

Mechanical Transmission of *Xanthomonas campestris* pv. *pruni* in Plum Nursery Trees

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ABSTRACT

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Xanthomonas campestris pv. *pruni* was transmitted from cankers on diseased plum trees to susceptible nursery trees during pruning. Transmission was more frequent when trees were pruned under cool, wet conditions than under hot, dry conditions. Rapid canker formation on shoots and severe necrosis of leaf veins were consistent with movement of the pathogen through xylem vessels.

Additional keywords: bacterial spot

Bacterial spot of stone fruit, caused by *Xanthomonas campestris* pv. *pruni* (Smith) Dye, is a serious disease in the southwestern Cape Province of South Africa. Pruning shears are rarely disinfested when workers move from one tree to the next in orchards. However, no published information is available on mechanical transmission of the pathogen from diseased to healthy trees during commercial pruning operations. The present investigation examines this possibility.

One-year-old plum (*Prunus salicina* Lindl. 'Golden King') trees were planted 30 cm apart in a single row. In summer (January), trees received different treatments by pruning with clean shears subjected to one of the following: 1) alcohol-flamed and dipped in sterile distilled water, 2) pruned through an established canker caused by *X. c.* pv. *pruni* on freshly collected plum shoots, and 3) alcohol-flamed and a drop of *X. c.* pv. *pruni* suspension (about 4×10^7 cfu/ml) applied to the pruning wound with a fine paint brush. A 48-hr-old Difco nutrient agar slant culture of a virulent strain of *X. c.* pv. *pruni* was suspended in

sterile water and adjusted turbidometrically for this purpose.

The trial was performed twice. In 1983, trees (30 per treatment) were pruned on a hot (26–28 C), cloudless, windy day; in 1984, trees (50 per treatment) were pruned on a cool (17–20 C), cloudy day with intermittent drizzle. The main stem of each tree that grew out was cut back to leave two or three side branches. These were each pruned to two buds. No leaves remained on the trees. Sealer was not applied after pruning.

After 8 wk, 7% of trees pruned in 1983 under hot, dry conditions with shears treated beforehand by cutting through cankers had developed disease symptoms. In 1984, when it had been cool and wet during pruning, 66% of the trees developed cankers. In contrast, all trees that were inoculated with *X. c.* pv. *pruni* became diseased within 8 wk. All those pruned with alcohol-flamed shears remained healthy. When cankers caused by *X. c.* pv. *pruni* become wet, the associated gum dissolves and forms a sticky, glutinous mass that adheres to shears. This provides an excellent vehicle for transmitting the pathogen. The low incidence of disease on trees pruned during dry conditions was probably associated with failure of pruning shears to become contaminated with high populations of the pathogen.

Cankers, invariably elongated with a water-soaked appearance, were the most conspicuous symptom on new shoots of diseased trees and began developing 4 wk after pruning. Many shoots had two or more cankers, usually on the lower half. Infected pruning stubs developed discolored, water-soaked areas originating from the cut surface. After 8 wk, new cankers developed higher up on shoots and confluent necrotic lesions were observed along veins. Thus, the pattern of symptom expression was consistent with movement of *X. c.* pv. *pruni* from the wound through xylem vessels. Systemic migration of the pathogen in invaded plum tissue was suggested recently (1,2).

Previously, the fire blight (*Erwinia amylovora* (Burr.) Winslow et al) and bacterial canker (*Pseudomonas syringae* pv. *syringae* van Hall and *P. s.* pv. *morsprunorum* (Wormald) Young et al) pathogens of deciduous fruit trees have been found to be spread by pruning (3,4). Our report is the first on spread of *X. c.* pv. *pruni* in this way.

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