CIR1094

UF UNIVERSITY of FLORIDA IFAS Extension

Production of Hybrid Asiatic and Oriental Lilies[1]

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Hybrid lilies are classified into nine major groups based primarily upon parentage and physical characteristics such as flower form and orientation. The three most important groups for commercial potted plant and cut flower production are the asiatic hybrids, which include such cultivars as 'Jolanda', 'Sunray', 'Montreaux', 'Dreamland', 'Corsica', 'Symphony', 'Connecticut King' and 'Orange Pixie'; the oriental hybrids, including such cultivars as 'Star Gazer', 'Sans Souci', 'Casa Blanca', and 'Journey's End'; and the longiflorum hybrids, which include 'Nellie White', 'Ace', and 'White America'. The longiflorum hybrids are produced primarily for the Easter holiday as a potted crop while the asiatics and orientals are marketed nearly year round as cut flowers and potted plants. In Florida, production of the asiatic and oriental hybrid lilies occurs generally from late fall through late spring. High temperatures inhibit production outside of this time period.

Jolanda.

Montreaux.

Significant improvements in hybrid lilies have been made in recent years. Among the potted-plant cultivars has been the introduction of true genetic dwarfs. These stay short and compact (12 to 18 inches tall) without the use of growth regulators. The most

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The term "plates," where used in this document, refers to color photographs that can be displayed on screen from CD-ROM. These photographs are not included in the printed document.

Dreamland.

Connecticut King.

significant improvements among the cut-flower cultivars are the addition of a complete selection of pastel colors, and improved cultivars that better tolerate adverse growing conditions such as high temperatures and high light.

Hybrid lilies are not difficult to grow if a few basic cultural requirements are followed. Shoot emergence, forcing time, plant heights, and flower bud counts are dependent upon several factors, including bulb maturity, duration of cold storage, planting date, planting density, temperatures and light intensities. This article reviews the major requirements for producing the hybrid asiatic and oriental lilies as either potted plants or cut flowers and common pitfalls encountered by commercial producers.

Production of Hybrid Lilies

Precooling Requirements

Asiatic and oriental hybrid lilies require a cold treatment of a minimum of 6 and 8 weeks, respectively, at 34 to 36°F before planting for rapid shoot emergence and flowering. Additional cooling is not harmful. Once the bulbs are precooled, they should not be exposed to temperatures above 36°F for extended periods of time or premature sprouting will occur.

Bulbs which will be used for late forcing (usually after February) are usually frozen in peat and maintained at 28°F. Holding the bulbs at this temperature prevents sprouting, reduces loss of the bulb's energy reserves and minimizes disease problems. However, bulbs must be totally vernalized before freezing. Further, the case must have adequate moisture since freezing temperatures are very drying and the bulbs can dehydrate easily. Allow for free flow of air between and around cases, and do not allow bulbs to thaw. If bulbs are allowed to thaw, and then refrozen, flower buds may not develop properly.

When bulbs are needed for planting, or when frozen bulbs are received from a supplier, defrost the bulbs slowly at 45 to 55°F for one to three days, or until the bulbs are thawed. As soon as the bulbs are thawed, they should be planted. If planting is delayed, sprouting and disease problems may occur.

Planting Requirements

Upon arrival of precooled bulbs, or after thawing frozen bulbs, they should be planted immediately in moist soil. If unfrozen precooled bulbs are received and cannot be planted immediately, they should be stored at 34 to 36°F. Storage at temperatures higher after precooling will induce premature sprouting.

Hybrid lilies must be planted deep. The top of the bulb must be covered with a minimum of 2 inches of soil. In fact, 3 to 5 inches is not too deep for production during high temperatures of late spring and early summer. A 4-inch x 4-inch spacing is commonly recommended. However, some producers of hybrid lilies for cut flowers use closer spacings. Water the bulbs in well after planting.

The bulb itself has enough stored energy to begin shoot growth. Initially, roots will develop from the base of the bulb. However, once the shoot starts to grow, roots will develop from the underground portion of the shoot. These roots are referred to as stem roots and are the most active in absorbing nutrients and water required by the plant. If adequate stem roots do not develop, growth will be poor and bud counts low. To obtain lilies of the highest quality the shoot should be allowed to grow slowly and develop adequate stem roots. Therefore, sufficient

planting depth and proper growing temperatures are of the utmost importance to allow this underground root system to develop.

Bulb Size

Asiatic lily bulbs are usually sold as 10-12 cm, 12-14 cm, 14-16 cm and 16 cm and larger sized bulbs. Oriental hybrid lily bulbs are sold as 16-18 cm, 20-22 cm and 22 cm and larger sized bulbs. For cut flower production, the smaller bulb sizes (usually 12-14 cm for asiatics and 16-18 cm for orientals) are often recommended for forcing purposes. Larger bulbs produce taller plants with greater bud counts than smaller bulbs. However, the majority of forcing cultivars have acceptable bud counts even on the smaller bulbs. Since more small bulbs may be planted per square foot when compared to the larger bulbs, smaller bulbs will yield a higher profit per square foot. For potted plant production, the smaller bulb sizes are used and the number of bulbs per pot is adjusted depending upon pot size.

Cultivar Selection

Selecting the proper cultivar can be an important factor in determining success in growing hybrid asiatic and oriental lilies. There are literally hundreds of cultivars from which to select. Experience is the best method of selecting lily cultivars. However, common cultivars and how those cultivars performed in evaluations conducted in Bradenton, Florida in 1991 are listed in Table 1 and Table 2. Best cultivars, by color, for Florida based on these evaluations are listed in Table 3. The weather conditions under which these evaluations were conducted are outlined in Table 4 .

For these trials, frozen hybrid lily bulbs were received on December 27, 1990 and planted on January 3, 1991. Bulb sizes were 12-14 and 16-18 cm for asiatic and oriental hybrids, respectively. Plant beds were composed of a sandy soil (EauGallie fine sand) raised to a height of approximately 8 inches and 39 inches across. Beds were fumigated with methyl bromide:chloropicrin and allowed to remain undisturbed for 2 weeks before planting. Prior to planting, a granular 6-6-6 fertilizer was applied to the soil surface at a rate of 2 lbs/100 sq ft. Bulbs were planted on 4-inch centers and and 4-inches deep. A fungicide soil drench was applied after planting. Water was supplied through a drip-tube irrigation system with 3 tubes placed on the soil surface along the length of the beds at approximately 13 inches apart. The entire raised bed drip tube irrigation system was covered with white-on-black polyethylene film. Fresh bulbs were received on March 10, 1992 and were planted on March 12, 1992. All other cultural conditions were the same as described for frozen bulbs.

Soil and Growing Media

A wide variety of soils and growing media are suitable for growing lilies. The growing medium should be fumigated or treated with aerated steam to control insect and mite pests, disease organisms, nematodes and weeds. The growing medium must be porous for good aeration and water drainage. A pH of 6.0 to 6.5 is recommended. If the pH is too low, fluoride-induced leaf scorch may result. This occurs because at a low pH soil-borne fluoride will become soluble and thus readily available for uptake by the plant. Potted lilies have been forced successfully in several types of growing media. Two successful media are as follows:

1. 50% sandy loam, 25% sphagnum peat, 25% sharp sand

2. 25% sandy loam, 50% peat, 25% pumice.

Other mixes may be suitable. However, bark should not be included in media for potted lilies if ancymidol (A-Rest) is required for height control. The bark can bind and deactivate the ancymidol and proper height control will not be achieved.

Fertilization

The bulb is an excellent reservoir of mineral nutrients up to the time of flowering. Due to variations in soils, growers need to use their own judgment, as well as soil testing, to determine if supplemental fertilization is required. For cut flowers, 1 to 2 lbs of a 6-6-6 or 8-8-8 per 100 square feet applied prior to planting has been used successfully used in producing hybrid lilies in Florida. For potted plants, a well-balanced liquid fertilizer containing 200 parts-per-million nitrogen and potassium should be

used once flower buds become visible. A second application 14 days later will darken the foliage color and add to market appeal. Avoid over-fertilizing, especially with nitrogen, which can produce a lush appearance, but soft stems. Avoid fertilizers with superphosphate.

Forcing Temperatures

Unpredictable temperatures are the major difficulty in forcing hybrid lilies in Florida. High temperatures increase disease incidence, reduce flower color intensity, and cause flower bud abortion. In Florida, producers must determine at what point the environment reduces quality to a point where production is no longer profitable. In general, 50 to 55°F night temperatures and 65 to 70°F day temperatures are optimal for asiatic lilies. The maximum day temperature should be 85°F. Oriental hybrids need a warmer night temperature of 60 to 65°F and a day temperature not exceeding 85°F.

Watering

Uniform moisture is important, especially during the first three weeks after planting. Watering must be carried out sparingly at this time, not letting the soil dry out, while at the same time not over-watering. When the shoot is 3 - 6 inches tall, the stem roots should be well developed. At this time, watering can be safely increased.

Lighting

Lilies require some shading. For cut flower production, a 30 - 40% shade cloth is common. In low light intensity conditions such as with a photoperiod less than 12 to 14 hours, an 8-hour night interruption, similar to chrysanthemum lighting, is beneficial in preventing bud abortion.

Height Control

The grower can increase the height of the plants substantially by crowding them in beds or flats and by adding extra shading during high light conditions such as late spring and early summer. Shorter day lengths also produce taller plants. Crowding will increase height for cut flowers forced late in the season when days are longer.

Bulb Crate Production System

Hybrid lilies for cut flower production my be forced in bulb crates for late spring or early fall season when soil temperatures are often too warm for a high quality crop to be produced (Plate 1). Bulbs are planted 15-20 per 23x16x9 inch crate. One inch of soil below the bulb is satisfactory. This allows the bulb to be planted 4-5 inches deep in the crate. Crates should be stored in a cooler at approximately 50°F. Bulbs should be held in the cooler for 3 weeks or until the emerging shoots are approximately 3 inches tall. The crates should then be moved from the cooler to the production facility. Producing hybrid lilies using this method allows the root system to develop under optimal temperatures and the plant to become established prior to being exposed to high temperatures. Hybrid lilies forced in a crate system for early fall production will be taller and have higher bud counts than hybrid lilies planted out-of-doors directly into ground beds.

Plate 1. Hybrid asiatic lily production using bulb-crate system. Background is crop in flower. Foreground is a crop one week after removal from cooler.

Growth Retardant Use for Pot Culture

Ancymidol (A-Rest) has proven to be the most reliable growth regulator currently available for height control of hybrid lilies. With the growing media suggested earlier, satisfactory height control has been obtained with split applications as a soil drench using a maximum, including all applications made, of 0.5 mg active ingredient (a.i.) per pot. A common method is to apply 0.25 mg a.i. per pot when the shoot is one-half to one inch tall, followed 10 to 14 days later by a second application of 0.25 mg a.i. per pot. If multiple bulbs are used per pot, apply ancymidol when the first two shoots that emerge are one-half inch to one inch tall. It is not necessary to

wait for all shoots to emerge before applying ancymidol.

Other application rates have been successful including 0.175 mg a.i. per pot applied at shoot emergence, followed 10 to 14 days later by a second application of 0.325 mg a.i. per pot. Also, a single application of 0.5 mg per pot applied at shoot emergence has been successful. Ancymidol application will delay flowering by approximately 3-5 days.

The actual amount of ancymidol required will vary with climate, weather conditions, season, light intensity, and soil moisture. Therefore, producers should experiment with a few plants and become experienced with the use of growth retardants before using the material on a large crop.

The new genetically dwarf pot plant varieties grow only 12 to 18 inches in height. These cultivars will require little or no growth retardant for production as potted plants.

Harvesting Hybrid Lilies

Cut Flowers

Lilies are cut soon after the primary bud displays color and begins to swell. Flowers may need to be harvested twice per day. Stems should be cut before flowers open to ensure easy packing and better quality of the flowers upon arrival at the florist. Cut lilies can be treated with silver thiosulfate (STS) to increase vase life. The stems are placed in STS solution for 24 hours at 68°F before being shipped. If flowers cannot be shipped after STS treatment, they can be held in cold storage at 38 to 40°F for three to five days. A floral preservative should be used during this storage period. It is not recommended that cut flowers be held in cold storage over five days as prolonged storage will decrease the vase life as well as flower quality.

Pot Plants

Potted lilies are ready for market at the same stage of development as cut lilies. If the crop is early, plants may be held in cold storage at 38 to 40°F. Plants held in cold rooms should not be sleeved.

Disorders, Insect Pests and Diseases

Bud Blasting and Abscission

Flower bud blasting is characterized by a withering and bleaching of the flower bud, followed by necrosis and bud drop. This may occur at any stage of bud development. Abscission usually occurs when the bud is about one-half inch to one inch in length. Generally there are few or no noticeable symptoms prior to the buds dropping. In the northern U.S., these conditions are associated with low light intensity and short photoperiods whereas in Florida, bud abortion commonly occurs in the early fall, late spring, and early summer due to high temperatures.

Leaf Scorch

A period of bright sunlight after prolonged dull weather can cause sunburn, or sun scorch, on the leaves of some cultivars. Scorch is noticed particularly at the critical visible bud stage, and will produce white bands across the leaf that eventually become necrotic. This necrotic tissue can serve as a starting point for disease development, such as botrytis, if not properly treated. Use a fungicide spray when the first signs of scorch appear. This disorder may also be induced by low calcium content in the young expanding foliage. A foliar application of one percent calcium chloride just before the buds are visible has been successful in reducing leaf scorch. Apply until the foliage is wet, but not dripping. Repeat spraying every other day for a total of five applications.

Leaf scorch may also be induced by high fluoride level in the soil, water or air. This is a common problem in Florida as fluoride can be found in the water and weather fronts can bring fluoride-contaminated air into production areas.

Root Rot

Hybrid lilies are susceptible to numerous root rot pathogens. For this reason, it is suggested that the growing medium or soil be drenched with an approved fungicide every four to six weeks. Loss of roots whether due to root pathogens, poor watering or improper fertilization practices will result in necrotic

lower leaves, leaf drop and overall poor plant performance.

Aphids

Aphids can be a problem when producing asiatic and oriental hybrid lilies in Florida. Aphids can be controlled by regular spray programs. If the aphid population is allowed to build before a spray program is initiated, damage may occur before the population can be brought under control.

Thrips

Thrips can often be found inside of open lily flowers. If populations are allowed to increase, damage may be done to the flower buds. Thrips damage often is seen as malformed or streaked flowers.

Common Pitfalls in Producing Hybrid Lilies

Many of the common pitfalls that growers encounter are easily avoided if certain cultural recommendations and techniques suggested are followed. Some of these pitfalls include:

1. Small groups of lilies intermingled with other plants such as pot mums or Easter lilies. The temperature for these two plants is generally much too warm for hybrid lilies.

2. Attempting to crowd too many pots per square foot. The spacing of pots per square foot varies with light intensities.

3. Not allowing enough time to force and having too many pots for the greenhouse space.

4. Not selecting the proper cultivars. Select only the cultivars recommended and select only the finest quality bulbs.

5. Not allowing sufficient precooling. Be sure bulbs are totally precooled before planting.

6. Planting bulbs too shallow. Adequate stem roots cannot develop if bulbs are planted with less than 2 inches of soil over the top of the bulb.

7. Overwatering. Bulbs should be watered in well when planted. Water sparingly thereafter until the shoot is 4 to 6 inches tall. After this stage, the roots are generally well developed and overwatering is not as severe a problem.

8. Overfertilization. The bulb itself is an excellent reservoir of mineral nutrients and will support the initial plant growth through shoot emergence. Overfertilization can result in a build up of soluble salts that can damage the root system.

Images of Lilies

Hybrid Oriental Lily Cultivars

Plate 2. 'Trance'

Plate 3. 'Primeur'

Plate 4. 'Lareve'

Hybrid Asiatic Lily Cultivars

Plate 5. 'Gold Stripe'

Plate 6. 'White Cloud'

Plate 7. 'Sterling Star'

Plate 8. 'Roma'

Plate 9. 'Admiration'

Plate 10. 'Snowstar'

Plate 11. 'Dream'

Plate 12. 'Sancere'

Plate 13. 'Medallion'

Plate 15. 'San Francisco'

Plate 16. 'Polyanna'

Plate 17. 'Delta'

Plate 18. 'Golden Melody'

Plate 19. 'Aladdin'

Plate 21. 'Red Tiger'

Plate 22. 'Lady Killer'

Plate 23. 'Enchantment'

Plate 24. 'Dominator'

Plate 25. 'Matchless'

Plate 26. 'Flaming Star'

Plate 28. 'Prominence'

Plate 29. 'Corina'

Plate 30. 'Red Knight'

Plate 31. 'Cadillac'

Plate 32. 'Unique'

Plate 33. 'Parisienne'

Plate 35. 'Strocco'

Plate 36. 'Seline'

Plate 37. 'Chinook'

Plate 38. 'Salmon Beauty'

Plate 39. 'Festival'

Plate 40. 'Electric'

Plate 41. 'Los Angeles'

Table 1. Winter 1991 Asiatic Hybrid Lily Cultivar Evaluations - Frozen Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Admiration	7.0	20.5	44.6	white, with brown spots
Aladdin	3.8	21.7	67.8	yellow
Alperglow	-	-	-	-
Amorette	2.0	19.3	42.4	orange,yellow
Apeldorn	4.4	24.1	62.4	orange
Apollo	6.6	14.8	62.2	white
Artisto	5.2	16.0	33.0	yellow with brown spots
Avignon	4.0	24.0	54.0	burnt orange
Butter Pixie	5.0	18.4	58.2	yellow
Cadillac	5.2	26.8	62.6	red with black spots
Chicago	4.4	26.8	59.4	yellow with brown spots
Chinook	7.0	28.8	63.2	salmon
Cocktail	7.2	23.0	51.6	pink
Compass	2.0	18.8	59.6	orange
Connecticut King	4.2	21.0	59.0	yellow with brown spots
Content	2.6	16.0	44.6	orange with brown spots
Cote D'Azur	4.8	22.6	53.8	dark rose
Corina	3.6	19.2	65.2	red
Crescendo	7.2	28.9	62.0	yellow with brown spots
Crimson Pixie	-	-	-	-
Dark Beauty	3.4	26.2	68.4	pink, yellow
Dawn Pixie	2.2	14.2	54.4	dark pink, yellow with black spots
Dominator	4.4	33.1	35.2	orange

Table 1. Winter 1991 Asiatic Hybrid Lily Cultivar Evaluations - Frozen Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Admiration	7.0	20.5	44.6	white, with brown spots
Donna	6.0	20.4	60.0	violet
Dream	3.8	21.4	45.6	white
Dreamland	5.0	22.9	68.6	yellow
Elfin Sun	2.4	15.4	48.0	cream with brown spots
Enchantment	2.4	19.7	60.4	orange, separated petals
Endeavor	3.0	22.4	59.6	orange, red
Eurovision	4.4	23.7	59.8	dark orange with black spots
Fair	-	-	-	-
Festival	6.0	30.1	68.2	yellow, brown, orange
Fiesta Gitana	3.8	23.0	57.2	orange, red
Flaming Star	5.2	25.5	56.2	dark orange, black spots
Florence	5.0	32.0	73.0	yellow, brown spots
Flower Song	2.0	14.8	56.0	yellow, brown spots
Gladiator	3.4	22.8	54.4	red
Golden Melody	11.4	28.5	62.6	yellow, brown spots
Grand Paradiso	3.8	27.2	66.6	burnt orange
Grand Cru	3.4	25.1	60.8	yellow,orange
Grandeur	2.2	25.1	57.4	yellow, brown spots
Horizon	7.0	12.8	55.4	orange
Jazz	4.6	24.5	55.6	dark red to scarlet
Jolanda	6.6	31.9	64.0	orange
L.D. Rose	6.6	18.4	40.0	rose, black spots

Table 1. Winter 1991 Asiatic Hybrid Lily Cultivar Evaluations - Frozen Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Admiration	7.0	20.5	44.6	white, with brown spots
La Toya	1.8	28.3	57.2	violet
Lady Killer	5.0	27.5	60.8	orange, brown spots
Lemon Pixie	2.2	12.6	57.2	yellow
Lily Sinai	2.6	18.7	52.4	light orange
Love Song	-	-	-	-
Los Angeles	6.2	34.3	56.0	white, pink, brown spots
Magic Eye	4.4	25.5	66.0	pink, yellow, white
Matchless	7.2	23.9	56.6	orange, petals separated
Medallion	-	-	-	-
Mercedes	-	-	-	-
Mont Blanc	4.8	22.8	60.2	white
Monte Rosa	3.8	22.3	62.0	pink, yellow
Montreux	5.8	26.2	67.2	rose, brown spots
Nice	7.4	27.8	59.2	rose, yellow
Nivea	4.2	28.6	63.8	white
Optima Forma	2.8	21.5	57.7	yellow
Orange Pixie	-	-	-	-
Orange Tiger	-	-	-	-
Parisienne	6.0	21.9	45.0	rose, white, black spots
Peach Blush	3.8	20.4	54.4	pink
Peach Pixie	-	-	-	-
Polyanna	6.6	29.2	65.0	dark and light yellow

Table 1. Winter 1991 Asiatic Hybrid Lily Cultivar Evaluations - Frozen Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Admiration	7.0	20.5	44.6	white, with brown spots
Prominence	2.6	16.4	56.6	red, black spots
Pink Pixie	4.0	26.5	53.8	pink, white, brown spots
Pink Tiger	5.4	35.8	62.0	pink, white, yellow
Purple Sensation	-	-	-	-
Red Carpet	-	-	-	-
Red Knight	6.2	26.1	56.4	red, black spots
Red Tiger	11.4	33.0	61.6	dark orange, black spots
Rouge Pixie	2.4	10.3	43.2	orange
Roma	4.8	22.6	53.8	cream
Rosamunda	7.2	21.3	45.8	pink
Rose Delight	3.6	23.2	62.2	rose, white
Rosefire	3.6	22.0	56.0	orange,yellow
Rosita	1.4	21.9	47.4	pink
Rosywings	5.2	26.5	67.4	dark rose
Ruby Pixie	3.2	9.5	56.0	red
Salmon Beauty	7.6	32.3	62.2	salmon, brown spots
San Francisco	6.2	29.8	63.4	yellow, brown spots
Selina	5.0	29.5	57.6	pink, brown spots
Snowstar	7.6	26.9	60.2	white, yellow
Solo Mio	-	-	-	-
Sorbet	2.0	18.5	60.8	purple, white
Star Pixie	2.3	12.2	55.2	orange

Table 1. Winter 1991 Asiatic Hybrid Lily Cultivar Evaluations - Frozen Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Admiration	7.0	20.5	44.6	white, with brown spots
Sterling Star	3.4	26.4	56.8	white, brown spots
Sunray	-	-	-	-
Symphony	5.2	16.1	42.4	yellow
Talent	3.8	20.0	59.2	dark orange, brown spots
Tamara	4.0	22.1	49.6	pink
Treasure	-	-	-	-
Unique	5.0	29.8	62.0	white, rose
White Tiger	4.2	28.0	56.0	white
Yellow Blaze	-	-	-	-
Yellow Tiger	5.4	37.6	73.0	yellow, brown spots
Zephyr	4.4	25.9	58.6	light rose, black spots

*Descriptions are for cultivars produced under conditions described under the cultural information section and under the prevailing weather conditions during production. An "-" indicates that plants failed to flower.

Table 2. Spring 1991 Oriental and Asiatic Hybrid Lily Cultivar Evaluations - Fresh Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Oriental Hybrid Lilies				
Auratum Othello	6.4	29.0	94.0	white, yellow
Casa Blanca	2.8	26.0	93.5	white
Chiffon	-	-	-	-
Everest	5.0	28.0	98.0	white
Gold Stripe	4.0	24.0	87.5	white, yellow

Table 2. Spring 1991 Oriental and Asiatic Hybrid Lily Cultivar Evaluations - Fresh Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Oriental Hybrid Lilies				
Impressive	-	-	-	-
Journey's End	5.4	22.7	93.0	dark pink
Lareve	3.0	17.6	64.0	pink, yellow
Mona Lisa	2.3	14.2	72.6	pink, white
Olivia	-	-	-	-
Omega	-	-	-	-
Primeur	8.5	18.6	64.6	white
Rubrum	-	-	-	-
Sante	-	-	-	-
Sans Souci	6.0	23.7	94.5	pink, white
Stargazer	6.2	25.2	88.5	pink, white
Trance	6.0	19.2	58.3	pink, white
Uchida	-	-	-	-
Valentino	-	-	-	-
White Sheen	3.0	15.7	69.0	white
Asiatic Hybrid Lilies				
Abisto	5.3	20.1	44.8	light yellow, browns spots
Admiration	3.6	18.1	49.4	white, brown spots
Aladdin	6.8	23.4	70.2	yellow, red spots
Amorette	7.6	19.4	41.2	orange,yellow
Apollo	9.8	19.5	64.8	white
Butter Pixie	2.8	13.5	63.8	yellow

Table 2. Spring 1991 Oriental and Asiatic Hybrid Lily Cultivar Evaluations - Fresh Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Oriental Hybrid Lilies				
Chicago	4.3	20.9	60.0	yellow, brown spots
Chinook	7.8	38.7	74.0	salmon
Cocktail	14.8	27.0	57.0	pink
Colosseo	3.8	27.7	56.0	pink, yellow, brown spots
Compass	5.0	18.7	57.6	orange
Connecticut King	8.0	25.2	62.0	yellow, brown spots
Content	6.4	16.5	47.2	orange, brown spots
Cote D'Azur	8.4	19.0	55.8	dark rose
Corina	5.6	27.3	62.0	red
Crescendo	6.8	25.9	64.4	yellow, brown spots
Dandy	4.8	23.3	55.0	light pink
Dawn Pixie	2.8	14.4	57.8	dark pink, yellow, black spots
Delta	8.6	31.0	62.4	yellow, brown
Dominator	10.4	20.6	44.2	orange
Donna	7.4	23.4	67.8	pink
Dream	6.4	22.7	49.2	white
Dreamland	11.0	28.6	65.2	yellow
Electric	6.3	33.5	57.0	orange, pink, brown spots
Elfin Sun	6.2	18.7	52.6	cream with brown spots
Enchantment	7.0	22.9	61.4	orange, petals separated
Endeavor	2.0	18.3	55.3	orange, red
Festival	5.8	42.5	71.0	yellow, brown, orange

Table 2. Spring 1991 Oriental and Asiatic Hybrid Lily Cultivar Evaluations - Fresh Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Oriental Hybrid Lilies				
Flaming Star	6.8	26.1	58.2	dark orange, black spots
Fuego	2.8	26.3	58.6	orange,yellow
Golden Melody	8.8	25.5	64.0	yellow, brown spots
Grand Paradiso	3.2	26.2	68.5	burnt orange
Grand Cru	5.8	30.6	60.0	yellow,orange
Horizon	7.0	11.5	55.4	orange
Jazz	4.5	21.0	55.3	red
Jolanda	4.8	25.3	64.6	orange
L.D. Rose	5.0	26.9	46.0	rose, black spots
Lady Killer	8.8	28.0	56.0	orange,brown spots
Lemon Pixie	3.5	13.3	58.0	yellow
Los Angeles	9.6	34.4	56.2	white, pink, brown spots
Medallion	5.6	24.2	69.6	cream, brown spots
Menton	4.0	21.5	67.0	salmon
Mont Blanc	5.4	21.3	62.0	white
Montreux	7.2	25.0	69.2	rose, brown spots
New Yellow	8.2	22.2	61.7	light yellow, dark yellow, brown
Nice	6.2	22.9	60.4	rose, yellow
Orange Pixie	3.4	11.5	52.2	orange, brown spots
Orange Princess	7.5	14.4	49.0	orange, brown spots
Parisienne	4.8	19.4	47.0	pink, white, brown spots
Peach Pixie	5.7	14.7	55.0	pink and yellow mix

Table 2. Spring 1991 Oriental and Asiatic Hybrid Lily Cultivar Evaluations - Fresh Bulbs*

Cultivar	Average Bud Count	Average Height (inches)	Average Days to Bud Color	Primary Flower Color
Oriental Hybrid Lilies				
Polka	6.4	12.4	52.8	orange, brown spots
Polyanna	6.2	32.8	69.0	dark yellow, light yellow
Prominence	7.6	16.5	61.6	red, black spots
Pink Pixie	4.2	16.6	56.8	pink, white, brown spots
Purple Sensation	5.8	23.4	64.4	purple
Red Carpet	4.6	17.7	54.0	red
Rouge Pixie	5.6	11.0	42.4	orange
Roma	4.4	23.3	72.2	cream
Rose Delight	4.4	30.5	63.2	rose, white
Rosefire	2.8	16.2	56.6	orange,yellow
Rosita	2.8	24.7	57.6	pink
Salmon Beauty	7.8	30.2	68.2	salmon, brown spots
Sancere	6.2	22.0	62.0	white, no spots
Selina	7.2	31.8	58.2	pink, brown spots
Snow Star	7.2	25.2	60.4	white, yellow
Star Pixie	6.0	18.2	53.8	orange
Sterling Star	6.8	30.1	58.0	white, brown spots
Strocco	7.8	26.6	57.4	dark pink, light pink, brown spots
Sunray	5.4	20.9	61.0	yellow, brown spots
Unique	9.6	33.9	62.0	white, rose
White Cloud	9.6	24.0	62.2	white, brown spots
Yellow Blaze	5.6	21.9	84.4	yellow, brown spots

Table 3. Best Hybrid Asiatic Culivars For Specific Flower Colors Using Frozen and Fresh Bulbs*

Dominant Flower Color	Frozen Bulbs	Fresh Bulbs
White	Snowstar, Admiration	Dream, Sancere, Snowstar, Sterling Star, White Cloud
Cream	Roma	Medallion
Yellow	Polyanna, Crescendo, Golden Melody, San Francisco	Aladdin, Connecticut King, Crescendo, Delta, Dreamland, Golden Melody, Polyanna
Orange	Jolanda, Matchless, Flaming Star, Lady Killer, Red Tiger	Dominator, Enchantment, Flaming Star, Lady Killer,
Red	Red Knight, Cadillac	Corina, Prominence
Rose/Pink	Rosamunda, Parisienne, Cocktail, Donna, Nice,	Cocktail, Donna, Montreux, Selina, Strocco, Unique
Salmon	Salmon Beauty, Chinook	Chinook, Salmon Beauty
Mixed	Los Angeles, Festival	Electric, Los Angeles

*Descriptions are for cultivars produced under conditions described under the materials and methods section and under the prevailing weather conditions during production. Not all cultivars were tested as both frozen and fresh bulbs. Therefore, cultivars listed in this table were those that performed best from each bulb type for those cultivars tested.

Table 4. Temperature (degrees Farenheit) and Rainfall (inches) Figures for Winter and Spring 1991*

Month	High Temperature	Low Temperature	Average Temperature	Rainfall
January	77	57	67	3.79
February	77	53	65	1.20
March	79	57	68	3.96
April	85	63	74	5.31
May	90	70	80	9.34
June	91	72	82	4.15

*Temperature and rainfall records were taken from: *Temperature and Rainfall Report for 1991*, C.D. Stanley, Bradenton GCREC Research Report BRA1992-2, February 1992, Gulf Coast Research and Education Center, Bradenton FL.