

New Flower Crops

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Most edible crops have been introduced into cultivation thousands of years ago. There are only a few new edible plants in the contemporary western horticulture, such as pecan, blueberry, and kiwifruit, but even these plants have been cultivated since ancient days by local farmers in their native region. This is not the case with ornamental crops. Many of the commercial cut flowers and pot-plants grown today have not been cultivated commercially until several years ago.

The ornamental plant industry is characterized by its great diversity. There are more ornamental species cultivated today than all other agricultural and horticultural crops combined. In some ways the introduction of new ornamental crops is easier than that of edible crops. Neither their nutritional value nor their general toxicity to human has to be considered, as evident in plants such as *Aconitum*, *Diffenbachia*, *Oleander*, and many others. Our main considerations in the introduction of new ornamental crops are the esthetic value, production costs, postproduction longevity, quality, and marketability.

The introduction of new crops includes many research stages, that start with the initial search and screening and concludes when the product is introduced commercially, as detailed in my other presentation in this proceedings (Halevy 1999).

Ten years ago the traditional major crops constituted over 60% of the cut flowers grown in and exported from Israel. This year over 60% of the exportable flowers are "new crops," most of them have not been grown commercially 10 years ago as shown in Table 1. Many of these new commercial flower crops are not even mentioned in a recently published textbook on floriculture (Dole and Wilkins 1999). There are several sources that serve for the introduction of new plant material as potential plant crops.

MINOR OUTDOOR GROWN CROPS

Many of the new greenhouse floral crops, grown and exported during the winter, are the so called "Summer Flowers." They are field grown plants that were used in Europe during their natural flowering season in the summer. Their introduction as a year round crop requires developing physiological and horticultural techniques for out of season production. *Gypsophila* and peony described above (Halevy 1999) are typical examples of such crops. Other examples are listed below.

***Aconitum napellus* L., Ranunculaceae (Monk's hood)**

This is a tuberous plant native to Europe. For winter flowering, tubers are cold stored during the summer and pretreated with gibberellic acid before planting.

***Asclepias tuberosa* L., Asclepiadaceae (Butterfly weed) and *A. incarnata* L. (Swamp milkweed)**

Both plants are native to the US and considered as weeds there. They are absolute long day (LD) plants that require warm temperature during their growth and flowering. For winter production they are grown in heated greenhouses and provided with supplementary light at night.

***Achillea filipendulina* Lam., Asteraceae (Yarrow)**

Native to East Asia it is used mainly for summer harvest as dry flowers. Year round production is obtained by digging the crowns and cold storing them for a few weeks before replanting.

Table 1. quantities of various exportable cut flowers from Israel in the 1996/7 export season.

Flowers	Exportable flowers (millions of stems)
Roses	453
Carnation	144
Gypsophila	116
Solidago	105
Ruscus	78
Wax flower	74
Hypericum	48
Gerbera	45
Limonium	41
Aster	35
Helianthus	32
Asclepias	27
Anemone	27
Safari sunset	20
Anigozanthos	17
Phlox	9
Others	210

***Liatris spicata* Willd., Asteraceae**

Native to Eastern US, for winter production, tubers are cold-stored during the summer and plants are lighted in the field.

***Phlox paniculata* L., Polemoniaceae**

Native to Eastern US, this herbaceous summer perennial is now grown for year round production in greenhouses. It is a LD plant, requiring supplementary night lighting.

***Solidago* sp. L., Asteraceae (Goldenrod)**

Species of goldenrod native to North America are considered as weeds there. New interspecific hybrids turned this plant into an important cut flowers. For winter production plants first receive LD to extend their stems and then are exposed to the natural winter short days (SD) for flower initiation and development.

***Trachelium caeruleum* L., Campanulaceae**

Native to South Europe, it is an absolute LD plant and grown in the warmer parts of Israel for winter production.

NEW CULTIVARS OF ORNAMENTAL FIELD PLANTS

Plants of this group have been grown as minor cut flowers, but recent introduction of new cultivars, with modified and improved horticultural traits, turned them into important floral crops. Examples are:

***Anigozanthos* hyb., Haemodoraceae (Kangaroo Paw)**

This Australian plant was grown mainly outdoors until a few years ago. Recently introduced highly yielding interspecific hybrids are now grown indoors for year round production. These new hybrids are propagated by in vitro tissue culture.

***Aster* hyb., Asteraceae**

New interspecific hybrids of *A. novi-belgii* and other species native to Eastern North America turned these herbaceous perennial, late summer garden plant, into an important greenhouse crop. This is a LD-SD plant, requiring at first LD, until the stems reach a certain desired height and then it is exposed to natural winter SD.

***Campanula medium* L., Campanulaceae**

This plant, native to south Europe, was used only as garden and pot-plant until recently. The original species required a long cold period followed by LD for flowering (Wellensiek 1985). However, new varieties, introduced recently, have long flowering stems and require only LD for flower induction. This enables growing the plant as a commercial cut flower crop.

***Clarkia amoena* Nels. & Macbr., Onagraceae (Godetia, Satin flower)**

This Western North American plant was mainly a garden plant until the recent introduction of improved cultivars for use as cut flowers. The plant requires mild temperature and moderate watering and feeding. It is a facultative LD plant.

***Eustoma grandiflorum* Shinn (Syn. *Lisianthus russellienus*), Gentianaceae**

Native to Southern US, it was used sparsely as garden and cut flower plant. Newly introduced F₁ hybrids turned the plant into an important greenhouse cut flower crop for year round production. Seed propagated, it requires mild-low temperatures in the first growing stage, followed by warmer temperatures.

***Leucadendron* Hyb., Proteaceae**

This South African shrub became an important outdoor crop for cut flowering shoots with the introduction of new hybrid cultivars. The 'Safari Sunset' cultivar is now grown on over 200 hectares in Israel.

***Limonium* hyb., Plumfaginaceae**

Interspecific hybrid cultivars of several perennial limoniums became important greenhouse cut flower crop, used as “filler.”

GARDEN AND LANDSCAPING PLANTS

These are mainly woody or herbaceous perennials, used for many years in gardens and introduced recently into the floral trade. Examples are:

***Cotinus coggygia* Scop., Anacardiaceae (Smoke Tree)**

A deciduous shrub, native to South Europe, used for many years as a garden plant. The cultivar ‘Royal Purple’ is now grown for cut foliage. LD is applied to prevent plants from entering dormancy.

***Hypericum* sp. (Hypericaceae)**

Several species and hybrids of these shrubby plants, native to the Mediterranean and the Canary Islands, have recently become important floral crop grown both outdoors and in greenhouses for cut shoots with fruits of various colors. This is an absolute LD plant that requires night lighting for winter production.

***Ruscus hypoglossum* L. (Liliaceae)**

This herbaceous perennial has been grown in Israel as a garden plants for many years. It is now the main cut foliage crop in Israel, grown exclusively in shaded houses.

ORNAMENTAL CULTIVARS OF FIELD CROPS

In some plants, grown mainly as field crops, new ornamental cultivars have been introduced and used as cut flowers. Examples are: sunflower (*Helianthus annuus* L., Asteraceae), cotton (*Gossypium hirsutum* L., Malvaceae), and safflower (*Carthamus tinctorius* L., Asteraceae).

PLANTS GROWN IN BOTANICAL GARDENS

Botanical gardens and specialized plant collections are rich sources for plant material, some of which can be used for introduction as potential floral crops. Some examples are the bulbous plants of the Liliaceae: *Eremurus* sp. of Central Asia, the South African *Bulbinella kookerri* of yellow, orange, and white flowers, and *Ornithogalum dubium* of yellow and orange flowers, and the South Asian *Curcuma alismatifolia* (Zingiberaceae).

WILD PLANTS IN THEIR NATIVE HABITAT

The introduction and development of Geraldton wax-flower described above (Halevy 1999) is an example of such introduction. Some such plants are currently under intensive developmental stages. They include plants originated from remote areas, but also plants native to Israel and California.

REFERENCES

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