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There are three important factors to think about when considering season long disease contol. Timing, timing and timing. Establishing early disease control is critical for many plant diseases and now is the right time to act. This month we will look at some of the principles involved and the weather tools needed to make a sound decision.

Diseases control is usually understood with the help of the disease triangle shown in figure 1. This triangle shows the three things that must be present before infection occurs. If anything is missing, infection won't occur. For example peaches don't get blackspot even though the pathogen and environment favour infection.

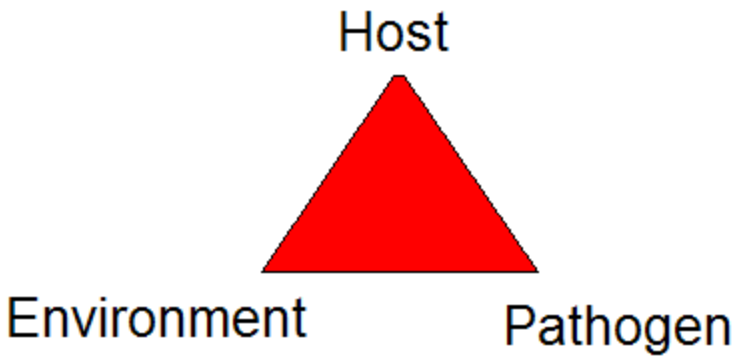

Figure 1 : Disease Triangle

This time of year is critical for season long apple blackspot control. As the old saying goes "An ounce of prevention is worth a pound of cure". All three elements of the disease triangle are available in large quantities. Young, soft growth means the host is very susceptible. The environment via rainfall and higher temperatures means there are plenty of possible infection events and the pathogen is available via ascospores released during daytime rainfall.

The environmental part of the disease triangle has traditionally been represented by the Mills Period. Output from the HortPlus Metwatch software package for this disease is shown in figure 2.

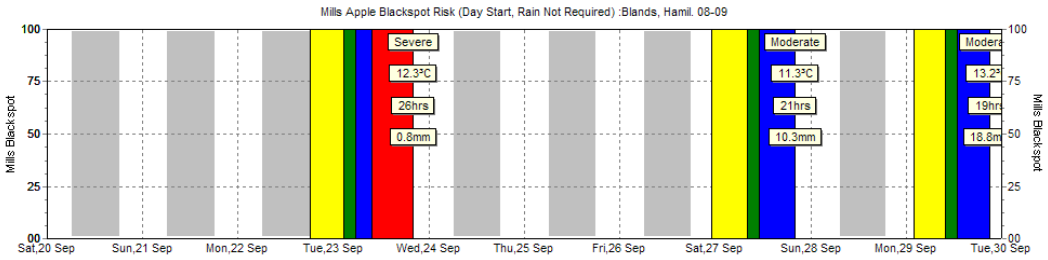

Figure 2 : HortPlus Metwatch Mills Model

Each infection event is shown as a coloured block indicating the severity of the infection event. Availability of spores is modelled with the ascospore model, developed by Dr Robert Beresford of Plant and Food Research. Model output for the 2008 season in Hawkes Bay is shown in figure 3.

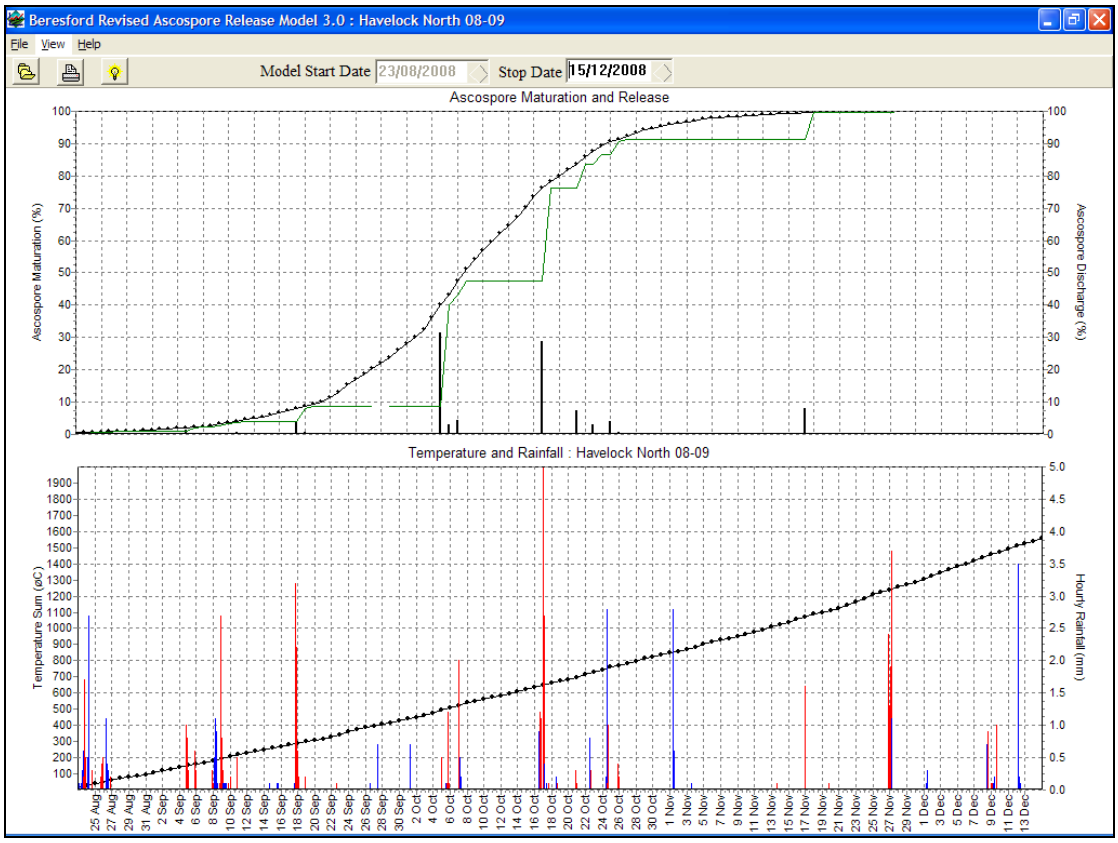

Figure 3: HortPlus Ascospore Model

Spores mature in New Zealand after August 23rd and maturity is governed by ambient temperatures. The red bars shown in figure 3 in the lower graph indicate daytime rainfall, when the spores are released into the environment ready for infection. The upper graph of figure 3 is worth a look. It represents spore maturity (dotted line) and release into the environment (black bars). Notice that 30% of the annual spore release can happen in one event. Early in the season this represents extreme infection risk to pipfruit growers. Having fungicide protectant and curative cover during this time is essential.

These two tools only cover two areas of the infection triangle. Environment, via Mills events and pathogen via the ascospore model. In recent years Dr Beresford has also included host susceptibility and combined all three in the Integrated Blackspot Model. Users of the Pipfruit New Zealand website should be familiar with this.

The Integrated Blackspot Model is the most advanced system. Other models just include the environment. Examples include grape botrytis, peach brownrot, onion white rot and potato early and late blight. We are doing further work on grape botrytis via the Grape Futures research project with Dr Robert Beresford. This research seeks to relate the risk of fruit botrytis infection to the maturity of the fruit, thus integrating host susceptibility to the system.

Whatever system is being used, growers are advised to keep a sharp eye on the models and the weather forecast, particularly early in the year when you will have the most impact. All the disease models plus more are available on HortPlus Metwatch Online. Email us if you would like to trial this.