Potential for flower seed production in New Zealand

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Abstract

New Zealand imports approximately $3 million worth of flower seeds annually for use in the production of bedding plants, cut flowers, horticultural displays, industrial processing and human consumption. Current flower seed production is limited to one or two cultivars of a small number of open-pollinated species (poppy, dahlia) which are in demand in New Zealand but no longer produced overseas. Opportunities exist for import substitution, multiplication for re-export and the development of export markets. New Zealand's advantages include its climate and highly developed seed industry. Constraints include lack of knowledge and the competitive nature of the industry internationally. These aspects are discussed. The potential exists for flower seed to become a small but valuable component of New Zealand's arable production, but progress will depend on market signals.

Additional key words: *diversification, research, marketing, cut flowers, oil seeds, export, production problems.*

Introduction

Commercial flower seed production began in Europe in the second half of the 19th century (Vis., 1980), and is now spread over many different countries in Europe, North and South America and Asia, depending on species, climatic requirements, and increasingly on costs of production. For example, species traditionally produced in Europe and USA are now being grown in Asia and eastern Europe to take advantage of lower labour costs, particularly for species which are hand harvested (B. Rasmussen, pers. comm.; Phetpradap, 1992).

Which species fit under the umbrella of 'flower seed' is open to debate. Those species such as sunflower (*Helianthus annuus*), poppy (*Papaver somniferum*) and safflower (*Carthamus tinctorius*) which can be regarded as field or arable crops are, for example, included for seed testing purposes among agricultural and horticultural seeds, but species such as *Calendula officinalis* (calendula), *Callistephus chinensis* (china aster) and *Dahlia pinnata* L. (dahlia) are included in a list of flower, spice, herb and medicinal species (ISTA, 1985). The former group are classified as 'oil seeds' and the latter group as 'flower seeds' by the New Zealand Department of Statistics, and their data for 1990-92 show annual imports of around 1000 tonnes at a cost of some $3 million (Table 1). Four species account for the majority of these imports: sesame (*Sesamum indicum*) - 529 t; sunflower - 487 t; poppy - 49 t and safflower - 10 t. Australia supplies virtually all the poppy and safflower plus two-thirds of the sunflower seed imported, while China and Mexico supply 80% of the sesame seed. 'Seed for sowing' is not broken down into species in the

Table 1. Quantity and value of flower seed imports, 1990 - 92[a].

	1990/91			1991/92		
	Quantity (t)	Value ($1000)	Price per kg ($)	Quantity (t)	Value ($1000)	Price per kg ($)
Seeds for sowing						
retail packs[b]	2.3	279	121.30	1.1	183	168.36
non-retail packs[b]	5.3	385	72.64	4.9	617	125.91
Seeds for other uses[c]	1187.6	2608	2.19	963.4	2042	2.11
Total	1195.2	3272		969.4	2842	

[a] data supplied by Department of Statistics; [b] species not specified; [c] includes poppy, sunflower, sesame, safflower

statistics and constitutes less than 1% by weight of the total imports (Table 1). However, because of their high unit value (which can range from less than $100 to over $500,000/kg depending on species, Table 2), they comprise more than 20% of the total value. Major suppliers are the U.K. for retail packs, and the Netherlands, U.S.A. and Costa Rica for seeds not in retail packs (Department of Statistics, 1992).

The New Zealand potential for oil seeds such as sunflower and safflower has been previously reviewed (Wynn-Williams and Logan, 1985; Wilson, Robson and Heaton, 1988), and although agronomically successful these crops have principally failed to become established because of poor market demand (Jermyn, 1990). These species will not be further considered as in this paper we focus on flower seeds in the horticultural sense i.e., those species used to produce 1) seeds for growing bedding plants, cut flowers and ornamentals 2) seeds for human consumption and 3) seeds for medicinal purposes.

New Zealand Production

According to FAO (1961), in the 1950's New Zealand was a small scale seed producer of 13 of the species listed in Table 3, the exception being *Papaver nudicaule* which was described as being grown on a 'large scale'. Unfortunately the source of these data was not provided. Most species were grown in 75 cm rows and hand harvested "when ripe". The average seed yields reported (Table 3) were often similar to those from Denmark, France and U.K., but usually lower than those from USA.

Little information exists as to current flower seed production. Although there are a number of individuals privately breeding new cultivars and producing flower seed (K.R.W. Hammett, pers. comm.), commercial production is limited to one or two cultivars of a small number of open-pollinated species (e.g., poppy, dahlia) which are in demand in New Zealand but no longer produced overseas (T.E. Welsh, pers. comm.).

Table 2. Retail price (NZ$) for some commonly grown flower species.

Species	Price/kilogram[a]	Seeds/kilogram[b]
aster	$180 - $1400	450,000
begonia	$340,000 - $540,000	50,000,000
marigold	$420 - $1260	280,000
dahlia	$400 - $8700	100,000

[a]Watkins Seeds Ltd., New Plymouth - 1992 Price List.
[b]most prices quoted as per 100 g, per 1 g or per 1000 seeds.

There has been recent commercial interest in species for medicinal use, for example, production of evening primrose (*Oenothera biennis*) seed, but agronomic problems, in particular establishment difficulties, weed control and harvesting (Wynn-Williams and Logan, 1985) caused an unmet demand and prompted Jermyn (1990) to include this crop in his 'production risk' category.

Potential for Production

Agronomy

The New Zealand seed industry has a number of strengths including well educated and innovative growers, a highly developed infrastructure (expertise, equipment, processing and storage, transport, communication), internationally recognised seed quality assurance programmes, research facilities and skilled researchers, and a climate which, because of daylength, temperature and frequency and time of rainfall, offers possibilities for a wide range of species and/or cultivars. While a Mediterranean type climate (with irrigation) may be ideal for flower seed production (Bodger, 1961), a country such as Denmark with a temperate climate, has a highly developed and successful flower seed industry. In New Zealand recent trials with a number of species (Table 4) have demonstrated that hand harvested/machine threshed seed yields of well over 500 kg/ha are achievable in Manawatu, and that potentially, for example in China aster (Phetpradap, 1992), yields are

Table 3. New Zealand flower seed production in the 1950's, as cited by FAO (1961).

Species	Average seed yield (kg/ha)
Antirrhinum majus	40 - 120
Calendula officinalis	250 - 350
Chrysanthemum spp.	200 - 400
Clarkia elegans	150 - 250
Delphinium spp.	140
Godetia grandiflora	200 - 400
Iberis spp.	40 - 120
Lathyrus odoratus	200 - 500
Nemesia versicolor	30 - 100
Papaver nudicaule	50
Primula veris	75
Salvia splendens	30 - 100
Tagetes spp.	120
Viola cornuta	50

Table 4. Hand harvested, machine dressed seed yields from plot trials at Palmerston North.

Species	Yield (kg/ha)	Reference
Tagetes patula	440 - 750	Kalaw-Sales (1987)
Tagetes erecta	800 - 2000	Ventura (1984), Othman (1987)
Viola cornuta	500 - 700	Vida (1987)
Callistephus chinensis		
cv. Powderpuff	450 - 602	Phetpradap (1992)
cv. Kurenai	1010 - 1350	
Dahlia spp.	550 - 922	Phetpradap S. (pers. comm.).

even higher. No published yield data are yet available for Canterbury.

However, there are a number of agronomic problems that need to be overcome. The first difficulty usually encountered is the virtual absence of previously published literature. The highly competitive (and therefore confidential) nature of this business has meant that flower seed production research data are kept 'in house' by companies, and as found by Phetpradap and Hampton (1991) and Phetpradap (1992), New Zealand trial work is often forced to start from first principles. 'Unknowns' for many species include:

- optimum plant population, row spacing, establishment method and time
- appropriate herbicides
- amount and timing of fertiliser
- pest and disease control requirements
- pollination requirements
- optimum harvest time and most appropriate method

Problems already encountered in China aster and dahlia seed production include:

- soil-borne pathogens
- poor pollination
- lodging/wind damage
- indeterminate growth producing uneven seed development
- seed shedding
- frost damage
- seed sprouting

Markets

The long list of agronomic unknown and/or problem areas identified in the previous section may legitimately lead to the question "why bother"? New Zealand's arable industry has long attempted to diversify, often starting from a much broader agronomic information base (depending on species), but there have been few successes and many failures (Wynn-Williams and Logan, 1985). However, according to Jermyn (1990) these failures have resulted primarily from market factors and not agronomic factors, and in his review Jermyn (1990) concluded that successes for new crop development depended on a sustained, clear and positive set of market signals, plus the co-operation of marketers, producers and researchers.

The market potential for flower seed from New Zealand is yet to be determined. However, it is worth considering a number of points:

a) the world market for seed propagated ornamentals (bedding plants, pot plants and cut flowers) has a demand which is rapidly changing (van Kester, 1990). The ability of air transport to deliver perishable products such as cut flowers to distant markets at reasonable cost, and thus the provision of fresh flowers all-year-round has created an international market which is a multimillion dollar industry. Japan alone imports flowers and fresh foliage to the value of over NZ$200 million annually (Phetpradap, 1992) while cut flower exports from the Netherlands in 1989 exceeded NZ$5,300 million (Pegrum, 1990). This rapidly increased product demand (Kelly, 1991) has led to a change in production systems for many species, from greenhouse production to field growing (Phetpradap, 1992). This in turn has led to production in countries outside Europe and USA such as Thailand, where land and labour costs are lower and flowering peaks differ from the peak production times of other exporting countries such as The Netherlands and Israel. However, while Thailand can produce quality cut flowers for export, major problems exist with seed production, primarily because the environmental requirements, particularly

daylength, are marginal, and also because of the temptation to harvest for cut flowers rather than leave plants to produce seed (Phetpradap, 1992). Seed production enterprises set up by European and Japanese companies have not been highly successful, and there is therefore an opportunity for New Zealand to become a supplier of the high quality flower seed required for the cut flower industry in Thailand and other countries.

b) Denmark is currently an important producer of flower seed, but recent problems with poor harvest conditions (i.e., rain) leading to low yields and reduced seed quality, and increasing labour costs, have induced Danish seed companies to look at alternative sites for production, e.g., in Zambia, Tanzania, Syria and Poland (B. Rasmussen, pers. comm.). For various reasons these trials have not been successful, and an opportunity therefore exists for New Zealand to produce seed for multiplication and re-export, a procedure currently being trialled with vegetable seed production for European companies (F. Onland, pers. comm.).

c) While the New Zealand market is small, there is scope for local production to reduce the necessity for imports. There is also a small but steadily increasing demand for flower seeds for human consumption, particularly as additives or decoration on cereal flour based products (R. Coulson, pers. comm.).

d) The increasing influence of the environmental lobby and the demands for "natural" products in an ever increasing number of disciplines (e.g., medicines, biological pest control) are likely to provide opportunities for some flower seed crops.

Conclusion

Flower seed production can vary from large field scale (e.g., several hundred hectares) to small field scale (e.g., less than one hectare) to an entirely glasshouse operation, depending on the species, demand and method of seed production (i.e., open pollinated or hybrids). The development of flower seed production in New Zealand would therefore be unlikely to be at the expense of other crops, but could be an important and valuable addition to arable production. However, at this time this is simply speculation. A large number of agronomic problems exist, but as demonstrated by Phetpradap (1992) for China aster, these can be successfully overcome. What is now required is a thorough analysis of market potential to indicate whether in fact flower seed production, and the specialised research needed to support such a development in New Zealand, has a positive future.

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