17. Tubercularia Canker of Siberian Elm and Russian-Olive

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Tubercularia ulmea causes Tubercularia canker on Siberian elm and Russian-olive.

Hosts and Distribution

Tubercularia canker is widely distributed on Siberian elm and Russian-olive in the northern Great Plains. In 1979, *T. ulmea* was isolated from 17 percent of 609 Siberian elm cankers collected in 56 counties in Minnesota, Montana, North Dakota, and South Dakota. It has been reported on both hosts in the Canadian Prairie Provinces.

Tubercularia has a wide host range. During 1971 through 1975 *T. ulmea* was identified (confirmed by J. C. Carter) on 28 different host plants in North Dakota. *T. vulgaris*, the asexual stage of *Nectria cinnabarina*, is similar to *T. ulmea* and occurs on honeylocust and other hardwoods in the Great Plains.

Symptoms and Signs

Oval to elongate Tubercularia cankers can develop on trunks, branches, and twigs of affected trees. Flags, recently killed branches with dead leaves still attached, can indicate the presence of a canker that has girdled the stem (fig. 17–1). Gum deposits may be found on Russian-olive branches and stems attacked by *Tubercularia* (fig. 17–2).

The surface of infected bark is red-brown, and becomes brown to black as it dies and dries out. Sporodochia (fungal fruiting bodies) initially are produced in the diseased bark and emerge onto the bark surface. Immature sporodochia range from tan to orange to black (fig. 17–3); sporodochia become black as they mature (fig. 17–4). Sporodochia, which can be scattered or gregarious, may be up to 1.5 mm in diameter and up to 0.9 mm high. Conidiophores are hyaline, straight to strongly curved, and mostly 45–65 by 1.5–2.5 μm. Spores (conidia) from sporodochia are one-celled, hyaline, ovoid to oblong, and usually 4.6–6.2 by 1.5–2.3 μm (fig. 17–5).

T. ulmea readily colonizes dead or broken branches; thus the presence of its sporodochia on a dead branch does not necessarily mean that it killed the branch. Sporodochia may not be present on young cankers. At this stage, wood chips from the edge of the canker must be cultured on agar to confirm the presence of *T. ulmea*. Other canker-causing organisms, such as *Botryodiplodia hypodermia* on Siberian elm and *B. theobromae* and *Phomopsis arnoldiae* (syn. *P. elaeagni*) on Russian-olive, can cause similar cankers and may be present. The conidial stage of *Nectria cinnabarina (Tubercularia vulgaris)* is similar to *T. ulmea*.

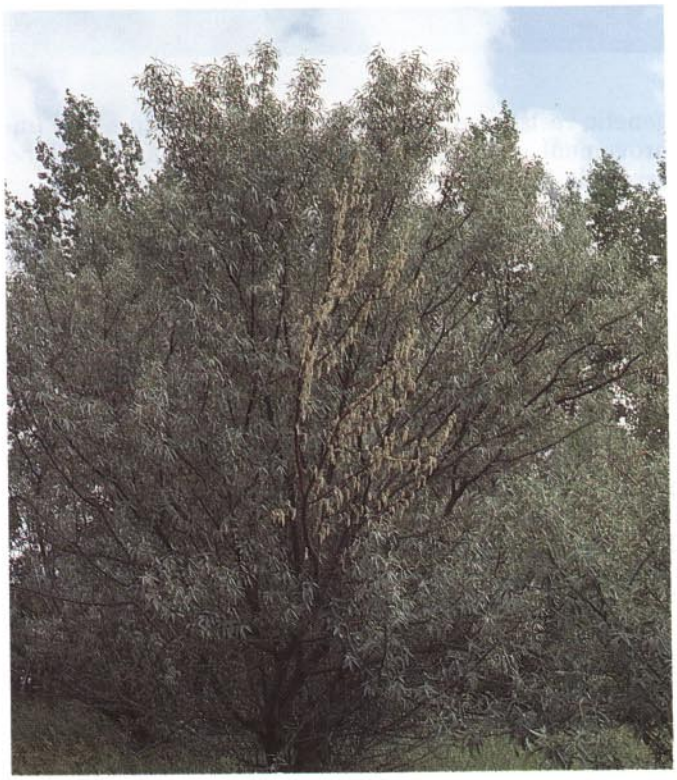

Figure 17–1. Flagging of Russian-olive stems caused by Tubercularia canker.

Figure 17–2. Gum deposits may develop on Russian-olive branch infected by *T. ulmea*.

Disease Cycle

Conidia liberated from sporodochia on cankers and on dead branches spread to and infect dead trees, or living trees that have been wounded. *Tubercularia* is a wound pathogen, and only infects living trees through wounds in the bark, such as those caused by hail, wind, snow, cattle, cultivation, or herbicide damage. The fungus can be found on weakened twigs and branches in the shaded interior of tree crowns. It is considered a weak parasite, and often infects stressed trees. Infections of wounded bark can either result in small cankers that callus over during the next season or in girdling cankers. The fungus occasionally causes perennial cankers. It overwinters as fruiting bodies and mycelium in cankered bark.

Damage

Tubercularia causes dieback or death of infected trees. Tubercularia canker appears to be a more important disease on Russian-olive than on Siberian elm. *T. ulmea* was isolated more frequently from girdling cankers on Russian-olive collected in North and South Dakota than either *B. theobromae* or *P. arnoldiae* (Krupinsky, unpublished). Although *T. ulmea* was isolated from girdling cankers on Siberian elm, it was considered secondary in importance to *B. hypodermia*, which was considered the primary pathogen.

Control

Because healthy trees are less susceptible to infection and damage, trees should be managed for optimum vigor. If possible, water and fertilize trees as needed. New plantings should be on good sites with vigorous planting stock and good weed control. Reduce chances of infection by preventing wounds, and do not bring infected material into uninfected areas. Because severely infected or dead branches are a source of fungal spores, they should be removed and destroyed. Prune back to the nearest living branch beyond the canker. Prune during dry weather. Disinfect pruning tools with alcohol after each cut, and apply fungicidal wound dressing to all cuts. Protective fungicides are registered for control of wound fungi on trees, but none are specifically labeled for this fungus. Genetic variation in disease resistance has been observed in common Siberian elm nursery stock. This genetic resistance is being utilized in a tree improvement program, and will be available in future cultivars of Siberian elm.

Selected References

Carter, J. C. Tubercularia canker and dieback of Siberian elm (*Ulmus pumila* L.). Phytopathology. 37: 243–246; 1947.

Krupinsky, J. M. *Botryodiplodia hypodermia* and *Tubercularia ulmea* in cankers on Siberian elm in northern Great Plains windbreaks. Plant Disease. 65: 677–678; 1981.

Figure 17-3. Immature sporodochia on surface of canker on Russian-olive. Removal of bark reveals canker margin.

Figure 17-4. Mature black sporodochia on bark of Siberian elm.

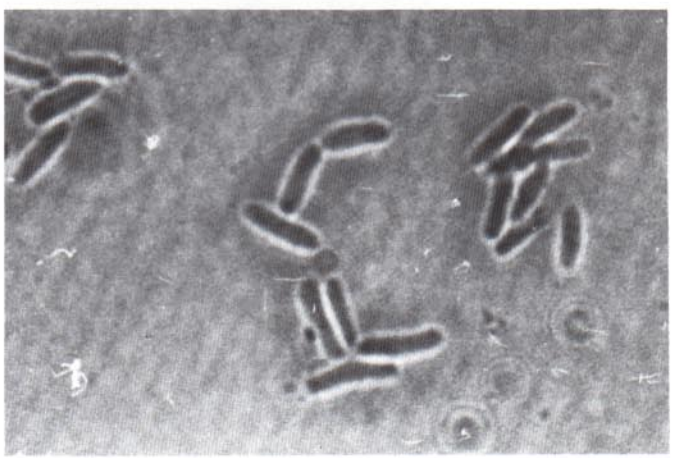

Figure 17-5. Conidia of *T. ulmea* from sporodochia.