



Pest e-alerts



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Pine Wilt Update

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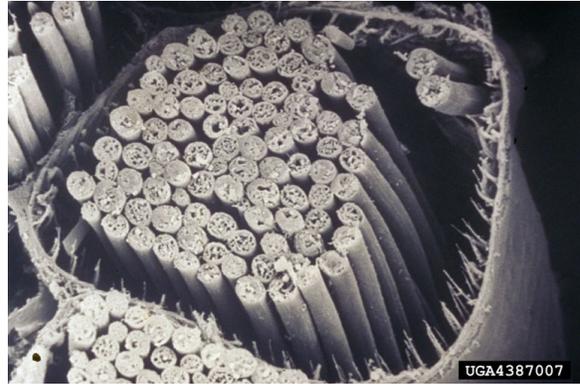
I have been receiving phone calls already this spring and early summer concerning the rapid death of Austrian pines in Oklahoma. I also accompanied Ray Ridlen, Oklahoma County Extension Educator, recently on a trek through areas of Oklahoma County that have had severe pine tree losses. The disease that is causing the rapid death is pine wilt, which is caused by infestations of the pinewood nematode. While many trees in the state have experienced damage from storms this season, these weather events would not cause this type of death. Even the large hail that moved through Oklahoma City last month would not cause rapid death like that which is being observed. Certainly the severe weather may have caused a lot of tree damage and may predispose trees to other diseases in the future.

Pine wilt is most devastating to non-native pine species such as Austrian pine, Scots pine, and Japanese black pine. The pinewood nematode (*Bursaphelenchus xylophilus*) is a pathogen that is native to North America. Therefore, native North American pine species will typically have better resistance. In fact in native stands of pines, infestations of the pinewood nematode are considered inconsequential. There are exceptions to this rule, pine trees that are under stress (drought and heat) are especially predisposed for pine wilt.



The pinewood nematode is transmitted to pine trees via long-horned beetle vectors, mostly in the genus *Monochamus* (left). The beetle can feed on limbs of healthy trees, but is drawn mostly to trees under stress or that are already in decline. The beetles will deposit eggs that will result in larvae that feed in dead or dying trees. The pinewood nematode is attracted to beetle pupae in the tree and before the beetle

molts to an adult they enter the breathing canals of the beetle. Each adult beetle that emerges can carry on average of 15,000 to 20,000 nematodes. The adult beetles are attracted to other declining pine trees, initiate feeding sites, and begin depositing eggs, and the nematodes emerge and gain entry to the trees. The nematodes will move through and feed in resin duct cells and xylem element cells. Pinewood nematodes also have a rapid life cycle (4-5 days when temperatures are 77° F) enabling a fast increase in nematode populations within a tree. Feeding, nematode movement, and the production of toxins result in destruction of resin ducts and severe disruption and blockage of xylem elements. Subsequently, rapid wilting, decline, and eventually tree death will manifest. Nematodes will also feed on fungi that are introduced into the declining tree and can be carried with the nematode/beetle complex. These fungal species typically produce blue pigments (staining) as they infect the tree giving them the common name, blue-stain fungi.



A cross section through a beetle breathing element showing many nematodes inside. Photo Credit: L.D. Dwindell, USDA-Forest Service.



Wilting and "drooping" of pine needles still attached to a tree. Photo Credit: USDA-Forest Service.

Symptoms of pine wilt may initiate as yellowing or browning of needles. Typically, the decline and death of the tree is so rapid that needles will remain attached to the tree and often have a "drooping" appearance. The wood will be very dry and lack resin. Bending of branches on infected trees will often result in clean snapping rather than pliable bending due to the lack of resin. Time from arrival of the nematode to the tree, and tree death, can take place in as little as 1 to 2 months. Cutting into infected wood will often yield wood displaying "blue staining" as a result of the infestation by blue-stain fungi. This symptom DOES NOT always guarantee that the tree harbored pine wood nematode, but there is a strong correlation between the two organisms.

Managing pine wilt involves a multifaceted approach. First, do not plant non-native susceptible tree species in the landscape. Avoid causing stress to existing trees by

providing sufficient irrigation, fertilization, and prevent mechanical damage to trees. Dead trees should be cut down and burned in the spring (prior to May 1) before the beetles that transmit the nematodes emerge. In areas where burning is not allowed, chipping may be a sufficient alternative, but be sure to make the chips as small as possible. Burying the wood in soil often does not work as the beetles can still emerge even if buried. If wood is chipped, do not use the chips for mulch. Research at Kansas State University has demonstrated that nematode transmission can occur to healthy trees from infested wood chips. Also, do not move infested wood, as you will also be transporting the nematode and beetles.

Tree injections are available to manage pine wilt. However, injections are preventative (applied prior to the nematode infestation) rather than curative (applied after the nematode has infected and damaged a tree) treatments. Greyhound and Pinetect are the most researched products on the market. Both are comprised of a 2% abamectin active ingredient. Research at the University of Nebraska and Kansas State University have demonstrated that when these injections are applied preventatively they are about 90% effective. There are several drawbacks however, they must be reapplied periodically and they are very expensive. In Nebraska, 4-6ml of product is recommended for every 4" of tree circumference. So for a tree that measure 20" in diameter at breast height (DBH) it takes 15 injection sites at \$12/injection, which amounts to \$180/tree! The treatment is good for about two years before reapplication is necessary. For more information about Greyhound and Pinetect visit these websites:

Greyhound - http://www.wedgle.com/chemicals_greyhound.html

Pinetect - <http://www.treecaescience.com/arborceuticals/nematicides/pinetect>

Garden Webworm Management in Soybean

Tom A. Royer, Extension Entomologist

I have received several reports (Muskogee, Ottawa and Garfield counties) of garden webworm infestations in soybean. This pest occurs occasionally in soybean, more commonly in eastern Oklahoma. Typically, populations are heavier along the edges of a field, and infestations within a field are often spotty as well.

Webworms overwinter as larva and pupae, with adults emerging in spring. Female moths deposit from 2-50 eggs on host plants that will hatch in about a week. Webworm larvae are



slender, green with three dark spots arranged in a triangle on the side of each body segment. They enclose the leaves that they

feed on within silk webbing that they spin. They will feed for about 3 weeks and pupate.

In Oklahoma, we may see continuous generations occur from now through August. They are sometimes associated with pigweed infestations or move out of alfalfa fields that have been cut and typically cause more problems in soybeans that have not closed canopy. One characteristic of this pest is that it may occur in one field but not be a problem in the field right next to it. Therefore it is critical that individual fields be scouted before making a decision to treat with an insecticide. Fields with plants in the vegetative stage that are suffering severe defoliation will need to be treated, especially on young plants, as stand loss is a possibility. Soybeans in the reproductive stages will need to be treated when defoliation exceeds 20%.



There are several insecticides registered for garden webworm control. Check with EPP-7167, Soybean Insect Survey and Control in Oklahoma for control recommendations. Note that additional products, Battalion, Cobalt, Endigo and Silencer are also registered for control of garden webworms. Check the label for registered rates.

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