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Popular Article

# Alstroemeria: Harnessing Potential and Redefining the Global Floral Future

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## INTRODUCTION

Alstroemeria, commonly known as the Peruvian lily or lily of the Incas, is a genus of flowering plants in the family Alstroemeriaceae. Named in honor of Swedish botanist Klas von Alstroemer, who introduced its seeds to Carl Linnaeus in 1754, this genus is native to South America, with species predominantly found in Chile and Brazil. Alstroemeria plants are rhizomatous perennials characterized by their unique leaf rotation, where leaves twist 180° during development, causing the underside to face upwards. The flowers, often resembling miniature lilies, display vibrant colors with distinctive spots and stripes, making them popular in floral arrangements (Monya *et al*., 2021). The plant's ovary is pseudo-epigynous with three carpels forming a tripartite structure. Each cavity of the ovary contains two rows of ovules along a central placenta. Alstroemeria exhibits protandrous flowering, with fruits that may be fleshy or non-fleshy, dehiscent or indehiscent, usually in the form of capsules or berries (Bridgen, 2018).

The species classification in Alstroemeria is based on an evaluation of morphological traits of the flower, stem, leaf, fruit and rhizome. The available biosystematic information on Alstroemeria species is restricted to the Chilean species. Little is known about the classification of the Brazilian species (Dhiman and Kashyap, 2022)

In recent years, Alstroemeria has been introduced to India as a commercial cut flower, with cultivation centers in Bangalore, Pune, Hyderabad, Palampur, Solan, Srinagar, and Ooty. Its popularity in the Indian market is attributed to its long-stemmed flowers, extended vase life, and a diverse palette of petal colors, including lavender, maroon, white, orange, yellow, pink, red, and purple. These attributes make Alstroemeria a valuable addition to gardens and floral designs (Singh and Dhyani, 2015).

## SOIL AND CLIMATE

Alstroemeria thrives in light, well-drained soils with a pH between 5.5 and 6.5. It prefers mild to cool climates, with optimal daytime temperatures ranging from 17°C to 22°C and nighttime temperatures between 14°C and 17°C. Soil temperatures above 20°C can hinder flower induction. A photoperiod of 13 to 16 hours with a light intensity of 5,000 lux is ideal for growth. The plant performs best in humidity levels between 65% and 85%.(Monya *et al*., 2021).

## PROPAGATION

Propagation is primarily through rhizome division, typically carried out during dormancy. Micropropagation is increasingly adopted for commercial cultivation due to its efficiency and the ability to produce disease-free plants. Seeds are rarely used due to genetic variability, though one-year-old seeds can germinate under specific environmental conditions.



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Propagation through seeds causes genetic variability hence growers should not opt for this system. However, one year old seeds will germinate within 8-10 weeks if are subjected to four week's moist and warm (18-25°C) environment, followed by four weeks of moist and cool (7°C) conditions. Fresh seeds will germinate in vitro at 18°C within 10-14 days.

**PLANTING AND SPACING**

Alstroemeria is ideally planted in September-October or February-March. Alstroemeria can be grows in both open fields and greenhouses in beds that are 15 to 20 cm deep and allow the plant roots to grow during the 3 to 4-year production cycle. Rhizomes are planted 7 to 10 cm deep at their growth

point. Required Spacing The spacing varies depending on the cultivar and the aim of the cultivation, whether it's for cut flowers, planting material or both. Plant to plant and row to row spacing should be between 40 and 50 cm. In order to grow Alstroemeria in pots, the rhizomes should be planted shallowly, with growth tips 2.5 to 3 cm below the surface of the soil. This helps the plants to sprout additional branches, giving the appearance of a full pot.

**IRRIGATION AND NUTRIENT MANAGEMENT**

Alstroemeria thrives in soil rich in organic matter, requiring 3 to 5 kg/m² of leaf mould or well-rotted manure. It needs a balanced mix of nutrients, including nitrogen in nitrate form, while keeping the soluble salt concentration below 1.5 mhos/cm. Frequent but controlled irrigation is crucial, as it is highly sensitive to salts, with water EC not exceeding 13 ds/m.

**INTERCULTIVATION PRACTICES**

1. Netting: To guide and support the shoots one needs nets. Three rows of galvanised or plastic wire mesh with a square of 20x20 cm should be placed at a height of 30 cm from one another. Bamboo sticks and twine can also be used to support Alstroemeria plants in three rows in the beds.



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2. Thinning of shoots: Thinning in Alstroemeria involves removing weak, old, or damaged shoots to maintain plant health and encourage growth. Leaving blooming flowers can trigger dormancy, so regular thinning is essential. Young crops should have bad shoots pinched rather than removed to preserve leaves for assimilation and soil protection. When possible, pulling stems stimulates new shoot development. For crops older than a year, thinning 1–3 times annually improves ventilation, promotes new shoots, and supports consistent growth.
3. Shoot-adjustment: Stems that stick out of the netting have to be adjusted with in the meshes of the nets. Varieties that grow wide easily can be planted more towards the middle of the bed.
4. Shading: Shading can be necessary to protect the crop and soil from the sun. Different shadings are used: movable shades, chalk on the greenhouse roof. It is important to find a good balance between shading for cooling/protection and to keep a sufficient light intensity in the greenhouse.

**FLOWER HARVESTING AND POST-HARVEST MANAGEMENT**

Alstroemeria flowers are harvested when fully colored, with increased frequency during warmer months. For long-distance markets, harvesting occurs when buds begin to show color, while for local markets, it's delayed until the first three flowers have opened. Post-harvest issues like leaf yellowing and flower desiccation can be mitigated by storing flowers at 4°C for 2–3 days and treating them with silver thiosulfate (STS) and gibberellic acid ($GA_3$) solutions to extend vase life and prevent yellowing. Yields range from 180–400 stems per square meter annually, depending on variety and cultivation methods. Stems are graded into three classes based on length and flower count, with Class I being the highest quality. Proper post-harvest care, including the use of specific vase solutions, can significantly enhance the longevity and quality of Alstroemeria cut flowers. (Chanasut *et al*., 2003).

**VASE LIFE AND CHEMICAL TREATMENTS**

Alstroemeria flowers typically have a vase life of 10–14 days, depending on the growing conditions, harvest stage and post-harvest treatments.Commercial floral preservatives containing sugar (energy source) and biocides (to prevent microbial growth) can extend vase life to around 2–3



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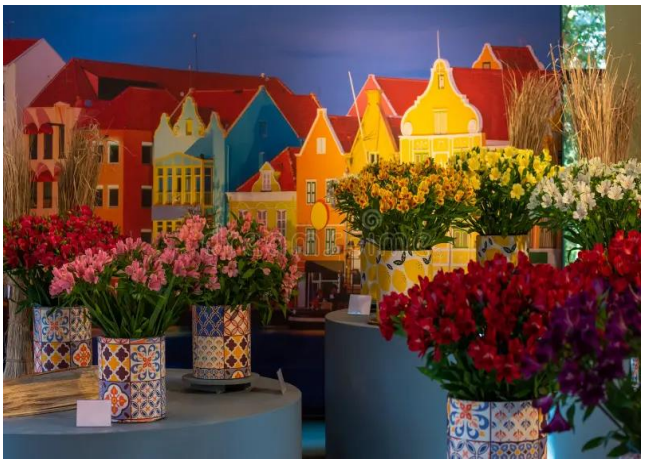
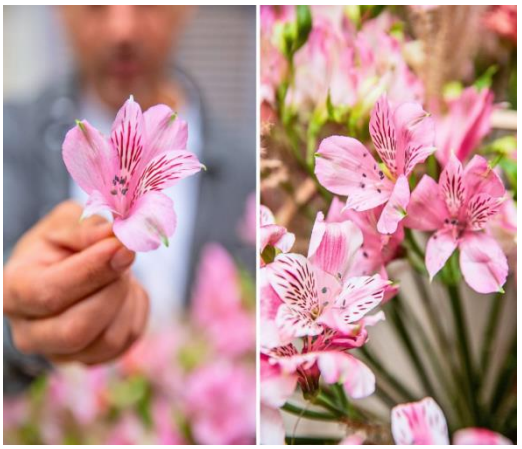
weeks. Alstroemeria flowers are sensitive to ethylene, which accelerates senescence (aging) and petal shedding. Treating flowers with silver thiosulfate (STS) or 1-MCP (1-methylcyclopropene) can protect against ethylene damage. Keeping Alstroemeria stems in a 100 ppm gibberellic acid (GA3) solution prevents leaf yellowing, a common issue during vase display, and enhances flower longevity. Using vase water treated with chlorine-based solutions (e.g., sodium hypochlorite) or citric acid ensures water uptake by preventing microbial blockages in stem vessels. Ideal vase water pH should be slightly acidic (4.5–5.0). Adding 2–3 per cent sucrose to the vase solution provides an energy source for the flowers, supporting bloom development and prolonging freshness. Pulsing Alstroemeria stems with STS (at 4 mM for 12 hours) before storage or display prevents premature petal shedding and increases vase life.

**STORAGE AND DISPLAY**

Store cut Alstroemeria flowers at 4°C if not displayed immediately. Using clean, sanitized vases to prevent microbial growth. Placing flowers near ethylene-producing fruits (e.g., bananas, apples) or in warm, dry conditions. By following these steps and using vase chemicals appropriately, the aesthetic appeal and longevity of Alstroemeria flowers can be maximized.





**PEST, DISEASE, AND DISORDER MANAGEMENT**

Managing pests and diseases in Alstroemeria requires a mix of chemical treatments and cultural practices. Aphids, thrips, and mites can be controlled using insecticides like Dimethoate, Acephate, and Fenazaquin, while caterpillars can be managed with Acephate or Chlorpyrifos. Fungal diseases such as Botrytis, Pythium, and Rhizoctonia can be prevented with good air circulation, proper drainage, and fungicide applications. Nematodes can be controlled through soil fumigation or treatments like Furadan. To prevent Tomato Spotted Wilt Virus, thrip populations must be managed, and infected plants removed. A well-rounded approach ensures healthy Alstroemeria growth.



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## PHYSIOLOGICAL DISORDERS

Flower abortion can occur due to low light, excessive watering, or high soil salt content. Abortion or blasting of flowers occurs during periods of low irradiance or when roots are damaged due to excessive watering or water-logging or due to excessive salts in the soil. In this case fully developed buds senesce before opening Proper environmental and irrigation management can mitigate these issues.

## CONCLUSION

Alstroemeria, a vibrant and long-lasting cut flower, is increasingly cultivated in regions like Bangalore, Pune, and Ooty due to its adaptability to moderate climates and well-drained, slightly acidic soils. Its striking colours and versatility in floral arrangements make it highly valued commercially. Propagated through rhizomes, the flower thrives with proper irrigation, shading, and nutrient enrichment. With effective post-harvest treatments to extend vase life, Alstroemeria offers significant potential for commercial floriculture in India.

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