18. Botryodiplodia Disease of Russian-Olive

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Russian-olive has been planted in the Great Plains for over 65 years. Early reports indicated that Russian-olive was highly adapted to Plains conditions, and was free of serious diseases and insect pests. Thus, this species was used extensively in windbreaks established in the Great Plains by the Prairie States Forestry Project (1935–1942). An investigation in the 1960's however, revealed that the fungus *Botryodiplodia theobromae* was causing a serious stem disease of Russian-olive in windbreaks in Nebraska (fig. 18–1).

Hosts and Distribution

B. theobromae has a wide host range that includes association with cankers of sycamore (see Article 20) and live oak, and with stained wood in the southern United States. The fungus has been found on Russian-olive in Nebraska and Oklahoma. Because autumn olive is being planted at an increasing rate in the Great Plains, inoculations were made to determine whether this related species is also damaged by *B. theobromae*. Inoculated seedlings exuded some gum and the fungus was recovered 6 weeks after inoculation, but no damage was evident after 5 months.

Symptoms and Signs

Typically, bark and cambium tissues are killed in strips extending many feet along stems and branches. Callus tissue usually does not form at the margin of the dead strips. Although the dead strips are not readily apparent on the bark surface, their presence on stems and major branches is often indicated by small dead branches along the strips. These small branches die as their bases become engulfed by necrotic tissue. Mortality of small branches can be detected most readily in the upper crown during July and August. Major branches may have more than one strip of dead tissue. The strips sometimes spiral along stems.

Infected trees sometimes exude gum from stems and branches (fig. 18–2), but gum is not a reliable indicator of this disease. Other pathogens can also cause gumming. Copious exudation may occur at the base of stems, but gum also can be found on branches of all sizes including current-year growth.

Disease Cycle

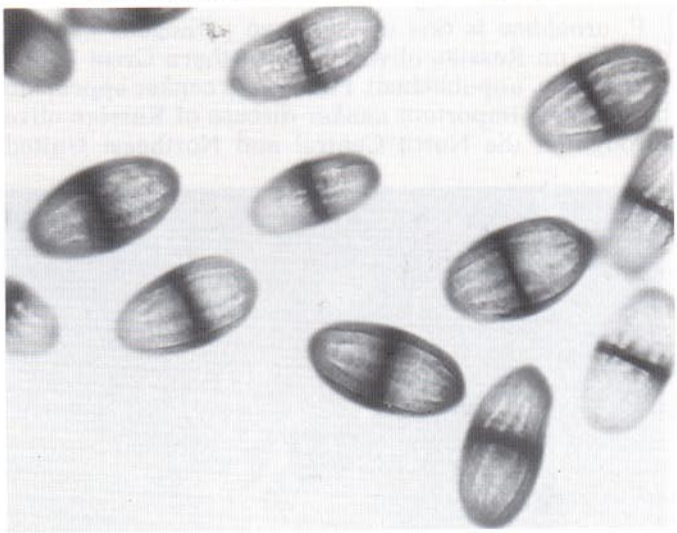
Information on the disease cycle is limited. The source of infection of Russian-olive in field plantings is not

Figure 18–1. Russian-olive infected by *Botryodiplodia theobromae*.

Figure 18-2. Gum on trunk of Russian-olive infected by *B. theobromae.*

Figure 18-3. Russian-olive seedling inoculated with *B. theobromae.*

Figure 18-4. Spores of *B. theobromae* (800X).



known; the fungus has not been detected on seedlings in nurseries (fig.18–3). Because *B. theobromae* has such a wide host range there may be other tree species in or adjacent to Russian-olive plantings that are a source of spores for new infections. Infection likely follows wounding of trees. Pycnidia are formed on the bark of dead branches. Spores produced in these pycnidia are ellipsoid to obovoid, walls are thick, striated, and not constricted at the septum; the spore surface is smooth (fig. 18–4). The average size of spores from Russian-olive is 16.4 by 30.4 μm. Spores are usually hyaline and nonseptate when extruded from pycnidia, becoming dark brown and septate after extrusion. The fungus has high temperature optima for growth (86°F), and germ tube development (93°F).

Damage

Tissues are killed rapidly in a longitudinal direction, but slowly in a transverse direction. Complete girdling of main stems may take many years. Infected trees may have some dead stems, other stems with many small branches dead and dying, and others with no appreciable damage. Vigorous sprouts developed from stumps after infected 20-year-old Russian-olive trees were cut; however, within 2 years many of these sprouts were extensively cankered, and within 4 years most were dead.

In a 1960 survey of 44 windbreaks established during the period 1935–1942 in 14 eastern Nebraska counties, some 30 percent of the Russian-olive were dead or nearly so. *B. theobromae* frequently was isolated from dying and recently killed branches.

Control

The lack of information on the disease cycle limits the recommendations that can be made to reduce the impact of this disease. The 1960 survey in Nebraska did not give any indication of factors that might decrease the threat of this disease. Surveillance will be required to determine whether there are areas in the Great Plains where this disease is not a threat.

Selected References

Lewis, R. Jr.; Van Arsdel, E. P. Vulnerability of water-stressed sycamores to strains of *Botryodiplodia theobromae.* Plant Disease Reporter. 62: 62–63; 1978.

Peterson, Glenn W. Disease of Russian-olive caused by *Botryodiplodia theobromae.* Plant Disease Reporter. 60: 490–494; 1976.