DIAGNOSING 51100T-BORING INSECTS OF PINES

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Many different kinds of insects feed in the shoots of pine trees. Some insects, such as the white pine weevil, can severely damage the growth, form or appearance of trees. Other insects, such as the pitch nodule maker, rarely cause serious damage. Still other insects, like the pine shoot beetle, may cause infested trees to be regulated by state or federal restrictions on shipping.

This flow chart is intended to help Christmas tree growers, landscapers and foresters determine what insect has caused damage to shoots of pine trees. Regular scouting of trees and plantations during the growing season will help you detect shoot borers before damaging populations can buildup. Although it is always best to actually collect the insect causing the damage, occasionally this may not be possible. Growers who learn to recognize the "clues" that shoot-boring insects leave behind will be better able to plan future scouting.

To use the flow chart, begin by determining whether the terminal leader or lateral shoots are damaged. It is also very helpful to know whether the damage was caused by a caterpillar (moth larva) or a beetle. See the illustrations in this bulletin for examples of the life stages of moths and beetles. Once the insect pest has been identified, the amount of damage to the tree, field or stand should be assessed. An integrated management plan can then be developed to prevent economic loss while protecting the environment. Refer to the table in this bulletin for information on the hosts, life cycle and control of common shoot-boring insects.
# SHOOT-BORING INSECTS OF PINE

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<tr>
<td>Eastern pine shoot borer</td>
<td>Pines, Douglas-fir, White spruce.</td>
<td>Attacks terminal leaders or laterals.</td>
<td>Caterpillar is present in shoots late May to early June to late June/ mid-July</td>
<td>On ground, late summer to following spring.</td>
<td>Overwinters as pupa on the ground.</td>
<td>Tunnel 10-30 cm long bored down pith of shoot lots of sawdust-like frass; a round or oblong exit hole can be seen on outside of shoot; terminal leader and sometimes lateral shoots break off cleanly, leaving a short stub.</td>
<td>Usually normal damage removed during shearing; corrective pruning needed if terminal killed; use insecticide only if damage very heavy; correct timing of application very difficult to achieve; try to spray trees in early May to kill recently hatched larvae before they bore into shoot.</td>
</tr>
<tr>
<td>White pine weevil</td>
<td>Pines, Spruces, rarely firs.</td>
<td>Attacks terminal leaders and bores down through 2-3 years of growth.</td>
<td>Grubs present late May/ early June to late July.</td>
<td>In chip cocoon (oblong chamber made of fine slivers of wood) under bark on terminal; late July to August.</td>
<td>As an adult weevil in litter below trees.</td>
<td>Several larvae form a &quot;ring&quot; and feed on cambium of terminal leader; damage occurs around the circumference of the leader and not in the shoot; pith: feeding damage may go down as far as the second and third whorl of branches; damaged terminals form &quot;shepherds' crook&quot;; chip cocoons under bark of leader; feeding on circumference of leader and not pith; a few to several grub-like larvae feeding in a ring just under bark.</td>
<td>Prune off and destroy infested or damaged terminal leader below the point where feeding stops; use corrective pruning to restore form by cutting back all but one upper lateral treat tops of trees in late April/ early May with registered insecticide if needed.</td>
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<tr>
<td>European pine shoot moth</td>
<td>Pines.</td>
<td>Attacks lateral shoots.</td>
<td>Caterpillars mine needles in late June or July; by mid/ late summer older larvae move into buds and remain there until the following spring.</td>
<td>In late May or June inside burrow-like tunnels in ends of shoots.</td>
<td>As larva in feeding tunnel in or near a bud.</td>
<td>Brown needles mixed with green needles on ends of shoots in midsummer; small webs coated with yellow-white pitch which turns hard around new bud clusters in late summer; stunted shoots, bushy or deformed tops; attacked shoots bend over and die in spring or grow crookedly.</td>
<td>Prune off damaged shoots; basal pruning to remove lowest whorl of branches will decrease winter survival of larvae; treat new shoots in late June or early July with registered insecticide to kill newly hatched larvae if needed.</td>
</tr>
<tr>
<td>Adana pine shoot moth</td>
<td>Pines; usually seedlings or young trees.</td>
<td>Attacks lateral shoots on trees or seedlings.</td>
<td>Caterpillars present late April/ early May to mid-summer.</td>
<td>Late summer to following spring.</td>
<td>As a pupa inside a cocoon attached to root collar just below soil surface.</td>
<td>Presence of cocoons (containing pupae) on root collar just below soil surface; usually seedlings and small trees affected; small hole at base of dead shoot in mid/ late summer; shoots die before needles fully expand.</td>
<td>Shear off damage and corrective prune; consider registered insecticide in mid/ late April if needed.</td>
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## Shoot-Boring Insects of Pine (continued)

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<td><strong>Nantucket pine tip moth</strong></td>
<td>Pines (except eastern white pine) less than 4.5 m in height.</td>
<td>Attacks lateral shoots on seedlings or trees.</td>
<td>Caterpillars present late A pupa is usually apparent in mid-June to late July; may have two generations in some areas; second generation larvae present in early August.</td>
<td>Mid- or late June to following spring if one shoots. Generation; mid-June to early July.</td>
<td>As pupa within damaged shoots; consider registered insecticide application to shoot tips in mid-May to late August if two generations.</td>
<td>Usually minor importance; Prune and destroy infested shoots in Michigan.</td>
<td>Prune and destroy infested or injured tips of damaged shoots; consider registered insecticide application to shoot tips in mid-May to late August if two generations.</td>
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<tr>
<td><strong>Northern pitch twig moth</strong></td>
<td>Scotch and jack pine (Petrova albicapitana)</td>
<td>Attacks lateral shoots, usually at or near a shoot.</td>
<td>Caterpillars can be present year round because the insect requires two years to complete its life cycle.</td>
<td>Can be present year round.</td>
<td>As larva or pupa Hollow, thin-walled blister. Prune off damaged shoots; can dig larva out of shoot or node of pitch usually located at crotch of two or more shoots; larvae or pupae may be found inside pitch blister.</td>
<td>Insecticides not needed.</td>
<td>Prune and destroy infested or injured tips of shoots.</td>
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<tr>
<td><strong>Jack pine tip beetle</strong></td>
<td>Pines.</td>
<td>Kills top 1 inch of lateral or terminal shoot.</td>
<td>Grubs may be present all summer; two generations per year.</td>
<td>May be present all summer.</td>
<td>As adults.</td>
<td>Very small dark beetle or several very small white beetles feeding in outer 1 inch of shoot; small pitch tube about 1 inch below bud where beetle bored in; yellow or red shoot tips.</td>
<td>Prune off damage; no insecticide needed.</td>
</tr>
<tr>
<td><strong>Pine shoot beetle</strong></td>
<td>Pines.</td>
<td>Attacks lateral shoots.</td>
<td>Grubs present in brood material such as logs, stumps and recently killed trees from late March to mid-late June.</td>
<td>Not seen in shoots; pupates in brood material.</td>
<td>As adult beetle in base of living pine tree.</td>
<td>Dark adult beetle feeding in shoot in pith of shoot; tunnel hollow with no frass; pitch tube often visible on shoot where beetle bored in; two or more pitch tubes, boring holes and tunnels may be present in single shoot; tunnels vary from 1 inch to 10 inches in length.</td>
<td>Best management is to destroy available brood material by late April; contact Extension agent for additional information.</td>
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<tr>
<td><strong>Shoot boring bark beetles</strong></td>
<td>Pines; one species known to attack red pine in Michigan.</td>
<td>Attacks lateral shoots.</td>
<td>Tiny grubs present probably early to mid-summer.</td>
<td>In shoots; probably late summer; maybe until following spring.</td>
<td>Probably as adult in litter or in shoots.</td>
<td>Pitch tube where adult beetles bore into shoot; egg gallery cut into pith of shoot; 1-3 larvae feed on pith, wood and inner bark and pupate in shoot; damaged shoots often occur in bunches on tree, probably because adults attack several nearby shoots; very little known about life cycle in this region.</td>
<td>None needed; beetle apparently rare in this region.</td>
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Moth Life Cycle

Terminal Leader

Lateral Shoots

Beetle Life Cycle

egg
larva (caterpillar)
pupa
moth

egg
larva (grub)
pupa
adult

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