

Section 4

Rieger Begonia

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History And Use

Although there are many types of begonias, the only ones I will discuss specifically in this chapter are those commonly referred to as Rieger begonias. Rieger begonias are a hybrid developed in Germany by Otto Rieger. Other similar hybrids exist, which probably are crosses between fibrous root begonias and tuberous root begonias. Since not all potted begonias on the market are from Rieger hybrids, it is more appropriate to refer to these hybrids collectively as hiemalis begonias. Their botanical name is *Begonia x hiemalis*, and they are commonly referred to as elatior begonias in Europe. The name Rieger, of course, only refers to those hybrids developed by Mr. Rieger. Hiemalis begonias were first introduced in the United States by Mikkelsens, Inc. in 1970. At that time, because of their beautiful flowering appearance (Figure 4-1) and long life in the home, they were thought to have the potential to become as popular as potted mums – but that has not occurred.

Continuing hybridization has definitely improved upon the original cultivars, many of which had powdery mildew problems. Consult a broker for sources of these new hybrids. Hiemalis begonias can be grown and marketed successfully year-round. Colors range from deep red through various shades of orange, salmons, and pinks. There are yellow and white cultivars as well. Two-toned flower colors are less common, but flowers come in both single and double forms. Some flowers have ruffled edges. The foliage is glossy and varies in color from medium to dark green; some cultivars have bronze or purple hues. Leaf margins also vary; serrated edges and the more common smooth margins are both available. Well-cared-for begonias can give months of pleasure in the home.

Common Sizes

The majority of hiemalis begonias are grown in azalea pots ranging from 4 inches to 10 inches in size with one or more plants. Several cultivars have a natural hanging appearance and do quite well as flowering hanging baskets. Growers may choose to pinch begonias, but that practice is less common than when the plants were first introduced. Marketing strategy will certainly influence size, pinch, and number of plants per pot. Serious, year-round



Figure 4-1. Hiemalis begonia in flower is very showy. From the left, 'Bavaria,' 'Whisper of Pink,' and 'Catrin.'

growers with carriage trade customers offer very different looking plants than mass market growers or growers who finish a begonia crop for a particular holiday or season only. Hanging baskets, although possible year-round, are more commonly seen in the spring and summer. Generally there are three plants per 8-inch basket and four plants per 10-inch basket.

Propagation

Although some similar types are grown from seed, the vast majority of hiemalis begonia varieties are patented and grown from leaf cuttings (Figure 4-2, page 24) or stem tip cuttings. Prior to 1993-94, the most common form of rooted liner was from leaf cuttings. Currently, stem tip cuttings are more popular (Figure 4-3, page 24). Leaf cutting liners are not available from most commercial propagators in the United States, although European propagators still produce them. The rooted liners you buy from commercial propagators cost approximately \$0.45 to \$0.55 each depending upon cultivar, quantity discounts, royalty costs, and other factors. Unrooted cuttings are approximately half that cost. Historically, liners from leaf cuttings

came multi-stemmed, but propagators often offered their "failed" one-shoot liners at a discounted price. Thus arose the market for tip cutting plants. Recent breeding programs from Europe have emphasized stem tip programs. Stem tips generally are less responsive to daylength and flower sooner than leaf cutting plants. Single-stem liners from tip cuttings are often planted two or three per 6-inch pot for a quicker schedule. Single-stem plants also may be pinched, generally with fewer plants per pot. Begonias generally are grown in 4- to 6-inch pots, but will enlarge to fill out larger pots if desired.

Rights for self-propagation of patented cultivars can be obtained from the patent holders. All stock plants and propagating areas should be kept under long-day conditions with daylength extending lighting to 18 hours per day or night interruption lighting used. Cuttings should be harvested regularly. Expect to be able to harvest two to three cuttings per plant per week. A leaf cutting takes six to eight weeks to form roots and transplantable plantlets with 68 to 72°F night temperatures. Mist is recommended with light intensity reduced to the 1,500- to 2,000-footcandle range. After rooting and shoot development, the plantlets can be shifted to final pots. Professional propagators often use a leaf disk which includes the blade and petiole union but excludes the leaf margins. This prevents the leaf from expanding during the rooting and shooting process. Stem tip cuttings generally are 1.5- to 2-inch (or larger) stem tips with one to two leaves, and they take four to six weeks to root. Once rooted, they should be grown on to become established liners before they are transplanted into finishing pots. It would be ideal to stick tip cuttings or leaf cuttings directly into liner pots or small finishing pots rather than causing transplanting shock by uprooting the cuttings before transplanting. No rooting compound appears necessary for hiemalis begonias.

Growing Media, Planting, And Water Quality

A heavily organic mix is best; a peat-lite like Jiffy-Mix or Redi-Earth is appropriate. Normal soil additives such as superphosphate and dolomite can be used to help provide calcium, magnesium, and phosphorus and to help obtain a pH of 5.0 to 5.5. A mineral-based medium with a pH from 5.5 to 6.0 is satisfactory. Small plants should be placed about 0.25 to 0.5 inch above soil level to help avoid crown rot problems. Proper drainage is important, so a coarse, loose-structured medium should be used. Begonias are sensitive to high salts levels, so good water quality is important. Also, water spotting on the leaves is unsightly and difficult to remove.

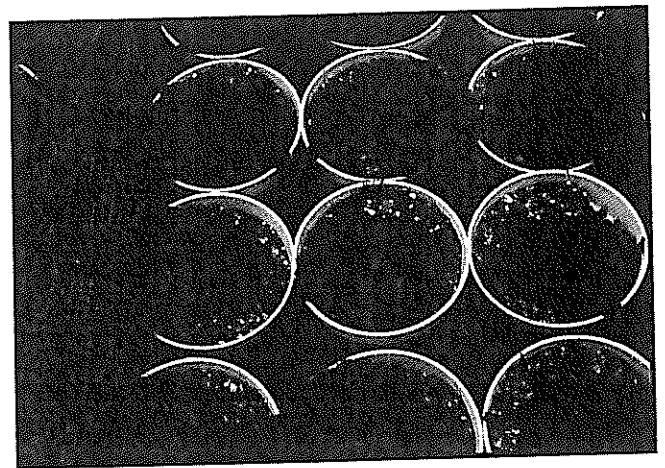


Figure 4-2. Leaf cutting propagation. Leaves recently stuck in 4-inch pots.

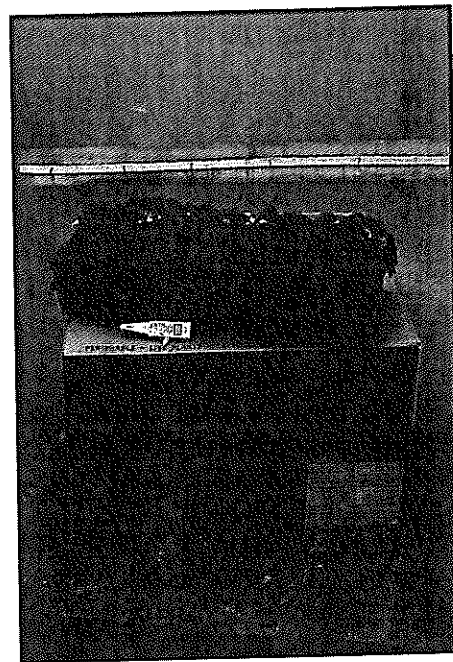


Figure 4-3. Stem tip liners, such as these from two different suppliers, are now more commonly used by growers than leaf cutting liners.

Watering

Hiemalis begonias should not be grown with excessive water, because they can develop tall, soft, and floppy growth; but they should not be allowed to wilt. Restricting water during the short-day period will help promote flowering. Begonias should not be watered late in the day, because they are sensitive to a variety of stem and foliar diseases encouraged by wet conditions. The leaves also "guttate," which can encourage standing water on the leaves if irrigation occurs too late in the day. Tube, ebb and flow, or capillary mat systems are preferred to overhead or hand watering. Good air circulation is a must to avoid problems enhanced by wet plants.

Supplemental carbon dioxide at the rate of 1,000 ppm during daylight hours in closed greenhouses is beneficial.

Fertility

Begonias are only moderate fertility level plants. They should receive a constant liquid fertilization of only 150 to 200 ppm N and K during rapid vegetative growth and half that amount during the start of short days for enhanced flowering. Total elimination would not be desirable for postproduction quality. Watering regularly with 200 ppm N or more will not injure the plant, but the dark green, crisp foliage is much more susceptible to breakage. High nutritional levels will also inhibit flowering. Variations, using a moderate rate of slow-release fertilizer or weekly fertilization of 500 to 750 ppm N using a complete fertilizer, are also practiced. Soluble salts levels should be measured regularly and should not exceed a saturated paste extract reading of 1 to 2 dS/m (mS/cm).

Temperature

A night temperature of 68 to 70°F is ideal, especially for good vegetative growth. Warmer temperatures of 70 to 72°F will encourage good initial growth. Excessively warm temperatures (above 75°F) will result in flower delay and soft growth. Gradually lowering temperatures during the flowering (short-day) period will improve the appearance of the plants. A night temperature of 64 to 68°F during the first three to four weeks of short days should be maintained, and then dropped to 60 to 64°F until sold. A constant temperature of 60 to 65°F during the entire flowering period is satisfactory also. In general, cool temperatures (60 to 62°F) will delay the production schedule.

Relative Humidity

High relative humidity will encourage soft, leggy growth. This may benefit larger pots early in their schedule. Small pots with fast schedules should not be grown with high relative humidity, because tall, leggy plants with nominal branching could occur. Growers in high humidity climates may wish to avoid growing during the most humid times of the year.

Light And Photoperiodic Response

Ideal light intensity is 1,500 to 3,000 footcandles (part shade). Higher light levels give a washed out look or burn the foliage and flowers. Plants growing under excessively warm temperatures (above 70°F) should be in light intensities below 3,000 foot-

candles. Begonias in even warmer temperature conditions than 70°F should be grown with light conditions reduced to 1,500 footcandles. With only nominal ability to control light intensity in summer or winter, a grower should adjust temperature to match light intensity whenever possible. Hiemalis begonias grow best vegetatively under long-day conditions. Extending the daylength seems to be better than night interruption. Fourteen hours of light per day is minimum, and 16 hours per day is ideal. Extended daylength is used between August and April. Short days are not necessary for flowering, but will encourage flowering. There are definite differences among cultivars in their response to daylength control. Some cultivars, such as the Barbara or Susie series, will be more vegetative in high light and high temperature conditions. These differences may dictate the choice between cultivars best for winter versus those best for summer conditions. In general, only two to three weeks of short days are necessary to stimulate flowering, and most cultivars will continue to flower regardless of daylength later in their schedule.

Culture And Timing

Plants can be pinched to create more stems, but plants from leaf cuttings are generally multi-stemmed. Any tall, vigorous side shoot can be pinched for shaping purposes (Figure 4-4). Regular grooming to remove excessively large leaves and odd shoots will help control shape, height, and diseases. Some cultivars are more likely to have ungainly, large leaves than others. Plants will fill in the areas where leaves have been removed in just a few days. Leaf removal also stimulates flowering. Removing any flower buds formed during vegetative growth time encourages fuller plants. Pinching a crop can extend crop time by three to four weeks. A soft pinch is usually given one to two weeks after planting a liner, as long as the plant is obviously

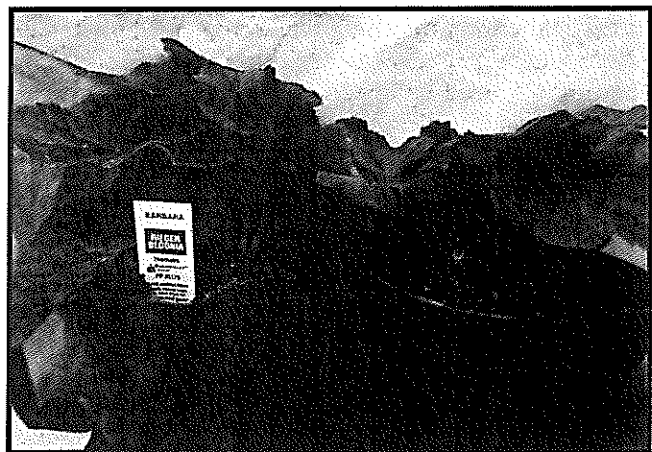


Figure 4-4. Plant just pinched on right, ready to pinch on left.

growing well and has a good root system. Actual time between potting and pinching plants will depend upon pot size, number of plants per pot, time of year, and intended market. The value of having fewer plants that receive a pinch compared to the expense of having more unpinched plants per pot that finish faster is an economic decision.

Crop time is about six to nine weeks from the start of short days, depending upon cultivar and time of year. Tip cutting plants generally flower faster than leaf cutting plants. Simply keeping a hiemalis begonia under long-day conditions until the plant is large enough for its pot is a general guideline. The plant will gain about half again its size during the flowering period. The long-day vegetative growth period should be about one to four weeks from the potted liner stage depending upon time of year, number of plants per pot, pinch or no pinch, and pot size. Short-days should be maintained for at least three weeks to help stimulate flowering. The benefit of short-day application is timing and uniform flower production of the crop.

Flowering

Flowering is influenced by photoperiodism and a number of other factors generally described as stress. Lower levels of N and K can help flowering be more profuse, but the foliage may be lighter in color. A level of 150 ppm each N and K seems adequate. Reducing this by half during the flower bud initiation period (first three weeks of short days) can help provide stress. Removing larger leaves and restricting water also provide some stress. Lowering temperature prior to the flowering period helps promote flowering. Checking growth with the use of growth regulators also promotes flowering.

Spacing

Begonias need to be spaced in a timely fashion to avoid tall, cylindrical plants, encourage strong basal branching, and help encourage good air circulation which inhibits disease organisms. Plants should be spaced before leaves of adjacent plants begin to touch. A final spacing for plants in 6-inch pots is 1 square foot per plant. Four-inch pots generally are finished about two to three pots per square foot depending upon market requirements.

Growth Regulators

Cycocel can be used with a 1:80 (1,500 ppm) dilution spray to control height and help promote flowering during the short-day period. It should be applied after three weeks of short days. A-Rest can also be used as a foliar spray at 25 ppm. A delay in flowering of up to one to two weeks is possible. Some fungicides also seem to stimulate short, strong, well-budded plants. Late applications of growth retardants may cause flower stalks to be reduced to such a degree that flowers become hidden by the foliage. Label clearance and recommendations should be observed.

Diseases And Pests

Root and crown rots are common, with *Pythium* and *Rhizoctonia* being the most common causes. Plants get both powdery and downy mildew. Powdery mildew can occur on the flowers as well as on the leaves. Leaf and stem bacteria, generally *Xanthomonas*, can happen, especially with poor stock plant maintenance. Symptoms are small, round spots on the underside of the leaves or discolored spots turning from yellow to brown. Off-colored leaf margins are possible as well. It is intensified by high temperatures and humidities. Rouging (i.e. selectively removing) the diseased plants seems to be the best control.

Botrytis is possible, especially with high humidity, poor air circulation conditions, and late overhead watering. Both *Botrytis* and powdery mildew can occur on very small flower buds tucked below leaves or in the interior of the plant if good air circulation and proper watering time and techniques are ignored.

Leaf nematodes are possible, generally with the use of infested stock plants. Symptoms include foliar discoloration, water-soaked appearance, or necrosis.

Aphids, cyclamen mites, fungus gnats, mealy bugs, thrips, caterpillars, and whiteflies can be troublesome. State chemical manuals should be consulted to determine control procedures.

Postproduction

Some grooming, and possibly staking and tying may be necessary prior to shipping. Hiemalis begonias, especially those with large crisp leaves, will be damaged by sleeving. Bent leaves will crack and scar eventually. Florist-quality hiemalis begonias are often delivered in sectioned flats rather than in sleeves and boxes to avoid this leaf damage (Figure 4-5). Hiemalis begonias should not be stored or shipped at temperatures below 50°F.

Typical Production Schedule

The following schedule is typical for a good-quality, 6-inch hiemalis begonia. Different sizes, markets, cultivars, or the time of year will influence this schedule.

Week 1: Pot well-rooted liners, two per 6-inch pot (Figure 4-6). Do not bury the plants. Maintain long days and temperatures above 65°F, ideally 70°F. Water in well and fertilize with a 150 ppm N and K solution. Water as needed to avoid stress. Maintain high relative humidity to encourage taller plants and softer growth.

Weeks 2 and 3: Maintain conditions of Week 1. Soft pinch plants by removing 0.25 inch to 0.5 inch of growth, or remove tip and one small leaf if stem is compact. This is especially important for plants with strong, dominant shoot tips. Some cultivars may not require this pinch. Unpinched plants can be given short days about three weeks after potting two plants per 6-inch pot.

Weeks 4 and 5: Maintain previous conditions, or if plant is large enough for market needs, place it in short-day conditions. Space out as early as possible.

Weeks 6, 7, and 8: Maintain short-day conditions for a minimum of three weeks. Decrease fertilizer regime by half, allow plants to dry out a bit more, consider removing some very large leaves, and drop temperature to 65°F.

Week 9 until sale: Short days are no longer necessary, but may be desirable in the summer months for some cultivars. Returning plants to long days in the winter may enhance the flowering potential in the postproduction setting.

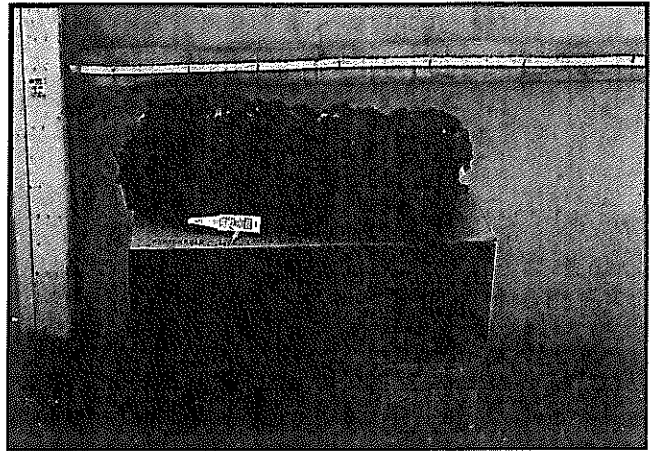


Figure 4-5. Typical shipping box with one of the four insert trays and labels.

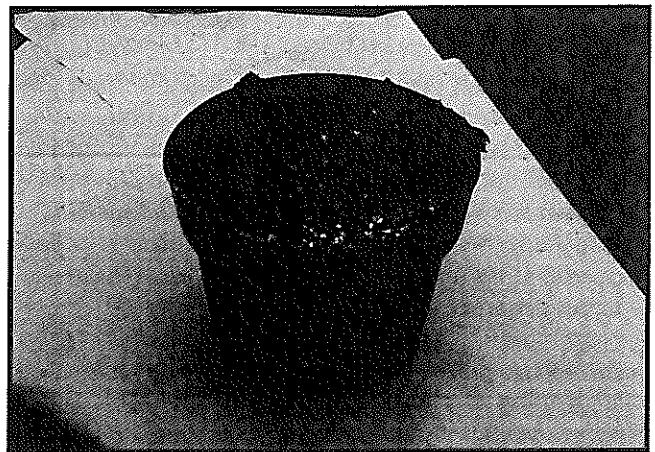


Figure 4-6. Two liners per 6-inch pot provides a more robust "saleable" pot sooner.

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