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Canker Production By Strains Of *Botryodiplodia Theobromae* In Cephalosporium-Wilted Sycamore

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SUMMARY

Two strains of *Botryodiplodia theobromae* were isolated from cankered sycamore trees; one was virulent and the other was less virulent. The less virulent strain colonized all sycamores inoculated with it but, in most cases, did not induce cankers unless the sycamores were wilting from *Cephalosporium diospyri* infections. The virulent strain of *B. theobromae* induced cankers in both wilting and non-wilting sycamores but it induced cankers more rapidly in the wilting trees. Cephalosporium wilt can make sycamores more vulnerable to Botryodiplodia cankers.

Additional keywords: *Diplodia theobromae, Platanus occidentalis.*

THE PROBLEM

Wilting sycamores (*Platanus occidentalis* L.) with cankers and dieback were observed throughout east Texas during the summers of 1973-1976. The wilt, *caused* by *Cephalosporium diospyri* Crandall, had been observed by Van Arsdel (1970) and Bush (1973) but they did not associate cankers with it. The cankers, caused by *Botryodiplodia theobromae,* were observed on wilting sycamores in more than 90 percent of the cases (Lewis and Van Arsdel 1975) and were believed to be stimulated by *Cephalosporium* wilt. This study measured the effects of Cephalosporium wilt on canker production by 6. *theobromae* in sycamore.

METHODS

Two-year-old nursery-grown sycamores were field planted near College Station, Texas. Trees were 2-3 feet (0.6-0.9 m) tall when inoculated. The inocula consisted of mycelium from a 2-week-old potato dextrose agar (PDA) culture of C. *diospyri* and from PDA cultures of the virulent and less virulent strains of *B. theobromae,* all isolated originally from wilted and cankered sycamores. The less virulent strain of *B. theobromae* seldom produced cankers in artificially inoculated sycamores; the virulent strain almost always produced cankers (Lewis and Van Arsdel 1975).

Canker production by the two strains of 8. *theobromae* in sycamores that were inoculated with C. *diospyri* was compared with canker production in sycamores that were not inoculated with C. *diospyri.* Fifteen sycamore trees were inoculated l-2 inches (2.5-5 cm) above the soil line with C. *diospyri* by surface sterilizing stems with 70 percent ethanol, cutting into the xylem, and placing PDA with mycelium onto the wounded surfaces. Inoculated wounds *were'* covered with masking tape. After the sycamores inoculated with C. *diospyri* developed wilt symptoms (5 weeks after inoculation), five of them were inoculated with the virulent strain of *B. theobromae,* five were inoculated with the less virulent strain, and five controls received PDA only. Fifteen healthy sycamores that had not been inoculated with C. *diospyri* were also inoculated with *B. theobromae:* five were inoculated with the virulent strain, five with the less virulent strain, and five controls received PDA only. The main stem of each sycamore was inoculated in three separate places with 8. *theobromae* to yield 15 inoculations for each strain of the fungus. Each inoculation experiment was triplicated to yield 15 trees and 45 inoculation points for each strain of *B. theobromae.*

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RESULTS AND DISCUSSION

The less virulent strain of *B. theobromae* induced cankers in only 3 percent of the inoculation points on sycamores not infected with *C. diospyri* but in 80 percent of the inoculation points on C. diospyri-infected sycamores. All cankers appeared within 15 days after inoculation. Canker length varied from 1'7 to 80 mm but averaged 26 mm in sycamores inoculated with both *C.* diospyri and the less virulent strain of *B. theobromae;* however, canker length averaged only 12 mm in sycamores inoculated with 8. *theobromae* alone. The less virulent strain of *B. theobromae* was reisolated consistently from above and below inoculation points on canker-free sycamores that had been inoculated with it.

The virulent strain of 0. *theobromae* induced cankers in 90 percent of the inoculation points on sycamores not infected with C. diospyri and in 100 percent of the inoculation points on C. *diospyri*-infected sycamores. Cankers were not observed on the controls, but wilt symptoms were observed in all trees inoculated with C. *diospyri.*

Cephalosporium wilt stimulated canker production by the less virulent strain of *B. theobromae* but had little effect on canker production by the virulent strain. Cephalosporium-wilted sycamores were killed, often within one growing season, after becoming naturally infected with *B. theobromae* early in the growing season. We never observed unwilted sycamores that were killed by Botryodiplodia cankers and dieback and seldom observed cankers on them.

Ross (1971) isolated two strains of *Diplodia theobromae* (=*B. theobromae*) from sycamore cankers. One strain produced cankers on artificially inoculated sycamore trees, but the other strain did not produce cankers even though it was re-isolated from the trees. The less virulent strain of *B.* theobromae used in our study was also re-isolated from canker-free trees. Therefore, the canker-producing ability of strains of *B. theobromae* in sycamore is not entirely due to their ability to colonize sycamore tissues. Host vigor at the time of infection appears to be a factor in determining whether strains of *B.* theobromae can induce cankers in sycamore. Trees that are stressed by Cephalosporium wilt are very vulnerable to *B. theobromae* infections and canker production.

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