

Breeding french bean cultivars for winter production

P.J. Farlow

Queensland Department of Primary Industries, Redlands Hort. Res. Stn., Ormiston, Q. 4163.

French beans (*Phaseolus vulgaris* L.) are most successfully grown in south east Queensland as a spring or autumn crop, owing to the susceptibility of green beans to low temperatures. Cold temperatures can result in reduced yields with a large number of unmarketable pods which are 'hooked' in shape and deficient in seed. These effects are generally most severe with stringless cultivars and consequently the winter bean industry is based on the string bean cv. Redlands Greenleaf C (RGC).

As part of an intensive plant breeding programme to develop cold tolerant stringless cultivars two mass selection trials were conducted in the field during winter. One of these was an intravarietal selection programme using a 1600 plant population of Redlands Pioneer (RP), a stringless variety which displayed some variation for cold tolerance. The other used a 3000 plant population of the F3 generation from a cross between RP and Tweed Wonder (TW), a cold tolerant, string cultivar.

In both programmes the populations were divided into 100 plant grids within which selections and random controls were both made at the 10 percent level. Selection was made for bushes bearing the greatest number of straight pods. After selection seed was increased for evaluation trials which were conducted the following winter. The evaluation trials used 5400 and 20000 plants for the RP and RP x VW programmes, respectively. During evaluation selection was again carried out at the 10 percent level. Further assessment of the RP selection established its superiority over RP and it was released to industry as Redlands New Pioneer (RNP).

The five most cold tolerant lines with acceptable pod quality were isolated from the RP x TW programme, inbred and designated by Red. CT numbers 12, 15, 57, 60 and 61. In winter 1979 their performance was compared to that of RP, RGC and RNP. All seed bearing pods were harvested and graded into groups dependant on pod curl. The results are presented in table 1.

TABLE 1. Pod yield of French bean cultivars grown in winter 1979 (kg ha⁻¹)

Pod type	Cultivar								LSD	
	Red CT 12	Red CT 15	Red CT 57	Red CT 60	Red CT 61	RNP	RP	RGC	5%	1%
Straight (S)	5922	4808	3945	4612	5184	910	791	737	1108	1538
Marketable (M)	220	259	3176	298	188	3961	2974	251	657	912
Curled (C)	557	471	1176	447	549	1992	1696	345	415	576
S + M	6141	5067	7122	4910	5373	4871	3765	988	1449	2011

RNP produced significantly ($P < 0.05$) more marketable pods than any other commercial cultivar. Most of the pods produced by the Red. CT lines, with the exception of 57, were straight and all yielded significantly ($P < 0.01$) more straight pods than any of the three commercial cultivars. Red. CT 57 produced significantly ($P < 0.01$) more marketable pods (M) than the other Red. CT lines and RGC, resulting in the highest S + M value of any cultivar. The Red. CT lines are all acceptable commercially and, with the exception of 57, would require virtually no grading for pod curl prior to marketing. *