

FOOD SAFETY BULLETIN: Infestation Contamination

Purpose:

Contamination of grain deliveries with infestation occurs every year. This bulletin is intended to bring awareness to the issue to ensure the quality of grain is maintained. Primary grain insect infestation can spread rapidly to neighboring storage locations and quickly lead to product deterioration.

Risk:

Insects considered as primary pests of stored products cause damage to stored grains by directly feeding on the grain at some point in their lifecycle. Primary pests will attack grains that are intact and stable. Primary pest species often develop and reproduce very quickly when the conditions are optimal. This allows for large populations and, therefore, considerable damage to ensue within a matter of a few months.

It is a contravention of the Canada Grain Act to deliver or accept delivery of grain contaminated with infestation. For this reason, as well as food safety risks and the demands of processors and export markets, elevators have a zero tolerance for this type of contamination. It only takes a trace amount of infestation in a shipment to trigger a rejection of a load or a vessel. Rejection by a foreign market could lead to trade restrictions if the importing country isn't confident that we can prevent this contamination from occurring in the future. Farmers will have their load rejected if infestation is discovered in their delivery.

Prevention: At the Farm

You can prevent insect pest infestations from developing in your stored grain by preparing your grain bins, keeping grain in good condition, and monitoring stored grain.

1. Prepare your bins

Before filling grain bins or using temporary storage, clean the bins or storage site thoroughly.

Follow these steps each time you empty a bin and before filling it with new grain:

- Clean the bin with air, a heavy broom and/or a vacuum.
- Clean aeration systems
- Eliminate dust and dockage from any cracks in the bin
- Repair holes, cracks and leaks in the bin and any cracks in concrete floors
- Clean under the floor grates
- Clear the area around the grain bins of all weeds, volunteer cereals, and grain spills

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2. Monitor Grain Temperature

It is important to monitor grain temperature and to keep stored grain cool and dry by regular aeration or by turning it. High moisture and warm temperatures in grain allow for the rapid growth of insects, fungi and the possible production of mycotoxins.

Grain with a moisture above grade requirements can create an environment conducive to insect and fungal growth and development if it is not managed. Grain left unmanaged may increase in temperature and subsequent convection currents can cause surface condensation.

Check the temperature of the bin every 2 weeks and aerate stored grain as soon as possible after harvest, particularly if aeration can reduce the bulk temperature to below 18°C.

- When the ambient temperature falls below that of the grain bulk (during the early evening, night and early morning), you can use aeration to reduce the temperature of the grain
- Aeration systems preserve stored grain and keep it dry by reducing the temperature of the grain and moisture migration
- Always ensure that temperature fronts have moved fully through the grain before stopping aeration

3. Temporary Grain Storage

Occasionally, you may need to use temporary storage solutions such as bags or grain piles on the ground.

- If grain is stored on the ground, ensure the ground is hard and the site is convex
- Clear the area of all debris
- Choose an area that is graded so that water flows away from the grain
- Determine if you need to manage grain temperature and/or moisture in temporary storage
- Cover the grain as best possible
- If you are using silo bags, regularly check and maintain the integrity of the bags
- Move temporarily stored grain into bins as soon as possible

4. On Farm Detection and Treating Methods

Regular monitoring of the stored grain can determine the presence and potential for serious infestations.

- Either presence of insects or damaged kernels will give an indication of a problem.

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- Common signs of insect infestation is sweet, musty odor in grain.
- If infestation is suspected a producer can take a representative sample from the bin in question and either complete a check on farm or take the sample to the terminal to check for insect activity.
- If a problem is determined, a producer can move the grain in cold weather which cools and dries the grain and insects, reducing populations and dispersing any warm or moist grain pockets.
- Moving the grain using pneumatic conveyors (grain vacuums) have also been an effective means of controlling free-living insects in stored grain.
- Incorporating diatomaceous earth products while re-binning can also help minimize stored grain pest buildup.
- **Note:** Regardless of infestation control product or method utilized, always ensure the label directions and restrictions are followed. Commodities treated for infestation must remain stored, on farm, until adequate treatment time period has been followed (see product label).

Prevention: At the Elevator

Our receiving inspection is a critical step in our efforts to eliminate the occurrence of infestation contamination within the elevator.

- At Viterra, we have a zero tolerance for infestation.
- Each sample is inspected for insect presence or activity. If insects are suspected, the sample is placed under the Berlese Funnels to stimulate activity.
- If there is any evidence of infestation detected prior to the load being dumped, the load will be rejected.

Reference Photos

Many species of stored product beetles feed internally in grain kernels as larvae. Rusty grain beetles, weevils, and lesser grain borer all develop initially inside the kernel.

Primary Larvae



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Rusty Grain Beetle



Resources

- Canadian Grain Commission: www.grainscanada.gc.ca
- Saskatchewan Business Agricultural Natural Resources: <https://www.saskatchewan.ca/business/agriculture-natural-resources-and-industry/agribusiness-farmers-and-ranchers/crops-and-irrigation/insects/insects-and-mould-in-stored-grain>