

# Occurrence of *Pseudomonas syringae* pathovars in stone fruits in the Netherlands

and availability of strains from different hosts of this pathogen



**EU-COST 873 Project**  
**Stone Fruit and Nut Health**

### **STF Meeting**

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'Determination of the incidence of the  
different pathovars of *Pseudomonas syringae*  
in stone fruits', 27-28 March 2008

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## Some data on stone fruit production in the Netherlands

- Fruit production developed strongly since 1875, mainly in area between rivers Rijn and Waal (area called Betuwe) with standard trees of apple, pear and cherry. On clay soils with grass.
- Cherries already in area Kromme Rijn river in 17<sup>th</sup> century
- Up till 1960 cherry very important (especially Betuwe), up to 5000 ha
- Now:
  - apple 9500 ha
  - pear 7000 ha
  - cherry and sour cherry 700 ha
  - plum 300 ha

## **Some data on stone fruit production in the Netherlands**

- Reason reduction of plum and cherry in sixties of last century:
  - too labour intensive (all standard tree orchards)
  - bird damage
- Peach and almond under glass almost disappeared, usually found as solitary trees near farms and in private gardens (frost risks)
- Fruit production 620 million kg – 335 million euro, 10% of agribusiness, 34.000 employed, 1.5% of culturable land
- Transit fruits: 3 billion kg fruits imported, 2.5 billion kg re-exported

# Some data on stone fruit production in the Netherlands

## Cherry

- Increasing cultivation, from 500-700 ha in past few years, 25 ha under glass
- Change from standard trees to small trees and weak rootstocks, intensive cultivation (c. 1500-2500 trees/ha), other varieties and (plastic) rain protection, better bird protection
- Sweet cherry (*Prunus avium*) varieties Regina, Lapins, Kordia, Merchant with Limburgse boskriek (*P. avium*), Gisela 5 and Colt as rootstocks
- Sour cherry (*Prunus cerasus*) mainly Kelleris and Morel with Limburgse boskriek as rootstock)

# Some data on stone fruit production in the Netherlands

## Plum

- Increasing cultivation, from 200-300 ha in past few years
- Change from standard trees to weak rootstocks, intensive cultivation (c. 1500 trees/ha), other varieties (smaller tree varieties)
- Common varieties Reine Victoria, Opal and to a lesser extent Jubileum and Bleu de Belgique with VVA-1 (Russia), St-Julien A and Ferlenain as rootstocks

# Some data on stone fruit production in the Netherlands



## Some remarks on history of bacterial canker of stone fruits (*Pseudomonas syringae* pv. *mors-prunorum* or *Pmp* and *P. s.* pv. *syringae* or *Pss*) in the Netherlands

- *Pseudomonas syringae* pv. *syringae* originally described from lilac (*Syringa vulgaris*) blight in the Netherlands in 1902 by van Hall (Van Hall, C.J.J., 1902. Thesis).
- Note: *P. mors-prunorum* was originally described as cause of a die-back disease in plums by Wormald in 1932 (Wormald, H., 1932. J. Min. Agric., London 39: 208-217
- Both pathogens known as pathogens in stone fruits in the Netherlands since 1937-1940.

## Some remarks on history of bacterial canker of stone fruits (*Pseudomonas syringae* pv. *mors-prunorum* or *Pmp* and *P. s.* pv. *syringae* or *Pss*) in the Netherlands

- *Pmp* reported in stone fruit in 1937 (van Poeteren N, Verslagen. Plzk Dienst 87, 1937), peach and cherry under glass in 1947 (Van Koot, Y, Mededelingen Directie Tuinbouw 1947, 619-634).
- Bacterial canker (mainly *Pmp*) became a problem in stone fruits in the 1950's.
- Extensively studied in plum, cherry and peach (Fuchs A, Grosjean J, Krythe JM, Reijenga W (1957) Tijdschrift over Plantenziekten 63, 33-44.



# Some remarks on history of bacterial canker of stone fruits (*Pseudomonas syringae* pv. *mors-prunorum* or *Pmp* and *P. s.* pv. *syringae* or *Pss*) in the Netherlands

- Plum variety Ontario and sweet cherry variety Early Rivers were found most susceptible.
- *Prunus avium* more susceptible than *P. cerasus*.
- Some of their strains (*Pmp* and *Pss*) still in international collections:

## ICPPB New Zealand, JM Young

3712 a *Prunus avium* (L.) L. - cherry. Netherlands 1953. From J.M. Young  
1731A<sup>2</sup> NCPPB 624<sup>2</sup> A. Fuchs F3 - LOPAT Ib. = *Pmp*

3976 a *Prunus avium* (L.) L. - sweet cherry. Netherlands 1955. From NCPPB  
617<sup>2</sup> P. Matthews<sup>2</sup> A. Fuchs F18. = *Pmp*

3682 *Prunus* sp. From J.M. Young 1712A1<sup>2</sup> NCPPB 625<sup>2</sup> A. Fuchs F17 -  
LOPAT Ia. = *Pss*

# **Present situation of bacterial canker of stone fruits in the Netherlands**

- **In cherry bacterial canker is present at low level, known problem**
- **In plum increasing problem, especially in young, vigourously growing trees on weak rootstocks. Sometimes 50% of trees infected**
- **Symptoms: yellowing of leaves, canker formation on trunk and larger branches, gum formation and eventual death of branches or whole tree.**
- **No investigation yet into virulence of strains**

# Present situation of bacterial canker of stone fruits in the Netherlands

**Victoria on  
VVA-1,  
1.5 ha in  
N.Holland  
2<sup>nd</sup> year in  
production  
field**



Symptoms in young plum trees: yellowing

# Present situation of bacterial canker of stone fruits in the Netherlands



Symptoms in young plum trees: canker formation and gumming

# Present situation of bacterial canker of stone fruits in the Netherlands



Symptoms in young plum trees: canker formation

# Present situation of bacterial canker of stone fruits in the Netherlands

- Rootstock often remains healthy
- Both *Pss* and (to a lesser extent) *Pmp* isolated from this material
- *Pmp* is more common in cherry, as found in Belgium
- In many cases growers do not send samples to the laboratory – for them a known problem, however the situation in intensive plum cultivation becomes alarming – like in Germany Austria and Switzerland

# **Present situation of bacterial canker of stone fruits in the Netherlands**

- **Control measures advised in NL:**
  - 1. Cultivation measures at planting site, such as optimal water household, cover of soil with organic material.**
  - 2. Careful pruning with disinfection of pruning tools between trees**
  - 3. Removal/burning of severely infected trees**

**Prophylactic sprays with copper or antibiotics  
not allowed anymore**

# Present situation of bacterial canker of stone fruits in the Netherlands

- Strains of *Pmp* have not been identified to race level in NL. Differentiation of *Pss* and *Pmp* on basis of biochemical tests, fatty acids analysis and serology.
- *P.s. pv. persicae*, *pv. cerasicola* and *pv. avii*, *P. amygdali*, *X. a. pv. pruni* have never been detected in the Netherlands till so far.
- The quarantine pathogen *X.a. pv. pruni* could pose a risk when climatic changes towards higher temperatures will persist and when new cherry varieties on weak rootstocks are grown under cover.



# Strains of Pss and Pmp in the Dutch (PD) Culture Collection

- **Recent isolates *Pmp* (from 2003)**
  - *Prunus domestica* PD4691, 4800, 5026, 5159, 5187, 5188, 5313, 5315, 5329-5331
  - *Prunus avium* PD 4495, 5128, 5325,
  - *Prunus spec.* PD5106
- **Recent isolates *Pss* (from 2003)**
  - *Pyrus* PD 4755
  - *Prunus domestica* PD5439
  - *Prunus avium* PD 5061
- Furthermore isolates from *Plumbago auriculata* (= *P.capensis*), Plumbaginaceae , *Rosa multiflora*, *Raphanus sativus*, *Diascia* (Scrophulariaceae)

# Strains of Pss and Pmp in the Dutch (PD) Culture Collection

- **Isolates of Pss from 1977-2003**
  - *Pyrus* PD 292, 1777, 1818,
  - *Malus* PD 208, 413, 1143, 1176, 1184,
  - *Malus bonsai* PD883
  - *Prunus armeniaca* PD3358
  - *Prunus cerasus* PD2926
  - *Prunus triloba* PD 342, 389, 1089,
  - *Prunus species* PD 564, 880

# Strains of Pss and Pmp in the Dutch (PD) Culture Collection

- Furthermore *Pss* isolates from:

*Ageratum* spec. (Compositae)

*Amalanchier canadensis*

*Anethum graveolens* (Umbelliferae)

*Antirrhinum* spec. (Scrophulariaceae)

*Apium graveolens* (Umbelliferae)

*Astilbe* (Saxifragaceae),

*Bellis* (Asteraceae)

*Cercidiphyllum japonicum* (Cercidiphyllaceae)

*Chaenomelis umblicatum*

*Cichorium intybus* (Compositae),

# Strains of Pss and Pmp in the Dutch (PD) Culture Collection

- **Furthermore isolates from:**

*Citrus* 'kumquat' (Rutaceae)

*Cornus canadensis*, *C. nutali*, *C. sanguinea*  
(Cornaceae)

*Cotoneaster* spp.

*Crataegus monogyna*

*Cydonia* spec.

*Delphinium* spec. (Ranunculaceae)

*Dianthus caryophyllus* (Caryophyllaceae)

*Eranthus hyematis* (Ranunculaceae)

*Euonymus* (Celastraceae)

# Strains of Pss and Pmp in the Dutch (PD) Culture Collection

- **Furthermore isolates from:**

*Forsythia intermedia* (Oleaceae)

*Fraxinus excelsior* (Oleaceae)

*Ilex* spec. (Aquifoliaceae)

*Impatiens* (Balsaminaceae)

*Limonium* spec. (Plumbaginaceae)

*Lonicera* spec. (Caprifoliaceae)

*Mahonia aquifolium* (Berberidaceae)

*Mespilus germanica*

*Philadelphus* spec. (Hydrangeaceae)

*Photinia davidiana*

# Strains of Pss and Pmp in the Dutch (PD) Culture Collection

- Furthermore isolates from:

*Pisum sativum*

*Populus* (Salixaceae)

*Primula* (Primulaceae)

*Pyracantha*

*Rosa*

*Skimmia japonica* (Rutaceae)

*Sorbus intermedia*

*Sprekelia formosissima* (Amaryllidaceae)

*Syringa vulgaris* (Oleaceae)

# Strains of Pss and Pmp in the Dutch (PD) Culture Collection

- **Furthermore isolates from:**

*Valeriana locusta* (Valerianaceae)

*Vaccinium* spec. (Ericaceae)

*Violoa* spec. (Violaceae).

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