

Storage Rots of Table Beets

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Table beets can spend as much time in storage as they do in the ground. Rots that develop during storage can be a significant source of economic loss, especially towards the end of the storage season (from February onwards).

The following steps are general practices to reduce storage losses:

- **Bin and storage unit sanitation:** Remove all crop debris and soil, which can be a source of disease inoculum.
- **Harvest practices to ensure proper cooling of storage piles:** Harvest on cooler days or during the coolest part of the day.
- **Seed treatments:** Use beet-seed treated with **Thiram** or **Captan**.

Pathogens most commonly associated with storage rots on Fraser Valley BC table beets are: *Botrytis* spp., *Penicillium* spp., and *Phoma betae* (Figure 1).



Figure 1. Characteristic white fungal growth of storage beet rots. Note: wounds at the crown and on the side of the beet (left) and blackening of internal tissue caused by *Phoma betae* (right) (Photos: Kelsey Patterson, E.S. Cropconsult Ltd.)

Botrytis spp. and *Penicillium* spp. are widespread fungi that require wounds in order to cause infection. Even small wounds could be entry points for these fungi.

Management:

- Monitor harvesting practices to reduce wounds and bruises caused by high falls from or bumps against equipment (Figure 2).
- Allow wounds to heal before placing in storage.
- Sort and store wounded beets for as short a period as possible.
- If topping beets prior to storage ensure that only a small amount of the crown is removed (less than 4-cm diameter).
- *Botrytis* spp. and *Penicillium* spp. infections can originate in the field or in storage. To minimize infection in storage, follow strict sanitation protocols of bins and storage units.



Figure 2. Wounds and bruises can occur along any point during harvest as beets are bumped against equipment or move from one type of equipment to another. (Photo: Heidi Van Dokkumburg, E.S. Cropconsult Ltd.)

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Phoma betae infected roots will not show symptoms for at least 10 to 12 weeks after being placed in storage. Beets are put into storage already infected; however, it is difficult to know if roots are infected prior to the development of symptoms.

Management:

- Practice a 4-year long crop rotation as *P. betae* can survive on crop residues.
- Use seed treated with **Thiram** or **Captan** fungicides, if possible.
- Follow best practices during production to ensure vigorous growth via adequate nutrition (in particular boron) and reduced crop stress via adequate irrigation.
- Monitoring is challenging but should be done in high-risk fields (e.g. where untreated seed was used). Monitor for seedling, root and foliar infections – however the absence of symptoms in the field does not guarantee that there won't be infections in roots.
 - Seedling stage infections will look similar to damping-off. Infected seedlings can recover but still remain infected, thus additional diagnosis may be needed.
 - Foliar infections will have a characteristic lesion with a bulls-eye pattern (Figure 3). Foliar symptoms are most likely to develop at high temperatures and humidity.
 - If *P. betae* is suspected, diagnosis should be confirmed via the BC Plant Health Laboratory.



Figure 3. *Phoma betae* leaf spot (Photo: Lindsey J. du Toit, Washington State University)

- Beets from fields where *P. betae* has been confirmed or suspected (because planted with untreated seed or less than 4-year crop rotation) should be stored for as short a time period as possible (e.g. less than 3 months).

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