A market-led approach to new crop research

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Abstract

The wide range of climatic variation in New Zealand offers the potential to grow a very wide range of crops. To narrow down the number of crops to investigate, the focus has shifted to identifying crops with defined international market opportunities and then working back to the feasibility of production. Trade and market information has been used to identify new crops which have established markets but which are not currently grown in New Zealand. Target crops have been sourced and grown in preliminary trials to assess their local environmental adaptation and their ability to produce the product required by the market place. Crop samples are sent to the target markets to assess their quality standard and market acceptability. Crops which exhibit potential proceed to more sophisticated trials to optimise both yield and quality parameters. This approach has been used to focus the research in the vegetable, edible fungi, herb and medicinal crop programmes on crops with known international markets. Analysis of the Japanese vegetable market illustrates this research approach. The Japanese vegetable market receives produce from all over the world and, apart from asparagus, the New Zealand vegetable export trade is based on low priced sea-transported vegetables. There is an opportunity for New Zealand producers to strive for a greater market share of higher priced vegetables in Japan. Test marketing of New Zealand-grown produce in Tokyo has provided information on the quality specifications required by the market. This market-led approach has focussed the research effort onto crops with established markets once growing conditions have been defined.

Additional key words: *vegetables, Japanese market, wasabi, perilla, myoga ginger, green soya bean.*

Introduction

The wide range of climatic variation in New Zealand from low to high rainfall, cool temperate to marginally subtropical conditions gives a capacity to grow a wide range of crops. The difficulty has been to narrow down the number of potential crops to grow from those which are environmentally feasible to those which are profitable. To do this, the focus has moved from examining what crops will grow in New Zealand to identifying crops with defined international market opportunities and then working back to the feasibility of production. Initially, a broad-brush approach was adopted to identify areas of world trade which had significant growth internationally but which New Zealand had little or no share.

These areas were:

- Specialist export vegetables
- Medicinal and culinary herbs
- Essential oils
- Edible fungi
- Ornamentals.

Published information about target markets has been used to identify growth areas within markets but often this information was too generalised to identify specific crops. Following the desk studies the NZ Trade Development Board was commissioned to investigate specific markets and gather detailed information required to identify crops which have established markets but which were not currently grown in New Zealand.

Literature is collected on each crop to characterise their environmental requirements and assess their likely adaptation to New Zealand conditions. Target crops have been sourced, plant material imported and grown in preliminary trials to assess their environmental adaptation and their ability to produce the product required by the market place. Crop samples have been sent to target markets to assess their quality standard and market acceptability. Crops which exhibit potential proceed to more sophisticated trials with a greater selection of cultivars to determine their specific environmental, agronomic, and postharvest requirements to optimise yield and quality parameters.

This market-led approach has provided an excellent way of prioritising new crop development with well

defined endpoints. An illustration of this philosophy is our approach to the Japanese vegetable market.

Japanese Produce Market

The Japanese consumer market is the second largest in the world after the USA. Japan is only 70% self sufficient in food and the Japanese spend almost 3 times more money on vegetables and seaweeds than fruit. In volume terms, twice the tonnage of vegetables (9.7 million tonnes) were sold through the auction system than fruit (4.6 million tonnes) in 1991 (Nisseikyo Statistics 1991).

These statistics indicate the enormity of the vegetable market in Japan. From a theoretical point of view, the major portion of the vegetable market is available to New Zealand growers in that most of the Japanese vegetables could be grown in New Zealand. This is not so for fruit in that pipfruit are banned and the subtropical-tropical fruits are environmentally unsuited to New Zealand conditions. The conclusion is that the total fruit market theoretically available for New Zealand produce is only one-third the size of the Japanese market for vegetables. Vegetables therefore have a greater potential market in Japan than fruit.

Japanese Vegetable Market

The Japanese vegetable market is made up of two broad categories: (a) international vegetables which are known worldwide, (b) traditional vegetables which are not widely known outside Japan.

International vegetables

The Japanese market is a true international market in that produce arrives from all over the world. For example, in 1991 asparagus was imported from China, Thailand, Philippines, France, USA, Mexico, Peru, Chile, Australia and New Zealand. Nevertheless, the total importation of vegetables is only a very small percentage of product which passed through wholesale markets. In effect, the vegetable market is largely domestically driven and the low relative amount of vegetables imported should be seen as an opportunity.

The vegetables imported into Japan in 1991 are given in Table 1 (Nisseikyo Statistics 1991). The most successful vegetable export from New Zealand was squash followed by onions and asparagus as the other two significant exports. If you take the squash price as a benchmark of a profitable New Zealand export, there were 21 of the 24 vegetable crops listed as imports which had a superior price. Clearly, profitable exporting has to be related to cost of production, whether the product is freighted by sea or air and the price received. Currently, apart from asparagus, the New Zealand vegetable export trade is based on low priced sea-transported vegetables. There is an opportunity to strive for greater market share in the higher priced vegetables such as shallots, brussel sprouts, witloof, root vegetables, beans, globe artichokes, and capsicums. To do this there is a need to define what product is required by the marketplace and what is hindering its production in New Zealand.

Closer examination of the market statistics indicates that, with some crops, market windows exist at some times of the year when the prices are high enough to make exporting profitable. In 1991, three crops (beans, field peas and parsley) gave higher prices than asparagus, which is already successfully exported (Table 2). The high price for beans continued through until April. This information indicates an opportunity and provides a focus for research. Firstly, there is a need to focus on why the price is high and the product specifications desired. The second requirement is to deliver the product at the appropriate time to maximise returns. Obviously there are environmental limits to when a product can be produced but adopting a market-led approach provides a basis for determining whether research is warranted on a crop.

One of the successes of the squash trade is that there has been considerable effort to supply the quality the market requires both by growing a Japanese cultivar and developing quality guidelines. In increasing trade with Japan in other products there is a need to define cultivars and growing conditions to produce the quality and style of product required by the market.

Traditional Japanese vegetables

There are a number of vegetables which are traditionally used in Japan which are not widely known or grown outside Japan. These vegetables have strong internal demand and the possibility of growing such vegetables in New Zealand and exporting them to Japan was the primary hypothesis. To do this successfully the vegetables must make a return that covers freight costs and allows a margin of profit. Secondly, the vegetables must have sufficient shelf-life so that they could be sent to Japan and sold in good condition. Analysis of the Tokyo market statistics (1991) identifies six traditional Japanese vegetables which have a price profile which deserves greater investigation (Table 3). Crops which did not have sufficient market return to cover the freight costs to Japan, postulated production costs and a profit margin were either discounted as possibilities or given

Table 1. Vegetables imported in Japan 1991 (Nisseikyo 1991)

	Volume (t)*	No. of exporting countries	NZ Export (t)	% NZ share	Ave price $ $NZ1 = 65 Yen
Tomatoes	11	2	1	9	4.95
Onions	63,000	10	10,800	17	0.85
Garlic	3,900	5	-	-	1.85
Shallot	310	7	8	3	6.28
Leek	6,400	8	-	-	3.60
Lettuce	5,800	7	-	-	6.00
Cauliflower	200	1	-	-	4.77
Brussel sprout	0.4	1	-	-	8.09
Cabbage types	45,000	12	-	-	2.61
Witloof	600	5	1.3	0.2	10.85
Carrots and turnips	10,000	5	26	0.3	1.09
Beetroot celeriac	340	7	-	-	9.01
Cucumber, gerkin	700	1	-	-	4.00
Beans	200	7	-	-	10.11
Other legumes	4,300	8	-	-	4.35
Globe artichoke	5	2	-	-	10.52
Aubergine	40	1	-	-	5.83
Asparagus	12,000	10	1,493	12	10.20
Celery	1,600	2	-	-	1.69
Capsicum	8	2	2.5	32	13.65
Spinach	3	1	-	-	5.40
Sweetcorn	30	3	13.8	45	2.78
Pumpkin (squash)	101,000	8	48,790	48	1.66
Other vegetables	3,700	15	-	-	5.85

* Figures rounded

lower priority status. Following desk analyses of each crop's growing requirements and cropping systems, research has begun on wasabi, perilla, myoga ginger and green soya bean. The advantage of this market-led approach is that when New Zealand production begins there is a ready market for the produce.

Test Marketing

One difficulty with developing new crops in New Zealand has been to obtain specifications of the product required by the marketplace. This information is important to guide production research on delivery of the required value attributes. For Japanese vegetables we have assembled this information by both inspecting the product traded in the markets (Follett 1986), and by test marketing New Zealand-grown produce to obtain the market feedback. By sending produce to Japan we have been able to gain information on whether or not the New Zealand produce is appropriate and whether or not it could be improved. For example, wasabi stems from our research plots were considered to be too light in colour compared with Japanese produce. This answer immediately focussed attention on plant populations and growing techniques for wasabi which allow more light into the base of the plant and gives a greener stem. By regularly checking that the New Zealand-grown produce is what the market wants we can research and develop production systems which will supply the appropriate produce.

Table 2. High and low monthly auction price for three vegetables compared with asparagus ($NZ1 = 65 yen).

	Average Price ($)	Highest price - month		Lowest price - month	
Asparagus	15.60	19.5	September	12.5	May
Parsley	14.4	21.0	October	9.5	August
Beans	12.6	21.4	November	9.4	July
Field peas	12.3	34.6	October	6.7	December

Table 3. Wholesale price of some traditional Japanese vegetables on the Tokyo market 1991 ($NZ1 = 65 yen).

	Ave price $/kg	High price $	month	Low price $	month
Wasabi (*Wasabia japonica*)	101	120	September	94	February
Perilla (*P. frutescens*)	52	87	October	23	February
Kirimitsuba (*Cryptotaenia canadensis*)	38	100	August	21	March
Chrysanthemum flower (*C. coronarium*)	23	51	March	13	September
Myoga ginger (*Zingiber myoga*)	16	49	December	7	August
Green soyabean (*Glycine max*)	10	29	February	8	August

Conclusion

Through our investigations of the Japanese market for vegetables we have been able to focus our research effort on crops which have an established market once we have worked out how best to grow them in New Zealand to supply the product to market specifications. We are using the same approach to good effect in the medicinal and culinary herb, edible fungi and essential oil programmes. At times, the market information seems expensive to obtain but in reality it has been a small price to pay to achieve market-led research programmes.

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