openings (anus, mouth, and nose) with an absorbent material to prevent further exudates leakage;
 - * Cover entire head with a heavy duty plastic bag secured at the neck, behind ears (poll), with duct tape or tied with rope or twine.
- To move a carcass, put it on a conveyance that can either be destroyed with the carcass or easily cleaned and disinfected.
- Carcasses must be covered with a tarp, heavy plastic or other appropriate material to prevent scavenging and spread of spores by insects, birds or mammals until disposal.
- The natural decomposition of a carcass will destroy most of the vegetative anthrax organisms within 48 to 72 hours in warm weather conditions. These carcasses will pose a smaller risk of environmental contamination during subsequent handling for disposal.



Figure 1: Plugged openings



Figure 2: Head covered with heavy plastic



Figure 3: Tarping



Methods of Disposal

Incineration/Burning:

This is the preferred method of disposal - especially when a carcass has been opened for post mortem examination or scavenged. The goal of burning is to destroy as many spores as possible and thereby decrease environmental contamination.

General considerations:

- Ventilation and adequate airflow within the pyre are essential. Prevailing winds should be taken into consideration so as to provide a good supply of air to the fire.
- If the fire burns too quickly a complete burn will not be achieved and a secondary burn will be necessary.
- Do not use materials that may be environmentally harmful (e.g. rubber tires).
- Ensure an adequate amount of fuel is available to completely reduce the carcass to ash.
- Any carcass parts or materials that fall off the pyre during the burn must be added back onto the fire for complete incineration.
- Burn permits may be required by municipal or provincial governing authorities—it is the responsibility of the owner to ensure all requirements are met.
- Use kerosene or diesel fuel (accelerant) to soak down all the materials (Approx. 5 gallons or 23 litres per carcass).
- The fire should be lit from two opposing ends of the pyre.

Pyre System:

Wood

Bottom layer: Place large-sized logs, fence posts, wood pallets, spaced 8 - 10 inches (20 – 25 cm) apart in a criss-cross fashion so as to allow air to enter the fire from below;

Middle layer: smaller pieces of wood or coal placed over top of the bottom layer;

Top layer: the carcass, propped up so that it is laying on its back and any soil potentially contaminated by the animal/exudates is placed on top of the pyre.



Figure 4: Wood pyre with criss-crossed logs

Note: Approximately one cord of wood (4'x4'x8' or 128 cubic feet; 1.2x1.2 x 2.4 or 3.4m³) is required per 1000 lb (500 kg) of carcass to be incinerated.



Straw

Bottom layer: Place large-sized logs, fence posts, wood pallets, spaced 8 - 10 inches (20 - 25 cm) apart in a criss-crossed manner so as to allow air to enter the fire from below;

Middle layer: two large round bales per carcass—approximately 1,200 lb (545 kg) each. The bales can be laid on their sides or placed on end. A layer of wood pallets on top of the bales to make a platform for the carcass(es). Pallets wedged between the bales will increase air flow into the pyre;

Top layer: the carcass propped up so that it is laying on its back and any soil potentially contaminated by the animal/exudates. Add diesel fuel or kerosene to soak down the materials (approx. 5 gallons (23 litres) per carcass).



Figure 5: Incineration Process



Figure 6: Straw pyre

Note: Flax bales burn at a very high temperature and are well suited to burning carcasses, however, when used as the sole fuel they may burn too fast for effective incineration of the carcass. Use of flax bales in the centre of the pyre surrounded by other straw bales will burn hot enough for complete carcass incineration. When other types of straw bales are used as the sole fuel source more accelerant will be required.

Note: After an effective burn, primarily ash and bits of bone should remain, with minimal fly attraction to the site.



Figure 7: Complete incineration

Burn Pits/Trenches

- The use of a pit will facilitate burial of ashes and prevent fire from spreading.
- Sloped sides on the pit will facilitate airflow.
- For a mature animal, the pit should be 18-20 inches (0.5 m) deep and extend approximately 2.5 feet (.75m) beyond each end of the pyre that will be constructed. The pit should be approximately 10 inches (25 cm) wider than the pyre on each side to allow air to flow around the carcass.
- The bottom of the pit is covered with straw, wood, etc. and placed in such a way as to facilitate air flow. This material is soaked with accelerant (e.g. diesel fuel, kerosene).
- Pieces of heavy timber (or other beams) are placed across the pit to support the pyre.



Figure 8: Burn pit

Note: it will be necessary to decontaminate the ground where the carcass laid as well as the equipment, tools, etc. used in handling the carcass and any contaminated materials. Decontamination is done by burning the area using a propane torch and/or covering the area with quick lime, formaldehyde or bleach.

*** In all cases, CFIA must be able to assess the burn site to ensure there was adequate incineration of the carcass. CFIA will also document the identification of carcass(es) involved.*

Burial:

In the event that incineration is not feasible or cannot take place immediately, deep burial may be permitted.

General Considerations:

- Use of heavy excavating equipment such as a back hoe is required to dig a suitable hole.
- The pit should be 6-8 feet (2m) in depth, the bottom of which should be well above the water table (minimum 3 feet (0.9m)).
- CFIA must assess the pit prior to burial. Water table level and soil composition are taken into consideration—clay soil is preferable, sand or gravel should be avoided.
- There should be a minimum of 3.2 feet (1m) of clay at the base of the pit and the carcass should be covered with a minimum of 3.2 feet (1m) of clay and top soil to prevent access to scavengers.
- Formalin (10%) or quick lime (ph 11) must be used to decontaminate the carcass and all soil put into the burial pit.
- Owners are required to cover the costs associated with digging of burial pits (the indemnity paid is to offset the costs of disposal).



Figure 9: Burial pit

*** CFIA will document GPS co-ordinates of burial locations.*



Special Circumstances:

In certain situations, due to environmental conditions such as prolonged rain, carcass inaccessibility (i.e. standing water, heavy bush) or logistical problems such as lack of proper equipment, manpower etc., the prompt disposal of infected carcasses may not be possible. In these circumstances, to prevent or minimize anthrax environmental contamination, the CFIA will assess the situation with the owner and decide on an appropriate course of action. The carcass and the surrounding area must be covered with disinfectants such as copious amounts of lime, and/or 10% formalin or 5% solution of lye (sodium hydroxide) and repeated as needed.

4. Decontamination (Cleaning and Disinfection):

For animals that die on pasture, decontamination is required at the place where the animal died.

Equipment:

- Formaldehyde/formalin solutions diluted to 10% have the ability to inactivate anthrax spores. As per label directions, a 37% solution of formalin can be diluted one part formalin to nine parts water to obtain a 10% solution.
- Organic material and soil should be removed from any equipment to be disinfected. Hot water and a detergent can be used to wash organic material such as hair, blood etc. from equipment. Wash water should be directed into the burial or burn pit. Once organic material is removed, formaldehyde can be sprayed onto the surface with a contact time of at least 30 minutes.
- Disposable materials (boot covers, latex gloves) can be left on site and burned or buried with the carcass; otherwise materials can be disposed of via bio-hazardous waste disposal sites or incinerated.

Note: Other disinfectants with activity against spores include chlorine, a Javex 6% solution diluted at a one part Javex to two parts water and peracetic acid at a 3% solution. Autoclaving is also an effective means to sterilize equipment.

Clothing and Boots:

- Visible organic material and soil that may be on the clothing and boots should be removed at the burn/burial site.
- Footwear should be washed with water and detergent; a disinfectant may be applied.
- Rubber boots are easily cleaned and disinfected. Leather footwear should not be worn when disposing of carcasses.
- Standard clothes washing procedures will remove any residual spores that may have adhered to clothing. Wash clothes separately from other household laundry.

--