Lisianthus An American Native

Eustoma grandiflorum

• Lisianthus flowers offer a simple beauty as well as elegant sophistication!

• Highly popular due to its long vase life, (2-3 weeks), wide color range, (including blue), and unique flower forms.
Standard Single Flowers

• The standard single flower is the original flower form.
• Still highly popular in Europe and Japan.
Spray Single flowers

- New Class of flower.
- Not just single Lisianthus.
- It is a “Piccolo”.
- Hard petal, Ideal cup shape of flower for shipping and design of flower bouquet.
Standard Double flowers

- Double flowers provide a fuller look and are highly popular in North and South America.
Spray double flowers

- Lisianthus Rosita features flower that resemble Sweet Heart Roses
- Great Vase Life with more usable buds.
Quadruple flowers

• The Mariachi series features extra double flowers giving a fuller look.
• Camellia-like flower form.
• Mariachi Carmine was named the 2011 cut flower of the year by the Association of Specialty Cut Flower Growers.
Lisianthus combines nicely with roses!

- Peach colored roses combined with Piccolo Yellow.
Lisianthus compliments all flowers!

- Mariachi Misty Blue combined with Stock and Bells of Ireland.
Native Habitat

- Native to northern Mexico, Texas and Colorado, grows in dry climate near water. Soil surface is dry but the roots always have access to water below the surface.
Native Habitat
Native Habitat
Challenges of cut flower plugs

- The cut flower grower needs actively growing plugs in order to maximize the stem length.
- The age of the plug, photoperiod, temperature and light quality all impact the final cut flower production.
Stage One: Days 1-14

- Ideal cell size 392.
- Sow pelleted seed into a well-drained media high in organic matter and lightly cover, if necessary, to maintain sufficient moisture.
- pH 6.0-6.5
- Optimum temperature is 68-71°F/20-21°C.
Stage One: Days 1-14

- Lisianthus seed requires light to germinate (up to 2,500 foot candles / 27,000 lux).
- If using a germination chamber, provide a minimum of 100-300 foot candles.
- Capillary watering mimics the native habitat and provides uniform moisture and uniform germination.
Stage Two: Days 15-21

• After germination is complete, place plugs in a greenhouse with high light (2,500-3,000 foot candles / 27,000-32,000 lux), good air circulation and a temperature between 60-68°F / 15-20°C.

• Fertilize lightly with 100-150 ppm N from a well balanced Calcium Nitrate based formulation.
Stage Three: Days 22-56

- Lisianthus plugs grow slowly at first and it is necessary to avoid exposing the seedlings to stress.
- High or low temperatures during the first 30 days after germination is the main concern.
- Avoid temperatures over 75°F/24°C and under 45°F/7°C.
Stage Three: Days 22-56

- Avoid stressing the plugs with low light levels and excessive dry conditions that also promote dormancy (rosette).
- Excessive moisture will invite disease.
- Feed with 150 ppm N to maintain EC levels at 0.7-1.0 mmhos (2:1 dilution).
Stage Three: Days 22-56

- The plugs are approaching the transplant stage.
- Provide the highest light possible within the optimum temperature range of 60-68°F/15-20°C.
- pH 6.0-6.5 and EC level between 0.7 and 1.0 mmhos.
Stage Four: Days 57-60

- Plugs have 2 pairs of leaves and are ready to be transplanted into cut flower beds.
- Delaying transplanting will result in poor rooting, delayed flowering and shorter flower stems.
Fusarium disease

- Fusarium is a soil borne disease. Use clean trays and soil.
- Never allow hose ends to touch the greenhouse floor.
- Only remedy is to discard infected seedlings.
Disease

- Fusarium infected plug showing the characteristic golden brown spores.
Rosetting - Plug Stage

Normal Leaf

Rossetted Plug
Boat-Shaped Leaf
Rosetting-Cut flower bed

- Induced dormancy (resting stage) often expresses itself after plugs are transplanted into cut flower beds.
- Induced by stress conditions.
- Nature’s way to ensure the survival of the species.
Temperature influence on rosetting following germination

<table>
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<th>Weeks</th>
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<th>Piccolo 1 Yellow</th>
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<td>2 %</td>
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<td>1 %</td>
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<td>3 %</td>
<td>2 %</td>
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<td>11</td>
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Transplant actively growing plugs!

- Avoid planting over grown plugs.
- Transplanting at the 4th true leaf stage is best; especially under long day conditions.
- Optimum plugs have straight roots ready to form a deep tap root system.
Root bound plugs

- Older plugs that are root bound or checked have a more difficult transition from the plug tray to the cut flower bed.
- Older plugs flower later on shorter stems.
Plug Age Study

Aged plugs flower later on shorter stems

Transplanted on time  Delayed transplant

Aged plugs flower later on shorter stems
**Flower Initiation**

- Plants are sensitive to flower initiation when they have three pairs of leaves.
- In order to initiate flowers the night temperature must be above 61°F/16°C.
- Long days >14 hours greatly accelerates the crop cycle and hastens flowering.

Mariachi Blue Picotee
Flower initiation delay

- In late spring and early fall growers struggle with adequate stem length.
- Treating plugs with short days (< 9 hours) or keeping the night temperature below 61°F/16°C during the seedling stage will delay pre-mature flower bud initiation.
- Good option for larger plugs grown for field transplanting.
Flowering response

- Lisianthus flowers in response to photoperiod, light quality and temperature.
- Long days (>14 hours), higher light quality and warmer temperatures all accelerate flowering.

Rosita Pink
Bed Preparation

- Cut flower beds should be high in organic matter and free of pathogens.
- Cultivate to a depth of 18 inches (45 cm.).
- Optimum pH is 6.8 - 7.2 in order to supply adequate calcium levels.
Spacing

- It is necessary to provide adequate distance for proper development.
- Plant density is determined by light intensity and quality. In general, space 8 plants per square foot (85 per square meter).
- Plant plugs slightly high to avoid stem rot.
Watering practices

- Overhead watering with a hose and water breaker is recommended for the first two weeks following transplant.
- Automatic irrigation can be used once sufficient root penetration is present.
Drip irrigation is best once the plants root out into the soil.

Burying the irrigation lines below the soil surface maintains the surface dry and discourages disease.
Culture After Planting

- Maintain high humidity for 10 days after transplanting and reduce light levels to minimize stress.
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.
Flower Support

- A minimum of two layers of netting is recommended to support the 3-4 foot (90-120 cm.) long stems.
Fertilization

- Maintain EC levels between 1.0 to 1.3 mmhos. (2:1 dilution). Calcium nitrate-based fertilizers suppress disease, especially fusarium, and promote strong healthy plants.
Light levels

- 3,500 - 7,000 foot candles / 38,000 - 76,000 lux is optimum.
- High light intensity promotes high bud count and good flower development.
- Shade to increase stem length in areas with excessive light levels, (over 7,000 foot candles / 76,000 lux).
Daylength Extension

- In winter months when the photoperiod is less than 12 hours one can extend the day length with ordinary incandescent lighting (mum lighting) from 22:00 – 02:00.
- The use of high pressure sodium lights will increase flower quality and decrease crop time.
Finishing Strategies
(4 weeks from transplant)

- Lisianthus resents continuously wet soil.
- Allow the soil to dry between watering or fertilizing.
Finishing Strategies
*(8 weeks from transplant)*

- As the crop matures, reduce moisture to promote a deep and healthy root system.
- Plants with a strong root system is better able to withstand stress conditions.
- High salts delays (> 1.8 mmhos) flowering. Stop fertilizing 4 weeks prior to flowering.
Tip Burn

- Tip burn often occurs under stress conditions.
- Often seen in spring when high light follows a dark period with sudden temperature and humidity fluctuations.
- Often related to poor root development (delayed transplanting, overly wet or dry soil, high salt levels or disease.)
Poor root development (checked plugs)

- Failure to develop a healthy root system will cause tip burn or death when plants are subjected to high stress.
Healthy root development

- The key to success with Lisianthus is to establish a healthy root system.
Calcium / boron deficiency

- Stunted plants with chlorotic leaves may signal low calcium/boron levels.
- Adjust fertilizer levels to supply sufficient calcium and boron levels. Target boron at 0.25 ppm and a K:Ca:Mg ratio of 10:5:1.
- Foliar applications of calcium and boron may also help.
Proper development

- Internodes should lengthen as the crop matures.
- This is a good indicator that the crop is being grown properly.
Finishing Strategies

- As flower color begins to show reduce the light level to 1,500 to 2,000 foot candles / 16,000 – 22,000 lux.
Flower Burn

- A combination of high light and temperature can scorch flower petals.
- Keep the temperature below 75°F/24°C and light levels below 3,000 foot candles / 33,000 lux.
Finishing Strategies

Harvest when two or more flowers are open!
Post Harvest Care

- After cutting, place stems in tepid water (68°F/20°C) and place in a cool shady place for rehydration.
- Store in a refrigerator (39°F/4°C) and treat with floral preservative.
- The use of floral preservatives with sucrose after cutting increases vase life by 40-50% and promotes a deeper flower color.
Insects

• Thrips
  – Vectors of INSV, petal damage, scatter pollen.
• Worms
  – Cut worms watch lighting at night.
• Leaf Miners
  – Watch for visible mines.
• White Fly
  – Use I.P.M., monitor with blue and yellow sticky cards.
Disease

- Fusarium avenaceum (*Gibberella avenacea*) 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.
Disease

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

- 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.
Disease

- 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 fungus gnats and rogue out infected plants to prevent and limit damage.
Thank you for your attention!