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## INFLUENCE OF PLANTING DATE ON POTATO LEAFHOPPER POPULATION AND HOPPERBURN DEVELOPMENT<sup>1</sup>

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In their studies of the resistance of numerous potato varieties to hopperburn, Allen and Rieman<sup>1</sup> have indicated that the early-maturing varieties are more susceptible than the late-maturing varieties. Early varieties such as Triumph, Warba, and Earlane developed a high percentage of hopperburned foliage as compared with such late varieties as Houma, Katahdin, and the Rurals. These preliminary studies suggest that resistance may in some way be associated with late maturity.

The purposes of the present study have been to determine the effect of planting date on the percentage of hopperburn development and upon the leafhopper population. Two resistant varieties, Houma and Katahdin, and two susceptible varieties, Triumph and Warba, were used in the test. Ten hill plantings of each of the four varieties were made at four weekly intervals beginning the 19th of May and ending the 9th of June. The ten hill plantings were replicated twice and the varieties randomized within the plantings.

Weekly records were kept of both percentage hopperburn development and of the nymphal leafhopper population. Foliage collections and nymphal counts were made immediately following the first appearance of hopperburn symptoms and were repeated at weekly intervals for a period of four weeks. Similar data were gathered from the varieties which were grown at each of the different planting dates. In this way

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<sup>1</sup>Approved by the Director of the Wisconsin Agricultural Experiment Station. Aid was received from the National Science Division of W. P. A. in the accumulation of data secured from the field plots.

a measure of the hopperburn population and the percentage hopperburn development was secured over a comparable period for each varietal planting.

The method used in determining the percentage hopperburn development was a modification of that described by Allen and Rieman. The sixth leaf from the stem tip was removed from ten plants selected at random from both replicates of a varietal planting and the hopperburned foliage separated from the green foliage by use of a scissors. The percentage hopperburned foliage was then calculated on a dry weight basis. Similar determinations were made on foliage samples collected from all of the different plantings grown at weekly intervals. The results of the forty determinations were averaged.

The nymphal leafhopper population was determined by counting the nymphs occurring on the sixth leaf from the stem tip. Counts were made from ten plants selected at random in both replicates of a varietal

TABLE I.—*Relation of planting date to potato leafhopper population and percentage hopperburn development in 1938 and 1939 Kenosha, Wis.*

Variety	Planting Date	Leafhopper Population <sup>1</sup>		Percentage Hopperburn <sup>2</sup>	
		1938	1939	1938	1939
Triumph	May 19	558	417	92.4	72.6
Triumph	May 26	451	308	62.8	52.4
Triumph	June 2	347	248	47.9	30.6
Triumph	June 9	172	166	74.6	15.2
Warba	May 19	277	244	57.4	63.4
Warba	May 26	344	102	59.9	36.3
Warba	June 2	156	182	27.3	17.2
Warba	June 9	78	68	51.9	7.8
Houma	May 19	145	187	17.3	8.3
Houma	May 26	99	109	4.2	8.5
Houma	June 2	115	36	8.3	2.1
Houma	June 9	27	22	1.9	2.9
Katahdin	May 19	137	115	10.1	5.0
Katahdin	May 26	108	61	4.7	2.2
Katahdin	June 2	72	42	2.1	2.7
Katahdin	June 9	47	18	1.8	1.3

<sup>1</sup>Total nymphal leafhoppers counted 4 times at weekly intervals from 10 leaves in each planting.

<sup>2</sup>Average percentage hopperburn from 10 samples of foliage from each planting.

planting. Similar counts were made at each of the four weekly intervals. The counts for the ten leaves were totalled and the average ten leaf counts for the four weekly intervals determined as above.

Percentage hopperburn determinations show that earlier plantings were more severely injured by the leafhoppers as shown in figure 1 and table 1. The injury was most severe on the two early varieties, Triumph and Warba; this relationship holding throughout the season on all plantings. It is to be noted, however, that the percentage hopperburn development was appreciably less on Houma and Katahdin even when they were exposed three weeks longer to leafhopper attack.

The sharp increase in hopperburn development in the plantings made on the 9th of June of Triumph and Warba for the 1938 season, table 1, may be explained by weather conditions. Moisture was lacking at the time and for a period following the final planting and as a result the early varieties were stunted and ripened prematurely. Such host and weather conditions favored a rapid hopperburn development. The late varieties were similarly stunted during their early growing period, but were able to resume growth following late season rains.

The nymphal leafhopper population was likewise greater on the earlier plantings, as shown in figure 2 and table 1. The early varieties,

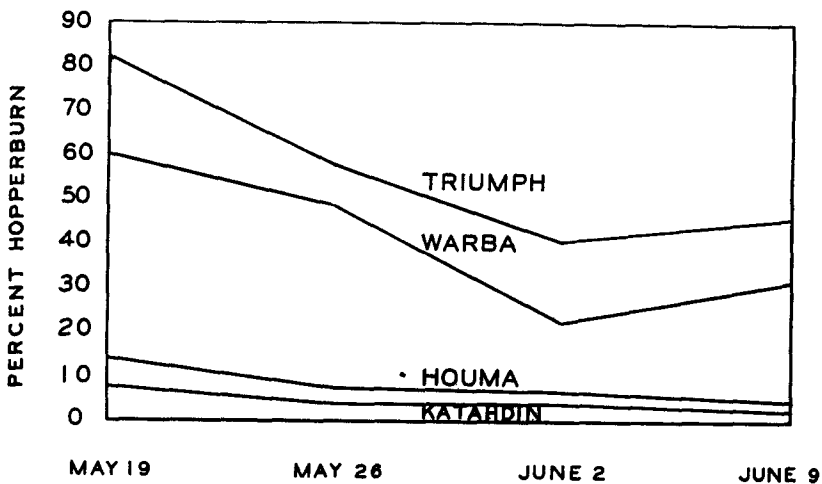


FIGURE 1—Average per cent hopperburn development on potato varieties planted at four successive weekly intervals during 1938-1939, Kenosha, Wisconsin. Average per cent hopperburn determined from ten leaves collected at four weekly intervals. (Results represent a two-year average).

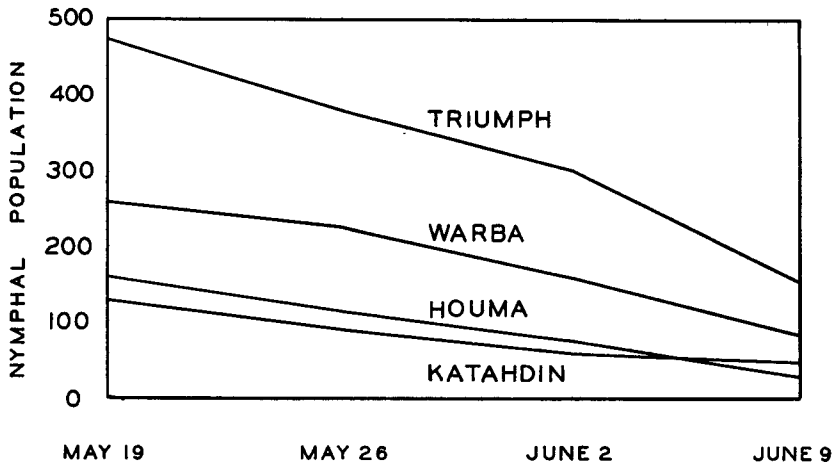


FIGURE 2—Average number of potato leafhopper nymphs occurring on potato varieties planted at four successive weekly intervals during 1938-1939, Kenosha, Wisconsin. Total nymphs from ten leaves counted at four weekly intervals and the four counts averaged. (Results represent a two-year average).

Triumph and Warba, proved more attractive throughout the season than did the late varieties Houma and Katahdin. The number of nymphs appearing on Houma and Katahdin when planted on the 9th of June, however, was no greater than that occurring on Triumph when exposed to leafhoppers three to four weeks longer. These observations indicate that there are factors other than earliness or lateness which influence the resistance of potato varieties to hopperburn.

#### CONCLUSIONS

Percentage hopperburn development was greater in the early maturing varieties than in the late maturing varieties regardless of the planting date.

Percentage hopperburn development was reduced by deferring the planting date with both early and late varieties of potatoes.

Nymphal leafhopper population is closely correlated with percentage hopperburn development in respect to time of planting.

The results indicate that the relative earliness or lateness of a variety is not the prime factor in determining its resistance or susceptibility to hopperburn.

#### LITERATURE CITED

1. Allen, T. C. and G. H. Rieman. 1939. Occurrence of hopperburn resistance and susceptibility in the potato. *Amer. Potato Jour.* 16: 139-142.