Culture Information for Eustoma russellianum *Lisianthus*

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Introduction

- North American Native
- Long vase life
- Multiple flower forms
- Wide color range and patterns
- Single stem vs. pinched production
- Scheduling

Lisianthus is native to desert areas but is not a true desert plant because it always has access to fresh water via its long tap root system.

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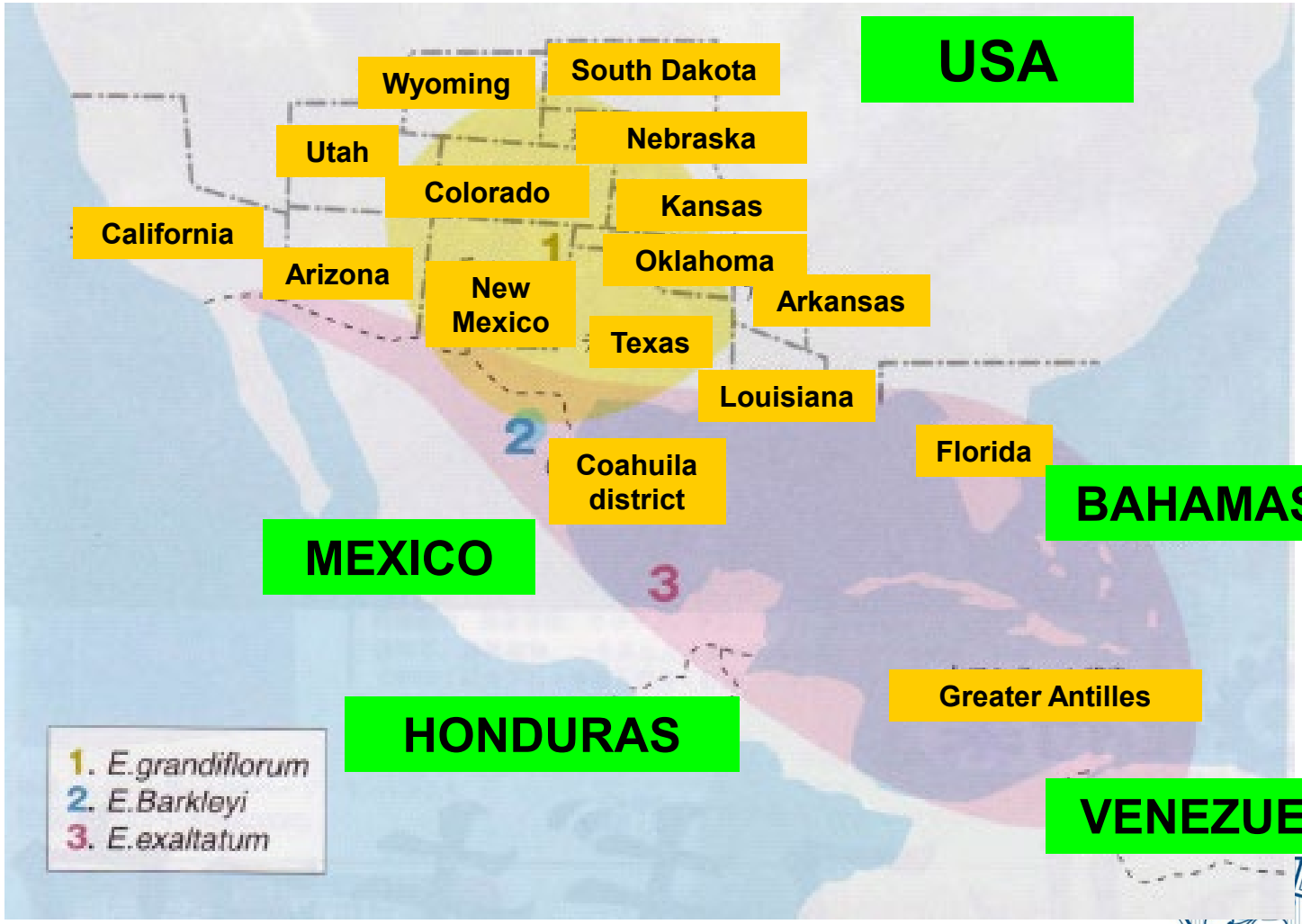
Native Habitat



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Vase Life

- Lisianthus is popular due to its long vase life of 14-21 days (depending on the variety and cultural practices).

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Lisianthus Classification

- Flower Petal; Single / Double
- Flower Size; Large / Medium / Small
- Flower Form; Rose / Camelia / Fringed
- Flower Color; Rose, Blue, White, Picotee +
- Type of Branching; Standard / Spray
- Earliness; Groups 1 - 3

❖ ¡ Let’s review the classification table!

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Lisianthus Characteristics

Flowering Period	Group 1	Group 2	Group 3
Summer	Good	Better	Good
Autumn	No	Maybe*	Better
Winter	Better	Maybe*	No
Spring	Better	Maybe*	No

**depending on the weather, somewhat risky*

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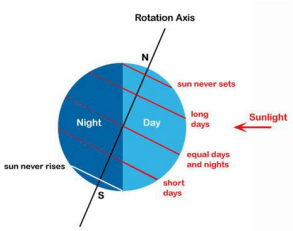
Lisianthus Classification

Optimium Height 24 – 30 inches

Factors that affect development in order of impact.

Temperature #1



Photoperiod #2

Light Intensity #3

Group 1
12 nodes

Group 2
15 nodes

Group 3
18 nodes

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Single Stem Production

- Single stem production is the most common.
- Pinching increases crop time (4 + weeks) along with reduced stem length, thinner stems and less branching.

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Pinched Stem Production

Plants are spaced at 6 x 8 inches / 15 x 20 cm* and then pinched at the 2nd or 3rd leaf pair with the goal of yielding 2-3 stems.

**3 per ft2 / 33 per m2*

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Basic Schedule*

22-24 weeks

Plug Production (288 cavity tray)	Juvenile Phase	Initiation*	Flower Development
8-10 weeks	6 weeks	9 – 10 leaf pairs	6-8 weeks

**the leaves becoming more pointed is an indication that the young plant is becoming generative.*
Flower bud formation after 9-10 leaf pairs produces the desired quality, not too light, but also not too heavy.

Factors that influence growth

#1 - Temperature
#2 - Photoperiod
#3 - Light Intensity

At higher temperatures, Lisianthus has an increased ability to photosynthesize.

**single stem production*

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Young Plant Production

- Seed storage
- Pre-cooling
- Plug stages 1-4
- Capillary mats
- Optimum temperatures
- Deep plug cells
- Timely transplanting
- Avoiding induced dormancy (rosette)

Seed Storage

Seed Staging Cooler

- Prior to sowing, allow seed packets to reach room temperature prior to opening to prevent condensation forming.
- When replacing seed after sowing, leave the packet open in the seed storage cooler (25-30% R.H.), for 24 hours to equalize the humidity level with the lower humidity in the cooler before sealing.
- This prevents higher humidity present in the sowing area from condensating inside the seed packet due to the lower temperature.
- Temperature 41ºF/5ºC and 25-30% relative humidity is optimum.

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Plug Tray

- The deeper the plug cell the better, due to to Lisianthus's tap root structure.

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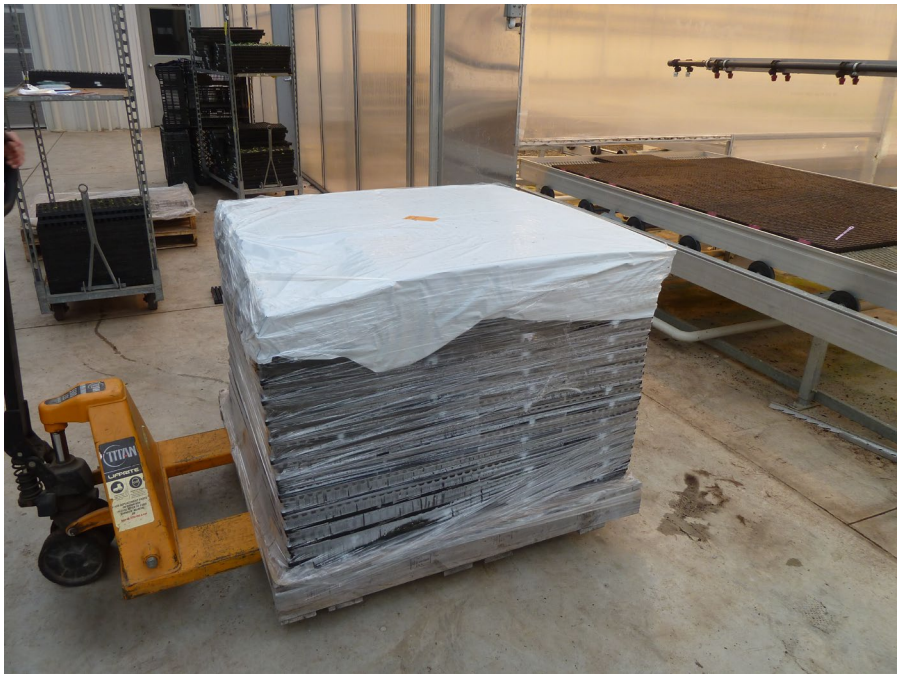
Pre-Cooling



After sowing seeds, wrap the tray and keep at 50ºF/10ºC for 4-5 weeks under completely dark conditions. Pre-cooling reduces the risk of rosetting by countering an enzyme that promotes rosetting (induced dormancy) and improves germination uniformity and plant development.

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Temperature and Rosetting*

Treatment	Maximum Day Temperature	Maximum Night Temperature	Comment
Pre-cooled	86°F / 30°C	69°F / 20.5°C	If the day temperature rises to 93°F/34°C target a night temperature below 68°F/20°C.
Non-pre-cooled	78°F / 25.5°C	68°F / 20°C	If the day temperature rises to 80°F/27°C, target a night temperature below 60°F/16°C.

*Rosetting is an induced dormancy designed by nature to ensure the survival of the species. In its native habitat Lisianthus germinates under cooler temperatures and then establishes itself prior to summer's heat. Therefore, higher than normal temperatures after germination may signal a stressful growing season, so some plants rosette (go dormant) to ensure that some plants will survive and reproduce the following season.

Lisianthus is susceptible to rosetting from sowing until the 2 and a half leaf pair stage with the third leaf pair starting to elongate. In addition to temperature, excess moisture, drought stress or low temperatures increase the risk of rosetting.

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Pre-Cooling - Seedling stage

Control – Pre-Cooled

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Pre-Cooling - After transplanting

Control – Pre-Cooled

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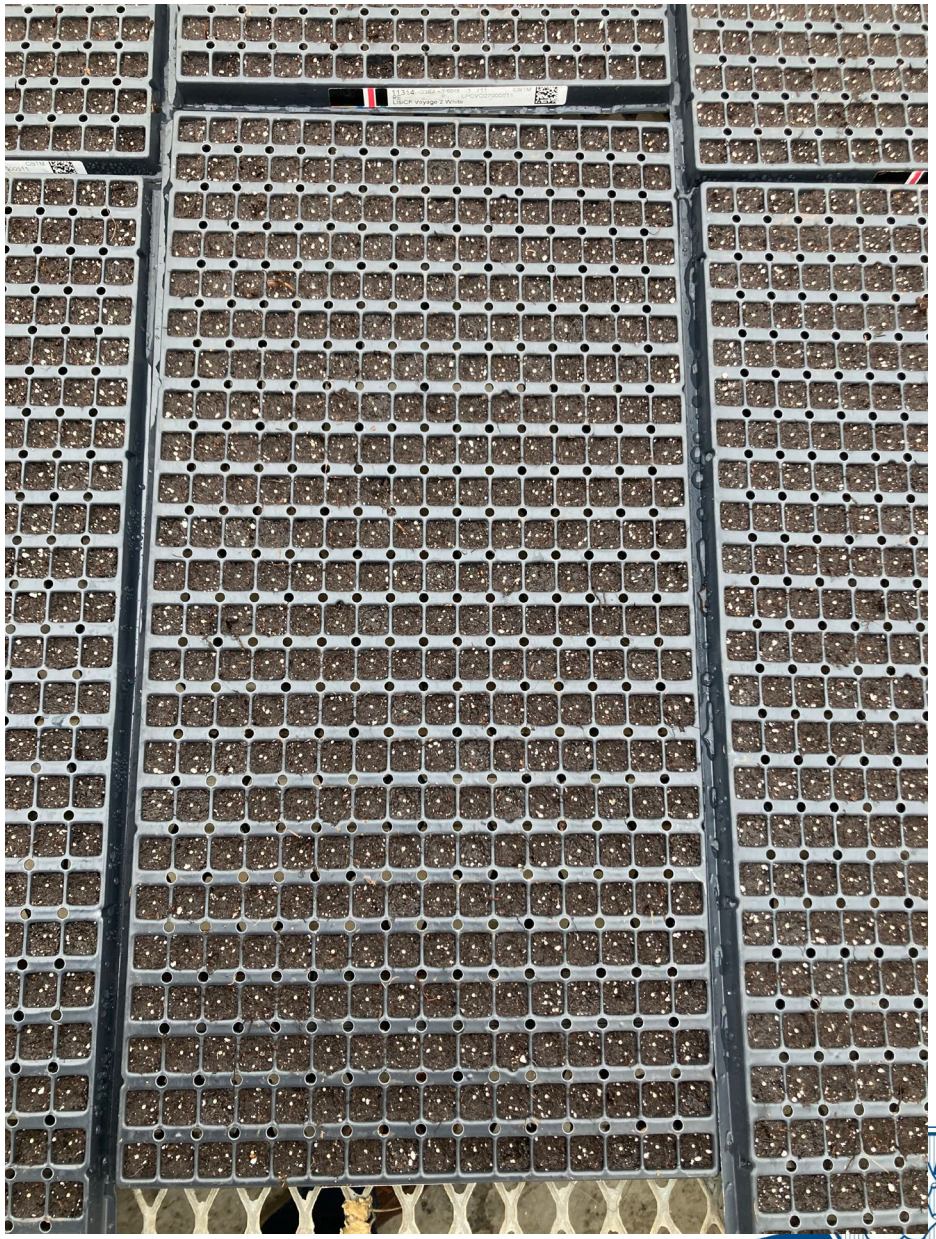
Stage 1: Day 1-14

- *Do not cover the seed and supply enough moisture to disolve the pellet.*
- *A plug media that contains vermiculite works well to maintain uniform moisture.*
- *pH 6.2-6.5*
- *Optimum temperature is 68-70°F/20-21°C.*



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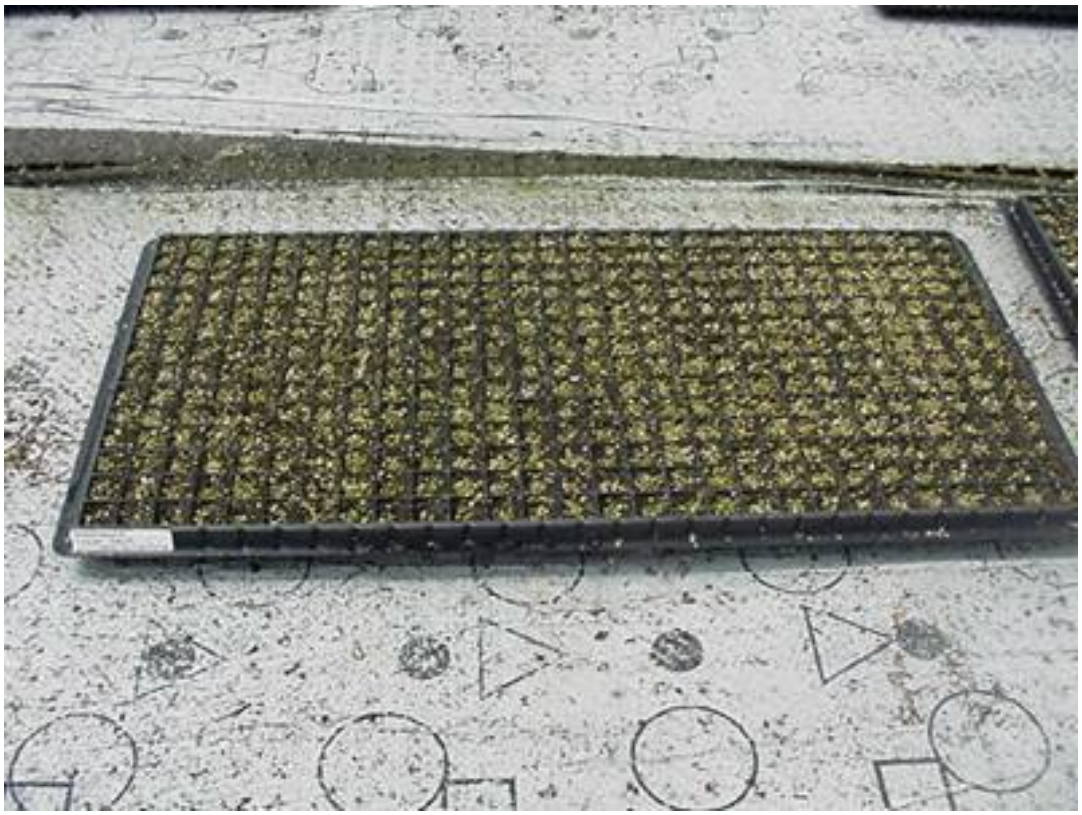
Stage 1: Days 1-14

- *Seed requires light to germinate (up to 2,500 f.c./27,000 lux).*
- *Capillary action imitates the native habit and provides uniform moisture and germination.*
- *In its native area Lisianthus germinates in small pools of water.*



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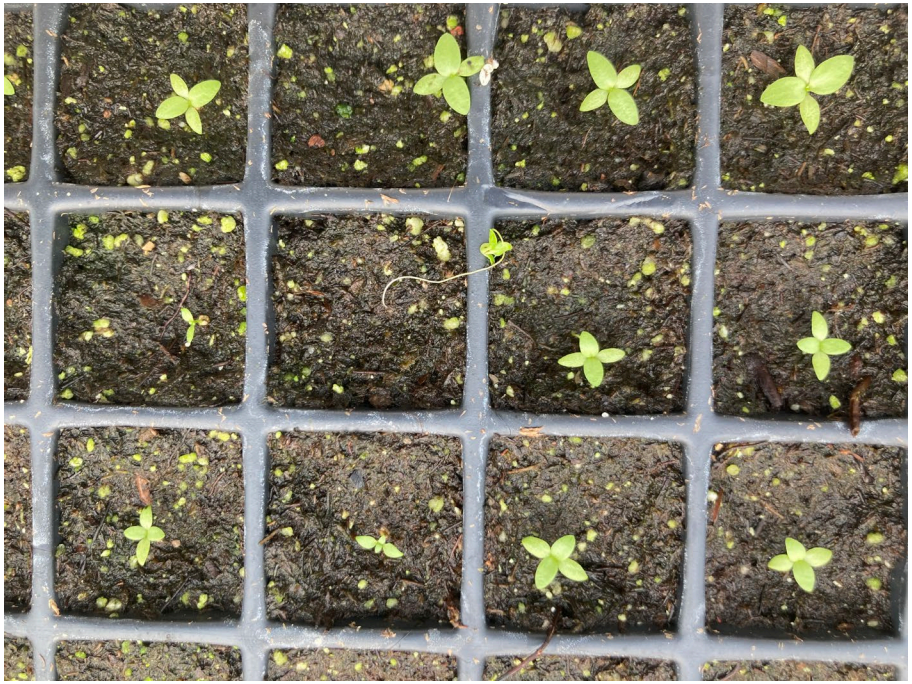
Stage 1: Days 1-14



Watering with booms is common, but excess moisture/humidity can lead to improper rooting.

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Stage 1: Days 1-14

- *White-colored plug trays reduce the surface temperture, reducing the risk of rosette (induced resting stage).*
- *Covering with remay (fiber spun cloth) retains moisture and avoids excess misting*

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Stage 2: Days 15-21

- *After germination is complete, place in a well lighted greenhouse with 2,500-3,000 f.c./27,000-32,000 lux, with good air circulation. Fertilize with 100-150 ppm N using a calcium nitrate-based formulation.*
- *Optimum temperature range is between 60-75ºF/16-25ºC.*

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Stage 3: Days 22-56

- *Avoid stressing the plant with:*
- *Low light levels*
- *Moisture stress*

which promote a rosette, an induced resting stage.

- *On the other hand, excess moisture invites disease.*
- *Fertilize at 150 ppm nitrogen targeting and EC of:*
  - *0.4 - 0.8 (1:2 dilution) mmhos/cm.*
  - *0.9-2.0 (SME) mmhos/cm.*
  - *1.1-2.6 (Pour Thru) mmhos/cm.*

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Cal Mag Fertilizer

- Cal Mag fertilizers are a good option for feeding Lisianthus seedlings.
- Target 150* ppm N to maintain the media EC at:
  - *0.4 - 0.8 mmhos/cm. (1:2 dilution)*
  - *0.9-2.0 mmhos/cm. (SME)*
  - *1.1-2.6 mmhos/cm. (Pour Thru)*

**supplies 0.18 ppm B so 0.07 ppm additional boron is required to meet the recommended 0.25 ppm B.*

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Stage 4: Days 57-60

- *The plugs have two pairs of leaves and are now ready for transplanting.*
- *Late transplanting results in poor rooting, delayed flowering and shorter flower stems.*

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Transplanting

- Transplant stage
- Active root system
- Transplanting on time
- Rosette (induced dormancy)

Active Root System

- *It is important to transplant on time to avoid root banding / circling.*
- *Straight roots improve the transition between the plug tray and the flower bed.*

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Transplant actively growing plugs!

- Avoid planting overgrown plugs.
- Transplanting when 2 pairs of true leaves form is best; especially under long day conditions.
- Optimum plugs have straight roots ready to form a deep tap root system.

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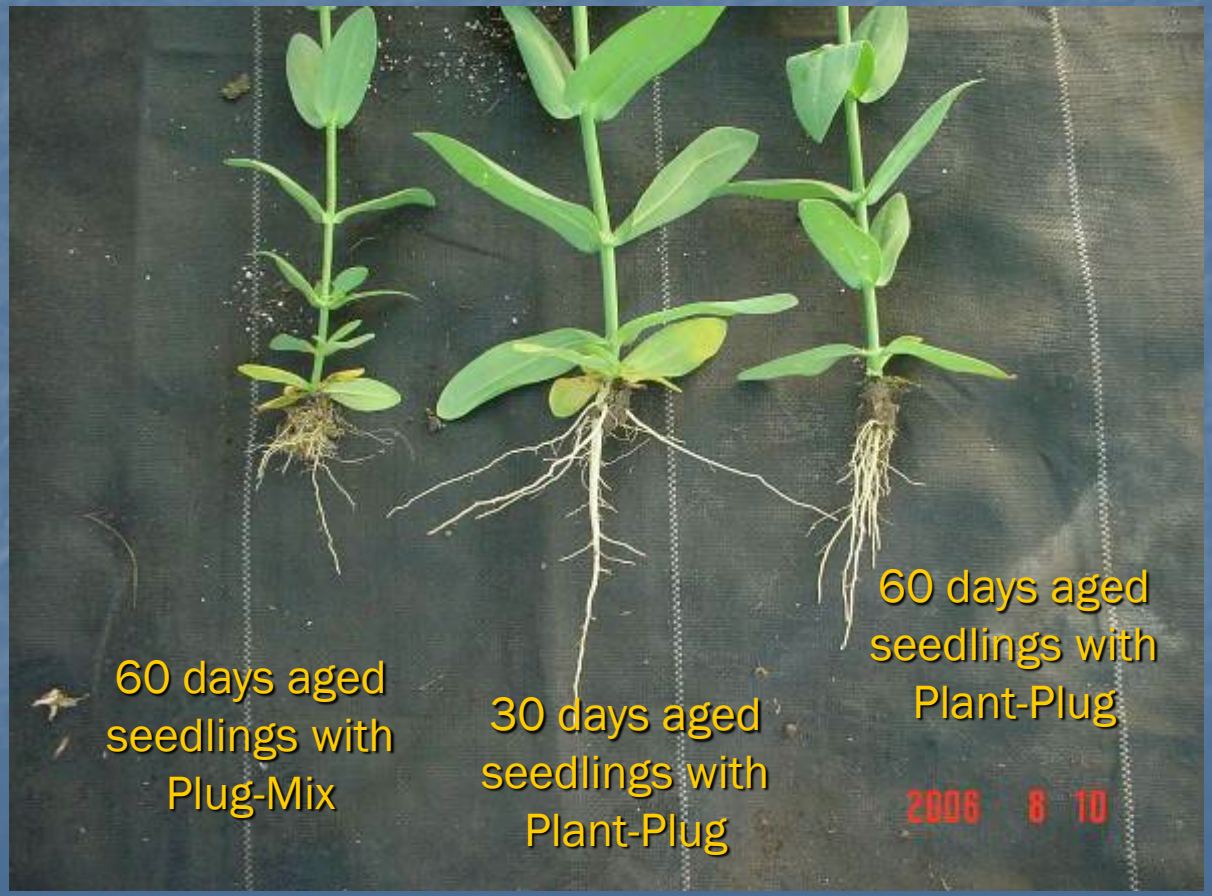
Lisianthus Plug Trials

Lisianthus Plug Trials

Excalibur Yellow

139 days after sowing



Preforma deep plug 30 days after germination*

**best to start with a pre-cooled seedling tray; especially when transplanting under warm temperature conditions (>75°F/24°°C).*

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Seedling Study

- Plants from aged plugs flower later on shorter stems.

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Transplanting – Warm Conditions

- Lisianthus is susceptible to rosette (induced dormancy) up to 12 weeks post-sowing.
- Maintain the day temperature below 75°F to prevent induced dormancy.
- The ideal plug has two pairs of true leaves and is beginning to elongate as the 3rd pair of true leaves emerges with a height of 1.5 inches.
- A cooler night temperature, below 60°F, for 8 hours offsets a high day temperature and prevents induced dormancy.

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Transplanting – Warm Conditions

SureRoots®

- V-shaped ribs from top to bottom prevent root wrapping and push the roots down for increased transplant success. *T.O. Plastics*

Plugs with 2 and a half leaf pairs with the third pair beginning to elongate.

Older plugs require plug trays that prevent root banding.

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Field Transplant

- For field production a larger plug cell (128) is common due to stress from drying winds and strong rains.

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Plugs produced in deep plug cells

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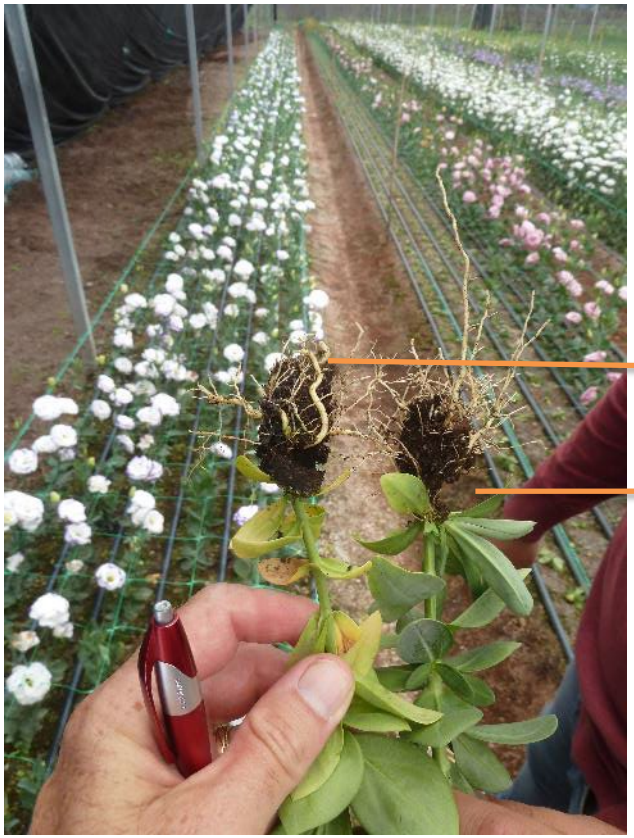
Impact of the root system

Left - poor root growth
Right - strong root growth



Relationship between roots and top growth.

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Rosette – resting stage

Temperatures* higher than 78°F/25.5°C during the first 4 weeks after sowing can induce rosetting in non-pre-cooled seedlings. Maintain moderate temperatures between 63-75°F/17-24°C to prevent rosetting. If the day temperature exceeds 78°F/25.5°C, compensate with a lower night temperature below 60°F/16°C.

*See slide #16 for more details.

Rosette

- A rosette is a resting stage due to plant stress,(high temperature or moisture stress).
- Stress induces a resting stage for the survival of the species with the hope that the following season will be more favorable for growth and reproduction.
- Plants are susceptible to rosetting from sowing until 2 and a half leaf pairs with the third pair beginning to elongate.

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Rosette

- Rosetted plants sometimes do not appear until after transplanting.
- This condition is difficult to cure and requires a strong cold period* to break the dormancy.
- The use of gibberellic acid at 50-100 ppm is an effective solution in mild cases. Make one application, and if after two weeks there is no sign of bolting, a second application may be made.

**less than 53°F/12°C for 5 weeks.*

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Bed Preparation

- Steam sterilization
- Solar sterilization
- Soil Preparation
- Drainage
- Bag production
- Density
- Air movement

Steam Sterilization

Due to fusarium, steam sterilization is necessary for continuous cropping in the same soil. The basic ***metric*** formula is 60-60-60.

Temperature	Depth	Minutes
60°C	60 cm.	60
140°F	2 feet	60

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Solar Sterilization

- Solar radiation is an option to sterilize the soil.
- Cover the soil with plastic at 180-200°F / 82-93°C.
- In hot climates it might take 4-6 weeks, while in cooler climates, it could take 6-8 weeks.
- Clear plastic works best in hot climates whereas black plastic works best in cooler climates due to its better ability to absorb and trap heat.

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Soil Preparation

- Plant into raised ground beds containing a soil that is high in organic matter with good aeration and drainage.
- Ideally, the soil should be free of disease-causing organisms with a pH 6.8-7.2. A pH less than 6.2 increases the risk of microelement toxicity and uneven growth.
- Optimum starting soil EC is less than 0.7 mmhos/cm (1:2 extraction).
- If the soil is high in nutrients, plant a crop of Matricaria (chamomile) which will pull out excess nutrients and chemicals.

Raised Bed

- A raised bed improves drainage and soil aeration for deeper rooting and a drier soil surface.
- Cultivate to a mínimum depth of 12-inches/30 cm.

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A raised bed made of wooden boards

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Black Bags

- Growing in black bags is an option to increase drainage. It also allows the use of sterilized soil mixed with recommended components.

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Spacing

- Spacing will depend on whether one is producing a pinched or single stem crop.
- In general, space at 4 x 5 inches/10 x 12.5 cm. apart for better air movement and disease prevention.

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Spacing

- Leaving 2 empty rows in the center of the bed improves air movement and reduces disease.

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Flower Bed Design

- Placing plants in lines of 2 rows with a space in between plantings improves air movement and increases light penetration.
- Reduces botrytis expression, of which Lisianthus is highly susceptible.

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Media

- Drainage
- Friable
- Organic Matter
- pH
- EC
- Carbonized rice hulls

Soil

- **Well drained, friable soil rich in organic matter.**
- **Optimum pH:** 6.5 to 7.2
- **Optimum EC Range:**

  0.9 – 1.3 mmhos/cm **(1:2)**

  2.1 – 3.5 **(SME)**

  2.7 - 4.6 **(Pour Thru)**

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Sandy Loam Soil

A sandy loam soil is ideal for lisianthus production.

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Carbonized Rice Hulls

- Improves soil structure (aeration and drainage); especially in heavy and compact soils.
- Slow to decompose to maintain structure and porosity over time.
- Light weight makes them easy to handle.
- Encourages microbial activity making soil nutrients more available to plants.
- Contain silica, a beneficial mineral that strengthens cell walls against disease and pests.
- High carbon to nitrogen ratio making them an excellent source of organic matter.
- Release potassium, phosphorus and calcium as they decompose.
- Carbonized rice hulls possess a high pH (8.5-9.0) compared to non-carbonized rice hulls which are pH neutral. An increase in pH is beneficial for Lisianthus, especially in acidic soils, as a low pH creates a favorable environment for weeds and harmful bacteria.
- Top dress (2 inches thick) to suppress weeds or incorporate into the top 6-8 inches of soil.
- Renewable resource.
- Source organic rice hulls free of contaminants and pesticides.

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Par Boiled Rice Hulls

- Par Boiled rice hulls are produced by steaming and drying rice hulls after the milling process. The results in a lightweight and consistent product that is free of viable weed and/or rice seed.
- 50 lb. bag = 7 cubic feet once expanded.

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Moisture Management

- Pre-watering
- Initial 2 weeks from transplant
- Humidity
- Irrigation line placement
- Disease management
- Toning the crop

Pre-Watering

- Prior to transplanting, water the bed deeply to encourage production of deep roots for better growth.
- Provide enough water until the flower bud initiation stage.

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Moisture Management

- After transplanting, employ overhead watering for the first two weeks to establish the root system.
- Once roots engage the soil drip irrigation may be used.

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Light / Humidity (greenhouse)

- After transplanting apply shading and maintain higher humidity for 4 weeks following transplanting.
- Lower light levels reduce heat stress and leaf scorch until the plants establish a strong root system.
- Optimum humidty level is 70% for establishing a crop for greenhouse production.

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Light / Humidity (outdoor)

- After transplanting apply a 50% shade cloth and maintain higher humidity for 4 weeks following transplanting.
- Lower light levels reduce heat stress and leaf scorch until the plants establish a strong root system.
- Installing a mist system increases the humidity in low humidity areas.
- Optimum humidty level is 70% for establishing a crop but this is weather dependent.
- After establishment remove the shade cloth or install one at 20-30%.
- A Group 3 or 4 is needed for summer production to achieve enough height.

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Soil Surface

Based on its native habit, keep the soil surface dry to prevent disease and force the roots to go deeper in search of moisture.

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Benefit of raised beds and porous soil

Raised cut flower beds and porous soil maintain the soil surface drier to reduce disease pressure.

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Excess Moisture

Non-raised bed
Soil lacks organic matter.

Fusarium oxysporum, is a common pathogen found in soil, and is a major challenge. Surface moisture facilitates its expression.

One strategy is to apply Azoxystrobin* to innoculate the plugs or transplants.

**Heritage*

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Subirrigation

- To maintain the soil surface dry, one can bury the irrigation 4-inches/10 cm. below grade or irrigate the walkway to accelerate healthy root development and reduce the outbreak of diseases.
- When side shoots appear on lower nodes, increased the interval between irrigations.

Weak Stems

- Lisianthus grown too warm and with too much moisture results in weak flower stems.

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Fertilizer

- Rate
- Calcium nitrate-based
- Fertilizer sources
- K: Ca: Mg ratio for mineral soils
- Nutrient deficiencies

Fertilizer

Cut Flower Bed EC Range

Method	Target EC
1:2	0.9 – 1.2 mmhos/cm.
SME	2.1 – 3.5 mmhos/cm.
Pour Thru	2.7 – 4.6 mmhos/cm.

- 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.
- Cal Mag fertilizer formulations work well to supply calcium and magnesium.
- Start with 150 ppm N

- *Prior to starting any fertilizer program, have the water and soil tested to identify what level of nutrients are needed*

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Single Element Fertilizer

4K: 2Ca: 1Mg

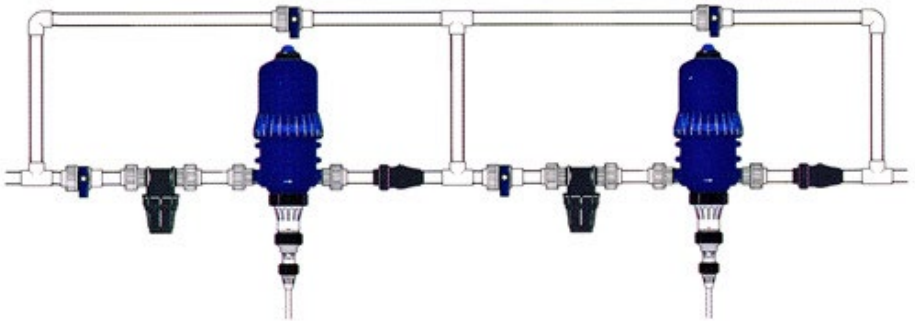
Tank A / per 1 gallon of stock at 1:100*

- **7 ounces CaNO3 (calcium nitrate)**
- **7 ounces KNO3 (potassium nitrate)**
- **chelates of iron, zinc, copper, manganese****

Tank B / per 1 gallon of stock at 1:100*

- **7 ounces MgSO4 (magnesium sulfate)**
- **1 fluid ounce 75% P2O5 (phosphoric acid)**
- **sulfates of iron, zinc, copper, manganese****

150 ppm N
25 ppm P
194 ppm K
100 ppm Ca
52 ppm Mg



**requires a double headed injector*

***chose one form or the other, boron and molybdenum are compatible with either tank.*

Fe: 1 ppm, Mn: 0.5 ppm, Zn: 0.5 ppm, B: 0.25 ppm, Cu: 0.2 ppm, Mo: 0.01 ppm in general for soilless media.

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Irrigation Strategy

Starting 8 weeks after transplanting

- As the crop progresses, supply water less frequently* to achieve a deep and healthy root system.
- Healthy roots are better able to withstand stressful conditions.
- Stop fertilizing 4 weeks before color begins to show on the buds.

**for the Voyage series maintain steady moisture.*

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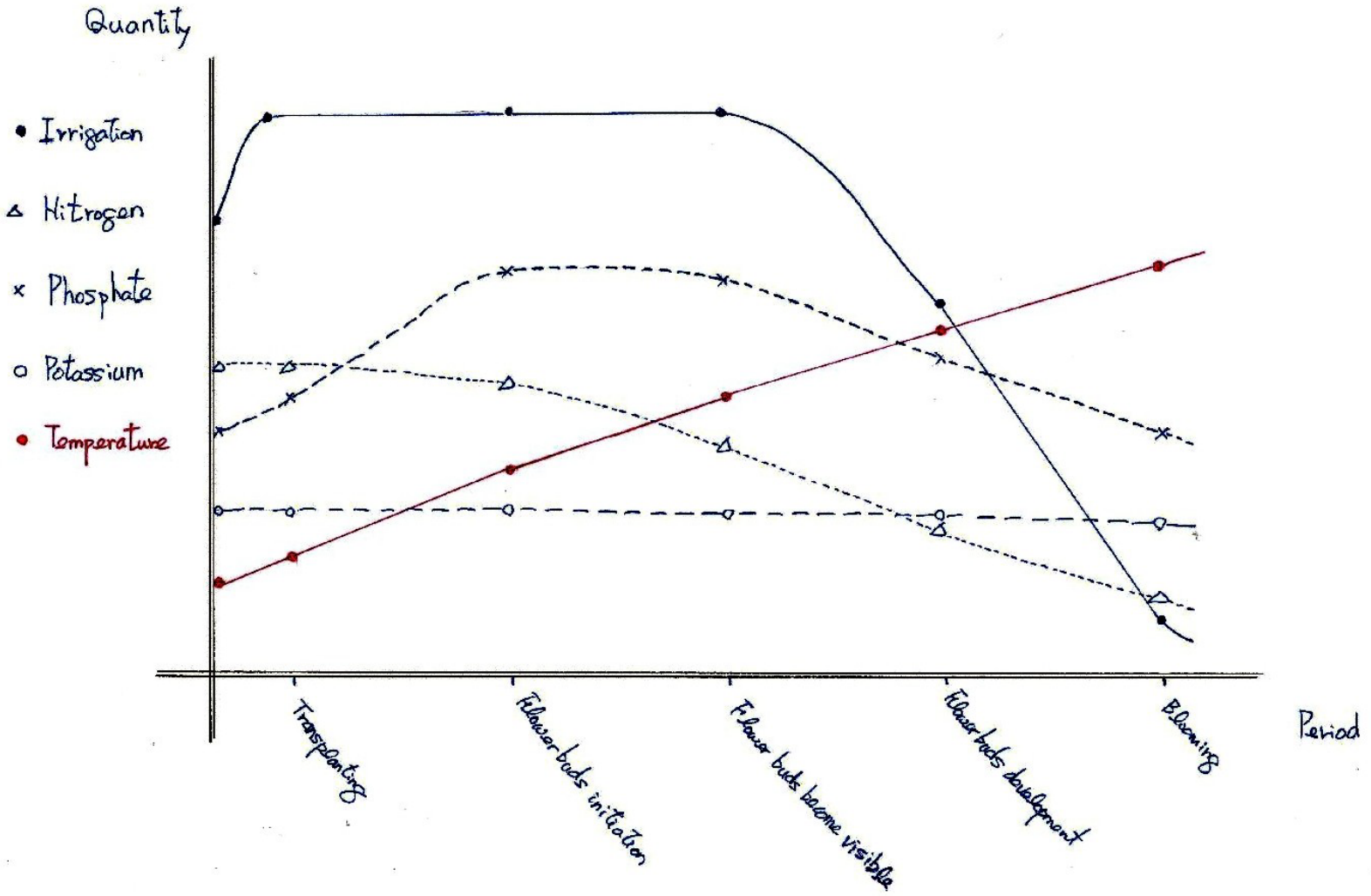
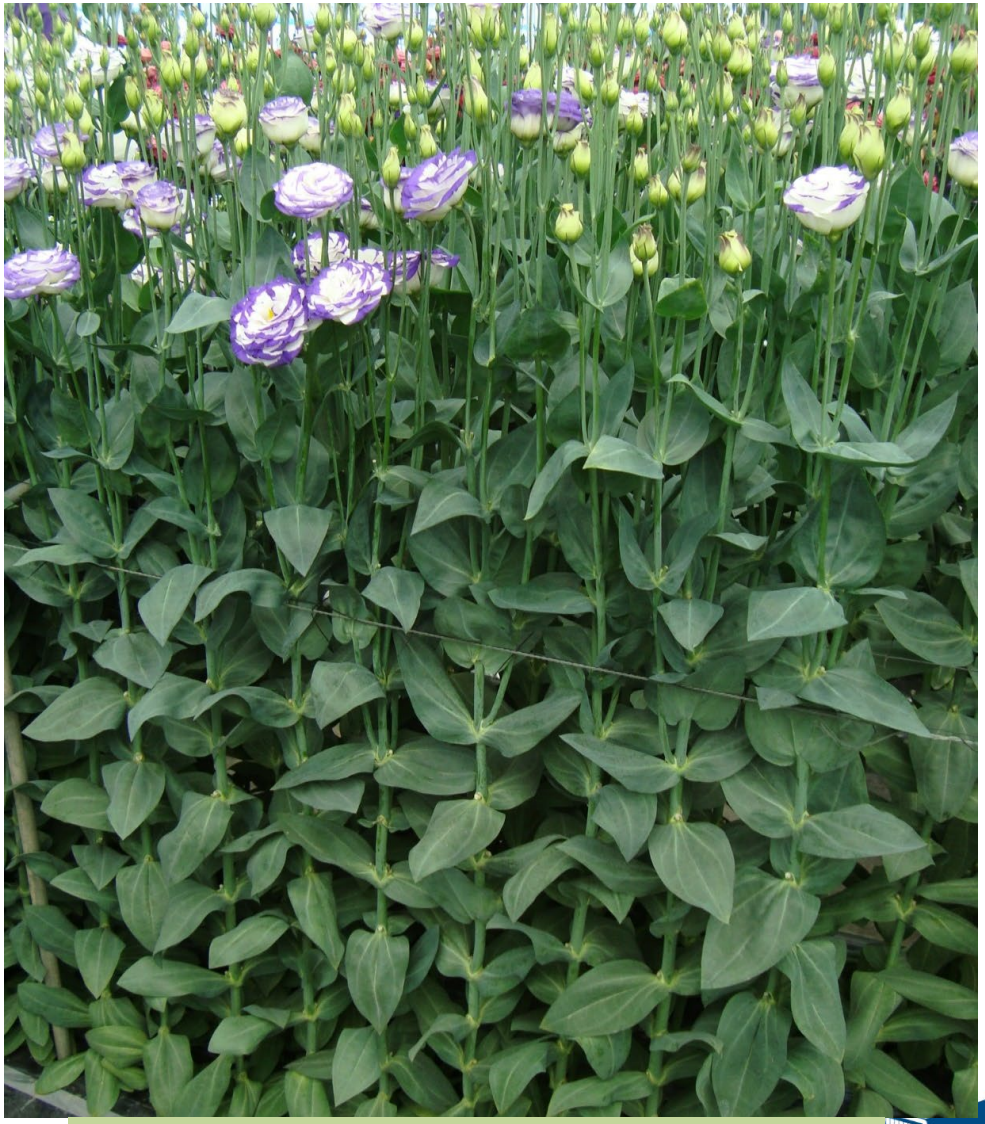
Irrigation – Fertilizer - Temperature



Internode length

- A gradual increase in internode length is a sign of a well-grown crop.



Rosita Blue Picotee

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BORON DEFICIENCY

- The snapping off of stems is caused by many factors.
- →Boron deficiency is a common cause of this problem.
- →Other reasons are Ca excess, low pH and N excess in the early stage.
- A soil pH level of over 6.5 is required.

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Lack of Calcium

- Calcium is an immobile element. Therefore, a deficiency shows in the younger foliage.
- **For optimum uptake do the following:**

- pH 6.8 – 7.2
- enough boron
- enough calcium
- a well-formed root system.

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Tip burn

- Excess nitrogen suppreses calciuim uptake, resulting in tip burn.
- Increase ventilation to promote transpiration and calcium uptake into the plants.

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Calcium Deficiency

Nitrogen excess

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Calcium Deficiency

Nitrogen excess

- Tip-burning can be caused by high sunlight, if the plants have been grown with Ca deficiency or N excess.
- →A major means of reducing the problems is through ventilation.

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Magnesium deficiency

- Magnesium is a mobile element, so a deficiency symptom shows first on the lower leaves.

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Phosphate excess

- A short plant height, many branches and Deep green foliage are typical symptoms of phosphate excess.

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Potassium excess

- The appearance of vertical stem cracking is a typical symptom of potassium excess due to the suppression of calcium.

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Light & Temperature

- DLI / Intensity
- Relationship between light and temperature
- Forcing / Supplemental light
- Air / Soil Temperature targets
- Photoperiod
- Flower Bud Initiation
- Excess light

Light

- A daily light integral of 14-18 moles is ideal.
- Optimum light levels range from 4,000-6,000 f.c. / 43,000-65,000 lux.
- A light level higher than 7,000 f.c. / 77,000 lux reduces stem length and should be avoided.
- As temperature increases, higher light is needed to maximize photosynthesis.
- Lisianthus requires ultra-violet light (UV-Ray) to form sturdy stems and produce pigments in the flower petals.

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Forcing with Lights

- Artificial lights increase air temperature which has a positive effect on photosynthesis as Lisianthus has an increased ability to photosynthesize at higher temperatures.
- Therefore, higher light benefits plant growth under higher temperatures.

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Supplemental Light

- Applying supplemental light to extend the photoperiod or provide more light calories reduces crop time and improves plant quality.

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Air Temperature

- For fast cropping maintain a minimum night temperature of 65ºF/18ºC and a minimum day temperature of 68ºF/20ºC.

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High Temperature Production

- Lisianthus production in Tanzania features 104°F degrees in the greenhouse (86-95°F outside) and a very low humidity (20-30 %),
- A plug with 2 pairs of true leaves with the main stem beginning to elongate (1.5 inches tall) are planted and may be pinched after 3-4 weeks (depending on the development) in order to have approximately 2 stems on every plant (average will be about 1.5 stem/plant when harvesting).
- Shading is needed for the first 4 weeks along with enough water and fertilizer every day.
- After establishing, they *propel the crop* with sun light, radiation, and heat as much as possible.
- Heat does certainly impact the flower size, as we see in forcing conditions in general.
- When the Lisianthus starts to flower, shade cloth will be necessary to keep the flower color!

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Soil temperature

- Soil temperature is critical to proper development.
- Maintain a minimum of 55°F/ 13°C and a maximum of 72°F/23°C.
- The use of black plastic for winter and reflective or white plastic in summer is an option in areas where soil temperatures are difficult to control.

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Tight internodes at the base due to cool soil temperature

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Low Temperature Damage

- The yellow spots on the leaves are also symptom of low temperature. The spots will disappear when the temperature increases.

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Rosetted plants

Rosetted plants due to high day temperature (>85°F/29°C) with a high night temperature (>73°F/23°C). In the case of high day temperature, even over 86°F/30°C, compensate with a lower night temperature (< 59°F/15°C) to prevent rosette formation.

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Light Intensity - Field Production

Group 2

Group 4

Lisianthus planted in full sun will be shorter than a crop planted under cover. Therefore, it is necessary to select the correct group number to compensate.

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Photoinhibition under high light

- Lisianthus has a greater ability to photosynthesize as the temperature increases. However, excess light can overwhelm the plant's system.
- The photooxidative damage due to excess light energy is a consequence of the accumulation of multiple reactive oxygen species generated due to an overflow of electrons in the photosystems of the light reaction.
- *The goal is to diffuse the light to reduce plant stress while maximizing light transmission for increased temperature and photosynthesis.*

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Diffused Light

High tunnel production in Southern California

- Most plants can benefit from diffuse light. Diffuse light penetrates deeper for greater photosynthesis by activating more of the canopy (less shading by upper leaves). In addition, diffuse light helps encourage better growth due to a better distribution of light (more evenly spread rather than with hot spots and shady spots).

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Diffused Light

Retractable screen to diffuse the light

- The goal of diffuse light is to diffuse the light for more even penetration without reducing light intensity.
- The use of retractable screens offers greater flexibility as light intensity changes throughout the year; especially in winter.
- With fixed solutions such as glazing and whitewash, light transmission is lost when conditions are too dark. With a permanent glazing, this can happen during any dull period in the year.

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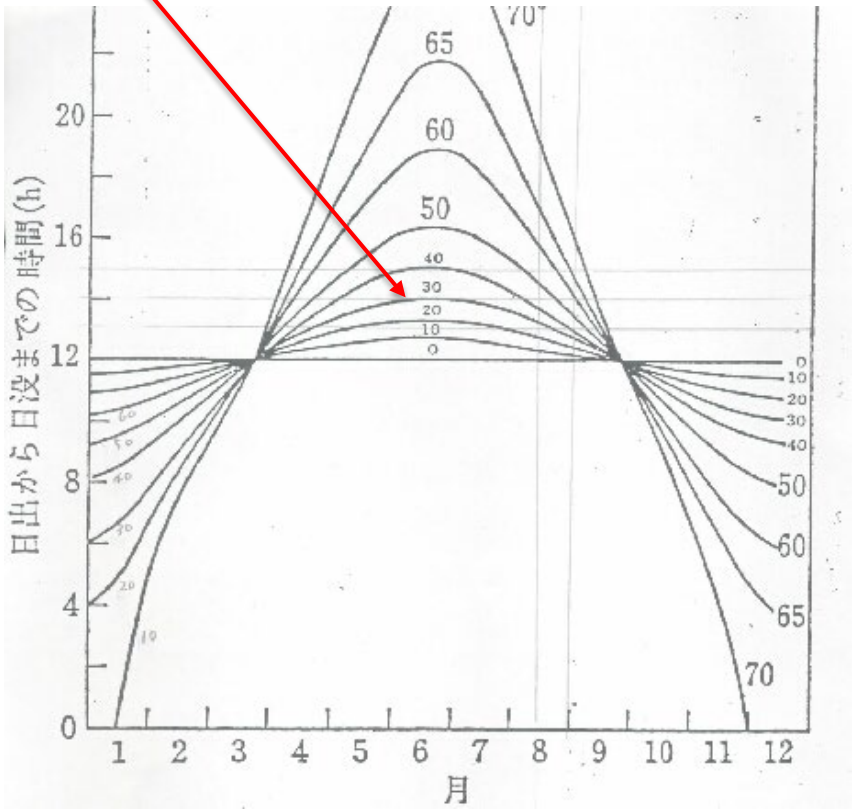
Photoperiod

Texas, native area of Lisianthus, is at latitude 30 with a maximum day length of 14 hours.



Natural day length

- The day length influences plant development and flower bud initiation.
- Longer days increase light calories for faster growth.
- A photoperiod greater than 12 hours promotes faster flower bud initiation and development.

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Flower Bud Initiation

- Research at Wageningen University in the Netherlands found that plant development and flowering are an interplay of temperature, photoperiod and light intensity.
- The research shows that *temperature* is the most determining factor for the generative development of lisianthus.
- A longer photoperiod also has an influence, in part due to providing more light calories.

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Excess Light

- Reduce light intensity to 2,000 f.c. / 21,500 lux before flowering to prevent flower discoloration.
- In addition, vent and increase air movement to reduce temperature.

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Excess Light

- High temperature combined with high light intensity causes flower petal burn.
- Blue and lavender-colored flowers are more sensitive to petal burn.
- Maintain enough soil moisture and apply shade cloth to reduce the temperature and light intensity.

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Excess Light

- Flower petal burn due to high light and high temperature following a chemical spray application.
- It is best to apply chemicals in the morning when temperatures are cooler and the light intensity is lower.

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Support

- Layers
- Wires
- Tailored System
- Support System Idea

Support Layer

A minimum of 1 layer of support is needed for indoor production and 2 layers for outdoor production due to wind and rain.

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Tailored Support System

Support wires are run along the length of the cut flower bed with horizontal cross supports (strong thread) placed by hand.

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Support Wire Tip

- Lisianthus needs at least one level of support to maintain straight stems.
- Using the invention in the photo helps keep the metal support wire more tense for a straighter crop.

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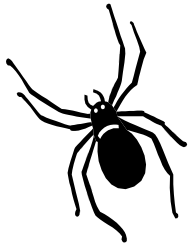
Insects

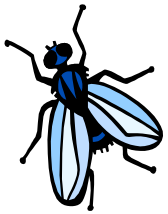
- Leaf Miners
- Thrips
- Whitefly
- Worms

Insects

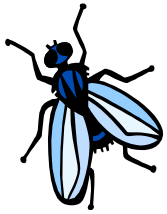
- Leaf Miners
  - Watch for visible mines.



- Thrips
  - Vectors of INSV, petal damage, scattered pollen.
- White Fly
  - Use I.P.M., monitor with blue and yellow sticky cards.



- Worms
  - Cut worms, watch lighting at night which attracts moths.



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Insects

Leafminers

Characteristic tunnels or mines indicate the presence of leaf miners.

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Insects

Thrips

Thrips are an important greenhouse pest and also a vector of disease.

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Organic Insect Control

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Disease

- Botrytis
- Downy Mildew
- Fusarium
- Viruses
- Powdery Mildew

Botrytis

Botrytis

- Botrytis
- Excess moisture, cool temperatures and lack of ventilation.

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Botrytis

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Downy Mildew

- Downy Mildew is favored by high humidity and low temperature (50-59ºF/10-15ºC).

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Fusarium

Fusarium

- Fusarium oxysporum, an ascomycete fungus, is a fungal pathogen that primarily attacks the crown and stems of lisianthus but may also rot the taproot and large feeder roots near the soil line.
- The first above-ground symptom is a gradual loss of green coloration in leaves, which is followed by tan leaf flecks, browning of leaf veins and a tan discoloration of entire leaves. Wilting and a brown stem rot occur as the disease progresses, and infected plants rapidly die. Orange spore masses form on the bases of rotted stems and are diagnostically very important.
- Starting with healthy plugs, good sanitation, prompt removal of infected plants, steam sterilization and crop rotation all work together in minimizing this disease.

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Fusarium

Pinkish powder is one of the typical symptom of Fusarium avenaceum.

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Fusarium

A second harvest increases the risk of fusarium, especially in beds that lack proper sanitation and moisture control.

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Fusarium

- If one is not able to sterilize one's soil with either steam or solar radiation, one must allow 6 years in between crops by planting in the same field once every 7 years.
- Relocating high tunnels to new ground every year is an option for those who own enough land.

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Virus

- Lisianthus is affected by various viruses, among which is INSV (Impatiens Necrotic Spot Virus).
- Destroy plants infected with a virus to avoid contaiminating the entire crop.

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INSV

INSV

- INSV is one of the most common viruses that affect Lisianthus.
- Symptoms include down turned tips, stunted growth, clustered terminal leaves. In advanced infections small brown spots appear on the terminal leaves.
- Once infected, there are no chemical controls.
- Control thrips and rogue out infected plants to prevent and limit damage.
- Keep all weeds away from inside the greenhouse and all adjacent areas.

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CMV

- Cucumber Mosaic Virus which is common virus disease and carried by aphids.
- The symptom is stripe on flower petals and foliage.

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Powdery Mildew

Mildew

- Main cause is lack of ventilation, excess air humidity and excess fertilizer; especially high nitrogen.
- Powdery Mildew (sphaerotheca) White to grey, talcum powder-like fungal spores appear mostly on the upper leaf surface.
- Downy Mildew (plasmopara) White sporulation mostly appears on the underside of the leaf. More related to phytopthora so chemicals that treat phytopthora also are effective against downy mildew.

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Harvesting

- Cutting Stage
- Post-harvest treatments
- Storage

Harvest Stage

- Lisianthus stems are harvested with 1 or more open flowers.
- For local sales, growers often cut and sell the first flower for corsages and wait for additional flowers to open for greater impact.

Mariachi Grande White

SAKATA®

Post Harvest Treatments

- Pulses with up to 6% sucrose or glucose improve petal color, increased bud opening, strengthened pedicels, and increased vase life.
- Holding solutions should be used by wholesalers and retailers for maximum vase life and improved bud opening and coloring.

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Ethylene

- Lisianthus is sensitive to ethylene and the use of STS or 1-MCP helps to delay senescence.

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Storage

- Lisianthus can be stored wet or dry at 35-41°F/2-3°C for 2-3 days.
- If holding for longer than a few days hold them in water to improve vase life.
- Wet storage for a week reduces vase life by about 3 days.
- Buds continue to grow and open after harvest and show geotropic responses so store in an upright position to avoid stem bending upwards.

SAKATA®

Lisianthus Echo – Group 1

- *Group 1 / Standard Double Flower*
- *8 vibrant colors*
- *The first series with 100% double large Flowers.*
- *Strong plants that support the large flowers.*

SAKATA®

Rosanne – Groups 1-3

- *Excellent vase life with strong petals that resist botrytis problems during transport.*
- *The flower stigmas do not develop yielding a longer vase life.*

SAKATA®

Mariachi® – Group 2

- *Quadruple petals that is ideal for sowing in winter and harvesting in spring.*
- *Thick petals for improved shelf life and easier transportation.*

SAKATA®

Voyage® – Group 2

- *Large fringed flowers that are beautiful!*
- *Strong petals that ship well under stressful conditions.*
- *Excellent top flowering habit.*
- *Highly sought-after flowers available in 9 unique colors*

SAKATA®

Rosita® – Groups 1 - 3

- *Strong petals and top flowering with strong stems making transportation easy with less botrytis problems.*
- *Rose-shaped medium-sized flowers.*
- *Excellent vase life with more usable buds.*

SAKATA®

Lisianthus Serie Solo® - Group 2

- *Solo® is the first pollen free series in the world, and the next generation in single flowered Lisianthus.*
- *Solo flowers do not produce pollen, which means that there is no mess, no stained flowers and an even longer vase life.*
- *The delicate but strong flowers ship well with less risk of damage and disease.*
- *Initially available in 4 colors.*

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Rosita 2 Green / Voyage 2 Green

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Many thanks for your attention!

- Thank you for your support and confidence in our genetics.
- Sakata Seed America

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