

Ralstonia solanacearum race 1/biovar III causing wilt of begonia in the State of São Paulo, Brazil

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Abstract. A natural occurrence of *Ralstonia solanacearum* causing wilt on begonia plants was observed for the first time in Brazil. Pathogenicity and biochemical tests placed the isolates into race1/biovar III.

Plants of begonia (*Begonia elatior* cv. Barkos) growing in pots under greenhouse conditions, located at the counties of Atibaia and Holambra, State of São Paulo, Brazil, and showing symptoms of wilt were observed during the year of 2003. Symptoms also included unilateral yellowing of leaves and irregular flowering, with subsequently wilt and death of the plant (Fig. 1). The vascular tissues of roots and stems of wilted plants showed a brown discolouration suggesting that *Ralstonia solanacearum* could be associated with the disease. Isolations on Kelman's TZC medium (Kelman 1954) yielded pink and slimy colonies. Further tests confirmed the identification of the bacteria as *R. solanacearum*. Three isolates were used for inoculations and biovar determination (Hayward 1964; Hayward *et al.* 1990).

For the pathogenicity tests, healthy plants of begonia growing in pots under greenhouse conditions were inoculated. A droplet

of the bacterial suspension ($\sim 10^7$ cfu/mL) was placed in a leaf axil followed by puncture of the stem surface with a sterile needle to introduce the bacterial cells into the tissue. The plants were observed for 21 days after inoculation for symptom development. The inoculated plants reproduced the disease symptoms and the bacterium was recovered from these plants. The same procedure was used for inoculations on tomato and potato plants, and the begonia isolates were highly virulent to these plants.

Based upon reactions of the oxidation/utilisation of carbohydrates, the *R. solanacearum* isolates from begonia plants were found to belong to race 1/biovar III.

This is the first report of the occurrence of *Ralstonia solanacearum* race 1/biovar III in *Begonia elatior*. Janse *et al.* (2006) described the occurrence of *R. solanacearum* race 1/biovar I on leaves of *B. elatior* showing wilting and yellowing from a nursery that imported cuttings from Costa Rica in 2003, and these authors also found that some cuttings were latently infected with that bacterial species.

Cultures were deposited on the Phytopathology Culture Collection of Instituto Biológico (IBSBF) under accession numbers 1839, 1882 and 1883.

References

- Hayward AC (1964) Characteristics of *Pseudomonas solanacearum*. *Journal of Applied Bacteriology* **27**, 265–277.
- Hayward AC, El-Nashaar HM, Nydegger U, De Lindo L (1990) Variation in nitrate metabolism in biovars of *Pseudomonas solanacearum*. *Journal of Applied Bacteriology* **69**, 269–280.
- Janse JD, Goossens E, van Beuningen AE, Gaisch K, Tjon Tam Sin NNA (2006) *Begonia elatior*, a new host for *Ralstonia solanacearum* race 1, biovar 1. In 'Proceedings. The 4th International Bacterial Wilt Symposium – Programme and Abstracts Book. 17th–20th July 2006. The Lakeside Conference Centre'. p. 32. (Central Science Laboratory: York, UK)
- Kelman A (1954) The relationship of pathogenicity in *Pseudomonas solanacearum* to colony appearance on a tetrazolium medium. *Phytopathology* **44**, 693–695.



Fig. 1. Naturally infected begonia plant showing wilt symptoms caused by *Ralstonia solanacearum*.

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