BACTERIOSES OF STONE FRUITS IN NOVA SCOTIA[1]

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Abstract

This is the first report of the isolation of Pseudomonas mors-prunorum Wormald from stone fruits in North America. It was found causing a serious shoot wilt, cankering and death of young trees in a sweet cherry orchard in Nova Scotia. Pseudomonas syringae van Hall, a closely related bacterium, was identified as the cause of an infection on sour cherry foliage.

Introduction

Bacterial canker is the most serious disease of stone fruits in many parts of the world. Pseudomonas mors-prunorum Wormald is considered to be the cause of bacterial canker of stone fruits in England (1, 8, 9, 10). The ubiquitous bacterial plant pathogen Pseudomonas syringae van Hall infects a wide range of host plants and has been the accepted cause of bacterial canker of stone fruits in North America (4, 5, 7).

In June, 1964, a wilt and canker of sweet cherry, Prunus avium L., was noticed for the first time at Kentville, Kings County, Nova Scotia. It was most noticeable during late May and early June and was more prevalent in the same orchard in 1965 than in 1964. In 1965 this disease was found in another orchard of young, non-bearing sweet cherry trees in Kings County.

The disease was first noticed as a wilting of the foliage on a branch. As the disease progressed main limbs and occasionally entire trees would wilt. The wilt was soon followed by death of the affected part. Closer examination showed the presence of girdling cankers. The gummy excretion which generally exudes from injuries and infections of the wood of stone fruits was not observed to occur with these cankers. Isolations made from the margins of cankers consistently yielded a pseudomonad-like bacterium. The symptoms and progression of wilt and canker on sweet cherry in Nova Scotia appeared to be similar to those described for bacterial canker, caused by Ps. mors-prunorum, of sweet cherry in Britain (3, 9).

During a survey for the presence of this bacterial disease on stone fruits in the Annapolis Valley, Nova Scotia, a pseudomonad-like bacterium was isolated from infections on the foliage of sweet cherry, sour cherry, P. cerasus L., peach, P. persica L., and the common and Japanese plums, P. domestica L., and P. salicina Lindl.

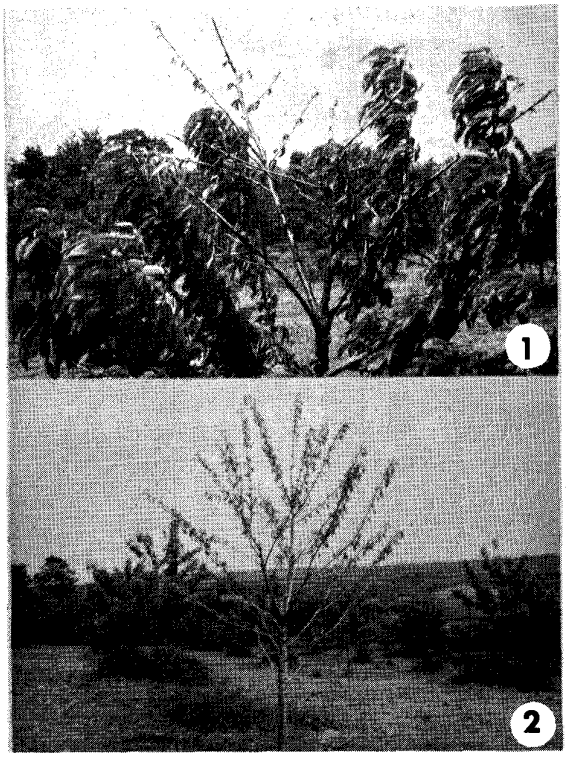

Fig. 1 Limb on sweet cherry tree girdled by canker

Fig. 2 Trunk of sweet cherry tree girdled by conker

Wilt and canker symptoms

The most obvious symptom was the wilting of the foliage of branches, limbs and entire trees. The wilt on branches and limbs was the result of a proximal positioned, girdling canker. When an entire tree wilted cankers were found to have girdled the trunk or crotch area. Cankers on branches and limbs often exceeded 30 cm in length and became somewhat sunken and more definite in outline as the season progressed. Buds above the visible cankered area of a branch appeared to have swelled and then withered. Beneath the outer bark tissue the centers of the cankers were brown; while water soaked and dark streaked areas appeared beyond their margins. Isolations made from the areas beyond and near the margins of cankers yielded only a pseudomonad-type bacterium.

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Discussion

The bacterium isolated from cankers on sweet cherry was tentatively identified as Pseudomonas mors-prunorum. Because this species of bacterium had never been reported from North America, confirmation of identification was sought from three different sources.

Dr. J. W. Rouatt, Head, Ecology Section, Microbiology Research Institute, Canada Department of Agriculture, Ottawa, reported that a June, 1964, isolate belonged to the genus Pseudomonas and, except for some slight differences, very closely resembled the species Ps. mors-prunorum*. Dr. Eve Billing, Department of Microbiology, The University, Reading, England, conducted tests on a culture of the bacterium isolated in 1965 and found that the bacterium very closely resembled United Kingdom isolates of Ps. mors-prunorum*. Tests carried out at East Malling Research Station, England, by Dr. J. E. Crosse and Miss Constance M. E. Garrett confirmed that the bacterium isolated in 1965 was Ps. mors-prunorum*.

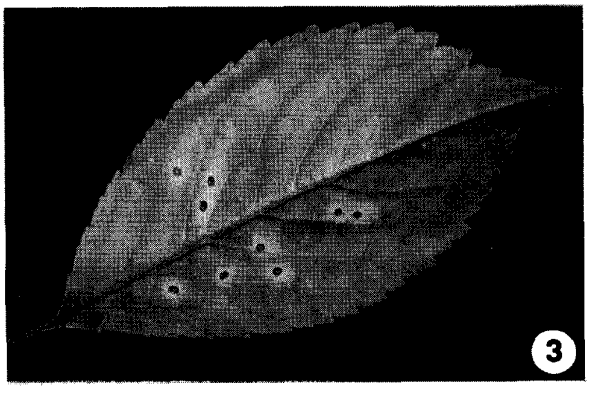

Fig.3 Sour cherry leaf infected by Pseudonomas syringae

An isolate obtained from a bacterial infection of sour cherry leaves, collected adjacent to trees where Ps. mors-prunorum was found, was identified by Crosse and Garrett as ps. syringae. According to Garrett this Nova Scotia isolate conformed with her isolates of Ps. syringae in its reaction on media, but was insensitive to all of her phages for that species*. This is not surprising because of the evidence in the literature pertaining to the variation in isolates of Ps. syringae and the intermediate forms that exist between it and the biochemically distinct Ps. mors-prunorum (2).

Except for Ps. mors-prunorum, bacterial cankering organisms are not considered new to Nova Scotia. During the survey of stone fruits in the Annapolis Valley, the bacterial spot organism, Xanthomonas pruni (Smith) Dowson, occasionally appeared in culture plates when isolations were made from the foliage and branch cankers of peach and plum. This bacterium causes a yearly, sporadic infection on the foliage and fruit of these two hosts. The pseudomonad-type bacteria isolated from the foliage of the stone fruits included in the survey were probably Ps. syringae since it was isolated from sour cherry leaves. Although reported as a pathogen of lilac, Syringa sp., and the cultivated smoke bush, Rhus cotinus L. in Nova Scotia (6), Ps. syringae has never been found causing pear blight on Pyrus communis L. in the province.

As far as the author is aware Ps. syringae has not been heretofore reported as a pathogen of stone fruits in Nova Scotia. Ps. mors-prunorum is reproted as the cause of bacterial canker of sweet cherry in Nova Scotia and this is the first authenticated report of the disease in North America. The establishment of this bacterial pathogen poses a further threat to the stone fruit industry on this continent.

* Private communication

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