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Data Sheets on Quarantine Pests

# *Pseudomonas syringae* pv. *persicae*

## IDENTITY

**Name**: *Pseudomonas syringae* pv. *persicae* (Prunier *et al.*) Young *et al.*
**Synonyms**: *Pseudomonas mors-prunorum* f.sp. *persicae* Prunier *et al.*
**Taxonomic position**: Bacteria: Gracilicutes
**Common names**: Bacterial dieback of peach (English)
Dépérissement bactérien du pêcher (French)
**Bayer computer code**: PSDMPE
**EPPO A2 list**: No. 145
**EU Annex designation**: II/A2

## HOSTS

Peaches and nectarines are the only hosts which show disease symptoms. *Prunus salicina* has shown some symptoms on artificial inoculation.

## GEOGRAPHICAL DISTRIBUTION

The bacterium was first observed in France by Vigouroux & Blache (1967). There have been unconfirmed reports from Yugoslavia. In France, the départements of Drôme and Ardèche in the Rhône-Alpes region are essentially those affected, with a few foci just beyond their borders. There is no evidence of the presence of the bacterium in any other European country apart from Yugoslavia. Similar symptoms have been seen in New Zealand, on peaches, nectarines and *P. salicina*. The bacterium responsible was originally thought to be only related to the one in France, but later investigations showed that it is actually *Pseudomonas syringae* pv. *persicae* (Young, 1988).
**EPPO region**: France, Yugoslavia (unconfirmed).
**Oceania**: New Zealand.
**EU**: Present.

## BIOLOGY

*P. syringae* pv. *persicae* enters shoots in autumn and winter through leaf scars to cause the characteristic lesions whose development leads a few months later to the dieback symptom. It was first suggested that, at low temperatures and due to its capacity for ice nucleation, the bacterium can penetrate directly into buds on shoots, branches or trunks to cause necrosis and allow infection of the shoot, branch or trunk. However, Vigouroux (1989) stated that the freezing-thawing cycle creates a water-soaked condition in the bark and shoots of peach that induces ingress of the bacteria. Pruning wounds also provide a means of entry, particularly those made in winter on susceptible tissues and with pruning tools carrying the pathogen (Luisetti *et al.*, 1981).

In spring, the bacterium spreads to young shoots and passes into an epiphytic phase (Gardan *et al.*, 1972). Leaf lesions provide abundant inoculum in spring. However, it is the

epiphytic population on the leaves in autumn that constitutes the inoculum for infection via leaf scars.

## DETECTION AND IDENTIFICATION

### Symptoms

**On shoots and branches**

The characteristic symptom which develops through the winter (even from mid-December) is an olive-green discoloration, rapidly browning, appearing round dormant buds on young shoots of peach. Infection can spread rapidly to reach the older shoots or even the main branches. In spring, the effects of infection can be seen, ranging from the death of a few buds or dieback of a few shoots in mild cases, to the wilting and death of main branches or the whole tree in severe cases.

Young trees (up to 5-6 years) are most susceptible. Affected tissues appear brownish-red; on the trunk, large lesions with ill-defined borders are formed.

Cankers are sometimes seen, corresponding to a defence reaction in less susceptible cultivars. They are mostly observed around pruning cuts, or sometimes at the point of insertion of an affected shoot on a branch.

**On leaves**

In wet springs, the bacterium causes necrotic spots of young leaves, 1-2 mm in diameter, surrounded by a chlorotic halo. The necrotic tissue subsequently falls out, causing a 'shot-hole' effect. Seriously affected leaves fall prematurely.

**On fruits**

On some cultivars, especially nectarines, necrotic spots 1-2 mm in diameter may be seen. They are often covered by a mass of transparent gum which rapidly browns. The necrosis generally remains superficial.

### Morphology

*P. syringae* pv. *persicae* is a Gram-negative rod with two to three polar flagella. In culture at 23°C, it develops in 48 h creamy-white colonies 1-2 mm in diameter (on yeast-peptone-glucose medium). Although a member of the fluorescent pseudomonad group, it produces no fluorescent pigment on King's B medium, but does on CSGA medium (Luisetti *et al*., 1972). Pathovar *persicae* can be distinguished from pv. *syringae* and pv. *mors-prunorum* by its utilization of sugar alcohols (sorbitol, erythritol, inositol) and organic acids (lactate, D(-) and L(+) tartrate). It has common antigens with numerous pathovars of *P. syringae* (pv. *papulans*) and especially with pv. *syringae*. This makes it difficult to use antisera for diagnosis or detection.

### Detection and inspection methods

EPPO has prepared a quarantine procedure (OEPP/EPPO, 1992) for detection of the bacterium on growing host plants.

## MEANS OF MOVEMENT AND DISPERSAL

Natural spread is most unlikely to occur over long distances. The main path for international spread would be on infected planting material. Fruits without symptoms do not present a significant risk.

## PEST SIGNIFICANCE

### Economic impact

This is a serious disease whose spread has been favoured by a combination of circumstances: highly susceptible cultivars (Hale and Redwing), predisposing effects of

climate and soil, ease of transmission by pruning. In the central Rhône valley, numerous trees are destroyed every year, although only the Ardèche and Drôme départements are seriously affected in this way. The disease could presumably be as damaging in other peach-growing areas in Europe.

### Control

Control of further spread depends essentially on prophylactic measures: production of disease-free nursery stock and disinfection of pruning tools. Use of less susceptible cultivars for new plantings in risk areas should help to limit spread. In infected orchards, three-fold treatment with copper-based products (125 g/hl) during leaf-fall will reduce losses (Luisetti *et al*., 1976). Fertilizing techniques such as increasing the calcium content have been reported to limit the disease in orchards (Vigouroux *et al.*, 1987).

### Phytosanitary risk

*P. syringae* pv. *persicae* is an EPPO A2 quarantine pest (OEPP/EPPO, 1986), in view of its very limited distribution in the EPPO region. It is not considered as a quarantine pest by any other regional plant protection organization.

## PHYTOSANITARY MEASURES

Planting material should not be taken from infested areas. Pre-export inspections of nurseries should take account of the possible presence of this bacterium. EPPO accordingly recommends that *Prunus persica* plants for planting should come from an area where *P. syringae* pv. *persicae* does not occur and from a field which was found free of *P. syringae* pv. *persicae* during the last growing season (OEPP/EPPO, 1990).

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