THE CHALLENGES AND LIMITATIONS OF TREE PEST MANAGEMENT TODAY

By Henry Gilbertson, Director of Technical Services, Davey Tree Expert Co., Kent, OH.

Tree pest management continues to face challenges on both a regional and national basis. For an overview of these problems, The Davey Tree Expert Co. polled its district managers across the United States and in five districts in Canada. The findings were presented in a speech at the 12th Annual Northern Forest Insect Work Conference last year by Davey's Henry Gilbertson. This article is taken from that speech.

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Bronze birch borer larva and its damage present such a problem that many hesitate to recommend planting of white birch. (Photo courtesy OARDC).

There are basic difficulties in controlling tree pests. These are in addition to those problems involving particular trees or pests.

It is impossible to be on every property at the right time or ideal time for spraying because of the great number of properties or trees that need protection. In some cases, we may not even know the ideal time, especially in those instances where the pest feeds over a relatively long period and the home owner can afford only one application.

We often receive calls after the damage is quite extensive or when the larvae are almost mature and tougher to kill. Some clients apparently expect the leaf injury to heal and become whole after sprays are applied!

Weather — rain, wind, high temperature or freezing temperature — can always cause a problem. The number of ideal spray days in a season can probably be counted on one hand.

Tall trees are a problem. Even with ideal conditions, it is difficult to thoroughly cover trees that are 85 to 90 ft. in height.

The fact that most of our insecticides have short residual and are used on insects that have extended egg-hatch periods or that may continue to reinfest a tree over a long period of time, makes control difficult. These factors must be tolerated and sometimes interfere with getting the spray on target with proper coverage and without plant injury.

Two other problems that need further publicity are the effect of temperature on insect control (for example, malathion is reported to be much less effective below 60 degrees F than at higher temperatures) and the effect of water pH used with the pesticide, which can reduce its chemical activity. Certain parts of the country have high pH water. What effect is this having on control?

The insects discussed represent a few of those prevalent problems to urban trees and, in some cases, problems for arborists to control.

Borers

Borers are one group of insects that create problems for the arborist, municipal forester and home owner. For this group, bronze birch borer is a major pest. It can kill large or small trees and is so destructive that we hesitate to recommend planting of white birch. Control success has varied, probably because larvae are protected most of their lives by bark, and adults may lay eggs over a six- to eight-week period. In looking over state recommendations, I found that one says to use two pints 20 percent lindane and another says to use two quarts (or twice as much). This could also be a factor in control. How much lindane and how many applications are required for control?

Dogwood borer is also a problem attacking the roughened bark or stresses areas. Several of our tree care territories have mentioned having the ash or lilac borer as a problem pest.

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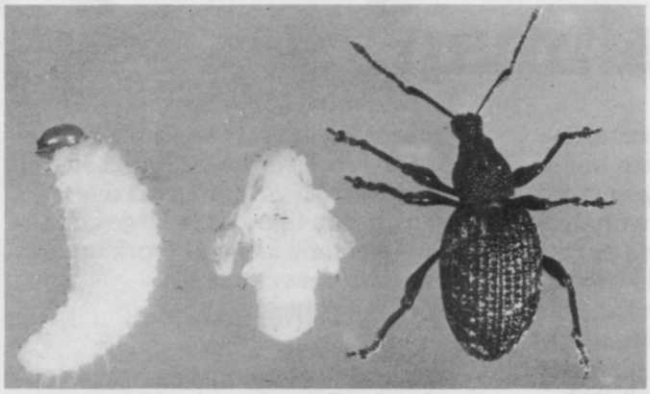

Black vine weevil larva, pupa, and adult (left to right). Photo courtesy OARDC.

Black vine weevil

Black vine weevil, although not a shade tree problem, is definitely an urban insect problem and is serious on taxus and rhododendron. The adult pest chews on the foliage, and damage is not readily noticed until the plant is dying because the larvae have been feeding on the root system.

With chlordane no longer available, we suggest the use of Orthene and understand that New York State has a 24-C or special local need registration covering this. Chevron Chemical Co. has told us that they have a recently approved label for Orthene which covers adult root weevils and they expect it to be available in time for applications this year.

Lindane is also labelled for this pest, although I have no information on its efficacy.

Scales

Scales are small but mighty and range from those that can kill trees or branches to those that are more noticeable because of the honeydew they secrete.

Cottony maple scale - The overwintering stage of the cottony maple scale could be overlooked by the homeowner. However, once the popcorn-like egg masses are produced and the tree starts to drip, our phone begins to ring. A single egg mass may contain 3,000 eggs, which easily explains any scale population explosion. Even an arborist may be mistaken about the success of his or her sprays unless he checks along the veins where the scale crawlers plug in to feed.

Oyster shell scale - This scale looks like oyster shell, hence its name. These scales overwinter in the egg stage and are more difficult to control with dormant oil sprays than if they were partly or full-grown scales. The addition of Ethion to the oil has improved control considerably. We follow up with a spray during the crawler phase.

Euonymus scale - Euonymus scale is hard to control. A close view will show yellowing caused by an infestation of the scale. Thick, bushy plants are difficult to cover thoroughly with spray and require special attention.

Magnolia scale resist control by forming a dense layer. (Photo courtesy of Davey Tree Expert Co.)

Galls

Although there are more than 800 different insect galls which may affect oaks, the one which is the real problem is the horned oak gall, caused by cynipid wasp. This has become a special problem in the Buffalo, NY, area, where it has killed hundreds of pin oaks; but it is also found in other areas.

An infested tree may look as if it were loaded with shishkabobs. A close look reveals the reason it is call horned oak gall.

Maple bladder gall commonly found on silver maple. (Photo courtesy Davey Tree Expert Co.).

Adults formed in the two-year-old gall chew their way out of the horns and lay eggs in the developing leaves. Wasps which develop in the leaf galls emerge about July 1 and pepper the new twig growth with eggs. New galls are produced, and after two years the cycle is repeated.

When DDT was available, we felt we were successful in our control efforts; but since then, control has not been satisfactory.

Aphids

Spruce gall aphids - Spruce gall aphids are not a serious problem where carbaryl is used, provided,

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of course, timing of the application is correct.

Eastern spruce gall can be found on Norway spruce and the Cooley spruce gall on blue spruce.

Overwintering stem mothers lay their eggs and start the process of gall development. Swelling at the base of needles starts very early, The gall can begin to develop before the bud cap is off. The aphids are protected in pockets inside the Cooley gall; here they feed and reproduce.

Woolly Oak aphid - Although the injury caused by the woolly oak aphid could be confused with leaf scorch, it actually is caused by masses of the aphids. This can be very injurious to leaves.

Pine bark aphid - Normally when pine bark aphid is mentioned, one thinks of aphids covering the main trunk and lower limbs. Control is more difficult when they feed on the base of the needles and are observed only as minute bits of cotton sticking out of the fascicle. I have seen Scotch pines that have been killed by the pine bark aphid.

Leaf miners

Leaf miners range from arborvitae leaf miner, which can wipe out a planting, to the birch leaf miner. Although I have not seen it kill birch, its damage may increase the possibility of attack by the bronze birch borer. The larvae feed between the leaf surfaces. The mining takes place in birch rapidly, making the timing of sprays critical.

Leaf chewing insects

Eastern or apple tent caterpillar and fall webworm are two pests that are present to some degree each year. They can completely defoliate a tree.

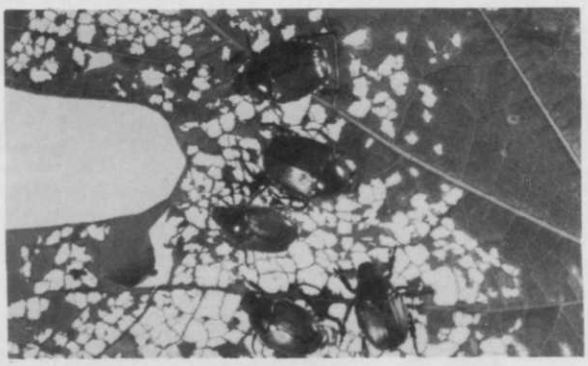
These pests are not so difficult to control, but their unsightly webs remain on trees long after they are gone.

Eggs of the fall webworm are laid over a four- to six-week period, making control difficult with the short residual insecticides, especially if the home owner expects 100 percent control with a single application.

Japanese beetle

The Japanese beetle seems to be on the increase. You are no doubt familiar with its life cycle. Linden is one of its favorite hosts, and sycamore is another.

Control of Japanese beetle is difficult, primarily because a sprayed tree can be reinfested over such a long period of time — at least two months. To prevent feeding damage, sprays would have to be applied weekly.



Japanese beetle is increasing its damage to many trees, especially linden and sycamore.

Pin oak sawfly

The pin oak sawfly skeletonizes the leaves, causing them to turn brown. The slug-like larva causes the injury. Usually an infested tree will "brown-up" before the home owner is even aware that a problem exists. This pest has been reported on the rise in the New Jersey area.

Research and extension needs

More information is needed on timing spray applications especially for those pests that hatch over a prolonged period or where adults lay eggs or feed over a four- to six-week period.

Phenological studies should be continued to help relate plant developmental stages with insect activity.

Long-range programs should include the effect of varying insect populations on the vigor of trees and shrubs. This type of study is being done on gypsy moth defoliation; hopefully, it can be done for other pests.

Weather has always been a problem. New application techniques are needed to provide the desired pest control and to reduce the chances of pesticide pollution to the environment.

How can we get coverage of the tall trees? How can we protect trees near the swimming pool or pond without the danger of polluting with drifting or dripping spray? How can we accomplish desirable results during adverse weather? Weather certainly influences the length of residual of an applied insecticide. How can we lengthen this period in order to provide better control with fewer sprays?

There is a need for studies on soil injections with systemics as well as injections directly into the tree. California has recently secured a special need label using Orthene injected into elms for elm bark beetle control.

If we are going to inject trees, we need teamwork from the plant physiologists on how to inject, where to inject, and the long-range effect of these wounds.

Last year we looked at the chemical distribution in elms injected with Arbotect. Bioassay of branch discs showed only 60 percent of the branches contained sufficient chemical to inhibit the test organism. What must be done to obtain 95 percent to 100 percent coverage?

It is well known that systemics move up in a tree, but rarely, if ever, down. Is there some way systemics could be tied into the phloem tissue where they might aid in the control of borers, twig scales, and other pests feeding in that area?

Help is needed from the arborist, municipal forester, and home owner to know when there is going to be an invasion of a certain pest. Is it practical to expect some assistance in predicting or forecasting outbreaks?

We are aware of the effect of insect defoliators on tree decline and mortality. Therefore, it would be very beneficial for all to know the likelihood of this defoliation occurring so that protective measures can be taken. **WTT**