Hickory dieback and mortality in Wisconsin

Wisconsin Department of Natural Resources, Forest Health Protection
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Hickory mortality seen in Dane County

Recently dieback and mortality on hickory have been reported in southern, and east and west central Wisconsin. This problem has been observed both on bitternut and shagbark hickory. Mortality of hickory has also been reported in neighboring states such as Minnesota, Iowa, and Missouri. Recent research found that the mortality is associated with the hickory bark beetle and possibly the fungus *Ceratocystis* spp.

The hickory bark beetle (*Scolytus quadrispinosus*), native to Wisconsin, is regarded as the most destructive insect of hickory in the eastern United States. Larvae of the hickory bark beetle attack and kill hickory trees by mining the phloem. Although the insect usually attacks overmature, weak, or recently killed trees, apparently healthy trees of all ages are also infested during outbreaks. Infested trees will show wilted leaves, twig and branch dieback, and often die. Feeding galleries are centipede-shaped and etched on the interface of sapwood (width 5-6 cm). Though both shagbark and bitternut hickories are commonly attacked by this insect, bitternut hickory appears more susceptible to attack for breeding purposes.

Hickory bark beetle adult exit holes

Adults are short, stout, dark brown to black beetles, and are 4-5 mm in length. Adults begin to emerge around the middle of June, and highest beetle populations and seasonal activity are observed during July and early August. Adult beetles fly to the crowns of healthy host trees to feed at the base of leaf petioles and twig crotches for 10-15 days before they deposit eggs. The insect overwinters as a larva. Adult exit holes are round and about 3mm in diameter.

Currently, management practice of this insect is to remove trees harboring overwintering larvae during winter and spring. Infested wood should be burned, chipped, debarked or submerged in water to prevent adults from emerging. Insecticide applications on trunks and large branches of high value trees in July can be effective to protect from infestation by this insect, though it is not practical in a forest situation.

Two additional beetles have been associated with the hickory mortality at some sites. The hickory agrilus (*Agrilus otiosus*) and the red-shouldered bostrichid (*Xylobiopsis basilaris*) have been recovered from dying/dead trees. Fresh cut hickory logs may also be attacked by the painted hickory borer (*Megacyllene caryae*). In some sites, extensive infection by Armillaria root rot was observed on some of the recently killed trees. The relative importance of Armillaria root rot in hickory mortality is unknown.

Recently two species of the genus *Ceratocystis* (*C. carya* and *C. smalley*i) have been isolated from sunken bark cankers and discolored wood associated with beetle attacks. It is suspected that *C.smalleyi* may play a role in hickory mortality associated with the hickory bark beetle. At this point, little is known about the relative role of the fungus *Ceratocystis* spp. and its distribution in Wisconsin. In the summer of 2006, the USDA Forest Service conducted a survey to detect the presence of *Ceratocystis* spp. on declining hickory trees in Wisconsin and some neighboring states. Isolates of *Ceratocystis* spp. were obtained from wood samples collected from 6 of the 8 sites chosen for the study in Wisconsin. The project is scheduled to continue in 2007 to further investigate this issue.