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PROCESSING PEAS

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INTRODUCTION

Peas are the most important processing vegetable in N.Z., grown on approximately 11,000 ha annually. In 1984, over 16,000 tonnes were exported for a value of $15 million. Production is located near factories in Gisborne, Hastings, Feilding, Motueka, Blenheim, Christchurch and Timaru, with half the production in each island.

Peas, like other processing vegetables, are grown under contract to processors, and factory production constraints mean that control of the raw product coming into the factory is one of the most important aspects of production.

CROP PLANNING

Process peas are one of the most perishable vegetable crops, making it difficult to provide an even flow of raw material of the desired maturity into the processing factory over the planned harvest period. The time limit between commencement of harvest of a truck-load of peas and the completion of processing is limited to a maximum of 2.5 to 3.5 hours, depending on temperature.

The crop plan is determined, in the first instance, by the total budgeted sales for the coming harvest season's crop. This requirement is then divided amongst the company factories according to sales areas (both domestic and export), the harvesting and processing capacity at each factory, other crop processing and the potential raw material supply in each factory area. The quality of the finished product, together with final costs to the point of sale are also taken into consideration. Processing factories then contract out to farmers to meet factory requirements.

A process pea planting schedule will include adjustments for statutory holidays, cultivar maturity times, locality, planned length of season, etc. The initial daily planting programme is calculated using a 5 year average of accumulated heat units, together with a graph depicting average cultivar yields over the planned harvest period.

The effect of the average daily mean temperatures at planting time on the area planted daily can most readily be appreciated by comparing the early season plantings with the late season plantings. Sufficient area for one day's harvest is spread over three days for August plantings whereas in November the area planted on one day is equivalent to one day's harvest.

Disruptions to the planting plan occur each season, and adjustments become necessary to even out the daily tonnage available for harvesting. Rain delaying planting is the main problem in many areas. It is less of a problem however, in Canterbury as the average rainfall is low, and the predominantly lighter soil types together with the rapid drying effect of the windy climate enable planting to be resumed with minimum delay. Other disruptions to planting may be caused, for example, by industrial action, mechanical breakdowns, and growers not being ready on time.

It is theoretically possible to minimise gaps in the harvest programme caused by major delays at planting time, by planting a short maturity cultivar after the delay. However, this can involve a lot of problems in practice.

CROP MANAGEMENT

The objective is to produce a maximum yield of acceptable quality peas at a time and maturity in accordance with a production plan. As for any once-over harvest perishable crop, the evenness of maturity is a critical factor in obtaining maximum yield.

The major aspects of pea crop management are crop rotation, cultivation, drilling, weed control and irrigation.

Crop rotation

One of the main benefits of sound crop rotation is disease control, especially prevention of soil borne root and ground level stem diseases in peas. A well planned rotation also results in higher yield.

A desirable minimum rotation is one crop of peas every four years. The intervening crops must not host pea diseases and preferably also improve soil structure. A pea crop in a pastoral farming rotation is the ideal situation. This may not always be practical, however peas do require a good soil structure. On the lighter, less fertile Canterbury soils in particular, the provision of extra fertiliser and irrigation alone will not necessarily result in a satisfactory crop. Growers who use peas as a restorative crop, particularly in a heavy cereal cropping programme, should not expect high pea yields. The effect of crop rotation on pea yields on well structured, fertile soils is far less

noticeable. Peas yield poorly after a potato crop, particularly where the growing and harvesting conditions of the potato crop have resulted in the destruction of the soil structure.

Cultivation

Excessive cultivation destroys soil structure. Most processing pea crops in Canterbury are grown using traditional cultivation methods; minimum tillage and direct drilling are also used. Early soil preparation, either by ploughing or grubbing, generally gives the best results. (Trash or turf has time to break-down, and soil moisture capillary action and total soil moisture holding capacity are maximised.) Late soil working can result in uneven soil moisture at planting with a resultant uneven seed germination.

Drilling

The aim should be even seed spacing and even seed depth over the paddock. Different drilling depths and rates result in a variation in maturity. Double drilled areas in paddocks often flower several days earlier than the balance of the paddock. This is due to increased plant density and to the second pass altering the depth of seed planted in the first pass. Cultivar, seed size, timing of drilling, soil type and condition, fertility, irrigation availability, disease factors and climatic regime all need to be considered when deciding on the optimum drilling rate.

Weed control

Weed competition can seriously affect yield and the harvesting of the crop. The increasing demand for a quality product has placed a greater emphasis on the control of some weeds that contaminate the harvested raw material. Spurrey, or any plant that has small hard seeds at vining time, is unacceptable as the seed can be imbedded in the pea during vining; berries from nightshade plant *(Solanum* sp.) and Californian thistle heads are also unacceptable. The use of the new FMC pod picking type of harvester with its more gentle threshing action than the previously used beater type harvester has altered some weed control requirements.

There is a wide range of herbicides for weed control currently available. These include pre-planting soil application types. A grower needs to be well aware of the weed spectrum in each of his paddocks and plan his weed control accordingly. Weed control advice is available from several sources. Chemical recommendations can vary according to seasonal conditions and weed spectrum.

Irrigation

Under the usually hot, dry, windy conditions that prevail in Canterbury, correctly timed irrigation can give dramatic yield increases. The most cost effective single irrigation application is just before crop flowering. A further increase in yield can be obtained by irrigating at the pod filling stage. However, this last irrigation has caused problems over the last two seasons. Mechanical damage to peas in the pod caused by the operation of irrigation equipment has resulted in rotten or marked peas contaminating the vined sample. Some growers have taken measures to prevent this problem from occurring. The provision of irrigation lanes for large irrigators and their drag hoses, and refraining from running over the crop when servicing or operating irrigation equipment can prevent the problem from occurring.

An even application of water over the whole paddock should be the objective. This can be a difficult proposition during a prolonged period of windy weather.

Poorly timed or unnecessary irrigation can result in excessive vine growth and may not increase the yield, particularly if the peas are harvested in the lower maturity range. Long vine growth can also result in a poor quality product as shaded pods can produce yellow peas.

CULTIVARS

The factors affecting cultivar selection can be subdivided into market, production and growing requirements.

Market requirements

For a cultivar to be acceptable, it must meet the quality requirements of a particular market. Quality is assessed according to texture, flavour, colour and appearance. Of course the bottom line is landed cost at the market place. Market requirements tend to go in cycles. Since 1971 the accent has changed from quality, to quantity (lowest landed cost) and back to quality again. In a buyers market, a quality product will always sell in preference to a lower quality product, all other factors being equal.

Production requirements

An acceptable cultivar should be easy to vine, and should maintain its quality throughout vining and processing to the packed stage. Sieve size and range of sieve size under different growing conditions is also important. The cultivar must be a consistant performer under a wide range of seasonal and cultural conditions as variation can cause major under or over production. Cultural variations such as plant density, irrigation practices, fertiliser, time of drilling, etc., can be adjusted but the seasonal weather pattern cannot. The most practical way of minimising variation due to climate is to select a cultivar that best suits the general weather pattern of a particular area.

The most practical means of extending the early part of the harvesting season, is to plant a cultivar that requires less heat units from planting to maturity. Thus there is a need for a range of cultivars to fulfill different production requirements as well as that of each particular growing area.

Growing requirements

From a grower's viewpoint, cultivar selection is related to net monetary return per hectare. Gross return per hectare is related to total yield, whereas net return can vary between cultivars depending on growing costs. Cultivar differences include drilling rate, seed dressing costs, seed costs and possibly the saving of an irrigation with some of the new

Table 1. N.Z. production of processed peas, (Source: MAF Horticultural Statistics 1985).

Year	1976/77	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
Production (tonnes)	37415	43236	44263	36963	26525	40451	n.a.

semi leafless types. For example, it costs an extra $60 per hectare (in 1985/86) to treat seed with Apron seed dressing fungicide if a cultivar is susceptible to downy mildew.

The interaction of factors in cultivar selection can be shown using Greenfeast as an example. This cultivar performed most consistently under the generally harsh Canterbury climate, but it had two serious drawbacks. It had a tight pointed pod and was hence difficult to vine so cost more to harvest. It was also of low quality and to meet market requirements had to be harvested at a lower maturity than other cultivars. It therefore cost the processors more for the raw material.

In Canterbury, J. Wattie Canneries are currently contracting four cultivars. Tere and Piri, relatively quick maturing cultivars, are grown early in the season. The main cultivar grown is Pania; it has performed consistently over a range of seasonal and cultural conditions, however with the increasing emphasis on quality it could be replaced by a cultivar with smaller sieve size and better overall quality. A small area of Puget, which is susceptible to top yellows virus, is grown late in the season in selected areas and on selected soil types. Provided that seasonal conditions suite the requirements of this cultivar, it can give the highest yield of the cultivars currently grown.

MARKETS

Processed peas are marketed in three forms: frozen, canned and dehydrated. They are also used as ingredients in mixed vegetable packs.

The major proportion of production (over 95%) is marketed frozen. From a relatively steady production of around 40,000 tonnes annually (Table 1) between 12,000 and 16,000 tonnes are exported (Table 2). Japan takes almost half the export volume, with Australia the next largest customer. Other minor markets include Middle Eastern and Pacific basin countries, and spasmodically North America imports a small quantity when domestic production falls short of requirements.

PROSPECTS

There has been a steady increase over the last two years in the quantity exported (Table 2). The greatest percentage increase has been to Australia. Prospects for increases in this market area present the greatest opportunity over the next few years.

Table 2. Exports of processed peas, year ended 30 June. (Source: MAF Horticultural Statistics 1985).

	1979/80		1980/81		1981/82		1982/83		1983/84	
	tonnes	$000	tonnes	$000	tonnes	$000	tonnes	$000	tonnes	$000
Peas - canned										
Australia	28	15	-	-	61	51	465	402	405	342
Fiji	24	15	15	11	15	12	10	10	212	104
Japan	-	-	-	-	-	-	90	76	1143	961
Papua New Guinea	8	5	8	4	18	14	16	15	14	13
Saudi Arabia	-	-	4	2	20	16	3	2	-	-
Singapore	11	7	9	7	19	17	-	-	5	5
United Arab Emirates	-	-	18	11	11	7	-	-	-	-
Others	24	17	45	30	28	26	36	35	839	693
TOTAL	95	59	99	65	177	143	620	540	2618	2118
No. of countries	18		22		20		19		19	
Peas - frozen										
Australia	1096	699	1510	1050	1907	1656	1363	1275	4911	4280
Japan	8140	3534	8838	4611	9783	7046	8402	6942	9525	8461
Saudi Arabia	283	209	239	219	392	426	477	577	415	533
Singapore	539	278	358	226	536	408	351	288	358	340
United Arab Emirates	72	52	145	136	276	336	229	316	263	372
Others	2767	1402	736	563	1042	956	880	935	878	1007
TOTAL	12897	6174	11826	6805	13890	10804	11702	10333	16350	14993
No. of countries	28		30		31		31		32	

CHANGES IN THE INDUSTRY OVER THE NEXT FIVE YEARS

Changes that can be expected in the next five years include:

- Greater emphasis on quality.
- Increases in yield per hectare with the introduction of new cultivars.
- A swing towards plant types more suited to pod-picker harvesting.
- A change in the ratio of production costs and a consequent adjustment in cultural practices to reduce costs; greater emphasis on obtaining optimum plant densities and the elimination of planting areas that will not be harvested due to irrigation or herbicide application damage.
- Greater use of computer technology in crop planning by processors, and to a lesser extent by growers, in both financial and crop planning.
- A necessity for growers to become better informed on crop cultural requirements to improve quality and yield. Some overseas markets have very demanding quality requirements. It is either not possible or not economically viable to meet these requirements using inferior raw material.

In summary, the future growth of the industry depends, in order of importance, on quality, yield per hectare and production costs.