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Natural infection of the native pasture legume, *Glycine latifolia*, by alfalfa mosaic virus in Queensland

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Abstract

The native pasture legume, *Glycine latifolia*, growing in experimental plots in south-east Queensland sometimes showed a yellow mosaic symptom, which was associated with a sap-transmissible virus identified as alfalfa mosaic virus. Inoculation with the virus reproduced the yellow mosaic disease in three lines of *G. latifolia*, but two other lines showed resistance in both inoculation tests and the field.

Glycine latifolia (Benth.) Newell and Hymowitz (Peak Downs clover) is an herbaceous semi-perennial legume which occurs in scattered locations in eastern Australia from central Queensland (22°S) to northern New South Wales (31°S) (Rees *et al.* 1993). One of many *Glycine* spp. native to Australia, it has been selected for development as a forage legume by the CSIRO Division of Tropical Crops and Pastures. *G. latifolia* has shown tolerance of grazing, drought and frost in a number of observation trials, and one line, CQ3368, has been accepted for Plant Breeder Rights as cv. Capella (Jones *et al.* 1996).

Yellow mosaic symptoms have been noted on plants of *G. latifolia* lines CQ3368, G1213 and G2117 growing at Gatton, and on line CQ3368 at Pittsworth and Toobeah but not at Biloela, Cracow, Goondiwindi, Mundubbera, Surat, Tara, Texas and Wandoan. All yellowed lines contained a virus which caused the formation of necrotic local lesions of about 1 mm in diameter in the inoculated primary leaves of *Phaseolus vulgaris* cv. Bountiful (bean) and *Vigna unguiculata* ssp. *unguiculata* cv. Blackeye (cowpea). A wide range of host plants was systemically infected with virus isolate ACM 4886, originally obtained from *G. latifolia* CQ3368 at Gatton. These hosts included *Glycine javanica*, *G. max* (soybean), *Macroptilium atropurpureum* (siratro), *Malva parviflora* (small-flower mallow), *Medicago sativa* (lucerne), *Nicandra physalodes* (apple-of-Peru), *Nicotiana clevelandii*, *N. glutinosa*, *N. sylvestris* and *N. tabacum* cv. Xanthi (tobacco). The main symptom induced was a yellow leaf mottling. Chlorotic spots were observed on the inoculated leaves of *Chenopodium* spp.

Bacilliform particles measuring 36–58 x 20 nm were observed in crude sap preparations which had been obtained from beans infected with isolate ACM 4886 and which had been glutaraldehyde fixed and negatively stained with ammonium molybdate. Particles were also trapped from crude and partially purified bean sap preparations and decorated by an alfalfa mosaic virus (AMV) antiserum prepared by Pliansinchai (1991). Furthermore, small bacilliform particles were observed in sections of virus-infected leaves of cowpea. In Ouchterlony gel diffusion tests with partially purified virus (ACM 4886) and AMV antiserum, precipitin bands formed at antiserum dilutions up to 1:8. Since no reaction was observed when the antiserum was tested against partially purified suspensions of uninfected bean plants, the reaction between the virus preparation and antiserum was considered to be specific.

Resistance to infection was found in lines G1160 and G1909 in which 9/9 and 10/10 plants, respectively, remained virus-free when leaves were mechanically inoculated with leaf sap from beans infected with isolate ACM 4886. In addition, these

two lines have not shown any yellow mosaic symptoms in the field at Gatton. However lines CQ3368, G1213 and G2117, which showed mosaic symptoms at Gatton, were easily infected when similarly inoculated with infection rates of 8/8, 8/9 and 10/10, respectively. Further, an AMV isolate, ACM 4881, originally from *N. physalodes* at Mt Sylvia and cultured in bean, caused a similar infection in CQ3368, G1213 and G2117, but not G1160 and G1909. Thus lines G1160 and G1909 have resistance to at least some isolates of AMV.

The evidence indicates that the yellowed line CQ3368 of *G. latifolia* at Gatton was infected with AMV. The associated virus-like agent had small bacilliform particles of variable length, which reacted with AMV-specific antisera in Ouchterlony double diffusion tests and specifically decorated particles in immune electron microscopy tests. Also when inoculated into a range of glasshouse plants, the virus produced mosaic symptoms typical of AMV infected plants (Buchen-Osmond *et al.* 1988). Should AMV prove to be a problem in CQ3368 or other lines of *G. latifolia*, resistance could be available in lines G1160 and G1909.

References

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