Cut Roses for Christmas and Valentine's Day from Cuttings

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The cut flower market in the U.S. remains strong. Rose sales are up; more than 1.22 billion rose stems were sold in the U.S. in 1998, and per capita consumption has doubled in the last 20 years (6). Unfortunately, U.S. production has not only lost a significant portion of domestic share but has failed to expand with the global market. For roses, the percent of domestic sales from imports in 1975, 1981, 1988, and 1992 ranged from 1%, 15%, 34%, and 52% respectively, and was 78% in 1998 (6). U.S. production has decreased only 40% in the last 10 years, but the market continues to expand with product from overseas.

The primary market periods are three major U.S. holidays - Valentine's Day, Mother's Day and Christmas. In order to have flowers for these peak market periods, the plants must be maintained year-round in controlled environment greenhouses. Hybrid tea roses are unusual, because they flower continuously throughout the year. Thus, each rose plant must be visited by a worker once or twice a day, every day of the year, for flower harvest. Consequently, production costs are quite high, because labor must be used to harvest flowers every day of the year and thus to try to sell the flowers throughout the year, even when market demand is low. Of course, all other overhead and energy costs must be maintained for the calendar year as well. The primary market periods are certainly an important target, however. Valentine's Day prices of $1.10 to $2.25 per rose stem in the Chicago market compare favorably with the year-round average of $0.33 (1).

Cheap labor overseas has been a main factor in the loss of U.S. rose production. Traditional methods of rose production (15,8) practiced in the U.S., and now overseas, are labor intensive and monotonous; thus utilizing large numbers of unskilled low-wage employees. While low production costs overseas were the main factor in the loss of this industry, current environmental laws and the nation's need for sustainable agricultural production systems that reduce the energy input per product and that increase the wages for individual employees are also important.

Greenhouses in Kentucky and the U.S. did not disappear with the change in the rose market; these businesses simply adapted to other markets and crops. The bedding plant industry that produces flowers for home and commercial landscapes has increased dramatically in the last 20 years. As the greenhouse industry changed, plant production technology changed as well. Ebb-flood irrigation, palletized benches, plug technology and robotic transplanters have changed greenhouses (10). Greenhouse operators that have invested in new labor efficient equipment are looking for new crops to pay for their investments.

An alternative to conventional rose production is to grow roses for only six months of the year. This production schedule would allow roses to be grown as part of the currently successful bedding plant business. Roses could be grown from cuttings started in August just as poinsettias are potted. Roses would compete with garden mums and poinsettias for greenhouse space in the summer and fall, but both crops have saturated their markets and prices have not increased in a number of years. After cut stems are harvested for Christmas and Valentine's Day, the plants can be discarded. This six-month alternative is well supported by an economic evaluation of single stem roses (5). An unusually high internal rate of return (175%) was estimated for Valentine's Day rose production integrated into a typical greenhouse system that produced bedding plants, garden mums and poinsettias.

Roses can be grown from cuttings quite easily. Rose growers have used cuttings for the last 100 years as part of their production system and all miniature roses for pots are propagated from cuttings (14). Cuttings have been used to produce roses for many university experiments (7, 12,11,16). Evaluation of single node cuttings for cut rose production was begun in the late 1980s (2,17,13). In general, typical propagation systems, intermittent mist, bottom heat at 70-75^{o}F and application of rooting hormone work well. Anderson (3,4) proposed the use of single node rose cuttings as the source of plants for a mechanized cut flower production system.

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(1) Develop a production model to produce roses from cuttings for Christmas and Valentine's Day.

Roses are relatively easy to grow from cuttings. Flowering stems were harvested for cuttings on Aug. 16, 29, Sept. 9 and 12, 2002. Cut rose stems were cut into 4-5 cm segments, each segment having a single leaf and bud. The lower 1 cm of each cutting received a 5 sec. dip in a solution of 750 ppm IBA in 50% ethanol. Cuttings were placed into a 6 cm pot containing a commercial growing medium. The cuttings were placed under intermittent mist and the rooting media temperature maintained at 75^{o}F.

Approximately 750 rooted cuttings from 14 red rose cultivars were transplanted into MetroMix 560 growing medium in 6-inch pots on Sept. 28, Oct. 22 and 27. Plants were placed pot to pot in a greenhouse that received ambient light levels. Greenhouse temperatures were maintained at an average daily temperature of 60 F during the fall and winter. Plants were irrigated by hand with a fertilizer solution, Peter's 20-10-20, with an EC of 1.0 to 1.2 dS and pH of 5.5 to 6.5 each day.

Pruning practices were compared during the winter of 2002-2003. Plants were pruned to 5 inches or 12 inches on Dec. 2 and compared with unpruned plants that were tied together in groups of four plants. The tying technique allowed light to reach the lower parts of the plant where new shoots could emerge.

(2) Prepare economic simulations of the model that focus on production costs for alternative plant densities, containers and pruning systems.

It is relatively simple to compare the yield of cut rose stems with example production costs. Commercial greenhouses have an operating cost of approximately $0.25 per square foot per week (Will Southerland, 2002, personal communication). Rose plants transplanted in mid-October will use greenhouse space for 16 weeks if roses are harvested for Valentine's Day. Cut rose production, in this system, costs $4.00 per square foot of space used. The plants were planted into 6-inch pots, so there are four plants per square foot of space. Thus, the returns need to be at least $1.00 per plant. At prices of $1.00 or more per cut stem, this system needs to produce at least one high quality stem per plant.

(3) Validate the optimal economic model by growing the roses in the greenhouse in replicated studies.

Rose growth is directly related to the amount of light the plants receive. The winter of 2002-2003 had unusually low light levels, so overall rose performance was poor.

All cultivars of roses pruned to a 5-inch height in early December had a yield of less than one stem per plant. 'Olympiad' and 'Cesar Chavez' roses produced 1.5 and 1.2 stems per plant in the 12-inch and tied treatments.

(4) Evaluate cultivars of red roses for their performance in a short-term production system.

Modern red greenhouse rose varieties, 'Black Magic' and 'Fahrenheit', traditional red greenhouse rose varieties 'Samantha' and 'Taboo', modern garden roses 'Cesar Chavez', 'Burning Desire', 'Opening Night', 'Veteran's Honor', 'Crimson Bouquet', and 'Cardinal's Song', and traditional red garden roses 'Olympiad' and 'Ingrid Bergman' were evaluated in this study. 'Black Magic', 'Olympiad', 'Cesar Chavez' and 'Kardinal' will be used in 2003-2004 studies.

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