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## DISEASE NOTES OR NEW RECORDS

***Acidovorax avenae* subsp. *cattleyae* (*Pseudomonas cattleyae*) causing leafspot and death of *Phalaenopsis* orchids in New South Wales**G. E. Stovold<sup>AD</sup>, J. Bradley<sup>B</sup> and P. C. Fahy<sup>C</sup><sup>A</sup>NSW Agriculture, Tropical Fruit Research Station, PO Box 72, Alstonville, NSW 2477, Australia.<sup>B</sup>Department of Land and Water Resources, PO Box 53, Orange, NSW 2800, Australia<sup>C</sup>4 Bailey Crescent, Epping, NSW 2121, Australia<sup>D</sup>Corresponding author; email: gordon.stovold@agric.nsw.gov.au

**Abstract.** *Acidovorax avenae* subsp. *cattleyae* is identified as the cause of a common leaf spot and expanding lesion leading to death of *Phalaenopsis* orchids. The identity of this organism has been confirmed on samples submitted from widely separated locations suggesting the endemic nature of this disease in New South Wales.

Bacterial brown spot of orchids, caused by *Pseudomonas cattleyae* (Pavarino) Sauvlescu, has been described from North America (Northern 1970; Miller 1990; Frank 1988) and Taiwan (Wey 1988). Symptoms begin as small water-soaked spots, later turning black and enlarging rapidly to kill entire leaves and eventually invading the growing point of the plant, causing death. Although the pathogen has been recorded from a number of orchid genera, *Phalaenopsis* is generally regarded as the most susceptible (Northern 1970).

Recently, Willems *et al.* (1992) using DNA–DNA hybridisation experiments have proposed that *P. cattleyae* is a member of the Comamonadaceae and clustered very closely around the type strain of *P. avenae*. Based on their work, *P. cattleyae* is reclassified as *Acidovorax avenae* subsp. *cattleyae* (Willems *et al.* 1992).

Over recent years, several specimens of *Phalaenopsis* orchids from commercial and hobby growers have been submitted to the Plant Health Diagnostic Service of NSW Agriculture. The symptoms (Fig. 1) evident on these plants have been generally similar to those described for bacterial brown spot, although this disease has not been recorded previously in New South Wales (NSW). Sections made through the leaf spots indicated the presence of bacterial ooze and isolations were made to Kings Medium B and sucrose-peptose agar (SPA) (Fahy and Hayward 1983) to obtain pure cultures. The cultures have been identified as *P. cattleyae* using standard chemical tests and analysis of fatty acids. Records of this disease have been obtained from *Phalaenopsis* collections at Mangrove Mountain (DAR 65851), Kemps Creek (DAR 69847) and Coopernook (DAR 65931).

Pathogenicity tests using isolates from Mangrove Mountain (DAR 65851) and Coopernook (DAR 65931) were completed by inoculating healthy leaves of *Phalaenopsis* orchid with *P. cattleyae* cultured on agar.

Disease-free *Phalaenopsis* orchids were covered with plastic bags 12 h before inoculation to create a humid



**Fig. 1.** Symptoms of bacterial brown spot (caused by *Acidovorax avenae* subsp. *cattleyae*) on commercially cultivated *Phalaenopsis* sp.

environment. Wounded (surface scratched with scalpel) and unwounded leaves were inoculated by wiping with a cotton wool swab impregnated with the bacterial suspension (approx.  $10^8$  cells  $\text{mL}^{-1}$ ). The plastic bags were replaced over



**Fig. 2.** Symptoms evident on *Phalaenopsis* sp. 21 days after artificial inoculation with a pure culture of *Acidovorax avenae* subsp. *cattleyae* (DAR 65851).

the plants for 24 h and then removed. Plants were maintained in a glasshouse (temperature 15–30°C) and watered daily by overhead irrigation. Five days after inoculation, water-soaked lesions (4 mm diameter) were evident on wounded leaves and smaller (1–2 mm diameter) lesions evident on unwounded leaves. Twenty one days after inoculation, water-

soaked lesions 30 × 30 mm were present extending from the wound line and, in some places larger, irregular rotted zones had developed (Fig. 2). Lesions on inoculated, unwounded leaves were smaller (5 × 5 mm) and circular but not expanding to involve entire leaves.

Reisolations were made from symptomatic tissue and the identity of the causal organism confirmed as *P. cattleyae* by fatty acid analysis (DAR 65852, DAR 65948).

Authentic records of this disease have been made from three widely reported locations in NSW suggesting its endemic nature and the need to implement control measures wherever *Phalaenopsis* species are cultivated. Overseas reports suggest that removal of affected leaves and adjustment of overhead watering regimes to reduce leaf wetness are the most effective control measures. Some chemical treatments are suggested by Frank (1988) but these are not registered for use in New South Wales.

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