

Alstroemeria

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History

Alstroemeria hybrids, more commonly known as the Inca Lily, Lily-of-the-Incas, Peruvian Lily, or Alstroemeria, have been grown in the United States since the 1970s. Alstroemeria has been grown mainly as a cut flower crop because the flowers have long postharvest vase lives up to two to three weeks. However, the plant has been grown as a garden flower and as a potted flowering plant since the 1980s (Figure 2-1). The plants produce large, beautiful inflorescences of purple, lavender, red, pink, yellow, orange, white, and bicolors. There is also a fragrant cultivar now available named 'Sweet Laura'.[®]

Alstroemeria are herbaceous plants that produce two types of shoots: floral and vegetative. Shoots are initiated on rhizomes and can grow as long as 4 feet in cut flower varieties or as short as 6 inches in potted varieties. A fibrous root system develops from the rhizome, with some roots becoming thickened storage roots as the plant develops.

Alstroemeria are becoming popular with growers because the plants are versatile and easy to cultivate with cool temperatures. Alstroemeria plants developed for pots are everblooming once flower initiation has occurred. The plants produce high yields of flowers that may be harvested anytime during the flowering season, since flowering stems will continue to develop from the underground rhizomes. Alstroemeria are beautiful and novel potted plants, but they often do not have a nice, neat symmetrical shape like chrysanthemums and poinsettia. Growers need to be prepared for this difference if they have a "conservative" market.

Current Sales (Methods)

Alstroemeria are often divided into two main classifications that generalize their flowering habits: the orchid-type and the butterfly-type. Unfortunately, due to intense hybridization, these categories are not always distinct. The orchid-type of Alstroemeria is a group that has three to five months of major flower production in the spring, with little or no flowering during the remainder of the year. These cultivars have tall growth habits, remain vegetative until spring, and are unsuitable for pot culture.



Figure 2-1. Alstroemeria, a traditional cut flower, is now also produced as a beautiful potted crop.

The butterfly-type is a group that will flower for 9 to 12 months each year depending upon the cultivar and environmental conditions. These cultivars have shorter growth habits and larger, more open flowers. They are often used for potted plant production and can be used for cut flowers.

Under normal greenhouse conditions in most parts of the United States, Alstroemeria plants flower from January until August. As a result, transplants are preferably planted in the late summer months through fall, although they can be planted any time of the year.

Prefinished liners for compact Alstroemeria in the United States are becoming more available. At this time, Erwin Mojonier Enterprises of Encinitas, California, and Coast Alpine Nursery of Lummi Island, Washington, are the largest suppliers of seed-propagated liners. Vegetatively propagated clones of the patented Constitution Series: 'Redcoat'[®] (red flowers), 'Liberty'[®] (purple/pink striped flowers), 'Patriot'[®] (purple flowers), 'Freedom'[®] (pink flowers), and 'Sweet Laura'[®] (yellow, fragrant flowers) are available from the University of Connecticut and its licensed suppliers.

Compact-growing cultivars of Alstroemeria can be grown in 6-inch pots or larger to produce a nice, full plant. Due to the extensive root system that develops, standard pots are recommended over azalea pots. One 2.5-inch liner can be planted per 6-inch pot. Liners should be planted in any well-drained

medium directly in the final pot. Rhizomes should be planted shallow with growing points 1 inch below the surface; growing points should not be exposed on the surface. Shallow planting allows for earlier flowering and bushier plants than deep planting. Vegetative shoots from the rhizomes of transplants should not be cut back when you plant liners because this will delay flowering up to two to three weeks. Only damaged shoots should be removed.

Plants that are to be sold in pots during the spring can be potted in the fall or 90 to 100 days before marketing. Pots that are planted in the fall allow for root growth with minimal care other than occasional watering. After liners are established, temperatures can be lowered to as low as 33 to 38°F in refrigerators, coldframes, or cold greenhouses and roots will continue to grow and fill the pots. Approximately 90 to 100 days before pots are to be marketed, the foliage can be cut back completely and pots can be moved to warmer greenhouses of 55 to 63°F. The removal of the foliage will help keep the plants short. Small (2-inch) liners that are planted 90 to 100 days before marketing should not have the foliage cut back.

Potted plant sales should be coordinated with the spring and early summer nursery and greenhouse market. Alstroemeria plants are grown in the garden as herbaceous perennials in regions warmer than U.S. climatic zone 5; in colder regions, they are treated as annuals or tender perennials. If the plants are planted in "pansy time" after the ground is workable, they will start to flower when frosts have ended and continue all summer and fall until frost. In warmer parts of the southern United States, Alstroemeria start to flower in February and end during the heat of summer; they rebloom in September until as late as December. Along the west coast of the United States, plants will flower all summer.

In the garden, Alstroemeria grow best in full sun. Plant heights will vary from 1 to 3 feet tall depending on the cultivar, the amount of light the plant receives, and plant culture. Flowering stems are shorter on plants that are grown in full sun. Plants will also remain shorter during the growing season if flowering stems are removed after they bloom. Alstroemeria plants that are grown in the garden respond positively to the application of mulch, adequate watering, and fertilizing.

Crop Culture

Propagation Strategies

Alstroemeria plants can be propagated by seed, but this process is difficult and often results in variable offspring. Plants are most often clonally propagated by division of the rhizomes or micropropagation. Asexual propagation allows plants to grow true-to-type and quicker than seeds. Plants can be divided every 8 to 12 weeks, depending on the time of year, cultivar, and growing conditions. At least three to four good divisions can be obtained from a healthy, established plant. About one to two weeks prior to dividing, plants should be severely pruned, leaving only the youngest 6- to 8-inch shoots. Undamaged growing points, some new aerial shoots, and some large, fleshy storage roots are necessary when making divisions.

It is important that pots and media are ready for planting before divisions are received or made, because rhizomes should be planted immediately. Extra plants may be potted up to replace plants that die or are not as vigorous. A fungicide drench is recommended at the time of planting and again a month later if vigorous root growth is not observed. Excess watering will quickly rot the rhizomes. After the initial watering with the fungicide drench, plants should be spot watered as they dry. Plants should be grown at 65 to 70°F night temperatures until they become well established (four to eight weeks), prior to lowering the temperatures.

As new growth commences, numerous shoots will form. Remove some of the weak vegetative shoots to encourage growth of lateral rhizomes. If shoots are pulled out with a quick upward pull, shoots should be cleanly removed from the rhizome; this process will encourage new buds to break on the rhizome. However, if plants are young or poorly rooted, the rhizome may be uprooted or torn loose from the soil if stem removal is careless.

Lily-of-the-Incas can be started from seed, but seed sources are few and genetic variability exists. Fresh seed can be quickly germinated by first scarifying them by pouring boiling water over the seeds and then allowing them to imbibe the water for eight hours or overnight. It is best to replace the water at least once during the imbibition process. After the seeds have been soaked, they should be planted into a well-drained medium, kept moist, and grown at 75°F. If seeds do not germinate after four weeks, they should be placed in a refrigerator for another four weeks or until they begin to germinate. After the cold treatment, seedlings and any ungerminated seeds should be returned to 75°F.

Seed propagation of *Alstroemeria* can be very difficult and disappointing.

Media

Alstroemeria plants can be grown in any loose, well-drained, and organic medium. The heavier the medium, the wetter the plants will be. Heavy media is an advantage when the plants are mature and the pots are full of rhizomes, because the pots should not be allowed to dry out. However, wet media will encourage root rot when the plants are newly planted.

Irrigation Strategies

Proper watering is the key to success with *Alstroemeria*. Newly established plants should not be overwatered, or rhizomes may rot. However, established plants need abundant water and should never be allowed to remain dry for very long.

Fertility Regimes

Alstroemeria plants are heavy “feeders,” with high nutrient levels required once the plants are established. Regular fertilization with 400 ppm N each week is very important for good growth. The number of flowers and the number of florets per flower will increase as nitrogen is increased to 400 ppm. Ammoniacal forms of nitrogen fertilizer should be avoided because ammonia is not readily converted to nitrate under cool growing temperatures. High soluble salt levels (greater than 1.2 to 1.5 mS/cm) should also be avoided because they reduce flower production and quality.

Growing Temperatures

The control of *Alstroemeria* flowering is a process that requires a primary cold temperature requirement and a secondary long photoperiod requirement. The cool temperature requirement must be fulfilled prior to the long photoperiod. Once flowering begins, the plants will continue to produce flowering shoots indefinitely until the soil temperature rises above 65 to 70°F for extended periods. Each cultivar has a unique requirement for cool temperatures varying from 50 to 63°F and the amount of time exposed to that temperature. The breeders' recommendations for best growth and flowering procedures should be followed.

The optimum growing temperatures for *Alstroemeria* in greenhouses are air temperatures of approximately 50 to 61°F during the night and 65 to 70°F during the day. Prolonged temperatures over 75°F may decrease or cease flowering. Air temperatures are not as important as rhizome temperatures.

Therefore, the temperature of the media should be kept between 55 to 61°F to induce flowering. In warm months, the flowering period may be extended by keeping pots cool. Cooling can be accomplished by placing the pots on subirrigation mats, watering with a cold water source, and growing the plants in white, reflective pots.

Lighting Considerations

Alstroemeria plants grow best under high-light conditions. If plants are grown in areas of low irradiance, supplementary light will hasten flowering and increase flower production. Approximately 600 footcandles of light supplied at canopy height (approximately 5 to 6.5 feet above ground) with an increased photoperiod of 16 hours of light is sufficient. Plants exposed to supplemental irradiance in the fall will flower earlier by up to 12 weeks and produce 30 percent more flowers than plants grown under natural days. This response to additional light will not occur if the plants have not been induced to flower with cool temperatures.

If *Alstroemeria* plants cannot receive supplemental irradiance from high light intensity discharge (HID) lights, there is still some advantage to supplying long days with incandescent lights. Plants that receive 16 hours of light per day will flower faster than plants receiving fewer than 13 hours of light. Daylength extension can occur by night-interruption or day-continuation treatments. Lighting should not occur during the first 45 to 60 days after new plantings. Lighting may be used on established plantings from about September 1 to April 1 at the Northern latitudes.

Pinching

Thinning procedures are used on *Alstroemeria* to increase light intensity, remove weak vegetative stems, stimulate rhizome branching, and stagger flowering. During the low-light winter months, 15 to 25 percent of the vegetative shoots should be gradually removed until flowering begins. Thinning is usually accomplished by pulling out stems rather than by cutting.

Alstroemeria plants respond to pruning for height control; the more they are pruned, the more compact they will grow. Every two to three weeks, plants should be “shaped up” by pulling out dead and unsightly stems. This process will encourage new shoots to grow shorter. Pulling out dead or unsightly stems, instead of cutting them, will encourage more lateral breaks of the rhizome. However, the whole plant could be pulled from the pot if roots are not well established. These plants are

monocotyledons, and once a shoot is pinched back, it will eventually turn yellow and die. New shoots will arise from the rhizome.

Chemical Growth Regulator Strategies

There are no commercial growth regulators registered for the control of *Alstroemeria* height. Studies with commercially available growth regulators have shown no benefit.

Good cultural practices in the greenhouse are still the best methods to control the height of potted *Alstroemeria*. Plants can remain short by choosing compact cultivars, growing at cool temperatures, not keeping the plants wet, and increasing light intensity with adequate spacing. When plants are first potted, they can be grown pot to pot until the foliage starts to touch the next pot. Plants should then be adequately spaced to maximize light exposure. Pots that are 6 inches in diameter should be spaced in a 15- by 15-inch pattern.

Common Pest Problems

Alstroemeria plants are relatively disease- and pest-free. When plants are grown outdoors, snails or slugs can be a problem as well as aphids, caterpillars, and whiteflies. The biggest pest problem is thrips, because they are very difficult to control when they get into the flowers and they may transmit viruses.

Botrytis and root rots can be problems during periods of low light intensity. *Botrytis* is the most prevalent disease and can be avoided with good air circulation, removal of infected plant parts, and preventive fungicides. Root rots can be avoided by pasteurizing media, using well-drained media, avoiding overwatering, and applying fungicides at the time of planting.

Sample Production Schedule

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| August – December | Buy in liners and plant into final pots. |
| November – December | Move to cold storage (but above freezing) or grow in a cool greenhouse. |
| January – March | Cut back foliage and move to 55 to 63°F nights for four to six weeks. Then, move to 50 to 61°F nights until sale. |
| January – March | OR Buy in liners, plant into final pots but do not remove foliage, and grow at 55 to 63°F nights for four to six weeks. Then, move to 50 to 61°F nights until sale. |
| April – June | Sale of plants. |

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