When Things Are Boring

The weeping trees await their destiny, an ignoble burial in the burn pile. Their fate in the pyre driven by their holy wounds, the tell-tale signs of borers. Boring beetles and moths can drill a hole into many types of trees and wallets in nursery production. Given a greater understanding of the culprit species and their biology, growers in the Pacific Northwest will have more success in managing these borers. Research conducted in Willamette Valley nurseries by Rosetta, Altland, Cramer, Doane, and Elliott has given us useful information about activity of key borers in regional nursery systems.

Identification of the most common species attacking field and container-grown shade trees has been determined by using a combination of trapping and examination of infested trees. We have seen some strong trends concerning key borer species in nurseries. Perhaps the easiest way to categorize borers affecting shade trees in Oregon is by their general type. In our experience, ambrosia beetles, flat-headed borers, and clearwing moths cause the greatest number of losses in shade trees.

Ambrosia beetles

The name conjures up a tasty treat, food for the gods. Indeed these beetles, though generally not considered deities by nursery producers, are named for their fostering care of ambrosia fungi. The beetles carry the fungi from tree to tree, rearing a mycological feast for young larvae in their tunnels. A common forensic hint of ambrosia attacks is the presence of dark-stained runs into the sapwood. These same beetles are sometimes called shothole borers, their tiny entrance holes, sometimes numerous, resembling damage wrought by a shotgun.

There are two species of ambrosia beetles that we most commonly find in our traps and trees in nurseries: *Anisandrus (Xyleborus) dispar*; and *Xyleborinus saxeseni*. The predominant damaging beetle is the European shothole borer, *Anisandrus (Xyleborus) dispar*, sometimes called the pear blight beetle. When autopsies are performed on infested bolts of shade trees, this is the villain most frequently found at the scene. Identification is made easier by the overwintering habit of the adult beetles, the tiny black beetle’s rear end projecting from the hole. This species can damage a wide variety of host trees, seemingly preferring the most expensive varieties grown. Hosts include: *Acer, Aesculus, Alnus, Betula, Castanea, Celtis, Crataegus, Corylus, Cydonia, Fagus, Fraxinus, Juglans, Liriodendron, Magnolia, Malus, Platanus, Populus, Prunus, Punica, Pyrus, Quercus, Salix, Styrax, Ulmus, and Vitis* (Bhagwandin, 1992; Solomon, 1995).

After wintering inside a suitable host, the female *A. dispar* beetle takes advantage of the first warm day in late winter or spring to escape to a new adventure in another host, preferably a tree.
exhibiting signs of stress. The much smaller male is flightless, destined to be homebound in the tree in which it was born. The female’s initial attraction is to ethanol emitted by stressed trees. Once the female shothole borer finds a good host, she sends out invitations to her friends in the form of an aggregation pheromone. This volatile chemical is responsible for secondary attacks on trees, with hordes of beetles gathering at the housewarming party. Thus shothole borers and their social habits can leave trees riddled with entrance holes. It is thought that *A. dispar* has two flights per year in Oregon, in early spring (our trap catches show a peak in late March/early April) with activity into May and June.

The lesser shothole borer, sometimes known as the pinhole borer, *X. saxeseni*, seems to have an affinity for baited funnel traps. It has a well-earned reputation for showing up in large numbers in traps but has also shown up in nursery trees as well, though much less commonly as *A. dispar*. It also has a wide host range and can be found from *Acer, Albizia, Arbutus, Betula, Carya, Cedrus, Celtis, Cornus, Diospyros, Fagus, Gleditsia, Ilex, Juglans, Liquidambar, Populus, Prunus, Quercus, Taxodium*, and *Tsuga* (Solomon, 1995). There may be three flights of the lesser shothole borer in Oregon. Our traps captured adults as early as March but with distinct peaks in adult catches in April and June with minor activity in July and August.

The oak ambrosia beetle, *Monarthrum scutellare*, was the third most commonly captured shothole borer in our funnel traps. We have had few reports of damage associated with this beetle in nursery stock, however.

Another shothole borer found now found in Oregon is the black stem borer, *Xylosandrus germanus*.

**Bostrichid borers**

The most common borer we see from the family of beetles called Bostrichidae, is the branch and twig borer, *Melalgus confertus*. It is a relatively large size beetle and only an occasional pest in nurseries.

**Flatheaded borers**

Fresh sawdust at the base of trees in August often heralds an issue with flatheaded borers. The Pacific flatheaded borer, *Chrysobothris mali*, is the key damaging species. At least 70 species belonging to 40 genera in 21 plant families have been reported as hosts. *C. mali*, like most other borers, targets stressed trees. Susceptible trees include those which have experienced sunburn, drought, or even too much water, leaving the root system anoxic. Gumming or sap dripping at the base of the plant often near the graph union shows the location of the larval activity. This borer tends to mine the cambial area leaving tunnels filled with sawdust and frass. Just one *C. mali* larva can girdle a tree but we also see multiple larvae at times. An exploratory dig under the bark of an affected tree during a nursery visit yielded eight such larvae.

The adult borers are dark reddish-brown, bullet-shaped beetles with copper colored spots on their wings (elytra). More often seen are the legless larvae with their large flattened “head”. Their real head is actually quite small. It is the large flat, slightly square prothorax next to the head that is most noticeable. The adult beetles are reported to fly in Western Oregon from May
through August. They lay their eggs in bark crevices. The eggs hatch (eclose) in two-to-three weeks and the larvae bore directly through the bark and begin feeding in the phloem tissue of the tree. By early fall the larvae begin to move inward into the sapwood to form the pupal chambers in which they will overwinter as prepupa. They remain as larvae within the trees for one to two years depending on the elevation and or location in colder climates. In Western Oregon they are reported to be in the pupal stage from mid-March through mid-June.

For those growing conifers, the flatheaded cedar borer, *Chrysobothris nixa*, can be problematic. Host plants include *Calocedrus decurrens*, *Cupressus macrocarpa*, *Cupressus forbesii*, *Cupressus nevadensis*, *Juniperus occidentalis*, and *Thuja plicata*.

Although native to eastern Oregon, bronze birch borer, *Agrilus anxius*, has been detected in several urban locations including the Portland metropolitan area, Albany, Corvallis, and Eugene. Its spread to more areas in western Oregon is likely. These flatheaded borers are more slender than their cousins and tend to tunnel higher on the trunk. *A. anxius* feeds and girdles phloem tissue, causing dieback in small crowns of the upper canopy. Foliage begins to yellow in mid-summer, progressing to brown dead leaves. Raised, uneven cracking bark, dark staining and emergence hole on the trunk are also indications of an infestation. These borers are particular about their hosts, remaining in birches but species preference is noticeable. The extent of this pest's impact in nursery production is yet to be determined.

Clearwing moths

Several species of clearwing moths may inhabit nursery trees in Oregon. By far the most common and serious clearwing moth is the peach tree borer, *Synanthedon exitiosa* (Say). Named for its preference for peaches and *Prunus* species, this moth can cause serious damage in hosts. Larvae burrow into the bark of the crown and feed on the cambium. Feeding is usually just above or just below soil level. The larvae are rather large, creamy beige and legless. They have a brown head capsule. The larger adult female moth is striking with her dark, smoky blue wings and dark body with a bright orange stripe. The male is smaller, more wasplike in appearance with clear wings and a black body with yellow stripes. Adult moths are reported to emerge in May through October (Solomon 1995) or late June and fly through September (Berry, 1998). Eggs are laid singly or in masses at the soil line and larvae bore into the trunk.

While many shade tree growers are aware of this borer, we also have been seeing damage in *English laurel*, *Prunus laurocerasus*: ‘Otto Luyken’ and ‘Schipkaensis’. Damage is harder to see in shrubs as it can be covered with the lower foliage.

Those growing conifers may have experience with another clearwing borer, the sequoia pitch moth, *Synanthedon sequoiae*. Despite the name, we tend to see it more commonly in pine trees in nurseries in Oregon.

Management

The oft repeated phrase that borers attract to trees under stress underlies the fix to most borer management issues. Improving growing conditions is well worth the attention. But one bad day or several in a row might put a crop at hazard. Should one determine a persistent problem with
borers, some protective management tactics might be useful. Monitoring with ethanol-baited funnel traps and protective long-residual chemical applications for shot hole borers is one tactic employed in some sites. Pheromone monitoring traps and mating disruption are another option available with the peach tree borer. Roguing and burning flatheaded borer-infested trees and modifying cultural conditions for future crops are current practices for those borers. Flat headed borers are notoriously hard to monitor but work by Jason Oliver and his colleagues at Tennessee State University and USDA/ARS has worked with benzaldehyde lures combined with purple or magenta traps to monitor the flatheaded appletree borer.

These are some of the most prominent borer species currently experienced in Pacific Northwest nursery production but that situation may change with the potential introduction of new exotic borer species. Hopefully armed with a little extra knowledge we'll keep boring to a minimum.

Acknowledgement:

This information has been updated from an article that was originally printed in the *Digger* magazine. I'd like to thank the contributors to this work, Dr. James Altland, Eryn Cramer, Sarah Doane, and Kirin Elliott.

References cited:


http://wcga.net/shb.htm


Author: R.L. Rosetta, Extension Nursery Integrated Pest Management, Department of Horticulture, Oregon State University/NWREC.

Published at Pacific Northwest Nursery IPM website on 5/17/11