

Maize Dwarf Mosaic Virus in Idaho

R. L. FORSTER, Assistant Professor, Department of Plant and Soil Sciences, University of Idaho, Kimberly 83341; R. L. STOLTZ, Assistant Extension Professor of Entomology, University of Idaho Cooperative Extension Service, Twin Falls 83301; H. S. FENWICK, Extension Professor, Department of Plant and Soil Sciences, University of Idaho, Moscow 83843; and W. R. SIMPSON, Research Professor, Department of Plant and Soil Sciences, University of Idaho, Parma 83660

ABSTRACT

FORSTER, R. L., R. L. STOLTZ, H. S. FENWICK, and W. R. SIMPSON. 1980. Maize dwarf mosaic virus in Idaho. *Plant Disease* 64:410-411.

Maize dwarf mosaic virus was identified in sweet corn plants in Idaho during 1977, the first report of the disease in the Pacific Northwest. Massive flights of aphids contributed to the incidence of the disease, and yield reductions of 75% or greater were noted in severely affected fields. Plants in late-seeded fields were most susceptible.

Additional key words: epidemiology, *Schizaphis graminum*, *Zea mays* L. var. *saccharata*

Maize dwarf mosaic virus (MDMV) has been reported throughout much of the United States with the notable exception of the Pacific Northwest (2). We report the first confirmed incidence of the disease in Idaho.

On 22 August 1977 we observed sweet corn (*Zea mays* L. var. *saccharata*) plants with severe mosaic, stunting, and chlorosis in the Buhl, Twin Falls County, Idaho, area (Fig. 1). Samples collected from two adjacent late-planted processing fields were mailed to D. T. Gordon at the Ohio Agricultural Research and Development Center, Wooster. He identified MDMV, strains A and B, in samples of the infected tissue (D. T. Gordon, *personal communication*). Neither wheat streak mosaic virus nor maize chlorotic dwarf virus was detected in any of the samples. Results were similar in sweet corn specimens collected and mailed to Dr. Gordon at about the same time from a vegetable seed company field near Buhl. There were also unconfirmed reports of sweet corn with similar symptoms in Cassia County, which adjoins Twin Falls County to the east.

Reports by personnel of the Green Giant Company, which contracts about 15,000 acres (6,070 ha) of sweet corn for processing annually in south central Idaho, indicated initial symptoms appeared in mid-July. Symptoms appeared simultaneously in high percentages of

plants in fields seeded with a midseason cultivar between 3 and 20 June. Fields seeded with the same cultivar before 3 June showed few or no symptoms, as did fields 5–15 miles (8–24 km) from the core area that were seeded 9–16 June (Fig. 1).

Yield reductions of 75% or greater were noted in the most severely affected fields. Data compiled by Green Giant personnel indicated "budgeted" (anticipated) yields of late-planted fields first fell below 100% in fields planted 7 and 8 June and dropped to a low of 51% for fields planted 17 and 18 June (Table 1). Ten of 42 fields (24%) seeded between 1 and 6 June and 112 of 140 fields (80%) seeded between 7 and 20 June were affected by MDMV.

MDMV is transmitted in the non-persistent manner by at least 14 aphid species (1), including the greenbug (*Schizaphis graminum* [Rond.]). Massive flights of aphids, predominantly the

greenbug, occurred during July 1977 in the Buhl area as wheat infested by that aphid began to mature (Fig. 2). Flights were monitored by collecting and counting aphids at weekly intervals from yellow, water-filled trap pans at five sites in the area of the epidemic (3). The massive flights undoubtedly contributed to the high incidence of MDMV within affected fields. In 1978, aphid flights were sparse throughout that area, and the incidence of MDMV in sweet corn was practically nil. MDMV was confirmed in only two fields in south central Idaho in 1978.

There is an apparent positive correlation between the numbers of aphids trapped in July 1977 and the number of fields affected by MDMV as the planting date progressed into June. Plants in fields seeded before 1 June were at least 5 wk old before the greenbug flights began and were not affected by MDMV. Plants in fields seeded between 7 and 20 June were only 2–4 wk old when the flights began and were seriously affected. These younger plants correspond closely to the three- to seven-leaf growth stages of corn, which have been found to be most susceptible to MDMV (4).

MDMV has been confirmed only from the Magic Valley of south central Idaho. No MDMV was detected in the sweet corn seed production area of southwestern Idaho during 1977, 1978, or 1979 in spite

Table 1. Percentage of sweetcorn fields with maize dwarf mosaic virus symptoms and yields of sweet corn planted from 1 June to 20 June 1977 from one seed lot near Buhl, Idaho^a

Planting date	Fields with symptoms		Yield (MWT/A)		Budgeted yield ^b (%)
	(%)	(no.)	Range	Mean	
1–2	40	2	12.4–17.0	15.3	100
3–4	13	2	8.6–26.4	17.5	114
5–6	29	6	12.4–20.2	16.2	106
7–8	78	14	6.4–22.4	13.8	90
9–10	58	7	5.6–19.0	13.9	91
11–12	93	27	6.4–15.8	11.1	73
13–14	56	10	7.6–19.6	11.3	74
15–16	93	26	5.8–16.8	9.2	60
17–18	85	17	4.0–17.2	7.8	51
19–20	73	11	2.6–16.8	8.9	58

^aData supplied by Green Giant Company, Buhl, Idaho.

^bBudgeted yield is the percent of the anticipated yield and varies with cultivar, planting date, location of field, etc.

Approved by the director of the Idaho Agricultural Experiment Station as research paper 79711.

00191-2917/80/04041002/\$03.00/0

©1980 American Phytopathological Society

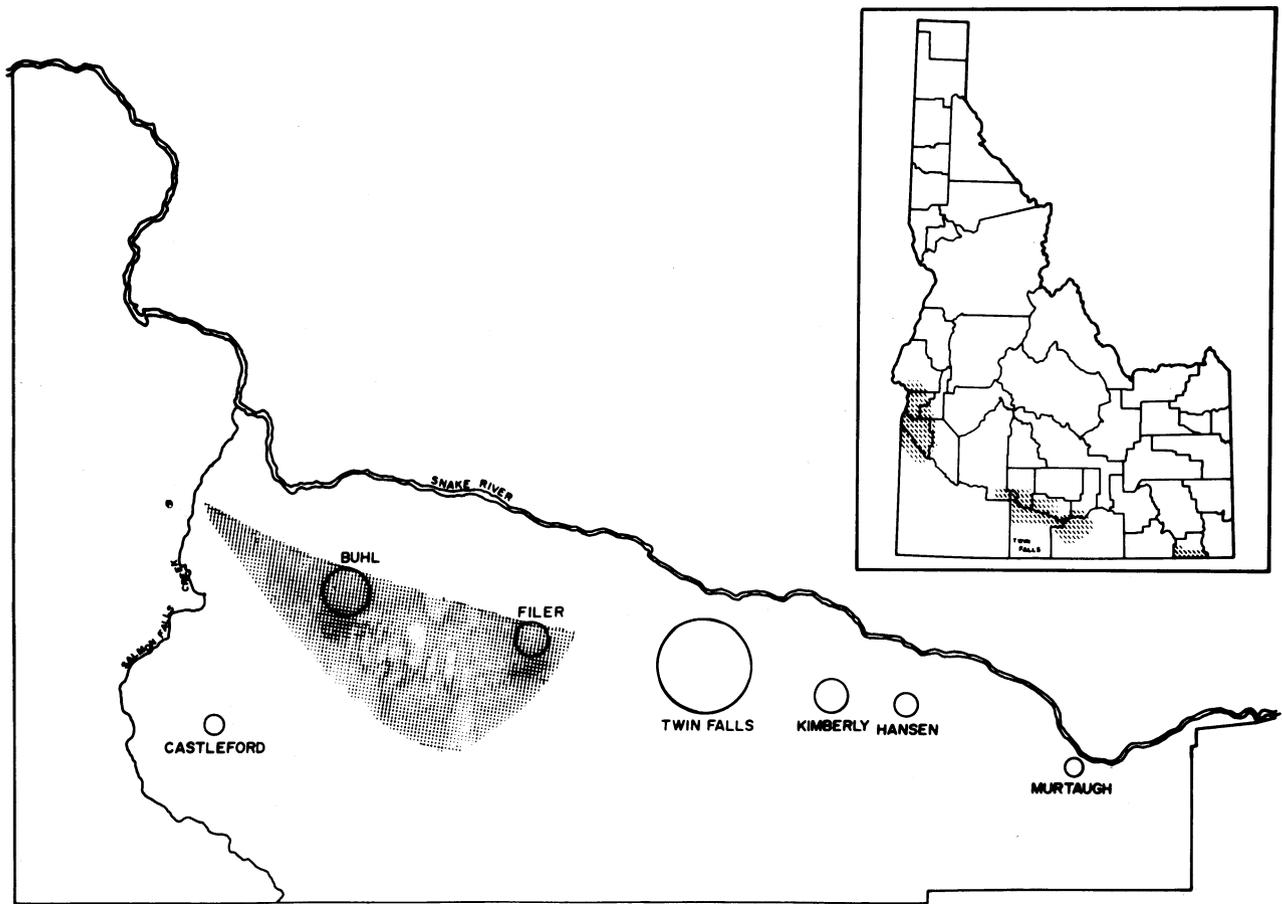


Fig. 1. Shading on the map of the northern part of Twin Falls County, Idaho, indicates the area where maize dwarf mosaic virus was epidemic in sweet corn in 1977. Shading on the state map (inset) indicates the principal sweet corn production areas of southern Idaho.

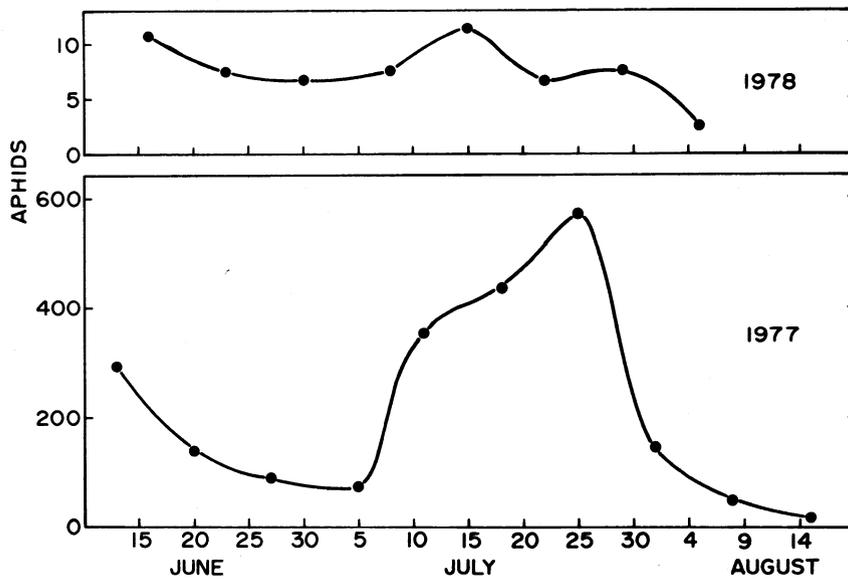


Fig. 2. Total numbers of aphids collected weekly from yellow, water-filled trap pans at five sites in south central Idaho during 1977 and 1978. Aphids trapped in June 1977 were primarily oat bird cherry aphids and corn leaf aphids, whereas those trapped in July 1977 were primarily greenbugs.

of close observation by personnel of the University of Idaho and sweet corn seed and processing companies.

ACKNOWLEDGMENTS

We wish to thank D. T. Gordon of the Ohio Agricultural Research and Development Center, Wooster, for diagnosing the disease in samples mailed to him and the Green Giant Company for providing data.

LITERATURE CITED

1. FENWICK, H. S., and B. ARNESON. 1978. Maize dwarf mosaic virus—additional reference material. University of Idaho, Moscow. 17 pp.
2. GORDON, D. T. 1976. Maize virus diseases in the United States. Pages 45-48 in: L. E. Williams, D. T. Gordon, and L. R. Nault, eds. Proceedings—International Maize Virus Disease Colloquium and Workshop. Ohio Agricultural Research and Development Center, Wooster. 145 pp.
3. MOERICKE, V. 1951. Eine Farbfrage zur Kontrolle des Fluges von Blattläusen in besondere der Pfirsich-blattlaus, *Myzodes persicae* (Sulz.). Nachrichtenbl. Dtsch. Pflanzenschutzdienst 3:23-24.
4. ROSENKRANZ, E., and G. E. SCOTT. 1978. Effect of plant age at time of inoculation with maize dwarf mosaic virus on disease development and yield in corn. Phytopathology 68:1688-1692.