

# GUIDELINES FOR CUT-FLOWER GROWERS

REV. 04/2010

Each color or variety is unique in its growth habit and performance. Our CALLAFORNIA CALLAS® Tech Sheet CD is available through your broker. The Tech Sheets can also be viewed/downloaded from our website @ [www.goldenstatebulb.com](http://www.goldenstatebulb.com) / [www.callaformiacallas.com](http://www.callaformiacallas.com) .

Highest quality and uniform calla culture requires special attention to media selection, water management and forcing temperatures, while employing a strong preventative fungicide program. Please read and follow these entire directions carefully. *The summary checklist of MUST DO'S are numbered 1 - 12 on page 8. However, proper culture is not limited to these twelve summarized points.*

## 1 TUBER TREATMENTS TO ENHANCE FLOWERING AND AID IN DISEASE

**PREVENTION:** Progibb, the standard gibberellic acid (GA<sub>3</sub>) or Provide (GA<sub>4+7</sub>) or Promalin (GA<sub>4+7</sub> with benzyladenine) treatments all increase the number of flowers and reduce the time between first and second flowers. Generally, you can expect twice as many flowers with a GA treated tuber than with an untreated tuber. A slight increase (5-10%) in flower deformation may occur on yellows and whites, but net gain in performance justifies its use. GA will increase plant height, slightly reduce leaf width, and soften stems, especially in low light and shorter days. Promalin tends to cause less flower deformities than Progibb.

To spray just lay the callas out "tops up" and spray to drip. Take care not to damage the sprout when handling. Try to get maximum coverage on all tubers. Allow tubers to passively dry slowly for at least 8 hours for maximum GA absorption.

GA should be added to the **spray mixture** at the following rates:

1. 1.8% Promalin\* solution: a 100 ppm GA<sub>4+7</sub>+BA mixture is 1.3 TBSP per U.S. gal H<sub>2</sub>O (5.5 ml/L)
2. 4% GA<sub>3</sub> solution (Progibb): a 125 ppm mixture is 0.8 TBSP per U.S. gallon H<sub>2</sub>O (3.1 ml/L)

**Note:** The addition of a fixed copper such as Champ II at 1 oz. per gal. to the solution can help reduce pathogen pressure.

*\*Promalin is the preferred compound over GA<sub>3</sub> as Promalin will not induce as many deformed flowers.*

**GSBG preconditioned tubers** for new plantings are highly recommended to improve disease management and ensures optimal blooming & performance.

**GA on Permanent Plantings:** GA can be drench applied to established plantings, without soil disturbance, prior to sprout emergence. A GA drench can be applied at the 100 ppm rate. The additional flowering effect will take 75-85 days. This method will increase flower yields and extend flower production, but, conversely, will decrease uniformity at harvest date as compared to the preconditioned, fresh planted bulbs.

Soil beds or containers can also be drenched with a 100 ppm GA solution if done during dormancy or within 5 days of initial watering of dormant bulbs. Soil should be moderately moist at time of drench to improve uniformity. Fungicides can be combined in the season's initial drench.

## 2 RECEIVING AND HANDLING OF DORMANT TUBERS:

Immediately unpack on arrival. Dispose of any soft rot and wash hands to avoid spreading the bacteria to healthy bulbs. Place in well-ventilated trays at 65°F (18°C) for one to two days prior to planting to "heal off" any wounds that may have occurred in transit. For long-term storage, keep well ventilated at 50°F (10°C); avoid excessive drying by keeping humidities at 80%.

## 3 PRODUCTION ENVIRONMENT:

**OUTDOOR:** Callas are semi-hardy and cannot take a hard frost. Though a light frost can be tolerated, the tuber will be destroyed if the ground freezes to the depth of the tuber.

In northern latitudes and California, open field-grown callas should naturally bloom from May to late July. Excellent soil drainage is critical. Later plantings, when soil temperatures approach 60°F (15.5°C), usually result in less loss due to bulb rot, but also later flowers. Earlier field plantings or established blocks can be plastic mulched or tunneled for earlier blooms. Trial for your environment.

**GREENHOUSE:** As a general rule, the earlier in the spring (or winter) that callas are planted, the sooner they will bloom. However, the number of days between planting date and bloom decreases with later plantings as warmer temperatures and longer days accelerate growth.

Callas can be grown in raised beds or in containers. Excellent soil drainage is critical. Planting tubers in portable Dutch bulb crates works well. 3 - 6 tubers can be planted per 15 x 24" crate, depending on tuber size and variety. The plants can be grown in a heated greenhouse for early spring flowering and moved outdoors for vegetative growth making greenhouse space available for another crop. Callas require 6 - 7 weeks of vegetative growth post flowering. Dormancy then requires another 8-10 weeks prior to regrowing.

**Though no exact scheduling techniques have been perfected yet for callas, here are some approximate forcing times when producing callas under temperature-controlled conditions.**

APPROXIMATE TIME TO FLOWER EXPRESSED IN WEEKS*				
(arranged in order of early to late flowering)				
CALLAFORNIA CALLA® CULTIVAR	JAN-FEB		MAR-MAY	
	FIRST FLOWER	PEAK (GA INDUCED) FLOWERING	FIRST FLOWER	PEAK (GA INDUCED) FLOWERING
LAVENDER GEM	8	9-10	7	8-9
RUBYLITE ROSE	9	10-11	8	9-10
SUPER GEM	"	"	"	"
GARNET GLOW	"	"	"	"
MINT JULIP (Crème de Mint)	"	"	"	"
CRYSTAL BLUSH	9 cont.	9-10 cont.	8 cont.	9-10 cont.
GOLD CROWN	"	"	"	"
CRYSTAL CLEAR	"	"	"	"
SUPER IVORY	"	"	"	"
GOLD RUSH	"	"	"	"
ACAPULCO GOLD	"	"	"	"
STRAWBERRY PARFAIT	"	"	"	"
REGAL	"	"	"	"
FIRE DANCER	"	"	"	"
TWILIGHT	"	"	"	"
NIGHT CAP	"	"	"	"
RUBY SENSATION	"	"	"	"
PARFAIT	10	11-12	9	10-11
FLAME	"	"	"	"
YELLOW HYBRID	"	"	"	"
SUNSHINE (Sunny)	"	"	"	"
FIREGLOW (Fireside)	"	"	"	"
BLAZE	"	"	"	"
PILLOW TALK	"	"	"	"
SWEET TALK	"	"	"	"
PINK GIANT	"	"	"	"
SOLAR FLARE	11	12-13	10	11-12
GOLDEN CHALICE	"	"	"	"

\*Larger and more sprouted calla tubers tend to bloom somewhat earlier than smaller tubers. Reduce average days to flowering by 5 days when using 2 ¼"-and-up-size tubers. For early plantings in dark and sub-optimal conditions, allow 2-3 weeks more time to reach peak bloom.

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**PLANTING AND SPACING:** Plant tubers 2-3" (5-7.5 cm) below surface, rounded side down. Tilting larger tubers slightly encourages drainage off of the crown. The spacing of tubers in the field, raised beds or containers depends on bulb size as well as whether they will be lifted in the fall.

RECOMMENDED PLANTING DENSITIES	
TUBER SIZE	ON CENTER (oc)
2-2¼" (16/18 cm)	8-9" (20-23 cm)
2¼-2½" (18/20 cm)	9-11" (23-28 cm)

**SPACING CONSIDERATION FOR LARGE-LEAVED GENETICS:** In order to allow for greater light penetration into the canopy for flower induction & development one should consider reducing planting densities on the yellow/orange genetic grouping for best floral productivity.

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**MEDIA:** The medium should be well drained and have a pH of 6-6.5. More drainage is required than for most cut-flowers. Raised beds will aid drainage in heavier soils. When using soilless mixes, callas are most successfully grown in a 35-50% peat medium. The remaining percentage should consist of two or three parts of high draining materials such as coarse and graded perlite, fir bark, redwood shavings, vermiculite, lava rock or graded #2 or coarser sand. Sand also can act as ballast for top-heavy containerized plants. Recommended examples are as follows:

1. 40% peat moss, 25% perlite, 10% vermiculite, 25% fir bark
2. 33% peat moss, 33% perlite, 33% vermiculite.
3. 33% peat moss, 33% fir bark, 33% perlite

Trials with premixed media from leading brands indicate that media selection should be dictated by the need to hold peat levels down. *Callas don't like wet feet.* Though luxuriant growth is promoted by higher peat levels (over 50%), the resulting moisture levels also promote pathogens.

**Incorporation of gypsum and lime to the soil media** is worthwhile not only for pH adjustment, but for calcium availability and its relation to plant health. Incorporation of a Trichoderma biological such as Root Shield or Soil Guard at 0.75-1.0 lb/yd<sup>3</sup> (593gm/m<sup>3</sup>) help disease management. New biologicals are being newly registered and should be trialed with and without fungicide drenches prior to large scale use.

**A note on coco peat/coir:** Coir that is high quality and salt free has been used with mixed results. In cut flowers, some improvements in flower and stem quality have been observed. However, in pots, an overall greater incidence of water molds (pythium) has also been observed. Consequently, we do not recommend coir. If coir is incorporated, the grower does so at their own risk. If using coir despite our warnings, we strongly recommend strict adherence to our preventative drench program.

**PLANT HEALTH & GROWTH:** The *bacterial soft-rot syndrome*, which concludes with *Erwinia carotovora*, is generally preceded by water molds and *Rhizoctonia*. Other wounds or moisture/salt stresses also add to this profit-impacting pathogen complex. It is very important to follow media recommendations, use good sanitation practices and proper irrigation/leaching practices, preventative drenches and temperature management. In early forcing, most calla diseases are favored by overly wet and cold conditions. In summer growth, overly wet and excessively warm day and night conditions are also conducive to disease and soft rot. Follow our recommendations for well drained media with good air porosity, optimal fertility and salts management, as well as our preventative four-component fungicide drench program (addressing *Rhizoctonia*, *Erwinia* and water molds). See Drench section.

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**WATERING:** Proper water management is perhaps the most critical aspect of calla culture. After planting, a complete wetting, followed immediately by our 4-component fungicide drench, provides generally adequate moisture until the sprouts have emerged, especially in early, cool-season plantings. (See pesticide section on drenches section 9). Then, without allowing plants to totally dry, water only moderately at least until foliage is full. Even

when growing rapidly, plants should not remain constantly wet since this can set the stage for root loss and subsequent erwinia. Furthermore, avoid splashing water to reduce potential disease spread. Conversely, "dry" cultivation can negatively result in short stems and in severe cases can cause flower abortion and blindness. Alternate extreme dry then extreme wet soil conditions will also cause root injury and will greatly increase pathogen susceptibility, especially if slow-release fertilizers are used in warm conditions. Note: occasional leaf spot phytotoxicity has been observed using overhead irrigation on bright, warm days, especially if using liquid feed, or using chemical drenches late in the evening where leaves never dry all night.

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**FERTILIZATION:** An early and aggressive balanced fertility is recommended to start plants off with a vigorous growth spurt and to deliver optimal final plant height and stature. Once sprouted and unfurling, fertility levels can be reduced by one half and later to one third of original concentration. As an example, begin with 150-200ppm (Nitrogen) and graduate to 100ppm, then later 50ppm for flower flush. These recommendations apply to the temperatures mentioned earlier. Available calcium sources, such as calcium nitrate, may be preferentially considered as a potential aid to disease tolerance. Slow-release fertilizers incorporated or "top dressed" can be reasonably effective, but can release too quickly under warmer temperatures. Maintain EC levels of 1.5-2.0. Avoid EC levels of 2.5 or above. Leach media with clear water every 3<sup>rd</sup> irrigation but especially during the last six weeks of the production cycle, leaching should be increased.

**Iron Chelate:** Pale foliage color can be corrected by the addition of an iron chelate at 6 oz/100 gal. (46.9 mls/100 L) of a 13.2% sequestered iron introduced with your liquid feed and applied weekly as the leaves unfurl.

**MODIFIED FERTILITY CONSIDERATION FOR LARGE LEAVED GENETICS:** In order to allow for greater light penetration into the canopy for flower induction & development, as well as improved plant habit, large-leaved varieties [like those found in the yellow/orange genetic grouping] will benefit from a modified fertilizer regime reducing Nitrogen (N) concentrations and increasing Phosphorous (P). An example of these ratios would be something similar to 50-75ppm N (vs. 200-250ppm N derived STD 20-10-20), 150ppm P (vs. 100-125ppm as STD 20-10-20) and where Potassium (K) remains constant. Preformulations of this type of blend can be readily obtained from products such as Peter's 10-30-20 "Hi Bloom". The greatest benefits will be recognized when modified feed is implemented somewhere between "early" and "late sprouting". Once implemented, modified feed should be carried through the end of the forcing cycle. Plants produced with the above fertility outline will tend have smaller overall leaves, as well as modest-to-significant increases in traditional flower counts amongst these genetic groups.

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**TEMPERATURE & ENVIRONMENT:** When planting early (Dec.-Feb.) in greenhouses, start in 70-75°F (21-24°C) environment (or 70°F (21°C) bottom heat) until well emerged. Temperatures can then be dropped to 60°F (15.5°C) nights and 65-75°F (18-24°C) days. **Remember: cool soil temperatures, overwatering and moist, heavy soil delay flowering and can promote diseases.** Warmer temperatures speed flowering. If temperatures are lower, reduce watering. Callas require minimum light of 4000-foot candles or more. Stouter stems and deeper coloration in pinks and many hybrid selections are achieved with high light and cool nights below 60°F (15.5°C). Under high temperatures and high light conditions 30-50% shade will help sustain optional growth and aid to lengthen stems.

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## **FUNGICIDE DRENCHES AND PESTICIDES:**

**DISEASE CONTROL AND PLANT HEALTH:** Constantly achieving or maintaining quality plants for the entire length of the crop requires cultural practices focusing on preventative control of diseases. Once established, diseases are difficult to control. Bulb stocks are field grown and every effort is made to ship healthy bulbs. Golden State Bulb Growers' proprietary synergistic preconditioning treatment is highly recommended and we consider it essential as the first step to disease prevention. Success in disease management is dependent on controlling three (3) primary pathogens that independently or in concert can cause root and/or bulb rot. These are Rhizoctonia, Erwinia, and the water molds, known as Pythium and Phytophthora. Not one or even two products can successfully control all of these pathogens, and controlling only a portion of this pathogen complex can sometimes lead to worsening of the other untreated pathogens. Having conducted extensive research on efficacy of fungicidal/bactericidal drenches, GSBG has concluded the best results for their use, combinations and alternatives (see written details below and chart that follows).

**Our best FOUR-PART TANK MIX** chemical drench combination against the "pathogen complex" for a successful program: Subdue Maxx (mefenoxam 25.1% ai) @ 0.5-1 fl oz/100 gal (4-8 ml/100L) and Aliette (fosetyl-aluminum

80% ai) @ 13 wt oz/100 gal (98 gm/100L); for Rhizoctonia, Heritage (azoxystrobin 50% ai) @ 4 oz/100 gal (30 gm/100L); and, for the Erwinia bacterium, use Agrimycin-17 @ 8-16 wt oz/100 gal (60-120 gm/100L). The above components have been found superior at Golden State Bulb Growers relative to the labels registered in California, but all may not be available in your region.

Remember that managing Pythium and other water molds is most critical. See our "Three Pathogen Calla Fungicide Drench Chart" below for these primary recommendations and other, lesser alternatives, should these not be available. Although callas tend to be tolerant to chemical phytotoxicity, trial other fungicides first on a small basis if our recommended chemicals are not labeled in your locale.

The Erwinia bacterium, leading to bulb soft rot, is best controlled with Agrimycin-17 (Streptomycin sulfate 21.2% ai) at 8-16 wt oz /100 gal (60-120 gm/100L). Alternatives for bacterial control are few and, therefore, GSBG's standard Bulb Preconditioning using fixed copper is essential. **As drenches, these fixed coppers are root phytotoxic.** Therefore, drenching of another agricultural antibiotic (at label rates) or use of soluble copper Phyton-27 (copper sulfate pentahydrate 21.4% ai) at 13-20 fl oz/100 gal (100-156ML/100L) can help. See chart for recommendations and alternatives.

**DRENCH TIMING: Drench timing is critical.** Drench the first time, when using preconditioned tubers, anywhere within 2 to 6 days of initial watering. If not using preconditioned tubers, drench within the first 2 to 3 days of initial watering. Timing of the second drench is important and should be made at 14 to 21 days after first drench and usually around the time of 1-3" sprouts (2-5-7.5cm). A third drench is recommended for 21-28 days after the second one (day 40-47 from planting), but may only be necessary if weekly root inspections reveal cleared or browning roots, uneven growth, any diseased plants, or if poor or prolonged shipping environments may be expected. **ALWAYS DRENCH IN THE MORNINGS OR EARLY ENOUGH FOR ALL FOLIAGE AND RUNOFF TO DRY THOROUGHLY.**

**Three Pathogen  
[FOUR PART]Calla Fungicide Drench Chart**  
All rates below are designated per 100 gal  
( ) indicates they are per 100 liters

**(1) ERWINIA**

**RATES**

⊕ Agrimycin-17 (streptomycin sulfate 21.2% ai) <i>powder</i>	8-16 oz/100 gal. (60-120 gm/100 L)
Phyton-27 (copper sulfate pentahydrate 21.4% ai) <i>liquid</i>	13-20 oz/100 gal. (100-156 ml/100 L)

**(2) WATER MOLDS**

⊕ Subdue Maxx (mefenoxam 25.1% ai) <i>liquid</i>	0.5-1 oz/100 gal. (4-8 ml/100 L)
⊕ Aliette (fosetyl-aluminum 80% ai) <i>powder</i>	13 oz/100 gal. (98 gm/100 L)
Terrazole (Etridiazole 35% ai) <i>powder</i> **	4-6 oz/100 gal. (30-45 gm/100 L)
Segway/Ranman (cyazofamid 53.45% ai) <i>liquid</i> **	2-6 oz/100 gal. (16-48 ml/100 L)

**(3) RHIZOCTONIA**

⊕ Heritage (azoxystrobin 50% ai) <i>powder (also Pythium control)</i>	4 oz/100 gal. (30 gm/100 L)
Prostar (flutolanil 70.0% ai) <i>powder</i>	3-6 oz/100 gal. (22.5-45 gm/100 L)
Medallion (fludioxonil 50% ai) <i>powder</i> **	2 oz/100 gal. (15 gm/100 L)
3336 Clearys (thiophanate methyl 46.2% ai) <i>liquid</i>	20 oz/100 gal. (156 ml/100 L)
26019 Chipco (iprodione 50% ai) <i>powder</i>	6.5 oz/100 gal. (49 gm/100 L)

⊕ **Primary four-part tank mix**

\*\* Especially in Terrazole, and to a lesser extent in Medallion, we have very effective pathogen controls. However, some delay (3-6 days) in early growth, under sub-optimal conditions, has been observed. For these reasons, we have removed these two effective materials from our first and primary drench recommendations.

\*\* Segway/Ranman is a new and very effective chemical (trial in your conditions for best results)

\*\* Aliette combined with Phyton-27 can occasionally be phytotoxic for foliage. Be careful not to get this combined mix on the foliage.

PRODUCT REGISTRATIONS, LABELING AND AVAILABILITY VARY BY LOCALE. Due to the nature of our product being consumed internationally, please consult your local information or farm/grower extension agency for usages or alternatives. IF ANY OF THESE PRODUCTS ARE NOT AVAILABLE IN YOUR LOCALE, THEN ADDRESS THE THREE MAJOR PATHOGENS COMPREHENSIVELY WITH THE BEST PRODUCTS AVAILABLE. Seek appropriate consultation for your area/region. Callas tend to be tolerant of most products, and we encourage experimentation (and record keeping) with new products or combinations on a trial basis. One such promising new product is the nutritional supplement potassium silicate, called Pro-Tekt (a Dyna-Gro product); which, in our trials, has demonstrated immune supportive benefit. Silicates are also correlated with stronger stems and tougher leaves more resistant to foliar pathogens.

#### **BIOLOGICAL AND ALTERNATIVE (GREEN) APPROACHES:**

As a supplement to chemical controls or where no chemicals can be used, a media incorporation of the biological control Trichoderma is useful as Root Shield (@ 1 lb/yd<sup>3</sup> (593gm/m<sup>3</sup>) or Soil Guard (Gliocladium is related to Trichoderma) (@ 12 oz/yd<sup>3</sup> (445gm/m<sup>3</sup>). These are compatible with most fungicides and can help maintain healthy roots. Although less effective than incorporation, these biologicals can also be drenched at planting at 8oz/100 gal (60 gm/100L) but **should not be used as a substitute for a preventative fungicide drenching.** The use of Zero Tol (hydrogen dioxide 27% ai) at 1:1000 to 1:3000 for algae growth in constant feed has routinely proven to help manage pathogens as well.

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**INSPECT CROP WEEKLY** for cleared or browning roots and be sure to redrench as above if root problems are discovered. These chemicals will lose their effectiveness with time. The same is true of Trichoderma. For this reason, repeat recommended chemical drench combination with optional Trichoderma at 21-28 days and, if necessary, near day 42 as well.

**Leaf Spot:** As leaves unfurl, watch for leaf spot, and, if present, spray foliage with Champ II (copper hydroxide 37.5%) at 1-2 qt/100 U.S. gal. (2.5-5.0 ml/L) plus Dithane (mancozeb) at 1 qt/100 U.S. gal. (2.5ml/L) for bacterial problems. For fungal leaf spots, use Daconil Weather Stik (a.i. chlorothalonil @ 54%) at the rate of 22 volumetric ounces per 100 gallons (1.72 ml/L) or use Chipco 26019 26GT (a.i. Iprodione @ 23.3%) at the rate of 32 volumetric ounces per 100 gallons (2.5 ml/L). If both bacterial and fungal leaf spots are present, do a tank mix of above and **watch residues at the higher rates.** Reduce guttation leaf-tip water droplets by modifying greenhouse environment and ventilation. Guttation droplets can sometimes result in small necrotic spots due to salt concentrations along leaf margins, especially during times of high temperatures, overly dried pots and excessive fertilizer release with temperature-dependent slow-release fertilizers, or a lack of the recommended clear-water leachings.

**DO NOT COMBINE FOLIAR COPPERS WITH ALIETTE OR OTHER ACIDIFYING PRODUCTS OR WHERE WATER SOURCES THAT HAVE A PH THAT TENDS/MOVES BELOW 7.0 (NEUTRAL).** Test your solution for pH before spraying anything that may be in question. Always spray or drench in the morning or early enough to allow the materials to thoroughly dry, otherwise extensive activity while still in solution may lead to inadvertent phytotoxic damage.

Leaf tip clearing at emergence, which we refer to as "vidrio" can lead to foliar disease in dark, humid conditions and must be treated as above immediately to prevent worsening and possible collapse to secondary diseases. Also improve ventilation.

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**SANITATION:** Always remove diseased plants from the greenhouse or field area. Sanitation is critical, especially in multiple cropping programs where rot can progress without an obvious cause. Therefore, between crops, sanitize benches, floors, conveyors, containers, soil mixers, etc. See also control of Fungus Gnats and Shoreflies below. Consider soil fumigation/sterilization between crops in beds if disease is severe or worsening.

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**INSECTS:** Control aphids, thrips, shoreflies and fungus gnats (shoreflies and fungus gnats can spread bacteria; thrips and aphids spread virus): Orthene, Diazinon, Malathion, Tempo, Dursban, Maverik, Conserve, Endeavor and Marathon, for example, have been shown effective and non-phytotoxic. (Gnatrol and Exhibit are also very effective on fungus gnat larvae.) Check registrations in your area. Follow label rates. Callas tend to be tolerant to phytotoxicity of most sprays. Do small trials on new chemicals.

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**HARVESTING FLOWERS:** Pick flowers when the spathe is 3/4 to fully open and prior to pollen shed. Pollen shed usually occurs 4-7 days after flower is fully open. Flowers can be picked either by pulling stems or by cutting stems. There are advantages and disadvantages to both techniques. Pulling stems increases stem length and is

a much quicker technique. Place hand at base of stem and pull sharply. However, some research shows that younger flower primordia can be damaged this way and stem "stretching" or bruising can take place if picking is not done correctly. Adequate soil moisture is necessary to avoid stem stretching when pulling.

Cutting stems reduces chance of flower primordia damage as well as stem stretching. However, the procedure takes more time, especially, if the harvesting tool is to be sterilized between cuts to avoid potential spread of virus. Note: the resulting stem length can be considerably shorter.

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**POSTHARVEST HANDLING:** After picking, the flowers should be re-cut and graded. They should be put in a solution of flower preservatives but absent of sugars. This will reduce stem splitting and postharvest diseases.

Flowers should be stored at 35-39°F (2-4°C) if possible. Stems should be re-cut and solutions changed every two days, if not daily.

*NOTE: When bunching, do not bunch too tightly or solution uptake will be restricted.*

**ALWAYS WATCH FOR ERWINIA INFECTED PLANTS AND CAREFULLY REMOVE AND DISCARD.**

**THESE INSTRUCTIONS ARE NOT A PRESCRIPTION OR GUARANTEE, NOR RECOMMENDATIONS OR ENDORSEMENTS OF CHEMICALS MENTIONED.**



**MESSICK COMPANY LLC**

# MUST DO STEPS

# PAGE NO.

- 1) Order only Preconditioned Callifornia Calla® Tubers. If purchasing non-GA'd/..... 1  
"Not Preconditioned" tubers, follow new recommendations for dis-infectant and  
GA spraying.
- 2) Sort and air dry bulbs before planting..... 1
- 3) Plant with a range of 2-3" (5-7.5 cm) of media covering tu-ber.....3
- 4) Use well-drained media with good porosity. (Incorporation of Trichoderma or other .....3  
trialed biologicals is beneficial).
- 5) Follow proper water management recommendations.....3-4
- 6) Follow fertility recommendations and avoid ammonium forms of nitrogen.....4  
Clear water leach every third to fifth irrigation.
- 7) Follow optimal temperature regimes by stages.....4
- 8) Drench within 2 - 6 days of planting "preconditioned" tubers using the chemical.....4-6  
combinations mentioned.
- 9) Re-drench with our recommended strong preventative program day 14 to 21 and .....5-6  
again day 40-47.
- 10) Maintain greenhouse and field sanitation.....6
- 11) Control, fungus gnats, shoreflies, chewing larvae, as well as thrips and aphids, .....6  
to reduce virus spread. Additionally, control leaf & flower spot to avoid pathogen  
spread and flower blemishes.
- 12) Change cut flower water solution and use "sugar free" preservatives, daily or .....7  
at a minimum, on alternate days.