

Rapeseed Research and Utilization in Australia

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Rapeseed Production

Rapeseed is a relatively new crop to Australia with the first commercial crops grown as recently as 1969. With the introduction of wheat quotas in the country in 1969-70 and the collapse of the wool market in 1970-71, rapeseed was seen as a good alternative crop for farmers. The return of good wool prices in 1972 and removal of wheat quotas in 1974-75 resulted in a depression in rapeseed production. Blackleg disease also contributed to the decline. Although production has fluctuated considerably over the next 10 years, low wheat prices together with the agronomic advantages of growing rapeseed have resulted in a renewed interest in the crop. In 1985, a record 87,000 tonnes was produced in Australia. Research indicates that with new varieties with better adaptations to the Australian environment and improved disease resistance, a potential of 300,000 tonnes could be achieved.

The major production areas are the Tablelands and Western Slopes of N.S.W. and the Western Districts of Victoria. To a lesser extent, the South East of South Australia and the South Coast region of Western Australia.

Table 1: Area, production and gross value of rapeseed in Australia.

Year	Area '000 hectares	Production '000 tonnes	Gross Value \$ million
1980-81	23.6	17.2	4.5
1981-82	15.7	14.5	3.3
1982-83	12.4	6.7	1.6
1983-84	17.8	17.2	5.0
1984-85	30.0	32.4	9.9
1985-86	74.2	87.0	24.1
1986-87	69.0	77.0	-
1987-88	65.0	73.0	-
1988-89*	63.0 (NSW-35.0)	63.0 (NSW-35.0)	-

1980-86: Year book - Australia 1988 (Australian Bureau of Statistics - Canberra).

1986-89: Crop Report - Australian Bureau of Agriculture and Resource Economics (* - estimates at 11th August 1988).

Initially cultivars grown in Australia were Canadian and European types. In 1970, Target was the most widely grown cultivar. By 1978, Midas, Tower and Span were the recommended cultivars. Since that time rapeseed breeding programs have been successful in producing cultivars better suited to Australian growing conditions. Two Australian *Brassica campestris* and several *Brassica napus* cultivars have been released with new and more promising types ready for release in the near future.

Breeding Programs

Currently, there are four major plant-breeding programs in Australia. These include:

- i. The Agricultural Research Institute, Wagga Wagga, N.S.W. Government owned.
- ii. The Victorian Crops Research Institute, Horsham, Victoria - the rapeseed breeding program is jointly owned by the State Government and Agseeds Pty Ltd.
- iii. The Western Australian Department of Agriculture, Perth, Western Australia, - Government owned.
- iv. Pacific Seeds Pty Ltd., Toowoomba, Queensland - Private ownership.

The aims of the four programs are basically the same, to increase yield, improve disease resistance and improve quality characteristics including increased oil concentration and reduced glucosinolate concentration. Each of the breeding programs has a breeder and quality evaluation facilities.

Advanced lines from each of the breeding programs are evaluated in an "Interstate Rapeseed Trial". With the cooperation of breeders and agronomists, the lines are grown throughout the rapeseed growing areas in Australia, including 6 states. Yield and disease resistance are evaluated and samples are sent to the Wagga Research Institute for quality analysis. A voluntary registration scheme is used for new cultivars to maintain consistency between the programs.

Quality Variability

A major factor in the growing of rapeseed in Australia is the wide range of environments from the high rainfall areas (750 mm) in north eastern New South Wales (N.S.W.) to the dry western areas (375 mm) of N.S.W. and Western Australia. Sowing and harvest dates may vary by up to 5 months between sites due to seasonal differences.

In Australia, rapeseed is grown as a winter crop with flowering commencing in late winter and pod filling extending into the warm late spring and early summer months. Rising evaporation and falling soil water content after lead to water stress during pod filling. As a result of climate, quality factors vary greatly between sites (Table 2).

Oil concentration in rapeseed grown in N.S.W. trials has been shown to vary from less than 20% to greater than 50% (Mailer, unpublished data). Glucosinolate concentration, also closely related to environmental conditions, varies greatly within and between cultivars with individual cultivars varying by + or- 70%. Studies have shown a large part of this variability to be related to water availability (Mailer and Cornish, 1987).

Table 2: Quality differences between Australian rapeseed cultivars (total glucosinolates measured as glucose, range is given in brackets)

Cultivar	Glucosinolates concentration (umol/g)	Oil concentration (%)	Erucic acid (%)
Bunyip	56 (41-73)	40.9 (33.0-46.5)	0.82 (0.3-1.3)
Marnoo	42 (22-61)	43.0 (34.6-50.6)	1.72 (1.1-2.6)
Wesbrook	29 (16-45)	42.6 (35.0-52.1)	0.26 (0.1-0.4)
Tatyoan	38 (24-59)	42.0 (34.8-48.6)	0.67 (0.2-1.0)
Maluka	18 (9-26)	41.9 (33.1-50.6)	0.35 (0.2-0.4)
Shiralee	17 (10-24)	42.3 (32.4-51.9)	0.25 (0.0-0.8)

New South Wales trials, 1986 (17 sites).

Utilisation

Rapeseed oil has been used as a blended oil in salad dressings and cooking oils with a small portion going into margarine. Rapeseed oil usage is generally dependent upon the price or availability of other vegetable oils. Recently, Meadow Lea, a major manufacturer of vegetable oil products, announced that canola oil, for the first time, will

be marketed under its own name as Crisco Canola Oil rather than a blend with other vegetable oils. Rapeseed meal is generally used in animal feeds, particularly for the broiler industry. The development of the new low glucosinolate cultivars, and the speed in which growers are moving away from the older rapeseed types, will see a far greater range of markets for the meal in the near future.

References

MAILER, R.J. and CORNISH P.S., 1987. - Effects of water stress on glucosinolate and oil concentrations in the seeds of rape and turnip rape. - *Australian Journal of Experimental Agriculture*, 27, p. 707-11.