

Breeding disease resistance into safflower

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The potential of safflower as a winter oilseed crop in Australia is limited by disease susceptibility of the present commercial cultivar, Gila. A research program established in 1975 has aimed at incorporation of resistance to Phytophthora root rot (*P. crytogea*) and leaf blight (*Alternaria carthami*). This paper reports progress to date.

Sources of resistance were located by screening portions of the world collection. After a program of back crossing and rigorous selection under controlled conditions 50 breeding lines were selected for evaluation trials carried out in conjunction with Departments of Agriculture in four states. Variations between sites and breeding lines would identify local selections for further testing.

Five trial sites were selected; they were located at Biloela in Queensland, at Griffith and Warren in New South Wales, at Horsham in Victoria and at Naracoorte in South Australia. The Biloela and Warren sites were selected to screen for Alternaria and Phytophthora, respectively. However, at Warren no infection occurred, even after the site was ponded twice at day temperatures above 35°C thus providing ideal conditions for the spread of the disease. This lack of infection suggests that the root rot pathogen was not present in the soil. The Horsham and Naracoorte sites were selected to screen for breeding lines that would adapt to temperate climate conditions and exhibit shorter stature, earlier maturity and disease resistance. At each of the 5 sites 10 lines have been selected according to their ratings for disease resistance and agronomic characteristics, which include plant uniformity, days to flower, plant height, lodging potential, yield and oil percentage. During 1984-85 the lines will be reevaluated in trials in Queensland, New South Wales, Victoria and South Australia.

Results for seed yield (kg ha⁻¹) of breeding lines found to be superior to Gila at the 5 test sites during 1983-84, and suitable for further testing in 1984-85, are as follows:

* Considered not suitable for further testing. Results, however, have not yet been statistically analysed.

Further studies are in progress to establish the genetic variation of root formations of the breeding lines currently being tested.

Breeding line	Site location				
	Biloela Qld	Griffith NSW	Warren NSW	Horsham Vic	Naracoorte SA
Gila	2655	1026	202	1238	802
13530	2585	1360	311	1634	944
14063	2670	1760	686	1217*	316*
14081	3037	1600	640	1075*	675*
13450	2730	1220	677	1245*	399*
13535	1265*	727*	286	1781	1083*
13556	2817	1234*	513	1441	424*