



**HAL**  
open science

## Phenotypic variability of *Pseudomonas syringae* pathovar Pisi, and differential identification towards other pea pseudomonads.

Régine Samson, C. Grondeau, M. Saunier, F. Poutier

### ► To cite this version:

Régine Samson, C. Grondeau, M. Saunier, F. Poutier. Phenotypic variability of *Pseudomonas syringae* pathovar Pisi, and differential identification towards other pea pseudomonads.. 4th International Working Group on *Pseudomonas syringae* Pathovars, Università degli Studi di Firenze [Firenze]. ITA., 1991, NA, France. 439 p. hal-01601592

**HAL Id: hal-01601592**

**<https://hal.science/hal-01601592v1>**

Submitted on 4 Jun 2020

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Distributed under a Creative Commons Attribution - ShareAlike 4.0 International License

PHENOTYPIC VARIABILITY OF *PSEUDOMONAS*  
*SYRINGAE* PATHOVAR *PISI*, AND DIFFERENTIAL  
IDENTIFICATION TOWARDS OTHER PEA  
PSEUDOMONADS.

SAMSON, R.<sup>1</sup>, GRONDEAU, C.<sup>2</sup>, SAUNIER, M.<sup>3</sup>, and  
POUTIER, F.<sup>1</sup>

1 Institut National de la Recherche Agronomique, Pathologie  
Végétale, Angers, France

2 Institut Technique des Céréales et des Fourrages, INRA,  
Angers, France

3 Institut Universitaire de Technologie, Angers, France.

Routine identification of the pathovars of *P. syringae* remains problematic unless pathogenicity is checked on the host. The ability of different related Pseudomonads to live altogether on plants increases the difficulty. The interest for diagnosis of the O-serogroups defined within the species (Samson and Saunier, 1987) needed to be evaluated. Pea blight spreading over France gave us the opportunity to study pv. *pisi* identification.

1. Materials and methods

More than 2,500 isolates of *P. s. pv. pisi* have being studied for a two-year period (1989 and 1990) during experimentations and surveys in the French production of combining pea (*Pisum sativum*). Additionnal *P. syringae* strains (about 2,000), that were not pathogenic to pea were also regularly isolated from pea plants. Physiological characters, serogrouping and pathogenicity tests (on Kelvedon Wonder pea cultivar susceptible to all races) were performed on every strain. Any strain giving watersoaked

lesions after injection of  $10^6$  organisms/ml suspension into the pea stem was designated as pv. *pisi*. The non-pea pathogenic isolates (inducing either hypersensitivity or no reaction) were arbitrarily named as *P. s. pv. syringae*.

## 2. Results

Some of the main classical physiological tests of *pisi* strains presented a wide variability : fluorescence + 93%, esculin - 86%, homoserine + 75%, erythritol + 70%, D(-)tartrate - 96%, L(+)-tartrate - 91%, DL-lactate - 85%. That diversity appeared rather unusual compared to the other pathovars.

As for their O-serogroups, pv. *pisi* strains were classified in APT-PIS (88.1 %), HEL2 (11.8 %) and RIB (0.1 %).

Nine patterns could be established when combining fluorescence, esculin response and O-serogroup. The frequency of them was measured. The pattern 1 (fluorescence +, esculin -, APT-PIS) harboured 73 % of the total *pisi* isolates. Not one *syringae* isolate (out of 2,067) fell into the pattern 1. Therefore, one can avoid pea inoculation for diagnosis when pattern 1 is obtained. Out of the pattern 1, pathogenicity tests remain necessary. For instance, patterns 2 and 4 harboured respectively 9.8 % and 9.5 % of the *syringae* isolates ; and 7.7 % and 0.5 % of the *pisi* isolates. Summing up, the *pisi* and the *syringae* isolates presented the same pattern during the two year-experimentation, 12.8 % of them needed inoculation test to avoid false positive identifications of pea blight organism.

## 3. Conclusion

The physiological variability of pv. *pisi* was already noticed (Lelliott *et al.*, 1966 ; Young and Dye, 1970 ; Taylor, 1972 ;

Hildebrand, 1973). Serology is more constant (serogroup APT-PIS) although not absolute since another serogroup HEL2 may occur. Nevertheless, serology can only be applied to cultured isolates. Direct serological detection methods cannot be used in the case of pea blight. If it is true that many pv. *syringae* strains belong to a different serogroup (Mazarei and Kerr, 1990) that is PER-SAV-TOM (Samson and Saunier, 1987) the presence on peas of *P. s. pv. syringae* and *P. viridiflava* strains that may share (even at a low percentage of the isolates) the same LPS with pv. *pisi*, gives up false positive detections. Other kinds of specific antigens are needed to achieve a serological detection of pea blight. Other technics, such as isozyme profiles and RFLP, could give some help in the differentiation of the related pathovars.

#### 4) References

Hildebrand, D. C., 1973, Tolerance of homoserine by *Pseudomonas pisi* and implications of homoserine in plant resistance. *Phytopathology*, 63, 301-302.

Lelliott, R. A., Billing, E., and Hayward, A. C., 1966, A determinative scheme for the fluorescent plant pathogenic pseudomonads. *J. Appl. Bacteriol.*, 29, 470-489.

Mazarei, M., and Kerr, A., 1990, Distinguishing pathovars of *Pseudomonas syringae* on peas : nutritional, pathogenicity and serological tests. *Plant Pathol.*, 39, 278-285.

Samson, R., and Saunier, M., 1987, Désignation de références sérologiques pour six sérogroupes de pathovars de *Pseudomonas syringae* sur la base de leur lipopolyside. *Bull. OEPP, OEPP Bull.*, 17, 165-171.

Taylor, J. D., 1972, Races of *Pseudomonas pisi* and sources of resistance in field and garden peas. N. Z. J. agr. Res., 15, 441-447.

Young, J. M. and Dye, D. W., 1970, Bacterial blight of peas caused by *Pseudomonas pisi* Sackett, 1916 in New Zealand. N. Z. J. agr. Res., 13, 315-324.