Forest Pest Alert: Oak Wilt

Caused by the fungus *Ceratocystis fagacearum*, this is probably the most serious disease of oaks in the eastern United States. Only found in the United States, oak wilt occurs from the Mississippi River east to the Atlantic, with an isolated pocket in Texas.

![Figure 1. Oaks infected with oak wilt fungus, *Ceratocystis fagacearum*. Photo was taken in September. Photo credits: David Jenkins, South Carolina Forestry Commission.](image)

All oaks are susceptible, but oaks in the red oak group (typically those with pointy foliage, like red oaks and turkey oaks) are affected much more severely than oaks in the white oak group (typically those oaks with rounded lobes, like white oaks). In fact, this disease has been used as a selective “herbicide” to remove red oaks from land where they are not desired!

The fungus reproduces in the tree’s vascular system, shutting down water transport in the xylem. Like many diseases that affect the vascular system, this results in symptoms very similar to those caused by drought. Symptoms often show up in the crown first, with leaves wilting (they aren’t getting water) and turning brown. The browning usually starts at the leaf
tips and progresses inward, leaving an abrupt border between brown dying tissue and green tissue.

Figure 2. Oak leaves from an infected tree. Typically die back from the tips. Photo credit: C.E. Seliskar, Bugwood.org.

The fungus can spread through root grafts and can be transmitted by oak bark beetles and sap beetles. Transmission by root grafts often results in a center of dead trees surrounded by a ring of dying trees.

Figure 3. Oak wilt spread by root grafts. Note the center of dead trees surrounded by a ring of dying trees. Photo credit: Joseph O'Brien, USDA Forest Service, Bugwood.org.

Under certain conditions, the fungus produces grey mats on the surface of the wood and on the inner surface of the bark. These grey mats produce a
fruit odor and exert pressure on the bark, often causing the bark to rupture. Sap beetles are especially attracted to the odor of the fungus.

Figure 4. Fissure in bark caused by the pressure exerted by a fungal mat. Photo credit: David Jenkins, South Carolina Forestry Commission.

Figure 5. Fungal mat under bark (bark has been peeled back). Photo credit: Fred Baker, Utah State University, Bugwood.org.
Wounds caused by wind damage or pruning can be entry points for spores and for beetles that are carrying the spores.

The oak wilt fungus does not tolerate high temperatures and often dies back in the smaller limbs when the weather is hot. However, the fungus will continue to grow in the trunk and the roots where the temperature is buffered by more tissue and soil.

The dead and dying trees are attractive to a variety of secondary pests besides the bark beetles and sap beetles already mentioned. These will include wood-boring beetles and woodwasps, such as *Tremex*. 

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*Figure 6. Xylem tissue with stains typical of sap beetles. Sap beetles are attracted to infected trees and can transmit the fungus to healthy trees. Photo credit: David Jenkins, South Carolina Forestry Commission.*
Figure 7. Tremex woodwasp ovipositing in a dying oak tree. Photo credit: David Jenkins, South Carolina Forestry Commission.

If you see symptoms consistent with oak wilt, you can contact the South Carolina Forestry Commission Insect and Disease Staff (David Jenkins (803) 896-8838 office; (803) 667-1002 cell; or at djenkins@scfc.gov) or your local Forestry Commission office.