Barley yellow dwarf virus in Tasmanian pastures

P.L. Guy

Plant Health Branch, Department of Agriculture,
St Johns Avenue, New Town, Tasmania.

More than forty viruses infect members of the Gramineae but only one, the aphid- borne barley yellow dwarf virus (BYDV) is known to occur in temperate Australia. BYDV affects cereal crops in all States of Australia and the sources of infection are presumably pasture and weed grasses but there is no published information available on the distribution, incidence and ecology of BYDV in Australian grasses.

Tasmania is a suitable location for such a study because much higher populations of aphids occur here than in other States. The fact that BYDV causes greater losses in cereals in Tasmania reflects this higher aphid activity. Plants were sampled from the field and tested for BYDV using oat indicator plants and the three aphid species occurring in Tasmania which are known to transmit various strains of the virus: *Rhopalosiphum maidis, H. padi* and *Sitobion* fragariae.

The tests included 31 species of Gramineae represented by 100 cereal plants, 2100 pasture grasses, 150 native grasses and 75 weed grasses.

BYDV was recovered from 30% of plants tested. Almost all of the isolates were transmitted non-specifically by both *R. padi* ands,,fragariae. . No isolates were found which could be transmitted by *R. maidis.*

Ten species were found naturally infected with BYDV, four cereals (barley, oats, wheat, triticale) and six grasses: *Agrostis parviflora,* cocksfoot *(Dactylis glomerata),* tall fescue *(Festuca arundinaceae),* barley grass *(Hordeum murinum),* ryegrass *(Lolium perenne)* and phalaris *(Phalaris* 'aduatica).

Most of the pasture grasses tested for infection were *L. perenne* plants collected from agricultural areas throughout the State. The incidence of infection in these pastures (greater than one year old) ranged from 4-70%. Incidence was generally correlated with age of the pasture but some older swards contained lower proportions of infected plants than some younger pastures. The rates of virus increase in pastures are obviously affected by complex sets of interacting factors. In an agronomic trial sown to compare the persistence of four pasture grasses at Sandford, BYDV increased more in plots sown with ryegrass and tall fescue than in plots of cocksfoot and phalaris. Tn addition, irrespective of species, the infection rate was much higher in plots on a dark-black clay loam than in adjacent comparable plots sown on a light-grey sandy loam.

One hundred isolates were checked in serological tests using antisera to the type strains of BYDV recognised in North America. All of the isolates trans- emitted by *R. padi* &S.fragariae were confirmed to he like PAV and the two isolates from *Agrostis* and barley grass transmitted only by *H. padi* were serologically like RPV. Three other strains of BYDV reported from North America do not appear to be present in Tasmania, some because their specific vectors have not been introduced.

The PAV and RPV types of BYDV cause more severe diseases than do the strains which do not occur in Tasmania. However the milder strains, should they become established, should not be ignored as such infections may predispose their hosts to attack by pests and other pathogens.

The aphid *Metopolophium dirhodum* hasrecently (1984) become established in southeast New South Wales and Victoria. Cocksfoot and phalaris are preferred hosts of this vector species and therefore there may he an increase in BYDV incidence if *M dirhodum* becomes established in Tasmania. *M.dirhodum* transmits some PAV strains and the milder MAV strains which have not yet been recorded in Tasmania.