Section 1. Mites and Sap Sucking Insects
Category. Biology, Virus Transmission

BARLEY YELLOW DWARF VIRUS INFECTIVITY OF APHIDS COLLECTED IN IDAHO

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At least eight species of aphids regularly infest small grain in southwestern Idaho. In addition, many other species which normally infest other Gramineae may occasionally feed on grain. Most of these species have been reported as vectors of barley yellow dwarf virus (BYDV) (Jedlinski, 1981) but only a few are considered to be important vectors. The objective of this research was to sample natural populations of aphids in southwestern Idaho and determine what percentage of them were viruliferous.

Aphids used in the assays were collected in two different ways in each of three years. First, samples were collected directly from grasses and other crops, taking only one aphid per plant. Second, aphids were collected in a suction trap at Parma adapted for live collection. Assays were done by caging aphids singly on "California Red" oat indicator plants and allowing them to feed for 48 to 72 hours. After transmission access, the plants were sprayed. They were held in the greenhouse for 3-4 weeks and observed for symptom expression.

Aphids representing eight different species were collected from their host plants and tested for BYDV transmission (Table 2). Of these, *Rhopalosiphum padi*, *Sitobion avenae*, *Rhopalosiphum maidis*, *Metopolophium dirhodum*, *Schizaphis graminum* and *Macrosiphum euphorbiae* all transmitted BYDV at least occasionally. *Diuraphis noxia* (595 tested) and *Sipha elegans* (31 tested) did not transmit. One species, *Diuraphis frequens*, which regularly colonizes wheat, was never abundant enough for a sample to be collected for an assay.

Among those aphids assayed from suction trap collections, *R. padi* was collected in highest numbers and transmitted BYDV most consistently (Table 2). Other common aphids on grain and corn which transmitted BYDV in these assays included *R. maidis*, *M. dirhodum*, and *M. euphorbiae*. Ten species of aphids which normally infest other possible hosts of BYDV were also tested. Of these, *Rhopalosiphum insertum* transmitted BYDV consistently, and *Ceruraphis eriophori* transmitted it once (63 tested).

Table 1. Barley yellow dwarf infectivity of aphids collected from plants in southwestern Idaho. 1985-1987.

Species	Host	1985		1986		1987	
		# tested	% trans	# tested	% trans	# tested	% trans
Rhopalosiphum padi	corn, winter grain	1442	1.3	1186	0.7	1243	2.0
Sitobion avenae	corn, spring wheat	408	1.2	390	0.0	332	1.8
Rhopalosiphum maidis	winter grain, barnyard grass	158	26.0	194	9.8	964	14.3
Metopolophium dirhodium	corn, spring wheat	-	-	31	0.0	64	4.7
Schizaphis graminum	spring wheat	-	-	32	0.0	112	13.4
Diuraphis noxia	wheat, barley	-	-	-	-	595	0.0
Macrosiphum euphorbiae	corn	828	0.5	212	0.0	320	0.3
Sipha elegans	spring wheat	-	-	31	0.0	-	-

Table 2. Transmission of barley yellow dwarf virus by aphids collected in a suction trap. Parma, ID.

	1985		1985		1987	
	# tested	% trans	# tested	% trans	# tested	% trans
Rhopalosiphum padi	980	6.0	2360	6.9	216	4.2
Rhopalosiphum maidis	47	6.4	22	0.0	25	4.0
Rhopalosiphum insertum	94	4.3	61	3.3	24	0.0
Metopolophium dirhodum	88	0.0	4	0.0	39	1.6
Sitobion avenae	6	0.0	-	-	8	0.0
Macrosiphum euphorbiae	26	3.8	24	4.2	25	4.0
Schizaphis graminum	-	-	-	-	4	0.0
Diuraphis noxia	-	-	-	-	4	0.0

Reference:
Jedlinski, H. M. C. 1981. Plant Disease 65:975-978