EFFECT OF SOWING RATE ON VINING PEA YIELDS AND PROFITABILITY IN MANAWATU

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ABSTRACT

Effects of sowing rate on yield and profitability were examined in three cultivars — Victory Freezer, Patea and Pania — in the 1980-81 and 1981-82 seasons. At sowing rates of 90 and 120 seeds/m², which gave mean harvest populations of 73 and 86 plants/m² respectively, yields and profitability were both high, and not statistically different. At sowing rates of 30 and 60 seeds/m² the harvest population, yield and profitability were significantly lower. It is considered that a sowing rate of between 90 and 120 seeds/m² is sufficient to optimise yields and profitability in vining peas in the Manawatu district. Pania gave the highest yield and profitability of the three cultivars examined.

Additional Keywords: cultivars, harvest populations.

INTRODUCTION

Relative yields among vining pea cultivars in the Manawatu district are not the same as in the other pea growing regions of New Zealand (Bussell, 1981). Thus it was considered necessary to find if the optimum sowing rate might also be different.

Although a sowing rate of between 100 and 120 seeds/m² generally produces a high yielding crop (Stoker, 1975) it may not be providing the best return when the high cost of seed is taken into account.

This paper reports on the sowing rate trials and discusses the profitability of vining peas in the Manawatu district. This information is of use to processors to assist them to decide sowing rates for the crop in the district.

MATERIALS AND METHODS

The trials were carried out on the New Zealand Dairy Board property at Awahuri. The soil type was Te Arakura sandy loam and none of the area had previously been used for pea cropping. Climatic conditions during the period have already been described (Bussell, 1983).

Three cultivars, Victory Freezer, Patea and Pania, were selected for study. These cultivars had yielded reasonably well in previous cultivar comparisons (Bussell, 1981) and were acceptable to processors. They were established at three times (mid-September, mid-October and mid-November) for two successive years (1981-1982). Plots 11 m long and 1.5 m wide with rows 150 mm apart were sown with a Stanhay drill at four rates (approximately 30, 60, 90 and 120 seeds/m²). The sowing rates and cultivars were randomised at each sowing time and the experiment was replicated five times.

At harvest, vines from the inside 10 m x 0.9 m of each plot were pulled by hand and threshed through a continuous flow miniature viner. The vined peas were then cleaned, weighed and their tenderometer readings were recorded. The yields were then corrected to tenderometer reading (TR) 105 as described by Wraight (1976). Most plots were harvested between TR100 and 110 to calculate the profitability, seed costs were taken as $600/tonne and payments for TR105 peas as $204.20/tonne. These were the rates applying in the district for the 1981-82 season. All other costs were not taken into account when calculating profitability as they were assumed to be fixed costs not dependent on the sowing rate.

Yield and profit values analysed were means over cultivars, sowing times and seasons. These factors had no significant interactions with sowing rate. The statistical package Minitab was used to fit quadratic curves to yield and profit data.

RESULTS AND DISCUSSION

Yield differences between the two highest sowing rates were not statistically significant (Table 1). Substantially lower yields were obtained at the two lowest sowing rates. The profit obtained from 90 and 120 seeds/m² sowing rates was far superior to the 30 and 60 seeds/m² rates.

TABLE 1: Mean harvest populations, yield and profitability of vining peas grown at a range of sowing rates.

Sowing rate (seeds/m²)	Harvest population (plants/m²)	Yield (t/ha)	Profit ($/ha)
30	33.6	3.97	745.7
60	50.7	5.25	943.1
90	73.3	6.17	1066.2
120	86.4	6.42	1053.5
L.S.D. 5%	2.8	0.27	55.1
C.V. (%)	15.7	16.8	19.6

When yield was regressed against sowing rate (Fig. 1) the maximum yield of the fitted curve was 6.43 t/ha obtained at a sowing rate of 123 seeds/m^2. From the fitted curve, greater than 95% of the maximum yield would be obtained at sowing rates above 90 seeds/m^2. When the profit was regressed against sowing rate (Fig. 1) the maximum profit was $1,066 per ha obtained at 105 seeds/m^2. Ninety five percent of the maximum profit occurred in the range 74 to 135 seeds/m^2. These figures suggest that a sowing rate of between 90 and 135 seeds/m^2 will optimise both yield and profit. The sowing rate for optimum yield or profit is, therefore, similar in the Manawatu district to that suggested for other parts of New Zealand (e.g. Stoker, 1975).

Sowing rate was highly correlated ($R^2 = 0.99$) with harvest plant population in the two seasons these trials were carried out. However, these two factors would not be so highly correlated if wet weather or animal damage (e.g. by slugs, grass grub or ducks) occurred after sowing or

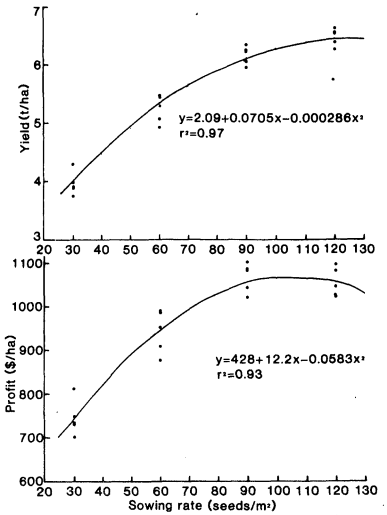

Figure 1: Relationships between sowing rate and yield and profit.

TABLE 2: Mean harvest populations, yield and profitability of vining peas for different cultivars.

Cultivar	Harvest population (plants/m^2)	Yield (t/ha)	Profit ($/ha)
Victory Freezer	54.8	4.80	820.5
Patea	67.9	5.51	963.7
Pania	60.3	6.04	1072.2
L.S.D. 5%	2.5	0.23	47.7
C.V. (%)	15.7	16.8	19.6

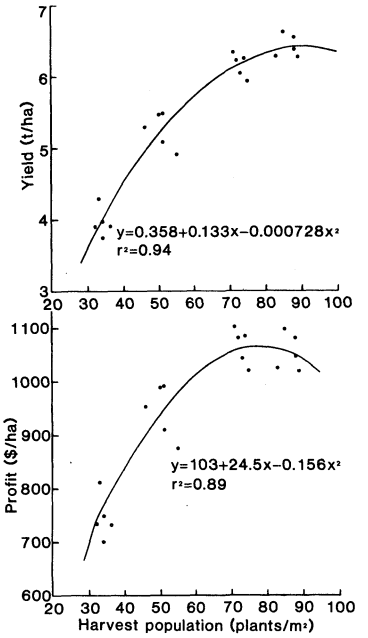

Figure 2: Relationship between harvest population and yield and profit.

emergence and a low harvest population resulted. Both yield and profit drop rapidly when harvest populations were below about 65 plants/m^2 (Fig. 2). Thus if poor establishment results in a low plant population, the crop is unlikely to be profitable.

Pania, the highest yielding cultivar, was also the most profitable (Table 2), as profit is highly dependent on yield. High yielding cultivars will provide both the grower and processor with a much better return.

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