Hordeum mosaic virus on perennial grasses in Manitoba

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A virus isolated in 1957 from diseased barley leaves, that had been collected in southern Alberta in 1952 and stored in a deep freeze, appeared to be related to both wheat streak mosaic virus (WSMV) and agropyron mosaic virus (AMV) (2). Like the latter viruses, it caused mosaic symptoms on wheat and had flexuous rod shaped particles 698 mμ long. Like WSMV it infected oats but not Agropyron *Z.* pens (L.) Beauv., a host of AMV, but like AMV it was not transmitted by Aceria tulipae (K.), vector of WSMV. In cross inoculation tests on wheat it interfered with infection by AMV but was synergistic with WSMV. Serological tests indicated that it was distantly related to WSMV and AMY, but it was sufficiently different from them to be considered as a distinct virus. It was designated hordeum mosaic virus (HMV).

HMV has not been isolated from any other collections of mosaic-diseased cereals. However, host tests in the greenhouse showed that it infected the perennial grasses Hordeum jubatum L., Agropyron trachycaulum (Link) and Elymus canadensis L. A decision was therefore made to search for this virus in perennial grasses in or near the area in southern Alberta where the original sample of infected barley was found.

In June 1966, the author assisted by T.G. Atkinson of the Lethbridge Research Station, collected perennial grasses with mild to moderate mosaic symptoms at 4 locations in southern Alberta and brought them to Ottawa. They were transplanted into pots for continued growth and development of inflorescence to enable identification. A virus was transmitted to wheat from grasses identified by W. G. Dore of the Plant Research Institute as A. trachycaulum and H. jubatum collected near Warner and Jefferson, Alberta, and also from x Agrohordeum macounii (Vasey) Lepage, a natural hybrid of A. trachycaulum x H. jubatum (1), collected at the Jefferson location. Because the isolates of virus from these grasses infected oats and H. jubatum but not A. repens, and reacted specifically with HMV antiserum, they were identified as isolates of HMV.

The susceptible perennial grasses appear to provide a stable reservoir of HMV, but there is no data on the frequency with which the virus spreads to cereals or by what means. The eriophyed mites Aceria tulipae, A. hystrix and Aculus mackenziei (K.) occur on H. jubatum in Alberta, but attempts to transmit HMV with these mites have failed.

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A mosaic disease of Poa palustris in Alberta

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In June 1966, light green to pale yellow mosaic symptoms were observed on Poa palustris L. growing by a roadway near Nobleford, Alberta. Plant samples were taken to Ottawa, transplanted into pots and tested for the presence of virus.

Juice from the diseased P. palustris was used to inoculate 'Kent' wheat seedlings by the leaf-rub method. Five of the 24 seedlings tested showed a chlorotic mottling by the 7th day. Subsequently, they developed a chlorotic striping and necrotic blotching. They died before the 15th day after inoculation. Other wheat plants developed mosaic symptoms more slowly and did not become necrotic but were slightly stunted.

In subsequent tests, plants in 9 of 54 species of Gramineae inoculated with juice from the diseased P. palustris plants developed mosaic symptoms. The numbers of plants that showed symptoms out of the numbers inoculated in the susceptible species were as follows:

Agropyron cristatum (L.) Gaertn.	2/5
Avena sativa L. var. 'Clintland'	16/35
Echinochloa pungens (Poir.) Rydb.	3/3
Lolium multifolium Lam. var 'S22'	4/38
Poa leptocoma Trin.	1/7
P. nemoralis L.	2/8
P. palustris L.	19/24
Secale cereale L. var. 'Dominant'	3/10
S. cereale L. var. 'Tetra Petkus'	15/23
Triticum aestivum L. var. 'Kent'	53/94

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The species with the highest percentages of infected plants were P. palustris, E. pungens, wheat, rye and oats. Necrosis and death of some of the seedlings occurred only in wheat and rye. Among the 45 species in which none of the plants developed symptoms were Agropyron repens L., Bromus inermis Leyss., Dactylis glomerata L., Hordeum jubatum L., H. vulgare L. var. 'Vantage', Lolium perenne L., var. 'Norlea', Poa compressa L., P. pratensis L., and 4 varieties of Zea mays L. However, since only 8 to 25 plants of each species were tested, further tests may show that some of these species can be infected.

Serological tests did not show a reaction between heat-clarified juice from wheat infected with the virus and antisera prepared againstwheat streak mosaic, agropyron mosaic, hordeum mosaic or ryegrass mosaic viruses. Electron microscopic examinationof grids prepared from diseased wheat by the quick dip method revealed rod-shaped particles about 750 mμ long, similar to particles of ryegrass mosaic virus.

Although the infectivity tests showed that the mosaic symptoms on P. palustris are caused by a virus, the virus does not appear to be identical with any other grass virus known in Canada.

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