

The field performance of three aphid-resistant, harbinger backcross lines

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A backcrossing program carried out by the National Annual Medic Breeding Unit (NAMBU) for the National Annual Medic Improvement Program (NAMIP) has resulted in the production of forty medic lines with 94% Harbinger genotype and some resistance to spotted alfalfa aphid (*berioaphis trifolii* (Monell) f. *maculata*) (SAA) and blue green aphid (*Acyrtosiphon kondoi* (Shinji)) (BGA) Of these, ten lines were discovered which are not segregating for resistance expression to either aphid, and on the basis of this and other greenhouse tests several have been chosen as candidates for an aphid-resistant Harbinger replacement. Before final release however, the performance of these lines needs to be gauged against Harbinger in the field.

Methods

Because of a seed shortage, only three lines (code named Z-219, Z-239 and Z-243) were sown in this trial. All are morphologically very similar to Harbinger. However, Z-239 and Z-219 do have a blotch leaf mark which is not present in Harbinger.

The three backcross lines and Harbinger were sown in four replicates at 10 kg/ha as small microward plots about 1 x 1m on a typical brown mallee sand of pH8 at Two Wells, South Australia. 200 kg/ha of single superphosphate was added pre-sowing. Seed was lightly raked into a moist seed bed on July 8,

1986. Seedling emergence counts were made three weeks post-sowing. Where required, plots were hand-weeded, while Fusilade(R) was applied in late August for grass control, and Imidan (R) in late July for red mite control. Aphid numbers were very low throughout the growing season. Herbage production was scored at strategic times, with late spring scores being converted to kg/ha by comparison with yield of Harbinger control plots sown next to the trial. Pod counts on mature plots coupled with weight measurements of 20 random pods from each line were used to estimate final pod and seed yield.

Results and discussion

	Seedlings /m ² , 29/7	Herbage scores		Herbage yield 22/10 (kg/ha)	Pod yield (kg/ha)	Seed yield (kg/ha)
		15/9	29/9			
Harbinger	290	45.0	56.3	4000	4760	1360
Z-219	330	60.0	70.0	4480	4500	1250
Z-239	280	53.8	57.7	3930	4580	1350
Z-243	270	75.5	77.8	4980	4950	1380
LSD (5%)	n.s.	19.9	n.s.	n.s.	n.s.	n.s.

The data obtained indicate that in first year field performance under aphid- free conditions, the three lines are basically similar to their recurrent parent Harbinger in this trial on a "typical" brown mallee soil. The possible exception to this is in herbage production, where Z-243 and Z-219 appear slightly superior to both Harbinger and Z-239, particularly early in the growing season. However this difference is not generally statistically significant. It should be noted that aphid numbers were very low throughout the season at this site and did not influence yield. Where either SAA or BGA are present in damaging numbers, it is most likely that Harbinger's yield would be significantly depressed in relation to all three other lines. Hence any of these would provide suitable aphid-resistant Harbinger replacements for this and similar situations.