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| <b>Cultural Information for:</b>        | Lisianthus – Cut Flower  | Annual                   |
| <b>Common Name:</b>                     | Lisianthus or Texas Blue Bell                                      |                          |
| <b>Botanical Name:</b>                  | Eustoma grandiflorum   |                          |
| <b>Seed Count:</b>                      | 19,800 /ounce <i>pellets</i>                                       | 700 /gram <i>pellets</i> |
| <b>Optimum Germination Temperature:</b> | 70 °F / 21 °C  |                          |
| <b>Optimum Growing Temperature:</b>     | 65-77 °F / 18-25 °C  |                          |
| <b>Optimum pH:</b>                      | 6.2 – 6.5 (plug), 6.5 – 7.2 (finished)                             |                          |
| <b>EC – Plug:</b>                       | 0.4 – 0.8 mmhos/cm (1:2) / 0.9 – 2.0 (SME) / 1.1 – 2.6 (Pour Thru) |                          |
| <b>EC – Finishing:</b>                  | 0.9 – 1.3 mmhos/cm (1:2) / 2.1 – 3.5 (SME) / 2.7 – 4.6 (Pour Thru) |                          |

## Plug Culture – 10-12 weeks (288 / 12 x 24 tray)

**Pre-Cooling** (28 days) Sow pelleted seed but do not cover. Water the tray well and then place it in a dark cooler at 50°F/10°C for 4-5 weeks to increase the germination percentage and uniformity. Pre-cooling also reduces the risk of rosetting (**induced resting stage**) by deactivating an enzyme.

**Note:** If 4-5 weeks is not possible, aim for at least 3 weeks at 50°F/10°C.

**Stage One** (days 1-14) If pre-cooling is not an option, sow pelleted seed uncovered and never allow it to dry out during the germination stage. Enough moisture must be provided to melt the pellet. Maintain a soil temperature of 70°F/ 21°C. Placing trays on capillary mats or plastic helps to keep the media moist and encourages a uniform emergence.

**Note:** 100 to 300-foot candles/1,000-3,000 lux of light is needed for germination.

**Stage Two** (days 14 - 21) After the seedlings emerge, remove the seedling flats from the germination area and place them in a location with good air circulation. Lower the temperature to 60-70°F/15-20°C and provide a light feed between 100-150 ppm of nitrogen from a well-balanced calcium nitrate-based fertilizer. For non-pre-cooled production, do not exceed 78°F/26°C daytime and set a night temperature below 65°F/18°C to prevent rosette problems, which is difficult to cure. For pre-cooled trays please see the note on rosetting\*.

**Stage Three** (days 21 - 56) The young seedlings are very slow in growth and should not be exposed to high night temperatures which induce rosette\*. Other factors to avoid are low light levels and excessive humidity, which will invite both disease and overgrowth of the seedlings. Since Lisianthus is native to the alkaline soils of West Texas, Arizona, and Southern Colorado, calcium-based feeds promote strong and healthy seedlings.

**Stage Four** (days 57 - 60) The seedlings should have 4 true leaves at this stage and are now ready to transplant into the cut flower bed. Lisianthus has a sensitive root system, and one must be careful to avoid checking the plugs. Timely transplanting will ensure that the root system stays active and takes hold in the cut flower bed. Older plugs will have twisted root systems and the transition into the cut flower bed will be more difficult. Also, older plugs will flower earlier on shorter stems, especially under long day conditions.

**\*Rosetting:** Seedlings are susceptible to rosetting from sowing until the 2 and a half leaf pair stage with the third pair starting to elongate. **Both non-optimum temperatures and drought stress induce dormancy.**

**Non-Pre-cooled production** - target a day temperature below 78°F/26°C and a night temperature below 68°F/20°C. If the day temperature exceeds 80°F/27°F, compensate with a cooler night temperature below 60°F/16°C. Offsetting a warm day with a cool night prevents rosetting under warmer non-optimum temperatures.

**Pre-cooled production** – target a day temperature below 86°F/30°C and a night temperature below 70°F/21°C. If the day temperature reaches 93°F/34°C target a night temperature below 68°F/20°C to compensate.

**Note:** To be effective, maintain the night temperature for 12 hours.

## Cut flower Production (14-16 weeks\*\*)

**Bed Preparation:** Choose a flower bed with a rich organic soil that is pest and pathogen free. Cultivate it to a depth of 18 inches (45 cm). Covering the bed with black plastic will increase soil temperature in winter and reduce crop time. For summer production, silver plastic will keep the soil temperature lower by reflecting the hot summer sun. Maintain a minimum soil temperature of 55°F/13°C and a maximum of 73°F/23°C for optimum results.

**\*\*depending on culture / temperature, light level, photoperiod**

**Transplanting:** Transplant seedlings when they are young and actively growing (around the fourth true leaf stage). In order to avoid stem rot, take care not to bury the plants too deep. Set the plugs a little “high” in the flower bed to guard against rhizoctonia. To ensure a healthy start, maintain high relative humidity for 10 days after transplanting and do not let the soil dry out.

**Spacing:** Spacing will depend on whether one is growing a pinched crop or a single stem crop. In general, space 4 x 6 inches /10 x 15 cm. apart and arrange plants to enhance air movement to minimize disease prevention.

**Irrigation:** Since Lisianthus is native to low humidity areas, Botrytis is a major disease problem. The use of drip irrigation is best to reduce free moisture on the plants. Some growers bury the irrigation lines 4 inches /10 cm. under the soil, which imitates the natural habitat of Lisianthus and helps promote a deep and strong root system.

**Fertilization:** Lisianthus does not require high fertilizer levels as do chrysanthemums. The use of calcium nitrate-based fertilizer is recommended to build strong stems and reduce soft growth. Lisianthus requires higher moisture levels in the early stage of development. As the plants begin to mature and show flower buds, watering should be reduced to tone the crop and prepare it for harvest.

**Support:** Support wires are necessary to support the plants as they grow.

**Lighting:** Since Lisianthus is a long day response plant, extending the day gradually over a period of 8 weeks from 15-20 hours with lighting, (approximately 600-900-foot candles / 6,500-9,700 lux), beginning at the 6th true leaf stage during the short days of winter will reduce flowering time. Be sure to maintain at least 55°F/13°C soil temperature.

**Flowering:** During periods of high light and warm temperatures, a light shade on the greenhouse roof is recommended to avoid flower scorch. Stems are usually harvested when one or more flowers are open. There is a longer period between the opening of the first and second flower than from the opening of the second and third flower. Therefore, some growers remove the first flower and sell it for small bud vases or corsages and then harvest the stems when the second and third flowers open.

**Insects:** Fungus gnats (plug stage), leaf miner and thrips

**Disease:** Botrytis, fusarium, pythium and rhizoctonia

**Post-Harvest:** After cutting, place in tepid water, around 68 °F/20 °C, and store in a refrigerator at 39 °F/4 °C. The use of floral preservative after cutting is recommended and increases vase life by 40-50%.

**Variety Selection:** Eustoma or Lisianthus is a native of the southeastern U.S. and northern Mexico. Lisianthus flowering is triggered by three factors in order of importance:

- \* Temperature (warmer temperatures accelerate flowering)
- \* Light intensity (high light intensity accelerates flowering)
- \* Day length (long days accelerate flowering)

For the above reasons, various groups of Lisianthus are available to maintain enough stem length for various climates and growing seasons. Groups are bred to flower after a defined number of nodes have unfolded. For example, in a northern area under summer (very long day) conditions a Group 0 variety will flower on too short of a stem whereas a Group 2 or 3 would produce enough stem length. Some growers may be able to use certain cultivars all year with manipulation of the day length and temperature. It is best to trial each cultivar to see which one works best for your growing environment and climate. The flowering months listed below are suggestions and may overlap depending upon environmental factors. In general, one should allow an average of 14–16 weeks from transplant to flowering.

## Group 1 (12 nodes)

Winter and Spring  
November-May\*

*Sow July to January*

Echo (standard double flower)  
Rosanne 1 (standard double flower)  
Rosita® 1 (spray double flower)

## Group 2 (15 nodes)

Mid-Summer  
May-August\*

*Sow January to April*

Excalibur (standard double flower)  
Mariachi® (standard quadruple flower)  
Rosanne 2 (standard double flower)  
Rosita® 2 (spray double flower)  
Solo® (spray single flower)  
Voyage 2 (standard double fringed flower)

## Group 3 (18 nodes)

Late Summer/Fall  
August-October\*

*Sow April to June*

Mariachi® Grande White  
(standard quadruple flower)  
Rosanne 3 (standard double flower)  
Rosita® 3 (spray double)  
Voyage 3 (standard double fringed flower)

## \* Northern Hemisphere flowering period

**Culture Watch Points:** Ultraviolet light intensifies flower color. High night temperature (>73 °F/23 °C), excess fertilizer/nitrogen, or keeping the media too moist will reduce intensity.

Picotee patterned varieties may revert to a solid color, depending on growing conditions. Excess fertilizer (especially nitrogen), excess moisture / irrigation, low light intensity and low temperature increase the percentage of solid colors.

*“All information given is intended for general guidance only and may have to be adjusted to meet individual needs. Cultural details are based on North American conditions and Sakata cannot be held responsible for any crop damage related to the information given herein. Application of recommended growth regulators and chemicals are subject to local and state regulations. Always follow manufacturer's label instructions. Testing a few plants prior to treating the entire crop is best.”*