

General Description

Cytospora canker, also called Leucostoma canker and/or Valsa canker, can be a serious disease of tree fruit (stone and pome fruit) in British Columbia (B.C.). *Cytospora* species (spp.) are opportunistic pathogens but with winter freeze injury and increased tree stress, canker incidence can increase. *Malus* and *Prunus* species are susceptible to Cytospora canker and when severe, a whole block of trees can show decline and decreased productivity.

Symptoms

Cytospora species attack the woody tissue of trees through injuries, pruning cuts and dead tissues. The initial symptom of disease in stone fruit is exudation of gum around the infected area (Figure 1a). The canker will have a necrotic center and slowly expand, as the outer bark remains intact. Figure 1b shows Cytospora canker with the outer bark removed. Eventually, the bark will crack and expose the black tissue beneath. Black, raised structures called stromata (i.e. spore producing fruiting bodies) of 1 to 3 mm in diameter can be seen below the bark surface (Figure 1c).



Figure 1. *Cytospora* canker in peach a) gum exudate around canker, b) discoloration of wood underneath outer bark and c) stroma under bark surface (BCMAF)

Cankers formed along the length of the branch/trunk are typically oval shaped. Limbs, branches and leaders with severe canker infection will show dieback (Figure 2a) and eventual tree death.

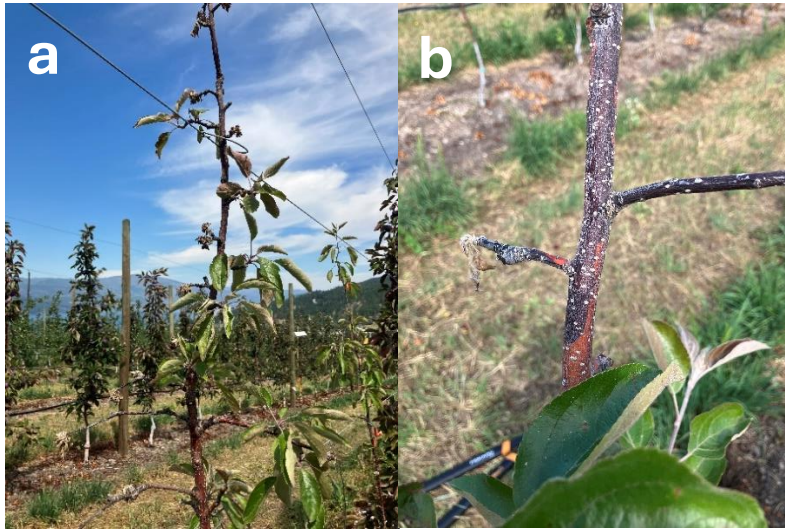


Figure 2. *Cytospora* canker on apple, a) dieback from top of tree, and b) canker with dark margin along main leader (BCMAF)

Stewart et al., 2022). The genus *Cytospora* has been taxonomically changing, and due to the morphological similarities amongst many species, the historical data on species identification is limited. Three different *Cytospora* spp. were associated with the cankers of fruit trees in B.C. as a result of this survey, including *C. parasitica*, *C. populicola* and *C. sorbicola*.

Biology

Cytospora spp. are common pathogens of woody plants. *Cytospora cincta* and *C. leucostoma* have been reported as the primary species affecting tree fruit. In a recent survey of tree fruit in B.C. conducted by Agriculture and Agri-Food Canada, neither of these two species was detected (Úrbez-Torres et al., 2024). Recent studies from Colorado and California states in the USA also identified *Cytospora* species other than *C. cincta* and *C. leucostoma* (Lawrence et al., 2018;

Life Cycle

The fungus overwinters in infected trees on cankers and twigs. Stromata on the cankers produce spores. Rain or irrigation releases the spores that are spread short distances via wind and splashing water. Infection occurs through wounds caused by winter injury, pruning, and insects like borers. Cankers expand in the fall and spring; actively growing trees are able to resist the canker. It is generally believed that *Cytospora* spp. cannot enter through healthy tissue or buds.

Management

Management of *Cytospora* canker requires an integrated approach relying on preventative measures. Control of canker diseases caused by fungi requires years of diligent management that can prevent the eventual decline of an orchard.

General Plant Health

- Maintain trees in a vigorous state with optimal fertilization and irrigation.
- Use preventative measures to minimize winter injury, sunburn, and rodent and insect damage.

Pruning

- Prune during mid- to late-winter when inoculum levels are lower.
- Encourage rapid healing of pruning wounds by cutting branches just beyond the ridge of the thickened bark which connects them to larger limbs. Do not leave pruning stubs.
- Train trees to develop wide crotch angles.
- Pruning in summer results in many wounds that can be infected by *Cytospora* species. Prune in dry weather and allow time for pruning wounds to heal before using overhead irrigation.
- Remove dead branches and branches with cankers.

New Plantings

- Do not plant new blocks of tree fruit next to old, canker infected blocks. Nursery stock should be canker free and protected from wood boring insects such as peach tree borer.
- Consider the effects of irrigation systems on disease development when planning new orchards. Drip or microsprinkler irrigation may result in less disease pressure than overhead irrigation.

Canker Removal/Surgery

- Research has shown that surgically removing the cankers on young trees can slow the decline and potential death of trees.
 - The best time for canker removal is when trees are actively growing, but during a dry period, May or June, to promote quick healing of wounds.
 - Do not use this technique when cankers are more than $\frac{1}{2}$ the branch diameter
 - When cutting out, place the knife 1 inch higher than the canker edge and trace the outside of the canker, ensuring the knife is in green tissue. Peel the bark away from the tree, thus ensuring a clean cut to promote healing success.
 - Practice disinfection of knives/shears between working on each canker and pruning infected dieback branches.

Chemical Control

There are no fungicides registered in Canada for the control of *Cytospora* canker on stone or pome fruit. Senator 50SC (thiophanate-methyl, FRAC Group 1) that is registered for other fungal diseases in stone and pome fruit may also provide some preventative suppression of canker diseases. Inspire Super (a combination of cyprodinil, FRAC Group 9 and difenoconazole, FRAC Group 3) registered for pome fruit may provide some suppression for canker diseases. A recent study from Colorado State University (Miller et al., 2018) showed that thiophanate-methyl, lime sulfur (FRAC Group M) and captan (FRAC Group M) were effective at reducing the lesion size of *Cytospora* canker in peach. Lime sulfur has shown phytotoxicity, therefore extra

care is needed when using it in an orchard. Always refer to the manufacturer's label before using a fungicide (access to pesticide labels available via Pest Management Regulatory Agency – PMRA <https://pr-rp.hc-sc.gc.ca/lr-re/index-eng.php>).

Additional Resources

- Colorado State University: [Preventive Control for Cytospora Canker on Peach - 2.954 - Extension \(colostate.edu\)](#)
- Penn State University: [Stone Fruit Disease - Cytospora Canker \(psu.edu\)](#)
- Ontario Crop IPM: [Ontario Crop IPM - Home \(gov.on.ca\)](#)
- Washington State University: [Fungal Canker and Dieback Pathogens of Stone Fruit | WSU Tree Fruit | Washington State University](#)

References

1. Lawrence, D. P., Holland, L. A., Nouri, M. T., Travadon, R., Abramians, A., Michailides, T. J., & Trouillas, F. P. (2018). Molecular phylogeny of *Cytospora* species associated with canker diseases of fruit and nut crops in California, with the descriptions of ten new species and one new combination. *IMA fungus*, 9, 333-369.
2. Miller, S. T., Otto, K. L., Sterle, D., Minas, I. S., & Stewart, J. E. (2019). Preventive fungicidal control of *Cytospora leucostoma* in peach orchards in Colorado. *Plant disease*, 103(6), 1138-1147.
3. Stewart, J. E., Miller, S. T., Zink, F. A., Caballero, J. I., & Tembrock, L. R. (2022). Genetic and phenotypic characterization of the fungal pathogen *Cytospora plurivora* from Western Colorado peach orchards and the development of a ddPCR assay for detection and quantification. *Phytopathology*®, 112(4), 917-928.
4. Úrbez-Torres, J. R., Boulé, J., Walker, M., Hrycan, J., & O’Gorman, D. T. (2024). Identification of fungal pathogens causing fruit tree dieback in British Columbia. *Canadian Journal of Plant Pathology*, 46(2), 89-105.

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For more information on plant diseases, diagnostics and resources in British Columbia, please visit <https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/animals-and-crops/plant-health>