

Incidence of summer outbreaks of fire blight in tree nurseries of South Alberta, Canada

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Growing trees in South Alberta



Nine commercial nurseries growing trees on 776 hectares of land are found in South Alberta (marked with a star on the map). The trees are sold in near-by cities, where an economic boom is fed by revenues from gas and oil exploration.

In this region, the summer is typically a short growing season of dry weather and mild temperatures (20°C to 30°C), whereas winter can be long and cold with extended periods at -20°C to -30°C.



Above: Typical weather patterns during the summer

From mid June to mid August, weather systems are formed at the base of the Rocky Mountains to the West (boundary of Alberta and British Columbia) then move in a South-East direction. These systems trigger severe thunderstorms in late afternoon, sometimes associated with strong winds and hail.



Impact on agricultural crops

Above: A local hail storm caused severe damage to corn fields.

Right: A contoneaster hedge growing on a private property, about 500 meters from a commercial tree nursery. The dead branches show infection by fire blight. This hedge is a source of inoculum for fire blight bacteria during windy weather.

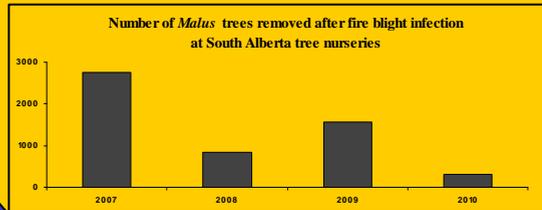


The extent of fire blight damage

From 2007 to 2010, over 5000 *Malus* trees have been destroyed because of fire blight (see the chart below). Other susceptible hosts were affected to a smaller extent (395 *Crataegus*, 376 *Sorbus* and 24 *Pyrus*).

For the period covered, the lost market value for these nurseries is over CDN \$1.2 millions, not counting removal and disposal of infected trees.

The vast majority of strikes occurred during summer months. Spring infection is minimized by strict sanitation of overwintering cankers, avoidance of overhead irrigation during bloom, and repeated spray applications during early bloom with an antibiotic (streptomycin) and biofungicides (*Pantoea a.*, *Pseudomonas f.* or *Bacillus s.*).



For these nurseries, current management procedures and available pesticides are sufficient to successfully manage the spring stage of fire blight.

However, new tools are required for management of summer strikes, including early field detection of new infections, sanitation of native hosts outside the nurseries, and new pesticide products to reduce disease incidence after hail.



Pictures of summer symptoms

Above: A new fire blight infection that originates on a leaf damaged by hail. The terminal growth is still healthy.

Below left: The leaf petiole shows oozing typical of fire blight (*Erwinia amylovora*). Leaves also show circular spots from *Pseudomonas sp.* and *Alternaria sp.*

Below right: A new fire blight infection that started after bloom. Fruitlets developed normally but show recent hail injury.

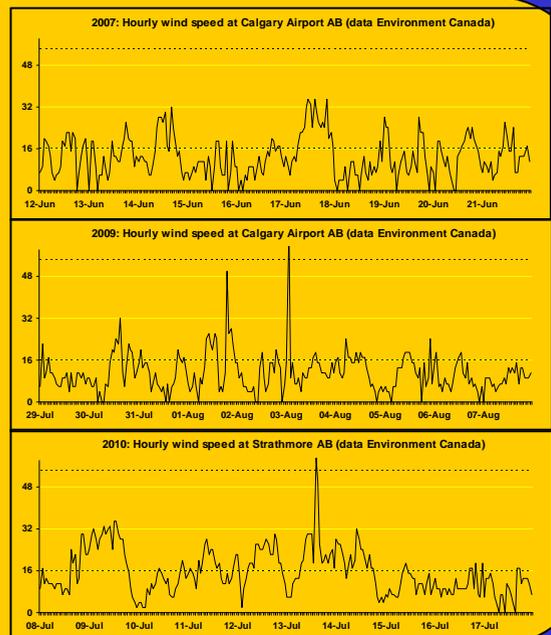


New outbreaks during summer months usually follow a severe wind storm associated with hail

Right on top: On June 17, 2007, winds were recorded at over 32 km/h, gusting to 50 km/h, between 10:00 and 15:00 hours. Fire blight symptoms became obvious at many nurseries after July 1st.

Middle: On August 3, 2009, winds over 65 km/h and hail were recorded at 01:00 hour. Damage was extensive in the path of the hail storm, including to plants, houses and buildings.

Bottom: On July 14, 2010, winds over 50 km/h were recorded between 13:00 and 15:00 hours. Damage was extensive and new fire blight strikes became obvious by July 24.



Poster presentation at the 12th International Workshop on Fire Blight, Warsaw, Poland, August 2010

Further references:

Berrie A.M., E. Billing. 1996. Hawthorns as a source of fire blight inoculum in English pear and apple orchards. VII International Workshop on Fire Blight. ISHS Acta Horticulturae 411:35-40.
Breth D.L., H.S. Aldwinckle and W. Turechek. 2002. Effects of weather conditions in development of "trauma" blight in apple shoots. IX International Workshop on Fire Blight. ISHS Acta Horticulturae (ISHS) 590:143-146.