



APPLE DECLINE

Recognizing apple decline in your orchard

'Apple decline', also known as 'rapid apple decline' or 'sudden apple death' has been reported over the last several years in apple growing regions across North America (e.g., New York, Pennsylvania, Ontario). A number of potential signs and symptoms of apple decline in British Columbia have been identified. While we are not yet sure of the association between these symptoms and the eventual death of apple trees, monitoring for and reporting of apple decline signs and symptoms to Agriculture and Agri-Food Canada will help us understand the extent of the issue and identify best practices for management and mitigation.

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SPRING

- small, 'spindly leaves' emerge on stressed trees
- cankers from previous year present near graft union
- often, fresh frass from apple clearwing moth infestation evident near graft union
- sometimes, weeping from wounds on stem

SUMMER

- cankers develop/bark sloughs, cracks and flakes
- sometimes, spore-producing fruiting bodies develop on extremely stressed trees infected with fungal pathogens
- leaves droop, turn yellow, dry up

FALL

- leaves on affected trees turn red or senesce earlier than surrounding healthy trees with normal-looking leaves; leaves and immature fruit on affected trees tend to be retained instead of dropping

THROUGHOUT THE SEASON

- tree collapse/death; leaves die and may or may not drop (observed from late May into mid-September)
- shothole borer/ambrosia beetle infest dead or near-dead trees
- apple clearwing moth larvae may or may not be present; boring concentrated near the graft union, taking advantage of openings in the bark

CANKERS AT THE GRAFT UNION



OOZING



[Above] Necrotic cankers, typically appearing as sunken purple, orange, or brown tissue that often cracks and splits. These have been observed spreading up from the graft union, and range from large cankers encompassing the girth of the tree, to smaller, sunken spots around the graft union.

[Left] Wet, weeping or oozing spots from wounds, including cankers, winter injury, and insect damage have been observed.

APPLE CLEARWING MOTH



Apple clearwing moth is present in most orchards experiencing apple decline.

[Above left] Removing bark can reveal the presence of apple clearwing moth larvae feeding in galleries (tunnels); galleries are often near the graft union, but can be found anywhere there are cracks, splits, or other entry points in the bark.

[Above right] Frass (insect excrement) seen in piles on the exterior of the graft union area, indicating that apple clearwing moth larvae have been active in the tree.

[Bottom Left] Apple clearwing moth pupal casing, present after a larvae has completed its lifecycle in the tree and has emerged as a moth. Indicates an active population of apple clearwing moth.

SPINDLY/UNDERDEVELOPED LEAVES



[Above] Small, spindly or undeveloped leaves throughout a tree have been observed on some trees that have later declined.

EARLY SENESCENCE OF LEAVES

[Below] Trees with purple, red, and orange leaves that are senescing, or undergoing physiological changes in preparation for dormancy, have been noted to sporadically appear throughout orchards in early fall; although healthy trees around them remain green.



SPORADIC DEAD OR DYING TREES



[Above] Stressed trees eventually collapse, typically with a sudden death of leaves, which may or may not remain on the tree. Often at this stage small boring beetles will infest the tree stem, and if a canker is present it may rapidly spread throughout the tree. Affected trees have been observed in seemingly sporadic patterns throughout the orchard, or in small clusters across several tree rows.

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