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NON-CHEMICAL CONTROL MEASURES FOR TREE AND SHRUB INSECT AND DISEASE PESTS

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As spring approaches the landscape trade, nurserymen, and homeowners brace themselves for the annual onslaught of pests on the plant world. This is especially true for trees and shrubs which are host to a variety of different enemies in western Canada. There are many insects and diseases which are all too familiar to western Canadians, forest tent caterpillar, birch leaf miner, and fireblight to name a few.

For the most part we rely heavily on mother nature to combat these foes. Many insect and disease pests go unnoticed by the layperson until a tree discolors, becomes defoliated or dies. By this time therapeutic action is too late. Most plant insect and disease control measures are aimed at preventing or minimizing the damage done by the pest. There are four basic control strategies in the plant health world, chemical control, cultural control, biological control, and physical control. At present there are insecticides registered for some of the tree insect pests and a few fungicides registered for some of the fungal incited tree diseases, however, there are many insect and disease problems for which there are no chemical solutions. This article is intended to provide a brief overview of some non-chemical control measures for insect and disease problems of trees and shrubs.

Cultural control

This method involves cultural practices that can be applied directly to the plant or to its surroundings. There are a wide variety of these cultural practices that can be used to control insect and disease problems. The key to exploiting these practices is to have a good knowledge of the plant material, their biology and their pests' biology.

These practices can be as simple as not planting incompatible plant species with each other. An example of this is white pine blister rust. The rust fungus that causes this disease has to have two host plant species to complete its life cycle, white pines and currants. The disease can be prevented by simply not planting the two species near each other.

Improving plant growing conditions is one of the best means of prevention. Providing proper drainage, irrigation, light, and soil conditions for good growth of the plants will help reduce the damage caused by insect and diseases. Often this can work in reverse, people provide too much care. Late summer fertilizing or pruning promotes young shoot growth. This young growth never properly hardens off in the fall for winter and so the following spring there will be some twig and branch kill.

Never willingly provide the pest an opportunity to become established. Pines are shade intolerant so why plant them in shady spots? They will grow poorly and be more susceptible to insect and disease problems. If your soil conditions are salty, why plant trees that are salt intolerant? These trees will show salt injury and will never grow well if at all.

Sanitation is probably the most important control measure that nurserymen, landscapers, grounds maintenance personnel, and homeowners have available to them. Dead trees and branches are breeding grounds for certain insect and disease pests. Remove the material from the site and burn or bury it. Dutch elm disease (DED) is a good case where sanitation is extremely important in slowing or stopping the disease. Elm bark beetles multiply quickly in dead elm trees and wood with bark on it. The beetles then spread to nearby healthy trees and feed on them. In the process they can transfer the fungus which causes the disease from the dead tree (if the tree died from DED) to the healthy tree and the cycle will continue. Proper pruning practices that remove diseased or dead branches can enhance the vigor of trees. In some instances it is necessary to remove diseased or insect infested trees to prevent the spread of the problem.

Biological Control

Biological control of tree insect and disease pests can be accomplished by two methods, breeding plants that are resistant to the pest or by using other organisms that are parasites or predators of the pest.

There are a few examples of breeding for resistance to pests in trees. The Jacan elm, developed at the Morden research station, is thought to be a dutch elm disease resistant elm.

One of the best examples of biological control is the use of the bacteria **Bacillus thuringiensis** (BT), marketed under several different trade names, for the control of spruce budworm, and forest tent caterpillar. The bacterial preparation is sprayed on the foliage of the tree. The larvae or caterpillars eat the foliage and ingest the bacteria. Once inside the caterpillar the bacteria cause the caterpillar to die or at least slow its feeding. This bacteria only affects lepidopterous insects (moths) and not beneficial insects.

Biological control has many attractive features, it affects only target organisms and once started is often self-perpetuating. But there are some drawbacks. Control is slower than using a chemical and it takes time to learn how to manipulate the organism or the environmental conditions necessary for successful control. Resistance to insect and diseases in trees might break down because trees are long lived.

Physical Control

Physical control through the use of heat is often used on fruit trees to free the breeding stock of viruses. Nurserymen who are propagating material in greenhouses often use steam pasteurized soil mixtures to destroy insect and disease pests that can damage young stock.

Non-chemical control measures of tree insect and disease pests can and do work. All control measures require a sound understanding of the host plant and pest's biology. It is important to understand where the weak link is in the pest's life cycle in order to break it and gain the upper hand. Remember that tree insect and disease pests will always be with us, but with sound, biologically rational approaches to pest control we can lessen their impact.

Note: The exclusion of certain manufactured products does not necessarily imply disapproval nor does the mention of other products necessarily imply endorsement by Forestry Canada.