

# Israel inspired to export the “Queen of the Garden”

Israeli research to extend the flowering season of the peony is successfully turning the “queen of the garden” into a cut flower, which can be exported. The scientists’ collaboration with growers setting an example for the successful commercialisation of many other ornamental crops in Israel.

by Rina Kamenetsky<sup>1</sup>, Amalia Barzilay<sup>1</sup> and Abraham H. Halevy<sup>2</sup> (deceased),  
<sup>1</sup>Agricultural Research Organization, The Volcani Center, Department of Ornamental Horticulture, Bet Dagan, Israel and <sup>2</sup>The Hebrew University of Jerusalem Institute of Plant Sciences and Genetics, Rehovot, Israel.



Cut peony flowers are highly valued in world markets; two of the most popular varieties are (top) Sarah Bernhardt and Duchesse De Nemours.

The peony has long reputation of “queen of the garden” in different countries and continents. In China, peonies were in cultivation 3,000 years ago. The Chinese chose it as the principle flower in the Imperial Palace Gardens, calling it Sho Yo, which means most beautiful. Missionary Buddhist monks brought knowledge of the peony to Japan, where to this day it is a symbol of prosperity and wealth. By the early 19th century, the peony had been widely introduced into European gardens, and by the 1850s many American nurseries began offering new varieties of herbaceous peonies to their customers. Today, gardeners throughout Europe, Asia and North America regard the peony as one of the most beautiful and most rewarding plants to grow.

In spite of their beauty and wide use as garden plants in temperate, cold-winter climate regions, peonies are less common as cut flowers, primarily because of their short flowering season from late spring to early summer. In the 1980s, the possibility of herbaceous peonies flowering under warmer conditions was reported. This research gave a start to the development of peony cultivation in Israel.

## Introduction of new ornamental

It is now 15 years since Israel saw the first introductions of a few peony varieties, which are popular in Europe. It was shown that under local climatic conditions in the north of Israel, some peonies flowered in April-May. The cut flowers could be exported to Europe. At the same time, it was realized that for successful commercial production, the peony has to be subjected to low temperatures during the winter and to moderate-warm temperatures in summer. Further, the rate of vegetative propagation is rather low and the propagation process of new prospective varieties takes several years.

In the last few years, to support what has become a rapidly developing branch of peony cut flower production, several scientific projects have been initiated:

- One focuses on the flowering physiology and optimization of environmental conditions during the dormancy stage and growth.

- A second project deals with the development of rapid vegetative propagation by conventional methods and tissue culture.



Israel is using specific cultivation techniques to prolong the marketing period of cut flower peonies.

- The scientists also study the possibility of increasing the vase life of the cut flowers, the rate of vegetative propagation and optimum fertigation requirements etc.

The overall aim of these projects is to advance the flowering time of the peony and to prolong the marketing period of these cut flowers from Israel.

### Cultivation techniques

The information gained from these studies has formed the basis for developing three practical methods for cut flower production of herbaceous peonies in Israel:

1. Plants are grown in containers whereby all necessary environmental conditions for optimal flower development can be provided. This method requires precise control of the plant development and an in-depth knowledge of the flower's initiation process. With this method a very

early crop can be obtained from mid-January on.

2. Field-grown plants in uncovered greenhouses are exposed to ambient cold temperatures until they receive a certain number of predetermined chill units. They are then covered with plastic sheets, to raise the growing temperatures. This method requires the precise control of temperatures during dormancy breaking and stem elongation. Such plants flower about one month earlier than plants grown in an open field, in March-April.

3. Peonies are grown in open plots and in net-houses for cut flower production in April-May.

### Collaboration success

Development of these new technologies for peony cultivation, in combination with an in-depth knowledge of plant physiology and requirements, has led to impressive results. More than two million

flower stems were exported from Israel in 2006.

High quality cut flowers of the two most popular varieties, "Sarah Bernhardt" and "Duchesse De Nemours", are produced today on approximately 25 ha. There are twenty other varieties, popular in Europe and the USA, which have recently been introduced to Israel and are now being evaluated under local conditions.

It can be concluded that the successful collaboration of growers with researchers and the extension service has resulted in the quick and effective development of a new, promising branch of ornamental horticulture. In fact, we believe the projects surrounding the cultivation of cut flower peonies serves as a good example of how the sector can benefit from diversification into new ornamental crops; the streamlining of scientific and practical skills introducing the potential to commercialise many other crops in Israel. ■

### Scientific references:

Barzilay, A, Zemah, H, Ran, I. and Kamenetsky, R. (2002) Annual life cycle and floral development of *Paeonia* 'Sarah Bernhardt' in Israel. *HortScience*, 37(2):300-303

Kamenetsky, R., Barzilay A, Erez, A. and Halevy A.H (2003) Temperature requirements for floral development of herbaceous peony cv. 'Sarah Bernhardt'. *Scientia Horticulturae*, 97: 309-320

Halevy, A.H., A. Barzilay and R. Kamenetsky (2005) Flowering Advancement in Herbaceous Peony Proceedings of the IXth International Symposium on Flower Bulbs, Japan, 2004. *Acta Horticulturae*, 279-286.

## Tree and herbaceous species

The genus *Paeonia* belongs to the family *Paeonaceae* and consists of more than 30 species. They are divided into tree and herbaceous peonies.

- Tree peonies are very popular as garden plants in the USA, Europe and Russia. These plants grow to eye level on woody stems; the stems stay alive all winter and then bloom in early spring.

- Herbaceous peonies are more commonly grown, and do well in a wide range of soil types and climates. Their bushy green, pink or red stems grow 80-100 cm tall and each cultivar has leaves of a particular shade of green and a shape ranging from broad to grass-like. Herbaceous peony varieties are primarily derived from *Paeonia lactiflora*, native to northeast Asia. Flower colours are white, yellow, cream, pink, rose and deep red. The flowers are grouped into types according to the shape of the petal: single, Japanese, anemone, semi-double, bomb and double.

