



1979

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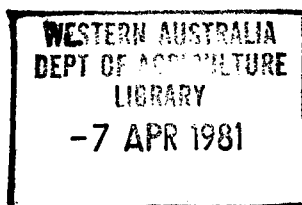
DEPARTMENT OF AGRICULTURE
Western Australia

EXPERIMENTAL SUMMARY 1979

BARLEY YELLOW DWARF VIRUS
IN BARLEY AND OATS
(79MT20, 79PE13)

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BARLEY YELLOW DWARF VIRUS IN BARLEY AND OATS
EXPTS. 79MT20, 79PE13

EXPERIMENTAL:

(1) Yield assessments have continued similar to those used in 1977 and 1978. Essentially, plants with symptoms typical of BYDV are marked in the early spring as well as a similar number without symptoms. Yield differences were obtained both for Clipper Barley and an oats variety.

(2) Two pilot experiments using viruliferous aphids were carried out at Mount Barker (79MT20) and at South Perth (79PE13). Both Rhopalosiphum padi and R. maidis were used. Infection at Mt Barker failed, and therefore no data is presented. The Perth experiment was planted on August 31, 1979. The original plan was to have two treatments, i.e. Aphid infestation vs. Control in 4 replications. However, as two different species of aphid became available, the experiment was split into two smaller ones, each using a different species of aphid with 2 replications.

RESULTS:

See Tables 1 and 2.

TABLE 1 Percentage reduction[†] due to Barley Yellow Dwarf Virus infection at Mount Barker (79MT20)

	Barley : Clipper	Oats : 66-201
Number of tillers	78 ***	1 N.S.
Number of fertile tillers	86 ***	30 *
Plant height (Longest tiller)	64 ***	35 ***
No. of Grains/Plant	95 **	69 ***
Grain Yield/Plant	94 ***	71 ***
Dry Weight/Plant	92 ***	59 ***

N.S. Not significant

* P < 0.05

** P < 0.01

*** P < 0.001

† $\frac{\text{Healthy} - \text{Diseased}}{\text{Healthy}} \times 100$

TABLE 2 Effect of infection with BYDV using two aphids as vectors on yield and yield components (79PE13)

	<u>Rhopalosiphum maidis</u>		<u>Rhopalosiphum padi</u>	
	Oats	Barley	Oats	Barley
<u>No. of Tillers</u>				
Infected	5.134	6.420	3.950	6.795
Not Infected	4.829	5.945	5.200	6.515
% Loss/Gain	N.S.	N.S.	-24*	N.S.
<u>No. of Fertile Tillers</u>				
Infected	3.917	5.440	3.050	6.675
Not Infected	3.714	5.785	3.600	6.100
% Loss/Gain	N.S.	N.S.	N.S.	N.S.
<u>100 Seed Weight</u>				
Infected	3.400	4.550	3.150	4.450
Not Infected	3.300	4.500	3.300	4.400
% Loss/Gain	N.S.	N.S.	-4.6*	N.S.
<u>Grain Yield/Plant</u>				
Infected	3.962	3.640	2.827	4.360
Not Infected	3.296	3.760	3.913	4.940
% Loss/Gain	N.S.	N.S.	N.S.	N.S.
<u>Plant Height (cm)</u>				
Infected	62.35	-	55.10	-
Not Infected	66.40		59.08	
% Loss/Gain	N.S.		N.S.	
<u>Dry Weight/Plant (g)</u>				
Infected	11.05	-	9.02	-
Not Infected	11.96		11.55	
% Loss/Gain	N.S.		N.S.	
<u>No. of Grains/Head</u>				
Infected	32.275	-	31.325	-
Not Infected	28.380		32.060	
% Loss/Gain	N.S.		N.S.	

N.S. Not significant

* P < 0.05

COMMENTS:

Table 1

Apparent barley yellow dwarf virus infection has caused significant reduction in plant yield for both oats and barley (94% for barley and 71% for oats). Affected plants also had much less dry weight/plant, shorter plants and fewer grains per plant.

Table 2

No apparent symptom of BYDV was observed. However infection does appear to have affected yield and yield components consistently when R. padi was used as vector. Apart from reduction in number of tillers and 100 seed weight in oats, no other differences were significant presumably due absolutely to minimum error degree of freedom (1). In contrast, R. maidis infestation did not show any consistent pattern confirming earlier reports that R. padi is a more efficient vector of BYDV.

This experiment does however indicate the feasibility of small plot trials in studying yield loss vs. BYDV infection relationship provided sufficient replications are employed, and that the trial is planted at a more appropriate date.