

27. *Thyronectria* Canker of Honeylocusts

William R. Jacobi and Jerry W. Riffle

Thyronectria canker is a disease of honeylocusts caused by the fungus *Thyronectria austro-americana*. The imperfect stage of *T. austro-americana* is *Gyrostroma austro-americanum*.

Hosts and Distribution

Native thorny honeylocust (*Gleditsia triacanthos* var. *triacanthos*), all cultivars of thornless and podless honeylocust (*G. triacanthos* var. *inermis*) and oriental honeylocust (*G. japonica*) are susceptible to *T. austro-americana*. The fungus also has been found on dead tissue of several hardwoods including American elm, white ash, mockernut hickory, willow, and bur oak.

The disease has been reported from Colorado to Massachusetts, occurring in Alabama, Colorado, Illinois, Kansas, Massachusetts, Mississippi, Nebraska, Oklahoma, South Dakota, and Tennessee. The disease has not been reported from northern States such as Minnesota or Wisconsin, so fungus distribution may be restricted by colder climates.

Symptoms and Signs

Symptoms include dieback of affected branches, reduced foliage, yellow foliage, premature fall coloration, and early leaf drop. Cankers range from slightly flattened surfaces to distinctly sunken areas with large callus ridges at the canker margin (figs. 27-1, 27-2). Thin bark areas of stems and branches may have a red-yellow discoloration associated with the canker. Usually there is no discoloration where the bark is thicker. Wood beneath infected bark turns wine-red to yellow.

Signs of the pathogen allow for better disease identification than do symptoms. Irregular pycnidia in stroma (stromatic conidiomata) (figs. 27-2, 27-3), which are light yellow-brown when fresh and blacken with age, and perithecia that are reddish-brown or gray but also darken with age, form in the cankered area on dying and dead bark. They are usually found in natural openings such as lenticels in thick bark areas (fig. 27-2), and scattered on bark surfaces in thin barked areas (fig. 27-4). Pycnidia exude milky masses of conidia. Conidia are



Figure 27-1. *Thyronectria* canker on a honeylocust originating from a branch crotch.



Figure 27-2. Canker on an inoculated honeylocust with large, dark colored masses of pycnidia extruding through bark.

hyaline, ovoid to ellipsoid, one-celled, and are 1.6–4.2 by 0.8–2.7 μm in size. The perithecia develop in rounded clusters in a stroma, and are smooth-surfaced and egg-shaped with a short neck. Asci contain 8 ellipsoid to pear-shaped ascospores. The hyaline to pale yellow ascospores have both transverse and longitudinal septa and range in size from 8–16 by 5–9 μm .

Nectria canker of honeylocust induced by *Nectria cinnabarina* appears very similar to *Thyronectria* canker, and is best distinguished from *T. austro-americana* on cultural characteristics, morphology of the asexual fruiting structures, and ascospore morphology. *T. austro-americana* cultures have somewhat waxy margins with orange slimy centers containing masses of conidia. *N. cinnabarina* cultures are white and fluffy. *N. cinnabarina* induces cankers that are usually sunken and contain a sporodochial asexual stage (*Tubercularia vulgaris*). The ascospores of *N. cinnabarina* are divided into two cells by a single transverse septum, unlike those of *T. austro-americana*.

Disease Cycle

The *Thyronectria* fungus overwinters as mycelium and fruiting structures on infected trees. Conidia presumably are spread by rain and ascospores by wind, although this has not been demonstrated. Infections are thought to take place through pruning wounds and other natural openings. Fresh bark wounds are infected readily by the fungus. Because the fungus is also a saprophyte, it can become established on dead wood such as branch stubs or wound edges.

The fungus grows in the cambium and outer xylem, where it eventually kills the cambium and surrounding cells. Trees, or affected parts, die because of cambial death and possible vascular dysfunction. Pycnidia can form within one month after tissue is colonized, and are abundant on bark of dying or dead trees. Perithecia form in affected areas but are not as common or abundant as pycnidia. Spore release is favored by high humidity and rain; spore germination is optimum at 77°–86°F. Infection and disease development is rapid at temperatures of 75° to 82°F.

Damage

Cankers at the tree base are usually fatal. Main stem or branch crotch cankers may cause complete girdling, depending on the tree's health. Stressed trees cannot compartmentalize the fungus, whereas vigorous trees may be able to callus over a canker and recover.

The incidence of the disease across the United States is not known, but occurs on honeylocust in urban, rural, and windbreak plantings.

Control

Thyronectria canker should be prevented rather than controlled. Physical damage and wounds should be avoided or properly cleaned and allowed to dry. The fungus infects trees under a variety of stresses. Avoid



Figure 27-3. Clumps of pycnidia on honeylocust bark (left).

Figure 27-4. Clumps of pycnidia are scattered on stems with thin bark (right).

stress due to drought, overwatering, restricted area for root growth, or restricted oxygen for root growth. Trees should be watered adequately but not excessively. Frequent light watering in heavy clay soils allows attack by other fungi at the tree base just below groundline. *T. austro-americana* then infects the weakened tree above the area previously infected by other fungi. Allowing the soil to dry out at the tree base would prevent infections at the soil line.

Pruning infected branches can reduce the chances of other infections. Trees should be pruned in cool, dry weather when the presence of fungal spores is reduced. Small cankers may be scribed out if the tree is reasonably vigorous.

Selected References

- Crowe, F.; Starkey, D.; Lengkeek, V. Honeylocust canker in Kansas caused by *Thyronectria austro-americana*. *Plant Disease*. 66: 155–158; 1982.
- Hudler, George W.; Oshima, Nagayoshi. The occurrence and distribution of *Thyronectria austro-americana* on honeylocust in Colorado. *Plant Disease Reporter*. 60: 920–922; 1976.
- Lieneman, Catharine. Observations on *Thyronectria denigrata*. *Mycologia*. 30: 494–511; 1938.
- Riffle, Jerry W.; Peterson, Glenn W. *Thyronectria* canker of honeylocust: Influence of temperature and wound age on disease development. *Phytopathology*. 76: (3): 313–316; 1986.
- Seeler, E. V., Jr. Two diseases of *Gleditsia* caused by species of *Thyronectria*. *Journal Arnold Arboretum, Harvard University* 21: 405–427; 1940.