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Insect-Tree Relationships from page 19

only a light infestation. Perhaps the plant which demonstrates or expresses genetic fitness with an insect pest should simply be replaced by a plant which is less susceptible or more tolerant of the endemic insect pest.

Landscape managers, nurserymen, scientists and others frequently ask why one plant species or cultivar is a particularly good host for a pest. Does man sometimes play a significant role in the evolution of this sort of relationship? Many of the most destructive insects have been imported from abroad. The reasons for their pest status generally include availabilities of an abundant food supply, suitable climate and absence of effective natural enemies. Gypsy moth, and black vine weevil are two examples of imported insects which create serious management problems on ornamental trees and shrubs.

Man has fostered another type of unstable host-parasite relationship by hybridizing and grafting woody plants. Lilac borer a native insect, was a pest of common lilac for years without creating serious

problems for nurserymen or landscape managers. However, when French hybrid lilacs were mass-produced by grafting lilac buds on privet and ash rootstocks, lilac borer became a serious pest, often precluding economical culture of lilac. Grafted lilacs are either more suitable host plants in which borers survive and multiply better, or they are incapable of withstanding or tolerating "normal" borer population density.

This example points out man's endeavor to change characteristics of plants can create the same kinds of problems sometimes created when an insect is introduced into a foreign environment. In both cases, the host-parasite relationships that develop are often unstable, resulting in a serious pest problem. Similar problems sometimes occur when native forest trees are planted off-site in the nursery or in the landscape. White birch is a good example of what may happen when a native hardwood is planted in the urban environment. In the forest, bronze birch borer prefers over-mature trees or those in poor vigor.

Severe damage occurs only on mature, decadent or disturbed stands.

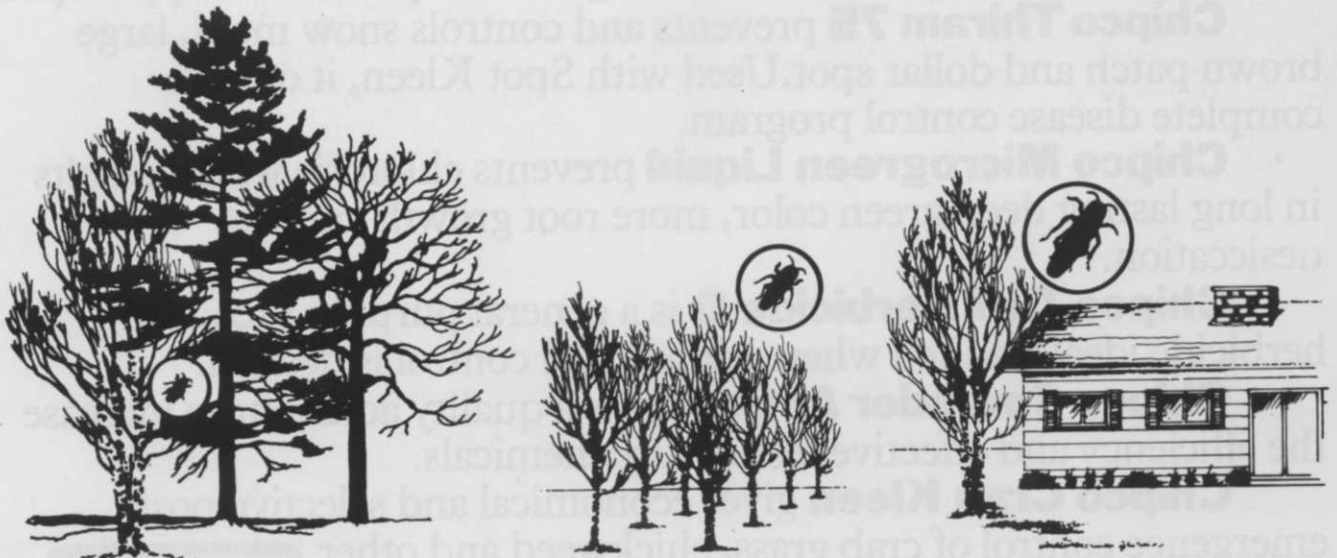
Apparently, white birch has a poor water transport system and is adapted to northern areas where cold temperatures and rainfall

Gypsy moth and black vine weevil are two examples of imported insects which create serious management problems on ornamental trees and shrubs.

prevail during much of the year. On more southern, drier, exposed sites, including nearly the entire state of Ohio, white birch seems to do quite well until bronze birch borer attacks. It appears that trees are healthy but are physiologically vulnerable to this destructive pest. Water stress is thought to play a primary role in the relationship. In this case, we are considering a native insect on a native tree in a foreign environment (the urban or suburban landscape).

Many of the most destructive urban insects are those which can be considered beneficial in the forest.

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Relative importance of bronze birch borer as a pest of white birch growing in various locations: (left) birch in a red oak — white pine — birch forest, borer is of minor importance; (middle) birch

in the nursery, borer is a significant production pest; and (right) birch in the landscape, borer is a major threat to survival.



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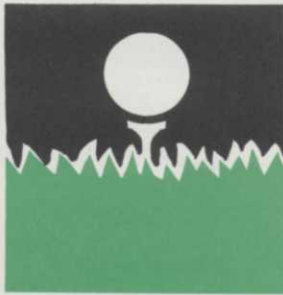
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| Spotted Spurge | Heal-All | Thistle |
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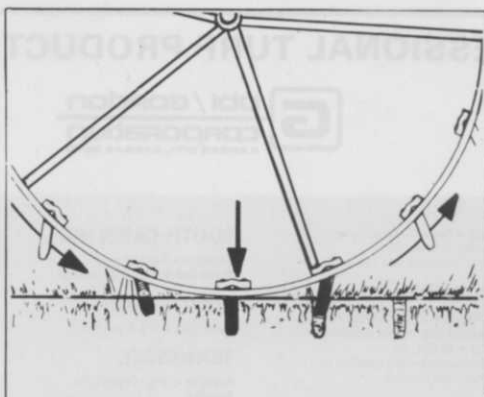


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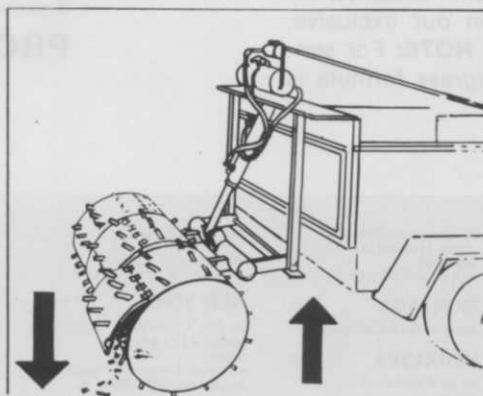
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Insect-Tree Relationships from page 22

Borers attack weakened trees, thereby expediting decline and decay of poor trees and making room for healthier trees. Whereas borers may be considered as secondary attackers or pests in the forests, clearwing moths seem to function as primary attackers or pests in the urban environment. Healthy looking ash trees in the landscape are often attacked by ash borers. These trees would probably survive if the borer were eliminated. On the other hand,

The landscape horticulturalist, plant pathologist and entomologist can work with the landscape architect to design plantings which will be less susceptible to insect predation and require less maintenance.

ash growing under forest conditions are seldom attacked by this insect.

I believe principles learned in forest entomology concerning insect tree-host relationships and used in forest management seldom apply to the urban environment. Many insects which are secondary attackers in nature are primary attackers in the landscape because trees are not adapted to this environment. In the forest, insects are adapted to (1) a co-existence relationship with healthy trees, and (2) a destructive relationship with trees which are in a weakened condition.

T. T. Koslowski of the Department of Forestry at the University of Wisconsin, has stressed the fact trees usually undergo some kind of physiological change before they are attacked by a damaging insect. And, the impact of an insect on a tree may or may not be drastic depending upon the physiological condition of the tree and subsequent environmental factors, including temperature, wind, rain, snowfall, etc. All these factors concern available soil moisture and evapotranspiration.

Most studies dealing with insect tree-host relationships indicate the importance of water stress in the severity of damage from insect at-

tack. Bark beetles, borers, sucking insects and lepidopterous defoliators seem to be more damaging either during or immediately following droughts. Some sawflies, however, do better when succulent foliage is available. N. E. Johnson, presently with Weyerhaeuser Co., has reviewed the literature dealing with these kinds of relationships. He indicates that sweeping generalizations are difficult to make, but a tree can withstand more injury without sustaining damage if it is vigorous and growing on a good (natural) site. How many urban trees are really vigorous and planted on good sites?

Common practices, often unrelated to trees or tree management in the urban environment, contribute added problems. J. D. Carrow and co-workers at the Canada Department of Fisheries and Forestry in Victoria, British Columbia have learned ammonium nitrate fertilizer adversely affects populations of balsam woody aphid, whereas urea and calcium nitrate are beneficial to the insect. Therefore, the kind or form of nitrogen fertilizer used on turf or landscape trees might promote or retard a sucking insect population. Defoliators and borers could be affected similarly.

As Kozlowski stated, insect pests influence their hosts by interfering with rates and balances among internal physiological processes, especially food, hormone and water

Most studies dealing with insect tree-host relationships indicate the importance of water stress in the severity of damage from insect attack.

relations. How the urban environment stresses trees and affects these internal processes must be understood before we can identify urban conditions which affect stress to which an insect can respond. The complicated system of interaction of tree-host environment has undoubtedly contributed to the lack of

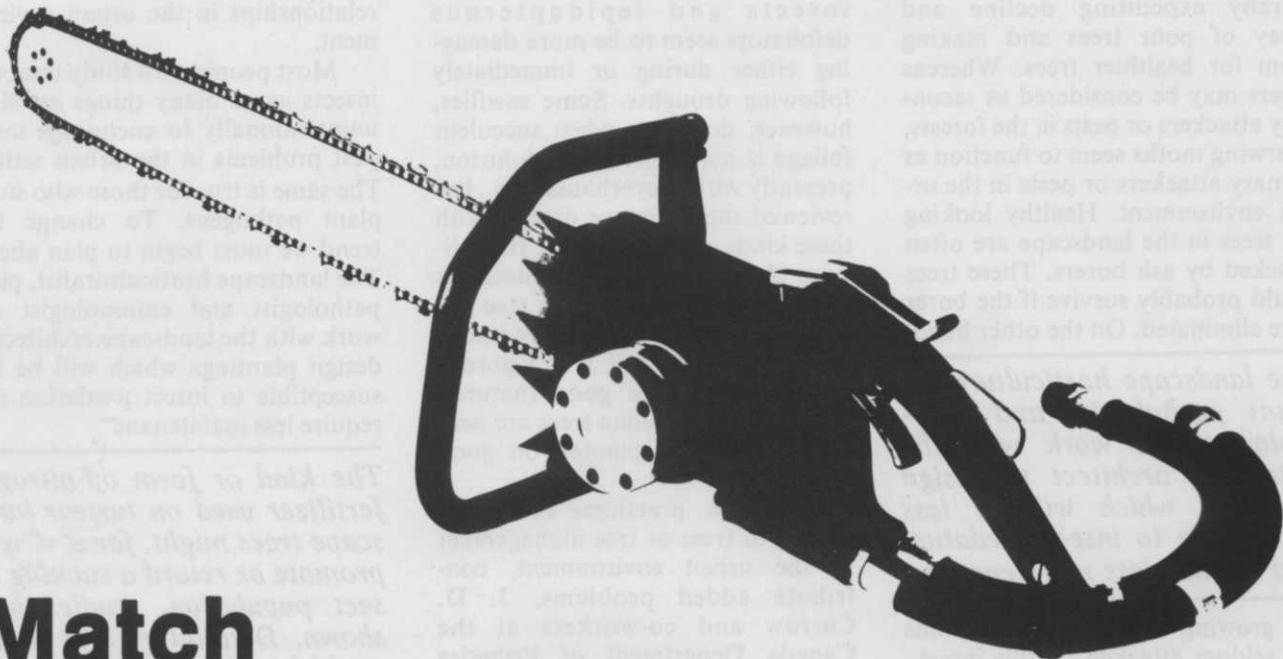
studies considering insect tree-host relationships in the urban environment.

Most people who study trees and insects agree many things are done unintentionally to encourage insect pest problems in the urban setting. The same is true for those who study plant pathogens. To change this trend we must begin to plan ahead. The landscape horticulturalist, plant pathologist and entomologist can work with the landscape architect to design plantings which will be less susceptible to insect predation and require less maintenance.

The kind or form of nitrogen fertilizer used on turf or landscape trees might, for example, promote or retard a sucking insect population, studies have shown. Defoliators and borers could be affected similarly.

If ornamental plants are a vital and necessary part of our urban environment, professional maintenance in the form of pest management is justified. Plant protection specialists who conduct surveys and serve as consultants to municipalities, industries and homeowners could implement such programs. However, before this approach can be workable across the nation we must rethink and possibly redefine the term "pest" and supply basic ecological information needed to make management decisions. Sampling methods, predictive models utilizing biotic and abiotic variables, and acceptable pesticides must be developed for our most common and destructive pests.

The research necessary to develop these tools is expensive and cannot be accomplished this century with the present commitment at state and federal levels. We must decide whether or not we will pursue pest management in the urban environment on the basis of sound biological and ecological information. □



Match The Chain Saw to the Job

A chain saw should be carefully selected. Buyers should match the saw to the job they intend to do. They should examine a variety of makes and models before purchasing. Dealers or company representatives should be consulted about the amount and type of cutting to be done, according to Howard J. Doss, Michigan State University extension agricultural engineer.

"The size of the saw, that is, cubic inch displacement, should match the type of work the operator expects to do with it," Doss told WEEDS TREES & TURF. "If too small a saw is continually used for tough jobs, the tendency for the person will be to over-exert. Under these conditions, accidents can occur. The saw should do the work with a minimum of effort on the part of the operator. If a saw keeps binding or stalling, even though it is in good mechanical condition, it is not matched for the job."

The operator should be matched

Match the operator to the job too, says Michigan State University agricultural engineer Howard Doss. His checklist for safe, efficient chain saw work can be used as basic training for every person on your crew.

to the job too. "Felling and cutting timber is hard work. Operators should be in good physical condition, able to withstand heavy work periods. Persons who become exhausted easily may be a potential accident victim," he says. Don't hesitate to take frequent rest breaks.

A chain saw equipped with anti-vibration characteristics will help reduce fatigue and avoid numbing and swelling of hands. Also, some units are equipped with chain brakes to stop the chain if the saw kicks back.

Most small saws are equipped

with automatic oilers which are sufficient for occasional cutting. But if several face-cords a day are to be cut, particularly hardwood, the saw should have a manual oiler in addition to the automatic system.

A prerequisite to any cutting operation is proper clothing for the operator. "Wear warm, comfortable trim fitting clothing that allows easy movement, light nonslip gloves and good gripping boots or shoes," Doss says.

Safety goggles or eye glasses with safety lens help prevent possible eye injury from flying wood chips or sticks. A good safety hardhat may prevent serious head injury from possible falling material.

"Ear plugs or acoustic muffs are essential because of the saw's high noise level. If ears ring for an extended time after the saw is used, hearing damage may have occurred," Doss says.

Check automatic or manual oilers, air filters and cooling fins for

to page 30

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Dwight Brubaker
Grounds Superintendent,
Host Farm Resort

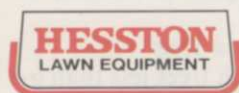
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Chain Saw

from page 28

possible blockage or clogging, before starting. Fuel should be mixed according to owner's manual instructions, stored and transported in a properly labeled heavy gauge metal gasoline container.

"Refueling should be done with the saw on the ground and in an area cleared of possible combustibles at least two tree lengths away from anyone else," Doss says. Under no circumstances should you be smoking while refueling.

Starting should be done with the saw on the ground, one foot placed in the bracket to the rear of the unit. Grip the handle at the top of the saw and pull the starter rope with the other hand after starting controls

Make sure the saw blade does not touch the ground. An operator can cut 40 trees and not do the damage to the chain that striking the ground with it once can do.

have been properly set. Never allow another person to assist in starting. If either person slips or lets go, someone may get cut.

A chain saw must be properly maintained to be safe. This includes sharp teeth, correct chain tension, proper lubrication and a well-tuned engine.

"Most routine maintenance can be accomplished by following the owner's manual recommendations.

Every owner should have a good tool kit to help assure continued operation when doing a lot of cutting. It should contain:

- a few extra cans or a bottle (with attached pouring nozzle) of chain oil
- Wrenches to fit all nuts and lugs on the saw
- Screwdriver
- Round file and guide for touching up the chain
- Flat file and depth gauge to file depth guides
- Small brush to clean away sawdust and wood chips
- Extra sparkplug
- Owner's manual (wrapped in a plastic bag)
- Cleaning rags

"If the operator is going to be doing a lot of cutting, an extra chain should be taken along as a spare. Alternating chains every day will greatly prolong the life of the chain and sprocket upon which it runs," Doss says.

If an owner has not had operating experience before purchasing a saw, a few trial cuts should be made to become accustomed with its cutting and handling characteristics. Cut small logs supported off the ground so the chain will not strike the ground. Let the saw do the cutting. Extra pressure need not be applied. Operate with the saw when cutting large diameter logs with the throttle about three-quarters open. Overpowering the saw will waste fuel and create unnecessary engine wear. Underpowering will not push enough air through the cooling fins and may cause engine overheating.

If the chain cuts a wide groove or the cut shows fine powder instead of wood chips, it needs sharpening. If the saw tends to cut a circular path instead of a straight line through the log, the guidebar track, along which the chain runs, is worn on one side. Unless the owner has the proper equipment to correct the problem, chain and guidebar should be taken to the dealer for filing.

The most important safety factor in a chain saw cutting operation is the operator.

"The saw must be adequate to do the job but more importantly, the operator must have the knowledge and ability to safely perform the work," says Dr. Randall Heiligmann, Michigan State University extension forestry specialist.

Certain trees are dangerous to inexperienced operators. Lumber-

An extra chain should be taken along if a lot of cutting is to be done. Alternating chains every day will greatly prolong the life of the chain and sprocket upon which it runs.

jacks use some of the following expressions to identify problem trees:

—Widowmaker, is a tree with broken or dead limbs or a dead tree "hung up" in another tree. A limb doesn't have to be very big or high in a tree to be capable of causing serious injury if it falls on a person.

—Spring pole is a sapling that is bent and held under tension by another tree. If the spring pole is cut or the other tree is removed from it, the sapling can snap up with a tremendous force and seriously injure anyone nearby.

—Schoolmarm is a tree with a prominent form in the trunk or two trees grown together at the base,

If a chain cuts a wide groove or the cut shows fine powder instead of wood chips, it needs sharpening. If the saw cuts a circular path instead of a straight line, the guidebar track is worn on one side.

making it difficult to predict which way it will fall.

"Unless the operator has had plenty of experience or instruction, trees like these should not be cut. Nor should an inexperienced operator try to cut any tree with a diameter greater than the length of the saw blade. This requires special techniques and a person could be seriously injured if the saw made a 'kickback' — jumped backward as the chain at the top of the cutting bar snagged," Heiligmann says.

Before felling a tree, size it up carefully. Note the distribution of the larger branches and wind direction to determine how the tree is apt to fall.

"During the cutting operation the saw should be held close to the body to provide maximum control. Do not work with arms extended. Keep knees flexed and one foot comfortably behind the other to provide maximum balance," Heiligmann says.

Be sure the work area around the tree is cleared of underbrush or obstacles that could be tripped over. Make sure an escape path 45 degrees opposite the direction the tree will fall, is cleared. Examine the tree for loose or dead limbs before felling. If they appear a hazard, remove them first.

When felling a tree:

—Cut through trees less than 6-8 inches thick with one cut.

—On larger trees, make a notch on the side of the tree on which it is expected to fall. It should have a depth approximately one-third the diameter of the tree.