19. Phomopsis Canker of Russian-Olive

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Russian-olive is used in windbreaks and in landscape plantings. It has been planted widely in windbreaks in the northern Great Plains because it survives rigorous environmental conditions. It is particularly tolerant of soil salt and drought. Unfortunately, it is susceptible to several fungal canker diseases: Phomopsis canker caused by *Phomopsis arnoldiae* (syn. *P. elaeagni*); Botryodiplodia canker caused by *Botryodiplodia theobromae*; and Tubercularia canker caused by *Tubercularia ulmea*. Information on Botryodiplodia and Tubercularia cankers is included elsewhere in this Handbook.

Hosts and Distribution

P. arnoldiae is one of the three pathogens causing cankers on Russian-olive in the northern Great Plains (Krupinsky, unpublished). Phomopsis canker appears to be the most important canker disease of Russian-olive throughout the North Central and Northeast United States. The disease was first found in Missouri in 1963 and subsequently in Illinois, Ohio, Delaware, Michigan, and New York. The only other recorded host is black walnut nursery seedling stock in Indiana.

Symptoms and Signs

Recently killed branches with dead leaves still attached (flags) indicate the presence of a canker that has girdled the stem (fig. 19–1). The primary symptom is an elongated reddish-brown to purplish-black canker (fig. 19–2). There is often an obvious canker margin in bark tissue, especially in older tissue. The sapwood immediately beneath the bark canker is brown, and this browning may extend beyond the margin of the canker.

Cankers often develop on shoots of the current year. Young shoots are girdled quickly, wilting the new silvery foliage. Phomopsis cankers also have been found on branches up to 4 inches in diameter. Frequently there

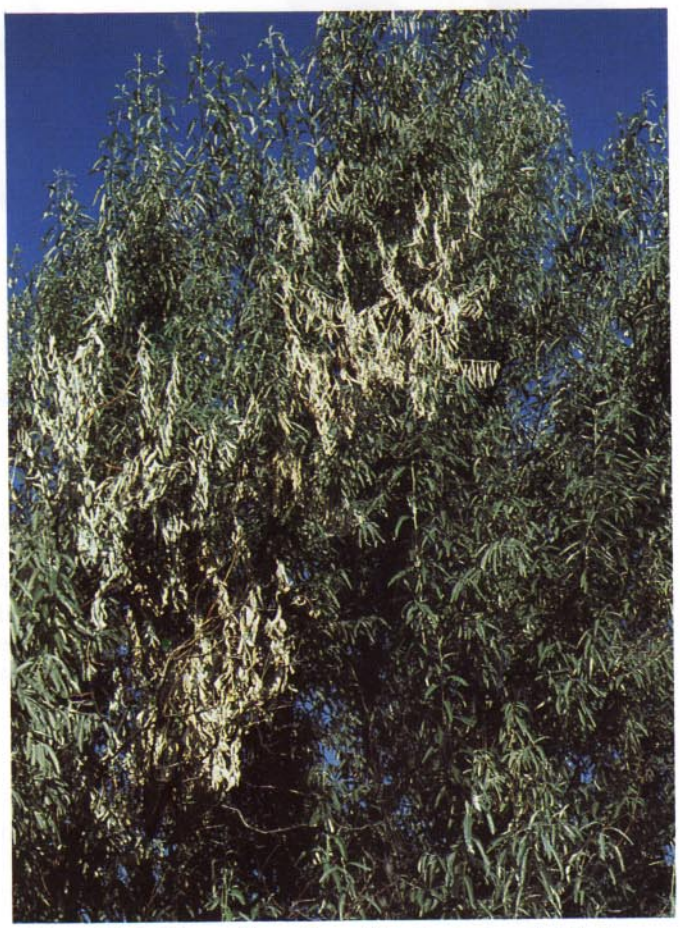

Figure 19–1. Flagged branches with attached, wilted foliage.

Figure 19–2. Elongated canker with reddish brown to purplish-black bark.

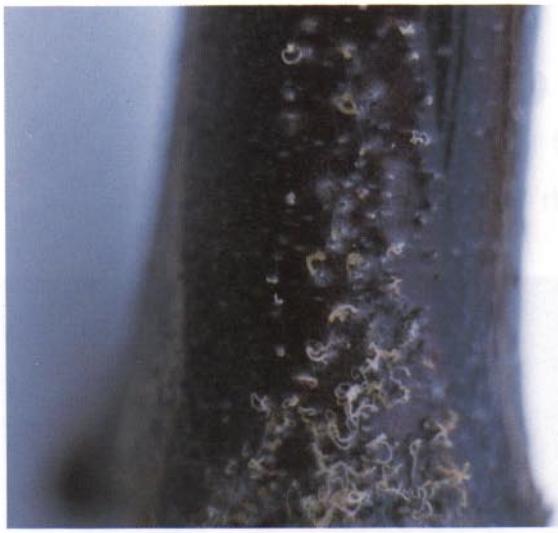

Figure 19–3. Conidia exuding from pycnidia of dying bark.

Figure 19–4. Alpha (shorter) and beta (longer) conidia of *Phomopsis arnoldiae.*

are gum deposits around the margins of cankers.

Artificial inoculation sometimes produced pycnidia in bark tissues within days; they are usually produced the same season. The pycnidia are multiloculate, usually gregarious on affected bark, erumpent, and 275 μm diameter by 500 μm high. Conidia exuded from pycnidia (fig. 19–3) are of two types. Alpha conidia are short (5–11 μm long), blunt, and straight; beta conidia are long (15–26 μm), filiform, and curved (fig. 19–4). Both spore types are produced on plant tissue and sometimes in culture.

When fruiting bodies are not present, the pathogen is confirmed by incubating wood chips, taken from the edge of the canker, on a nutrient medium until the fungus produces white fluffy aerial hyphae and pycnidia in stroma. *B. theobromae* and *T. ulmea* can cause similar cankers and may be present, particularly in the northern Great Plains.

Disease Cycle

The life cycle of the parasite has not been demonstrated, but observations of naturally infected trees suggest that most infection occurs on new growth. It is not known whether natural infection takes place throughout the growing season. Cankers develop within a few days following natural infection or artificial inoculation. Sporulation on infected tissue also follows quickly.

Damage

Infected Russian-olive and black walnut nursery stock must be culled and regraded. Terminal dieback of black walnut leads to multiple-stemmed trees. In the North Central States esthetic damage to ornamentals is most serious. While young ornamentals may appear to be disease-free, an inspection of trees in southeastern Michigan indicated that 52 percent of Russian-olive was infected. Both disease incidence and severity increase with age until plant appearance is no longer acceptable. In the northern Great Plains, the disease contributes to the decline of Russian-olive windbreaks.

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. Establish new plantings on good sites with vigorous planting stock, and control weeds. Reduce chances of infection by preventing wounds to the bark. Do not bring infected material into nondiseased areas. Because severely infected or dead branches of trees are a source of fungal inoculum, the branches should be removed from the site and burned. Infected branches should be pruned back to the nearest living branch beyond the canker. On specimen trees, the fungus was found no more than 6 inches below the canker margin. Trees should be pruned during dry weather, and pruning tools should be disinfected with alcohol after each cut. Preliminary results suggest that new canker development may be inhibited by systemic chemicals. Another option may be the use of resistant varieties. The newly released Russian-olive variety 'King Red' is described as being disease resistant.

Selected References

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