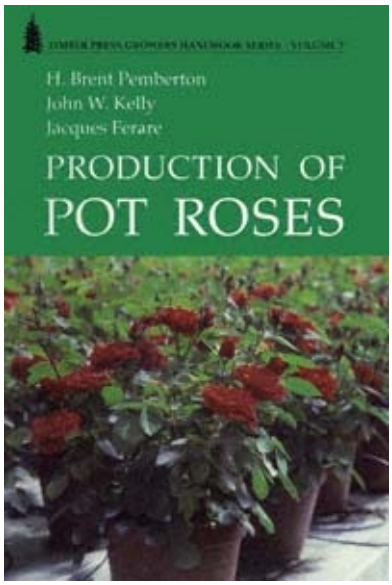

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Production of Pot Roses

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Production of Pot Roses

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Volume 7

Allan M. Armitage, General Editor

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Contents

1
Introduction

The growing of roses in pots is not new! As early as 1869, elaborate instructions were available concerning the forcing of roses out of season in large containers (Parsons, 1869). By 1949, techniques had sufficiently advanced that Dr. Kenneth Post of Cornell University described the use of roses for pot culture for the Easter and Mother's Day holidays (Post, 1949). Traditional spring pot forcing of field-grown bare-root grafted plants of the floribunda and polyantha type reached its peak after the second world war, but by the 1970's this market was in decline. Efforts were made to expand bare-root pot rose forcing to include the Valentine's Day holiday through the use of early field digging and supplemental light (Heins, 1981), but the practice was never adopted on a large scale in the United States due to economics.

Based on the work of Moe (1973), growers in Europe developed an economical system of year-round production in pots employing the use of cutting propagation and supplemental light. This system also used a smaller pot than traditionally used for bare-root grafted plant forcing, which was more suited for mass market sales. Beginning in the 1980's, new miniature rose cultivars were introduced that exhibited greenhouse and postharvest performance superior to those traditionally used. In recent years, the accelerated introduction of new cultivars and improvements in greenhouse technology have resulted in increasingly efficient year-round production schedules. The new cutting-grown products have been widely accepted by consumers, resulting in a significant expansion of the pot rose market. Also, recently introduced cultivars have been used for spring forcing of bare-root grafted plants, resulting in a rejuvenation of the traditional market.

The impact of the new cutting-grown products has been dramatic on the European market over the past decade and, in the last few years, has been felt in North American markets as well. Current production in Europe is estimated at more than 50 million pots. The majority of this production is in Denmark (35 million) and Holland (10 million), with the remainder grown in France, Germany, and Italy. U.S. and Canadian production was estimated at 4 million pots in 1989 but is estimated at over 12 million for 1997. Most production is in 4 to 5-inch (10 to 12.5-cm) pots, but there is a tendency for using larger, 5 to 6-inch (12.5 to 15-cm) pots in North America and smaller, 2.5 to 3-inch (6 to 7.5-cm) pots in Europe.

The objective of this production guide is to present our current state of knowledge of pot rose production for use by growers, researchers, and educators. Both traditional and recent advances in production methods are included. Pertinent examples from the scientific literature have been included to form a basis of understanding of how rose plant physiology can be used to improve production techniques. The intent is to stimulate interest in pot rose production research and to improve the efficiency of production and postharvest handling so that a growing number of consumers can enjoy this beautiful and unique plant.

2
Selection of Cultivars

Available Cultivars

Traditionally, cultivars from the polyantha and floribunda classes have been used for pot rose forcing (Table 1). Dick Koster and Margo Koster (polyanthas) have been used extensively since their introduction in 1929 and 1931, respectively. The floribunda Garnette and its many sports (e.g. Carol Amling, Marimba, and Bright Pink Garnette) were introduced in the 1950's and 1960's. Until recently, they were still among the mainstays of the pot rose forcing industry in North America, especially for larger containers (Hammer, 1992).

Use of cultivars from the miniature class is increasing rapidly (Table 1). Traditionally, numerous cultivars of miniatures were available, but few were suitable for pot forcing due to poor shelf-life or the inability to provide uniform growth and flowering on a year-round basis. Due to recent breeding breakthroughs, however, the palette of cultivars for pot forcing has rapidly broadened (Plate 1). Many new cultivars have been introduced from Europe where they have become an established floricultural crop, but North American breeding programs also continue to expand. Most modern pot rose production is and will continue to be with miniature-type cultivars.

Two main groups of miniature cultivars (all classed as miniatures) suitable for pot forcing are the true miniatures and the large-leaf/large-bloom types (Table 1). The true miniatures are most suitable for a 4-inch (10-cm) pot program because they are compact, well branched, heavy flowering, and may be forced under low light intensity. Compared to the larger miniatures, the true miniatures are usually easier to grow and produce more, but

smaller, flowers. True miniatures are well adapted for a Valentine's Day crop, but are also suitable as an impulse product year-round. They bloom continuously throughout the growing season in the garden; however, they may not be winter hardy in the northern United States and Canada. The best known cultivars are from the Rosamini, Minimo, Parade, Rainbow, and Mini-wonder series.

The large-leaf/large-bloom types are the likely successors of the Garnetres and Kosters. They are smaller, better branched, and more compact and uniform in habit than the Kosters. The vividly colored flowers, which are smaller than the floribundas but larger than the true miniatures, are highly resistant to shattering. Plants are best adapted to a 4.5 to 6-inch (11 to 15-cm) pot program. They are also available as budded, field-grown plants (see Chapter 4), which are forced in 7 to 8-inch (18 to 20-cm) pots similar to the Garnettes and Kosters. Most of these cultivars exhibit good winter hardiness and disease tolerance. Cultivars of the Sunblaze series are good examples of the large-leaf/large-bloom miniature rose.

The above-mentioned miniature cultivars have been selected by rose breeders specifically for greenhouse production. Other miniature cultivars might also be suitable for greenhouse forcing, but selection must be made from the hundreds of cultivars presently available for garden use. While dormant plants of garden cultivars can be successfully forced in the spring and sold for garden use, cultivars suitable for pot-plant use must exhibit uniform growth and flowering after a severe pinch (pruning) on a year-round basis. A good shelf-life is essential for marketing and indoor enjoyment.

The Selection Process

New pot rose cultivars are being developed through the almost exclusive use of genetic material from the miniature class in modern breeding programs. Because they are relatively easy to breed, large quantities of miniature rose cultivars are available today; however, only very few qualify as "pot roses." An intensive and thorough selection process is used to determine the suitability of a rose selection for pot-plant production. Some of the important attributes are the following:

At the production level, cuttings must root readily and uniformly; plants must exhibit uniform, well-balanced growth with heavy flowering and be easy to schedule, quick to cycle from pinching or cut-back (heavy pruning) to flower, and disease tolerant.

At the distribution level, plants must withstand adverse long-distance shipping practices; flowers must be persistent and have a strong, stable, attractive color.

At the consumer level, plants must have a persistent flowering period and be easy to maintain for their intended use, whether indoors, outdoors, or both.

In order to meet these criteria, pot rose cultivars usually require 5 to 7 years of evaluation before they are released. Most of the cultivars available today have been rigorously selected for pot-plant culture, especially the more recently introduced ones. Breeding of pot roses for the characteristics described above is taking place in Europe, Canada, and the United States, bringing new colors and more adaptable plants to the marketplace each year.

A typical breeding and selection program begins with the crossing of parents determined by the breeder to have the characteristics desired and a high probability of being able to pass the genes for those characteristics to the resulting progeny. The selection process then follows and usually consists of 5 main stages of development from the time the seedlings germinate until a new cultivar is released.

Stage 1

The first selections are made for color and habit from hybrid seedlings, which may number in the thousands.

Stage 2

From the first selection, typically about 10% of the seedlings may show desirable characteristics and are propagated by cuttings for further testing. This stage lasts 18 to 24 months, involves several cycles of growth, and focuses primarily on plant performance characteristics such as habit, floriferousness, ease of propagation, and forcing capacity.

Stage 3

At this stage, the best seedlings are observed in the greenhouse under standard commercial production scheduling. Cutting-grown plants are used for greenhouse testing that focuses on production timing, shipping tolerance, and shelf-life. Some companies graft all selections on a rootstock at this stage to evaluate field and garden performance. Usually, less than 50 selections reach this stage in any given year.

Stage 4

After year-round testing on greenhouse performance, shipping and shelf-life tolerance, and garden performance (Stage 3), no more than 6 to 10 selections are likely to remain. By this time, the technical characteristics of the cultivars are well defined. The potential market value is then evaluated by selected growers who grow the new selection under "real production conditions."

Stage 5

Following a successful market trial, a selection will be named and the new cultivar may be patented and released to the trade. Because of the extensive amount of testing required to develop any new pot rose cultivar, virtually all the selections deemed acceptable in Stage 4 are protected by plant patent. Therefore, a grower interested in propagating and growing plants of these cultivars must first obtain a propagating license from the patenting company.

Value and Importance of Plant Patents

New, asexually propagated cultivars are usually protected by plant patent or plant breeder's rights in most countries where pot roses are grown. Licensed growers of patented cultivars pay a royalty, usually per plant sold or per plant rooted, to the breeder and/or patent holder. Once granted, a patent protects a cultivar for 17 years in the United States. At this time, plant patents are recognized in the country of origin only, but a cultivar can be patented in other countries as well. The introduction of patent laws provided plant breeders the right to be rewarded for their inventiveness. Growers who pay royalties on patented cultivars are,

in fact, providing funds to support research programs that are both costly and long-term. These programs, in turn, benefit growers by supplying them with cultivars exhibiting new colors, better disease resistance, better greenhouse performance, and improved shipping capacity and shelf-life. Without plant patents, little or no incentive exists to invest the large funds and resources needed to create new cultivars.

A Word about Nomenclature

Currently there is much confusion over botanical nomenclature in roses. Traditionally, a name was assigned to a rose and registered with the American Rose Society (ARS), the international registration authority for roses (Cairns, 1993). In this way, the assigned name became the cultivar name for that rose according to the international code of nomenclature (Brickell, 1980). However, modern practice has evolved into assigning a code (denomination.) name to a breeding selection prior to introduction (e.g. Meijikatar). This name is used for patenting, which is typically applied for before the rose is introduced commercially. A common name (e.g. Orange Sunblaze) is chosen and usually trademarked for marketing purposes when a rose is introduced commercially. Both the denomination and common names can be registered with the ARS. Since both names can be registered, resolving which is the correct cultivar name is problematic. However, the denomination name will always be the same for a specific rose, as will the patent number, because it was used in the patent application. The denomination name is generally considered to be the correct cultivar name, especially when the common name is trademarked. According to the code of nomenclature, the cultivar names should not be trademarked (Brickell, 1980).

Another controversy exists concerning the use of trademarked names for selling roses. Many view the use of trademarked names as a means of circumventing the expiration of a patent because trademarks are renewable whereas plant patents are not (Higginbotham, 1992). After a patent expires, anyone can legally propagate a rose, but it cannot be sold without permission under the name that was trademarked by the company originally holding the patent. Nevertheless, selling roses under trademarked names

is common practice. There is disagreement, however, over whether trademarks are being used correctly. Elliot (1991) states that using a trademark to market a single variety is not prevented by law. However, improper use can easily invalidate the trademark. For this reason, trademarked and cultivar names are commonly used together. If they are not, there is a danger that the trademark can be genericized, thus rendering it invalid (e.g. if a rose is only known in commerce by the trademarked name) (Elliot, 1991; Higginbotham, 1992).

There are commonly many conflicting opinions on the naming of roses and use of trademarks (Higginbotham, 1992). Revisions to the code are currently being considered to solve these problems, but cooperation and compromise will be needed to end the confusion (Higginbotham, 1992). It is hoped that these issues can be resolved to the benefit of scientists, plant breeders, plant producers, and consumers alike.

For the purposes of this book, the presentation of rose names has been simplified. Single quotes, typically used to denote cultivar names, and marks denoting trademarks of any kind have been omitted in the text. Names in common use in North America have been used when referring to research originally reported using correct synonyms. Table 1 contains information on all of the pot rose cultivars referred to in the text, and many of those available in commerce. This table also lists information concerning common names, code names, synonyms, patents, and claims of property rights concerning names and propagation.

3
Forcing Strategy

The specific plant-production and forcing methods used for pot rose production are dependent upon the choice of forcing strategy. Details of the propagation and production of plants for forcing are in Chapter 4, and details for the forcing phase of pot rose production may be found in Chapter 5. The choice of forcing strategy is driven by marketing requirements which not only dictate cultivar selection, but time of year for forcing and pot size as well (see Chapter 9). Plants produced for forcing are either field-grown bare-root grafted plants, bench-grown bare-root rooted cuttings, or container-grown as liners or pre-finished units.

Field production is used to produce dormant, grafted, bare-root plants for forcing (Plate 2). Because of the typically large size of these plants, they are usually potted into 6.5-inch (16.5-cm) or larger pots for forcing. Field-grown plants are only available for a limited time during the winter and spring and are typically used for Easter and Mother's Day forcing. Forcing time is 6 to 8 weeks. Forcing of field-grown plants has been traditionally used to produce crops of the larger flowered cultivars such as the Garnettes and Kosters, but is also now used to produce plants of the large-flowered type miniature cultivars such as the Sunblaze series and specialty items such as patio trees (Plate 3).

Another type of bare-root plant that is produced for forcing is the dormant bare-root rooted cutting. These are potted into 4 to 5-inch (10 to 13-cm) pots with availability and forcing time the same as for field-grown plants. These plants are considerably smaller than field-grown plants, however, because this procedure is primarily used to produce plants of the small-flowered miniature cultivars for small pot forcing.

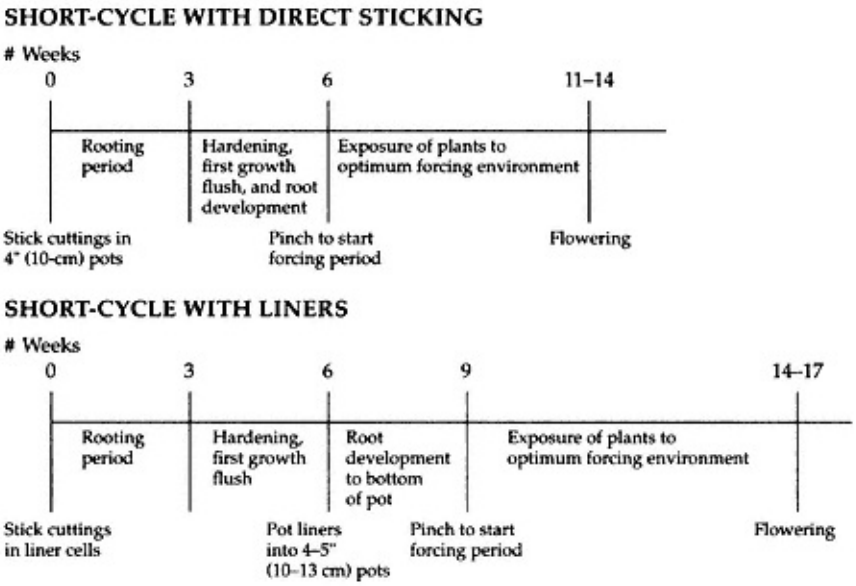

Figure 1.
Examples of short-cycle crop-production schedules.
See Chapters 4 and 5 for details of propagation and forcing techniques.

Potted roses grown in containers from start to finish are produced by using the smaller flowered cultivars with 1 of 2 methods, the short-cycle or the long-cycle method. For the short-cycle method, actively growing liners or pre-finished plants are commonly used (Figure 1 and cover photo). Depending on plant size, liners can be potted into pots 4 to 6 inches (10 to 15 cm) in diameter. Plants pre-finished in 4-inch (10-cm) pots can be either forced as is or finished in 6-inch (15-cm) pots. Many larger producers propagate directly into the pot to be used for finishing (referred to as direct-sticking; Figure 1). Regardless, the key to success with the short-cycle is allowing the roots to become well established in the finishing pot. This usually takes 2 to 3 weeks for newly potted liners. The plants are then pinched to 2 inches (5 cm) above the pot rim to start the forcing period. Forcing time is 5 to 8 weeks depending on time of year and local conditions (see Chapter 5). If plant roots are not well established when pinched, poor and uneven bud-break results in a finished plant with poor balance. This is the most commonly used forcing method for finishing plants from March to November in North America. In northern Europe,

supplemental high intensity discharge (HID) lighting and CO_2 are added to produce plants year-round. Winter forcing and year-round production with supplemental lighting are also common in the U.S. and Canada.

With the long-cycle method, better results are obtained when forcing for winter and Valentine's Day flowering (Plate 4). Plants used for long-cycle forcing are container grown during the summer and allowed to go dormant in the autumn (Figure 2). Plants are usually ready to force by early December in most areas of North America. To force, the plants are cut back 2 to 3 inches (5 to 7.5 cm) above the pot rim, cleaned of all dead branches and debris, and put in the forcing environment. Uniform bud-break and growth is achieved by providing a good balance between light and temperature (see Chapter 5). Seven to 8 weeks are usually needed to finish long-cycle plants for Valentine's Day or 6 weeks if HID supplemental lighting is used. The long-cycle method results in plants that are woody and well branched with a high

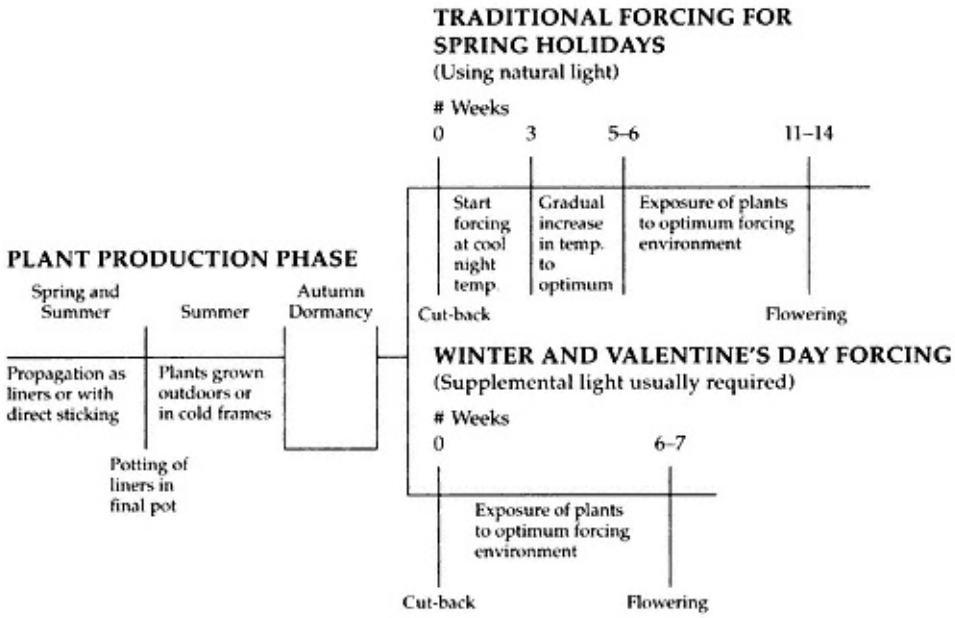

Figure 2.
Example of long-cycle crop-production schedules.
See Chapters 4 and 5 for details of propagation and forcing techniques.

carbohydrate content. The well-developed buds and root system (Plate 5) result in plants with vigorous growth that finish under the lower light intensity of the winter months significantly better than a short-cycle plant. In addition, the long-cycle plants can be used to force for Easter or Mother's Day in less expensive growing structures such as cold frames. However, the availability of long-cycle grown plants of good forcing cultivars is currently limited in the U.S. Long-cycle production is more common in large nurseries where the plants are used internally rather than sold to finishers. These operations often use long-cycle grown plants to increase the number of plants available for finishing for major winter and spring holidays. When year-round, short-cycle production is sustained with plants grown with cuttings from each final pinch, the number of plants that can be produced on a weekly basis is limited by the number of cuttings that can be generated from existing crops. Because this number is not generally much more than that necessary to sustain current production numbers, increases can only be accomplished gradually. By utilizing excess cutting numbers from short-cycle crops during late spring and summer to produce long-cycle plants, large numbers of plants can be finished for subsequent peak holidays such as Valentine's Day and Mother's Day.