ASSESSMENT OF NEW VINING PEA CULTIVARS IN HAWKES BAY

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ABSTRACT

Vining pea cultivar trials were conducted from 1972 to 1976 at Hastings Horticultural Research Station. Each season there were main cultivar trials with 14 cultivars/breeding lines (5 reps) and 3 sowing dates, and observation trials with up to 20 cultivars (2 reps) and 2 sowing dates. A total of 63 cultivars and breeding lines were included.

In the main trials, highest yields came from Canterbury 39s and Resistant Victory Freezer in the early season sowings and from Pania in both mid and late season sowings. Puke early and Patea mid and late were the best yielding "catch-up" cultivars.

Whole season average yields over 3 years for the combination of Canterbury 39s sown early and Pania sown mid and late season were 7.2 t/ha; for Puke early and Patea mid and late 7.0 t/ha; for Ajax sown early, mid and late 5.3 t/ha and Victory Freezer 3.6 t/ha.

Of 11 very small seeded cultivars tested only Waverex produced good yields of good quality peas.

The better yielding cultivars and breeding lines had resistance to pea mosaic, good tolerance of pea top yellows and generally more tolerance to foot and root rots and of moisture stress than the poorer yielding ones.

INTRODUCTION

Vining peas for freezing, dehydration and canning are an important crop in Hawkes Bay with up to 4500 ha being grown annually.

Processors have very good records of the performance of many cultivars. However, these records do have some limitations in comparing the performance of different cultivars. For example, a favoured cultivar can often get favoured treatment such as allocation to the best and safest growers and at the most favourable part of the season. Or, because of its faster maturity, a cultivar may be used only to catch up sowings and therefore be used only when conditions are less than optimal.

Because of the importance of the vining pea crop to Hawkes Bay and because of limitations to processors' ability to objectively test cultivars, vining pea cultivar testing has been a top priority in the work of the Hastings Horticultural Research Station in the four years it has been operating. The aims of this work have been to find the best yielding combinations of both commercially available cultivars and of promising advanced breeding lines.

METHODS

Over each of the four seasons 1972/73 to 1975/76 there were two sets of trials:

1. **Main cultivar trials** sown 3 times each season containing 14 cultivars or advanced breeding lines and
2. **Observation trials** containing up to 20 cultivars or breeding lines and sown 2 times each season. Trial layouts were randomised block design with 5 replicates for main trials and 2 replicates for observation trials.

All trials were conducted at the Hastings Horticultural Research Station, soil type being Hastings clay loam with rotation being ex 2 year old ryegrass/white clover pasture.

Plots were sown 11m x 2.1m using Stanhay precision seeders with rows 15cm apart and seeds spaced in the rows 5.7cm apart, aiming for an eventual plant stand of around 100 plants/m^2 for the standard sized cultivars. (Very small seeded petit-pois cultivars were at much higher plant density). Methabenzthiazuron was used for weed control (post emergence). Irrigation was used on only one trial (73/74 mid season main trial - 50mm) as the aim was to get a good range of growing conditions.

At harvest, vine from the inside 8m x 1.2m of each plot was hand pulled and run through a continuous flow miniature viner which had the same beating characteristics as the commercial viners in use in the region.

The vined peas were run through a commercial (Key) pneumatic separator to remove any remaining leaf and stem trash as well as immature and badly split peas.

The clean peas were weighed and at least 3 tenderometer readings were taken after bringing the peas to constant temperature in running cold (15°C) water. Yields were corrected to tenderometer reading (T.R.) 105 using the following correction scale:

T.R.	Relative Yield
85	.570
90	.700
95	.825
100	.915
105	1.000
110	1.080
115	1.130
120	1.185
125	1.230

Most plots were harvested within the range T.R. 100 to 110.

Samples of all promising cultivars and breeding lines were quick frozen and evaluated by taste panels of processor factory staff 5-7 months later.

Over the 4 years, 30 cultivars and advanced breeding lines were included in main cultivar trials

and a further 33 in observation trials. Each year cultivars were discarded if their yields were less than that of Ajax or they produced peas of quite unacceptable quality. See Appendix I and Appendix II.

RESULTS

Yield results for the top yielding cultivars in main trials in the 3 seasons 1973/74, to 1975/76 are summarised in Table 1. Victory Freezer yields for the 2 seasons that it was in main trials (1972/73 and 1973/74) are also included.

Results of the taste panels indicated that processed quality of all the cultivars shown in Table 1 was of a good acceptable standard with Piri and Puget being marginally better than the rest.

Included in the 1974/75 and 1975/76 both main and observation trials were 11 cultivars being considered for the very small pea (petit-pois) packs. Of these 11, only Waverex and Rurik produced worthwhile yields (Ajax equivalents) and of these two only Waverex had acceptable freezing quality.

TABLE 1: Mean yields for 1973/74, 1974/75, 1975/76. Seasons for Top Yielding Cultivars.

t/ha at T.R. 105

Cultivar	Early Sown	Mid Sown	Late Sown	Overall Mean	Maturity Days ± Ajax
Pania	7.6	7.6	5.9	7.0	+4
Patea	7.0	7.6	5.8	6.8	-2
Puke	7.5	7.0	4.8	6.4	0
Puget	6.8	6.6	5.8	6.4	+5
Canterbury 39s	8.1	6.9	4.2	6.4	+3
Resist V.F.*	8.1	7.3	4.7	6.7	+1
Poha	6.5	6.3	5.0	5.9	+3
Piri	6.6	6.1	4.1	5.6	0
Ajax	5.8	5.9	4.1	5.3	0
Victory Freezer ∓	3.7	4.1	3.2	3.6	+2

Approximate minimum significant differences deduced from composite analyses of variance for cultivars x time of sowing are

P= .05 .49t/ha
P- .01 .65t/ha

* means of 73/74 and 74/75 seasons only (75/76 plots kept for seed)

∓ means of 72/73 and 73/74 seasons only

One cultivar in 1974/75 main trials, the very small seeded Waverex yielded as well as Ajax and in 1975/76 main trials 5 cultivars and breeding lines had yields better than Ajax. These were 10 node Piri and Elite x D.S.P. x Poha (1) ex D.S.I.R.; Ag2 ex Colworth; Waverex and Vernon. From the 1975/76 observation trials promising breeding lines and cultivars were the Swift Cross lines 1 and 4, Elite Cross lines 2 and 3, all ex D.S.I.R., a Western Valley line coded Canty 3 and Jof-now named Green Marble. Along with Victory Freezer, 42 cultivars and lines have been discarded.

From Table 1 it can be seen that over the 3 seasons 1973/74 to 1975/76, top yields in the early sowings came from Canterbury 39s and the D.S.I.R. breeding line Resistant Victory Freezer. In mid season sowings Pania and Patea were the top yielders and for the late sowings top yields came from Pania, Patea and Puget. Best of the faster maturing or "catch-up" cultivars were Puke early and Patea mid and late.

Whole season mean yields for the combination of

C39 early, Pania mid and late were	7.2 t/ha
for Puke early, Patea mid and late were	7.0 t/ha
as compared to Ajax early, mid and late	5.3 t/ha
and Victory Freezer early, mid and late	3.6 t/ha

DISCUSSION

Major reasons cultivars and breeding lines included in these trials not yielding well have been firstly their susceptibility to diseases and secondly and to a lesser extent their poorer ability to withstand environmental stresses.

All the cultivars listed in Table 1 except Victory Freezer are resistant to Pea Mosaic virus disease, and all except Puget and Victory Freezer have good tolerance to Pea Top Yellows virus disease. In fact, if it had not been for a bad outbreak of top yellows in Puget in the 1975/76 early and mid season sowings, then its yields would have been close to those of Pania.

None of the cultivars listed in Table 1 are resistant to foot rot caused by **Fusarium solani**, but the cultivar most susceptible is Canterbury 39s which is a major reason for its relatively poor showing late in the season. It is suspected that the relatively good performance of Pania, Patea and Puget late in the season stems in part from their greater ability to withstand moisture stress, and possibly in part from greater foot rot tolerance.

Race 2 of **Fusarium** wilt has now been isolated from several pea crops in Hawkes Bay and of the

cultivars listed in Table 1, only Resistant Victory Freezer and Puget have resistance to it. (S.A. Menzies pers. com.).

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APPENDIX I: Cultivars and advanced breeding lines included in the main trials that did not reach Ajax yields.

SEASON			
1972/73	1973/74	1974/75	1975/76
Frosty	Cooper No. 7	Vitalis	Perfected Freezer 60
Greenfeast 68	Polaris	Gloriosa	
Jade	Skagit	Samson*	
Swan		Early June 359*	
Victory Freezer	Victory Freezer		
WM x VF x 102	WM x VF x 102		
WM x VF x SSF	WM x VF x SSF		
SSF x 102	Poha x S1 (1)		

Cultivars and advanced breeding lines in main trials as good as or better than Ajax and not included in Table I.

1974/75	1975/76
Waverex*	Waverex*
	Vernon
Ag 2	Ag 2
	Elite Cross (1)
	10 node Piri

* petit-pois cultivars

APPENDIX 2: Cultivars included in observation trials and discarded for not reaching Ajax yields.

SEASON

1972/73	1973/74	1974/75	1975/76
Freezer 421	Coopers Early Freezer	Coopers Early Freezer	Victory Freezer
Early Freezer 61	Coopers early D.S.P.	Coopers Early D.S.P.	Rurik*
	Johnsons Freezer	Freezer 421	Frizette*
	Coopers Res. D.S.P.	Mars	Mars
		Signet	Signet
		Trumpet	Venus
		Venus	Canty 2
		Ag 4	Canty 4
		Ag 23	SSF x 102
		Freezer 626	WM x VF x 102
		Early Junes 1 to 5*	
		Mini Sweet*	
		Somette*	
		Rurik*	
		Frizette*	
		Victory Freezer	

Cultivars and advanced breeding lines in observation trials with better than Ajax yields.

1974/75	1975/76
Swift Cross (1)	Jof (Green Marble)
Ag 2	Canty 3
	Swift Cross (1)
	Swift Cross (4)
	Elite Cross (2)
	Elite Cross (3)

* petit-pois cultivars