

research bulletin

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DWARF CARNATIONS, A FUTURE POT CROP

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Background

In the early 1970's, T. Sakata and Company, a seed company in Yokohama, Japan, introduced a line of dwarf *Dianthus caryophyllus* (carnations) that were grown for use in the Colorado State University All American Selections demonstration garden. Upon viewing seedling plants in the cell pack stage, it was noted that some of the material might be desirable for production in our mini pot plant program under way at that time. Desirable plants were placed directly in four-inch azalea pots and grown to flowering stage in the greenhouse and others were placed in the annual trial grounds. Plants, with the potential of becoming pot plants, were chosen and a breeding program established. In around 1975, other dwarf carnation materials became available and seed was obtained, germinated, grown for evaluation, and some plants used for germ plasm.

In February 1976, mini carnation pot plants of 23 different numbered cultivars were provided to approximately 113 Colorado State University personnel for evaluation as a flowering plant product in their home. Seventy-five people filled out and returned the evaluation form which accompanied each plant. From the responses to the evaluation, it was evident that there was merit in developing a dwarf carnation line for pot plant use and breeding and selection work continued.

In 1977, during a trip to Holland, field displays of spray, semi dwarf and dwarf carnations were observed. Seeds of some lines were obtained, germinated and plants grown to the flowering stage for observation. Some of the germ plasm was incorporated in the carnation mini pot plant breeding program. Other recent *dianthus* lines have been incorporated in the program.

¹Professor. Development supported by the Colorado Agricultural Experiment Station.

The Goal

By 1978, enough crosses and selections had been made to determine that a desirable flowering pot plant could be developed providing some more combinations were achieved. The goal at this point was to produce a plant that when placed in a four-inch azalea pot would have the following characteristics;

- 1) Develop rapidly from a rooted cutting.
- 2) Develop strong vegetative breaks upon being pinched approximately ten to fourteen days after being placed in the pot.
- 3) Develop into a flowering plant with one to one-and-a-half inch flowers, within twelve to fourteen weeks following the pinch, during the winter months.
- 4) Have a total height, including the pot, of nine to ten inches at the time of flowering and be pleasing aesthetically.
- 5) Have an abundance of buds that would continue to open over a period of three to four weeks while in the home.
- 6) Have a clove fragrance that was characteristic of carnations at the turn of the century.
- 7) Be available in an array of colors that could be used throughout the year or on specific occasions.
- 8) Possibly be of a perpetual nature, whereby it could be planted outside in the spring and continue to grow and produce flowers until frost.
- 9) Have a typical blue-gray foliage.
- 10) Require no disbudding at the grower level.

Plant Characteristics

Each plant, upon pinching, will develop 4 to 5 lateral breaks which bear the first flowers. Each lateral has 3 to 6 buds that are capable of flowering. Limited repinching and no disbudding is anticipated at grower level; however, the consumer will have to cut off flowers as they senesce.

A pot-grown dwarf carnation plant does not look like a pot chrysanthemum. It will be marketed when the first flower is

open and one or two buds showing color. A few new buds may be above the earliest open flowers, giving the over-all appearance of a bunch of spray or mini carnations. Any buds showing color continue to open, but the pea-sized buds will not continue to develop if the plants are placed in an area too low in light. Keeping life under average home conditions varies from three to four weeks, but under proper conditions could be flowered continuously for several months.

Besides the characteristics described in the goals, pot plants have been developed from rooted cuttings, incorporating methods used to grow pot mums. They have been designed and selected to be grown in 4-inch azalea pots (one per pot) or three cuttings per 6-inch azalea pot. No growth regulators are required.

Several colors of flowers will eventually be available. The flowers of the first introductions will range in size from 1½ to 2 inches. Some cultivars will be fully double and others semidouble. Petalage will be highly serrated to smooth lobed, depending on the cultivar.

The plant materials are virtually disease free and do not succumb to the normal carnation diseases because of their short growing span. This does not mean they are not susceptible. The pot carnation, however, is susceptible to thrip, aphids and spider mites, just like its ancestors.

General Culture

The pot carnation has been designed to be grown in an environment like that required by the various carnation cut flower crops. It is a cool crop and growing temperatures include heating to 52-54°F (night) and 62°F (day) and cooling to 70°F (day). They should be grown in full light during nine months of the year and possibly about 10-15 percent shading in the summer months. Shade in the summer will definitely be required in the warm temperature geographical

areas. The United States carnation production areas of the 1950's should be ideal for this new pot crop. The cultivars have been developed with day time CO₂ levels of 500 to 600 ppm.

A standard carnation fertilizer program has been used, feeding at every watering. Plants have been grown on mats or directly on benches. Those grown on mats will be slightly taller than non-mat plants. It is possible that the 6" pot plants could be watered with a drip irrigation system and the ebb and flow method for the 4-inch pots. *The water person will definitely control the height and quality of the plants.*

All plants, during the 12+ years of development, have been grown in a 2 spagnum peat, 1 soil and 1 no. 6 perlite (V:V:V) medium. Research is underway to evaluate their growth habits in the peat-lite media. Studies on low light development, nutrient requirements, growth regulator and STS responses, photoperiod, shipping and post harvest physiology are also being carried out. Our second goal is to have a "recipe book" crop ready for the floriculture industry upon its availability.

Availability

Several lines are presently being evaluated by four propagators in the United States. The cultivars being considered for introduction have been irradiated, tissue cultured, finger printed and have had patent applications filed. A consumer education program is under way, so John Q. Public will be anticipating the pot carnation. Rooted cuttings will hopefully be available to growers on a limited basis by early summer and readily so in October. It is anticipated that several organizations will be licensed for propagating the dwarf carnation lines in the United States. They will also be made available in foreign countries as soon as plant protection or "plant breeder rights" are properly executed.