BARLEY STRIPE MOSAIC VIRUS

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Summary

The presence of barley stripe mosaic virus in New Zealand is recorded for the first time. Symptoms are described and an assessment of the potential importance of the disease in New Zealand is given.

INTRODUCTION

In December 1974, barley (*Hordeum vulgare*) plants grown from introduced seed in research plots at the Palmerston North Substation of Crop Research Division of DSIR were found showing leaf stripe symptoms. These have been confirmed as being due to infection by barley stripe mosaic virus (BSMV).

SYMPTOMS AND EPIDEMIOLOGY

The main symptom of this virus disease is a dark brown stripe forming a narrow inverted 'v' or 'w' of necrotic tissue on the leaf blade. The leaf tissue on the side of the stripe nearest the leaf tip remains a healthy dark green colour whereas the portion of the leaf enclosed by the 'v' or 'w' shows a pale mottling or chlorosis. Infected plants tend to grow less vigorously and their seed yield may be substantially reduced.

BSMV is seed-borne and may, under some circumstances, be pollen-transmitted. Slack *et al* (1975) suggest, however, that pollen transmission is not of great importance in the natural spread of this virus. In the field, infected plants may transmit the virus by contact but there are no known insect vectors. Contact spread of the virus does not occur at low temperatures (7° C). The presence of BSMV in species other than barley in nature is limited to wheat (*Triticum* spp) and wild oat (*Avena fatua*) but its presence in these species is uncommon.

Because of its transmission through seed the percentage of plants in an infected seed line will increase with the continued use of that line for seed. However, not every seed produced by an infected plant will be infected.

SURVEY OF BARLEY CROPS

In 1975, in a survey of barley crops throughout New Zealand, Arnst and Martens (pers comm) found very few crops infected with BSMV and infection was confined to the North Island. 'Rika', an imported barley cultivar grown in the Manawatu and Hawkes Bay was found to have the highest incidence of the disease. 'Rika' is a European 2-row cultivar that has not been recommended for use in New Zealand. BSMV was found in all 'Rika' crops inspected and in some 'Rika' crops up to 16% of the plants were infected with BSMV but generally the percentage was lower than this, ranging from 5-8%.

A small number of crops of the cultivars 'Zephyr' and 'Carlsberg' was infected with BSMV, but in these the level of infection was very low.

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TESTING OF BARLEY CULTIVARS

Glasshouse trials at Lincoln have shown that there is no difficulty in transmitting BSMV by sap inoculation to any of the main currently-grown cultivars of barley or promising breeding lines. The cultivars, 'Zephyr', 'Carlsberg', 'Kakapo', and 'Rupe' and the selections 'Kaniere', 'Kuaka', 'Manapou', and 'Mata' were tested. Several oat and wheat cultivars also were readily infected with the virus.

IMPORTANCE OF THE DISEASE

In a preliminary field experiment at Lincoln, losses due to BSMV were measured on a single-tiller basis and were found to be approximately 5%. This will need confirmation but it suggests that the disease may be of limited importance in barley in New Zealand.

From overseas studies it appears that BSMV may cause significant yield losses in barley grown in warm continental climates, but that in cooler areas its effect is negligible. Methods for testing for infection in seed lines have been developed at DSIR so that if necessary the virus can be eliminated by rejection of infected seed lines.

REFERENCE

- Slack, S. A., Shepherd, R. J., and Hall, D. H., 1975. Spread of seed-borne barley stripe mosaic virus and effects of the virus on barley in California. *Phytopathology* 65 : 1218 - 23.