

GARDEN PEA CULTIVARS : ADAPTABILITY AND USES**R.J. Casey**Yates Research
Courtenay
Canterbury**INTRODUCTION**

The term "garden pea" is an anomaly nowadays, as at least three quarters of the area contracted as "garden peas" are seed peas to supply the food processing industry. Of the twenty eight cultivars listed in Table 1, only five are true

garden peas, the others have been especially bred as vining peas for freezing, canning or dehydration. This is as distinct, however, from field peas which are used for stock food or for human consumption as dried peas in various forms. Garden peas usually have wrinkled seeds, whereas field peas are usually smooth seeded.

Table 1. Garden pea cultivars grown in New Zealand

	Straw length	Foliage	1st flower node	Pods per node	Maturity	Origin	Agent	Use
Ajax	M	M	13	2	M	NZ	3	F
Alderman	T	D	18	1	L	UK	5	G
Aorangi	M	M	15	2-3	M	NZ	1	F
Bolero	M	M	14	2-3	M	USA	4	F
Canterbury 39	M	M	15	1-2	M	AUST	1	F
Combi	M	M-D	14	1-2	M	USA	4	F
Dark Skinned Perfection	M	M	16	1-2	M-L	USA	5	F
Early Onward	M	D	13	1-2	E-M	UK	3,4	M
Frosty	M	M	13	1-2	M	USA	2,4	F
Greenfeast 68	M	M	15	1-2	M	UK/NZ	5	F,C,G,M
Kuru	M	D	15	1-2	M	NZ	2	F
Mitre	M	M	14	2-3	M	NZ	1	F
Multistar	M	M	17	2-3	L	DENMARK	3	F
New Victory	M	D	15	1-2	M	AUST	3	F,M
Onward	M	D	14	1-2	M	UK/NZ	5	M,G
Pania	M	M-D	15	1-2	M	NZ	5	F
Patea	M	M	13	1-2	E-M	NZ	5	F
Piri	M	M	14	1-2	M	NZ	5	F
Princess	M	D	16	1-2	L	USA	3	F
Puget	M	L-M	15	2-3	M	USA	2	F
Puke	M	M	15	1-2	M	NZ	5	F
Scout	M	M	14	1-2	M	USA	5	F
Sela	S	M	13	2	M	HOLLAND	3	F
Small Sieve Freezer	M	M	15	1-2	M	USA	5	F
Tere	S	M	10	1-2	E	NZ	1	F
Triad	M	M	16	2-3	M-L	NZ	4	F
Victory Freezer	M	M	15	1-2	M	USA	5	F,M,G
William Massey	S	M	9	1-2	E	UK/NZ	5	M,G

Key to Table 1.

S = short
M = medium
T = tall

L = light
M = medium
D = dense

E = early
M = medium
L = late

1 = Cant. Seed
2 = Dalgety
3 = Wrightson
4 = Yates
5 = Various

F = freezing
C = canning
M = fresh market
G = home garden

Source: Jermyn, 1984.

SEED YIELD

As the end use of garden peas is consumption in the immature state, all new introductions are evaluated for yield and quality in trials which are harvested green at the practical freezing stage. For this reason there are no trial data available on seed yields in New Zealand. Agricultural production statistics combine field peas and garden peas for seed under "peas for threshing". The only seed yield data obtainable was from Yates records. This is presented in Table 2 which shows the average seed yields of some of the major cultivars grown in New Zealand. The data covers the seasons 1982/83 to 1984/85 and is from crops grown in the Canterbury, Marlborough, Wairarapa and Manawatu districts. Areas per cultivar ranged from 50 to 800 hectares per year. The cultivars listed are those predominantly contracted to supply seed to New Zealand, Australian, English and South African processors.

Newer cultivars such as Pania and Bolero are higher yielding than older cultivars such as Victory Freezer and William Massey. The low yield of Victory Freezer is in part due to its susceptibility to virus diseases. Logan (1983) comments that pea seed yields have increased at an average rate of 1.6% per annum since 1950. Some of the improvement in yield is due to the breeding and introduction of disease resistant cultivars, particularly those with resistance to fusarium wilt and top yellows virus (Table 2) (Crampton, 1966).

It should be mentioned that growers are paid a higher price for the older garden cultivars in the lower part of Table 2 to compensate for their lower average yield.

ADAPTABILITY

Peas are widely adapted, being grown from tropical to cold temperate conditions. Of the cultivars listed in Table 3,

Table 3. Resistance to major diseases of pea cultivars grown in New Zealand

	Fusarium Wilt	Top Yellows	Pea Mosaic
Ajax	R	R	I
Alderman	R	T	S
Aorangi	R	R	I
Bolero	R	T	S
Canterbury 39	R	R	I
Combi	R	T	S
Dark Skinned Perfection	R	S	I
Early Onward	R	S	I
Frosty	R	R	I
Greenfeast 68	R	R	I
Kuru	R	R	I
Mitre	R	R	I
Multistar	R	T	S
New Victory	R	R	S
Onward	R	T	I
Pania	R	R	I
Patea	R	R	I
Piri	R	R	I
Princess	R	R	S
Puget	R	S	I
Puke	R	R	I
Scout	R	T	S
Sela	R	T	I
Small Sieve Freezer	R	R	I
Tere	R	R	I
Triad	R	R	I
Victory Freezer	R	S	S
William Massey	R	R	I

(R = resistant; T = tolerant; I = immune; S = susceptible)

Table 2. Garden pea seed crop average yields for major cultivars grown in New Zealand 1983-85 (t/ha, machine dressed weights).

	1983	1984	1985	Mean	% of grand mean
New Cultivars (post 1960)					
Bolero	2.18	3.50	2.76	2.81	115
Pania	2.78	2.97	2.40	2.72	111
Patea	2.77	2.89	2.36	2.67	109
Greenfeast 68	2.32	3.13	2.43	2.63	108
Scout	2.50	2.92	2.43	2.62	107
Small Sieve Freezer	2.46	3.00	2.34	2.60	107
Older cultivars (pre 1960)					
Onward	1.82	2.89	2.25	2.32	95
Early Onward	2.22	2.57	2.07	2.29	94
Victory Freezer	2.01	2.34	2.27	2.21	91
William Massey	1.87	2.10	2.08	2.02	83
Alderman	1.82	2.30	1.68	1.93	79
Mean	2.25	2.78	2.28	Grand mean = 2.44 t/ha	

about half were bred in New Zealand, the remainder were bred in temperate areas of the USA and Europe, at latitudes which approximate those of southern New Zealand.

For optimum growth, peas favour warm days (20°C+) followed by night temperatures which are 6-10°C lower (Sutcliffe and Pate, 1977). These conditions occur in the eastern districts of New Zealand where peas are grown. The cultivars listed in Table 3 are adapted to the New Zealand climate and daylength, so adaptability becomes a question of ability to tolerate the disease complex present in New Zealand. Many diseases are most economically controlled by introducing stable genetic resistance, if available. In Table 3 it can be seen that resistance to three of the major diseases — fusarium (pea) wilt, pea mosaic virus and top yellows virus, has been incorporated by breeders.

Race 1 of wilt (*Fusarium oxysporum* var. *pisi*) is widespread in the arable areas of Canterbury, Marlborough and Hawkes Bay. All the cultivars listed are resistant. Race 2 of this disease (near wilt) is also present in Hawkes Bay. Three of the cultivars listed, namely Kuru, New Victory and Puget are resistant.

Pea mosaic is caused by a strain of bean yellow mosaic virus and is prevalent in Marlborough and Hawkes Bay. Twenty of the cultivars listed are immune to the disease and eight are susceptible.

Pea top yellows is caused by beet western yellows virus and/or subterranean clover red leaf virus, and is sometimes prevalent in South Island districts. Again all but four of the cultivars are resistant or tolerant to this disease.

USE

Most of the cultivars listed in Table 1 are primarily freezing types, processed as quick frozen or dehydrated peas. In New Zealand, Australia, South Africa and the United Kingdom, these "freezer" types are also used for canning. Six of the cultivars listed in Table 1 are used for fresh market and home gardens. Three have multiple uses.

CONCLUSION

The garden pea cultivars grown in New Zealand give satisfactory yields and most have good resistance to those major diseases for which genetic resistance is available. It is envisaged that breeders in New Zealand and overseas will incorporate resistance to additional diseases and higher yield potential in the next generation of pea cultivars.

REFERENCES

- Crampton, M.J. 1966. Disease resistant pea cultivars. *N.Z. Journal of Agricultural Research* 9: 152-156
- Jermyn, W.A. 1984. Pea cultivar and management guide. *Crop Research Division, D.S.I.R. Report 95*: 6 pp.
- Logan, L.A. 1983. Crop production and utilisation in New Zealand. *Crop Research Division, D.S.I.R. Report No. 81*.
- Sutcliffe, J.F., Pate, J.S. (eds.). 1977. *The Physiology of the Garden Pea*. Academic Press. 500 p.