Cultural "Bullet Points" for some of the Newer Cutting Produced Plant Material for Spring Production 2007

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Angelonia

- Constant feed 150 ppm. pH 5.5 to 6.2 with high iron requirement. Water stress causes tip burn.
- Establish with night temperatures 62-65°, can finish crop at 60-62°.
- Finishing times: 1 per 4" pot 8 weeks, 2 per 6" pot 8-10 weeks. Timing longer in low light. Florel causes significant tip burn even @ 100 ppm per Ball FloraPlant.
- Common problems: *Pythium*, *Rhizoctonia*, aphids, whiteflies, thrips.
- PGR's: Ball FloraPlant and others recommend foliar spray of 1500 ppm Cycocel and 3000 ppm B-Nine tank mix.

Abutilon (Flowering Maple)

- Establish with 65° night temps, finish with 62-65° nights. Days about 5 degrees higher.
- Pinch plants as soon as established. (Florel can be trialed at 250-300 ppm per Peter Konjoian). Follow with foliar sprays of Cycocel @ 1500 ppm as needed.
- Finishing times: 1 per 4" pot 5-7 weeks, 2 per 6" pot 6-8 weeks.
- 150 ppm constant feed, excess nitrogen decreases blooming. pH 5.8 to 6.3
- Aphids, mites, whiteflies are common pests.

Argyranthemum

- 200 ppm constant feed, pH 5.5-6.0, elevated iron and magnesium requirements.
- Establish plants at 62-64° nights then grow on at 55-60°. Nights can be lowered to 50° but it increases crop time. Day temperatures should be about 5° higher than nights.
- Finishing times: 1 per 4" pot 6-8 weeks, 1 per 6" pot 8-10 weeks. Pinch once or use Florel at 500ppm as soon as plants are established.
- B-Nine® can be used to control height on vigorous cultivars at 2500 ppm. Multiple applications will delay flowering. 1-2ppm Bonzi drenches are also effective.
- Aphids, thrips, and whiteflies are primary pests.

Bacopa

- 200 ppm constant feed, pH 5.5-6.0, elevated iron and magnesium requirements.
- Establish plants 65° nights, then finish at 60-62°. Lower night temps encourage botrytis. Day temperatures 5° higher than nights.
- Finishing times: 1 per 4" pot 5-6 weeks, 4 per 10" HB 8-10 weeks. Florel® 500 ppm or soft pinch as soon as established. Repeat in two weeks for baskets or larger containers.
- Whiteflies, thrips, *Botrytis*, *Rhizoctonia* and *Pythium* are prevalent problems. Drench with a broad-spectrum fungicide at planting. Maintain good air movement and utilize preventative fungicide sprays when the canopy gets tight.
- Recommend partial shade to final customer. Drying out, not heat, blasts flowers and buds.
- Some growers have reported 1-2 ppm Bonzi drenches have been effective producing more compact growth.

Calibrachoa

- 300 ppm constant feed, pH 5.3-5.8, elevated iron and magnesium requirements.
- Establish at 62-65° nights then finish 55-62°. The cooler nights encourage blooms. Day temperatures should be 5° higher than nights.
- Self-branching, but plants still benefit from a soft pinch or Florel® @ 500 ppm as soon as established. No additional treatments needed.
- Finishing times: 1 per 4" pot 6-8 weeks, 4 per 10" basket 10-12 weeks. Long day plants, schedules can be shortened with mum lights extending days to 14-16 hours.
- Root and stem rots, aphids, and thrips are common problems. Drench with a broad-spectrum fungicide at planting and again in 4 weeks. Lower leaf yellowing sometimes is caused by Powdery mildew. Check for indistinct white powder with a hand lens.
- Responds to 2500 B-Nine®/1500ppm Cycocel®, 20 ppm Sumagic or 30 ppm Bonzi® if needed. Two applications of B-Nine® may delay bloom. 1-2ppm Bonzi drenches have been effective.

Coleus (vegetative)

- 150 ppm constant feed, pH 5.7-6.2.
- Establish and grow on at 63-65° to minimize botrytis and stem rot problems. Day temperatures should be about 5° higher.
- Finishing times: 1 per 4" pot 4-6 weeks, 1 per 6" pot 6-8 weeks. Most cultivars are best suited to 6" or larger containers, Duckfoot™ and similar cultivars can be done in 4".
- Florel® 500 ppm or soft pinch as soon as established. Repeat in two weeks for containers larger than 6".

- *Botrytis*, stem rots and thrips are the primary problems. Use a broad-spectrum fungicide drench at planting. Downy mildew can cause necrotic patches of leaf tissue.
- Bonzi® 30 ppm or Sumagic® 20 ppm can be applied at 14 day intervals if needed. 1-2 ppm Bonzi drenches are effective.

Diascia

- 150-200ppm constant feed, but only 100ppm for the first three weeks. pH 5.2 to 5.8, elevated iron requirement.
- Establish at 60-62° nights, grow on at 50-60° nights to enhance flowering. Day temperatures should be about 5° higher.
- Hand pinch or use 500 ppm Florel® as soon as established. They can be cut back if they become overgrown the same way you would a verbena.
- Finishing times: 1 per 4" pot 8-10 weeks, 4 per 10" baskets 12 weeks.
- *Pythium* (do not bury crowns and use a broad spectrum fungicide at planting), *Botrytis*, aphids, thrips, and whiteflies are the primary pests.
- Foliar sprays of B-Nine® 2500 ppm, or Bonzi® 30 ppm for height control. 1-2ppm Bonzi drenches are also effective.
- Good cool weather tolerance and new cultivars have improved heat tolerance as well, but the number of blooms decreases in extended periods of hot weather. High light plant. Water stress can cause flowers to blast.

Helichrysum (Bracteantha), flowering

- 200 ppm constant feed, pH 5.5-6.3.
- 63-65° nights, cooler nights encourage disease. Day temperatures should be about 5° above night temperatures. Hand pinch or 500 ppm Florel® at planting. Finishing times: 1 per 4" pot requires 6-7 weeks, 4 per 10" basket 10 weeks.
- *Pythium*, *Phytophthora*, aphids, thrips. Drench with a broad-spectrum fungicide at planting and again 4 weeks later. Downy mildew has been reported the past few years.
- B-Nine® 2500 ppm, or Bonzi® 20 ppm are effective but generally not required. Some growers have used 1 ppm Bonzi drenches with good results.
- Running plants on the drier side for the first 4-5 weeks can reduce root and stem diseases.

Helichrysum, ("trailing dusty miller")

- Constant feed 200 ppm, pH 5.5-6.3
- 65° nights, can cool to 57-60° as they mature. Day temperatures should be about 5° above night temperatures. Pinch or 500 ppm Florel® as soon as they are established and again 2 weeks later. Only one treatment is needed for 4" production. 1 ppm Bonzi drenches have been effective on less vigorous cultivars, use 2 ppm on all of the others.
- Finishing times: 1 per 4" pot 6 weeks, 3-4 per 10" basket 8-10 weeks. Variegated, "lime", and dwarf may take 1-2 weeks longer.

- Root rots, *Botrytis*, and aphids are the primary pest problems. Drench with a broad-spectrum fungicide drench at planting.
- The regular silver leaf type is quite aggressive, use with equally fast growing items in combination plantings.

Impatiens, (double)

- Constant feed 150 ppm. pH 5.5-6.2. Somewhat elevated need for iron and magnesium.
- Establish at 63-65° nights, finish at 60-62°. Day temperatures should be about 5° above night temperatures. 300 ppm Florel® as soon as established (repeat in 2 weeks on baskets), or hand pinch 2 week after planting.
- Finishing times: 1 per 4" pot 6 weeks, 4 per10" HB 8-10 weeks.
- Aerial *Rhizoctonia*, aphids, spider mites, and thrips are the primary pests.
- Bonzi® foliar spray 20-30 ppm, or drench 1 ppm @ 10 oz per 10" basket. Sumagic® can be sprayed at 5 ppm. Variegated foliage varieties use ½ of the previous rates.
- Leaf cupping on variegated varieties is usually due to different growth rate of green and white portions of the foliage.
- High light levels can cause leaf yellowing. Thrips and water stress can lead to buds dropping before they open.

Ipomoea (Sweet Potato Vine)

- Constant feed 200 ppm, pH 5.7-6.3.
- Establish liners at no less than 65° nights, prefer bottom heat. Finish at 62-65° nights. Day temperatures should be at least 5° above night temperatures. Heat loving plant!
- One pinch as soon as established, and as needed to shape. 500 ppm Florel® produces compact, free branching habit per Peter Konjoian. Don't use Florel on the tri-color varieties.
- Finishing times: 1 per 4"-6" pot 6-7 week, 3 per 10" HB 10-12weeks. Allow extra time for the tri-color varieties.
- Root rots can be a problem, particularly if started too cool. Aphids, spider mites and whiteflies are primary pests. White raised growths on top of leaves is an oedema like disorder, not a disease. Broad mites can cause distorted terminal growth. Young growth may look "burned".
- Tubers that form are not poisonous (but not very tasty either!).

Lamium

- 200 ppm constant feed, pH 5.5-6.3.
- Establish at 65° nights, can finish at 50-60°. Day temperatures should be about 5° above night temperatures. If liners are not already pinched, pinch them at time of

planting. 500 ppm Florel® produces good branching and compact habit per Peter Konjoian.

- Finishing times: 1 per 4” pot 7-8 weeks, 4 per 10” basket 10 weeks.
- Primary pests include: root rots, spider mites and whiteflies. Drench with a broad-spectrum fungicide at planting.
- Responds to foliar sprays of 30 ppm Bonzi or 5 ppm Sumagic per Sawyer Nursery trials. 1ppm Bonzi drenches can also be used when plants are 75% or more of finished size.

Lantana

- 200 ppm constant feed, pH 5.5-6.3.
- Establish liners at no less than 65° nights. Can finish at 62° but 65° is better. Keep day temperatures 5-10° higher than nights.
- Pinch at planting and repeat in 2-3 weeks, or two applications of Florel® @ 500 ppm two weeks apart with the first spray applied as soon as plants are established in the final container. Use only one pinch or Florel® treatment on 4” pots.
- Finishing times: 1 per 4” pot, 5-7 weeks, 4 per 10” basket 8-10 weeks. Night temps less than 65 degrees increase crop time.
- Spider mites, thrips, whiteflies and aphids are common pests.
- Full sun plants that tolerate high temperatures.

Mimulus

- 200 ppm constant feed, pH 5.7-6.2.
- Establish plants at 60-62° nights then cool to 50-55°. Day temperatures should be 5° higher than nights. Warmer temperatures produce softer less desirable growth.
- Finishing times: 1 per 4” pot 9-11 weeks, 1 per 6” pot 12-14 weeks, 4 per 10” HB 12-14 weeks. Pinch at planting if not already done and repeat in 2-3 weeks for 6” and larger pots.
- B-Nine® can be used at 2500 ppm to tone growth. Multiple applications will delay flowering.
- *Botrytis*, powdery mildew, aphids, thrips and whiteflies are the primary pests. Preventative foliar sprays for botrytis are recommended.

Nemesia

- 200 ppm constant feed, pH 5.5-6.0, elevated iron requirement.
- Establish liners at 60-63° nights, then can cool to the 50’s. Cooler nights produce sturdy plants but lengthens crop cycle. Day temperatures should be about 5° above night temperatures.
- Finishing times: 1 per 4” pot 8 weeks, 4 per 10” basket 12 weeks (14 if finished below 55°). Pinch or use Florel @ 500 ppm once, 1-2 weeks after planting.
- Primary pests: *Botrytis*, aphids, spider mites, thrips, whiteflies.

- B-Nine® can be used at 2500-5000 ppm. Bonzi® or Sumagic can be used as a 30 ppm foliar spray. Bonzi drenches at 1ppm have been reported to be effective.
- Avoid water stress. Wilting blasts flower buds and yellows foliage.

Osteospermum

- 200 ppm constant feed, pH 5.3-5.8, elevated iron requirements.
- Establish liners at 60° night temperature then cool to 45-50°. Cooler nights can be used but it lengthens crop times. Day temperatures should be 5° higher than nights.
- Finishing times: 1 per 4"-6"pot or 4 per 10" HB requires 14-16 weeks at 50-55° nights. Only compact varieties are well suited to 4" pots. Pinch once two weeks after potting.
- Aphids, thrips, and whiteflies are the primary insect pests. *Botrytis* stem canker can be a major problem particularly in the first weeks after transplanting.
- B-Nine® can be applied at 2500 ppm, or a 20 ppm foliar spray of Bonzi. None needed for Orange Symphony.

Petunias, (vegetative and waves)

- 300-350 PPM constant feed (see the appendix for tips on using controlled release fertilizer), pH 5.3-5.8, elevated iron requirement.
- 60-65° nights to establish liners then grow on at 50-60° can be cooled into 40's for finishing, but lower night temperatures increase crop time and botrytis potential. Day temperatures should be about 5° above night temperatures.
- Apply a foliar spray of 500 ppm Florel® as soon as established. If they overgrow they can be cut back again with a 2-3 week re-bloom period.
- Finishing times: 1 per 4" pot 4-6 weeks, 3 per 10" HB 5-7 weeks. Long days or lighting to extend days are needed to achieve the shorter crop times.
- Aerial *Rhizoctonia*, *Thielaviopsis*, aphids, budworms, thrips are the primary pests.
- B-Nine® is effective as a 5000 ppm foliar spray but there is some flower delay with two or more applications. Bonzi® can be used as a 45 ppm foliar spray, or a 4 ppm drench with 10 oz per 10" basket. Bonzi® drench is most effective when plants first reach the edge of the container. Some growers prefer a 20ppm Sumagic foliar spray.

Portulaca, (purslane type)

- 200 ppm constant feed, pH 5.5-6.5.
- Establish liners at 65-68° nights, finish at 62-65°. Day temperatures should be about 5° above night temperatures.
- A soft tip pinch is all that is usually required to encourage branching. 500 ppm Florel® causes good branching but may cause excessively small leaves or even defoliation per Peter Konjoian. Consider a limited trial of 300 ppm.
- Finishing times: 1 per 4" pot 6-8 weeks, 4 per 10" basket 10-12 weeks.

- Primary pests: root rots, aphids, thrips. Use a broad-spectrum fungicide at planting and run dry the first few weeks of production.
- Heat and drought tolerant plants.

Scaevola

- 200 ppm constant feed, pH 5.3-5.8, elevated iron requirement. Low phosphorus fertilizer recommended.
- 65° nights to establish liners, then finish at 60-65°. Day temperatures should be about 5° above night temperatures.
- 4" pots should be pinched or given a 500 ppm Florel® foliar spray as soon as established. For larger containers repeat in 2 weeks.
- Finishing times: 1 per 4" pot 6-7 weeks, 4 per 10" HB 10-12 weeks.
- Primary pests: root rots, aphids, thrips, spider mites and whiteflies. Drench with a broad-spectrum fungicide at planting.
- 20 ppm Sumagic® foliar spray, or 30 ppm Bonzi® foliar spray. 1ppm Bonzi drenches are effective.
- Consider compact cultivars for 4" pots.

Snapdragons, trailing

- 150 ppm constant feed, pH 5.3-5.8, elevated iron requirements.
- 60° nights to establish, then drop to 40-55° to encourage flowering. Day temperatures should be about 5° above night temperatures.
- 500 ppm Florel® as soon as established or a soft pinch. If they go out of bloom during hot weather they can be cut back to re-bloom in the fall.
- Finishing times: 1 per 4" pot 6-7 weeks, 4 per 10" basket 8-10 weeks. Faster flower response with long days.
- Primary pests: *Thielaviopsis*, *Botrytis*, downy mildew, aphids, and thrips.
- Foliar sprays of 5000 ppm B-Nine®, 30 ppm Bonzi®, or 30 ppm Sumagic® can be used if needed. 2 ppm Bonzi drenches have worked well.
- Consider as a fall crop along with mums, ornamental kale, etc.

Strobilanthes (Persian Shield)

- 100 ppm constant feed, pH 5.5-6.3.
- 62-65° night temperatures. Day temperatures should be about 5° above night temperatures.
- Pinch at planting and as needed for height control.
- Finishing times: 1 per 4-6" pot, 6-8 weeks
- Primary pests are aphids and whiteflies.
- Reduce internode elongation with foliar sprays of B-Nine® 2500 ppm, or Bonzi® 30ppm.
- Avoid drying to the point of wilting as it yellows lower leaves.

Torenia, (Vegetative)

- 200 ppm constant feed, ph 5.5-6.2, elevated iron requirements.
- Establish liners at 65° nights, finish at 60-62°. Day temperatures should be about 5° above night temperatures.
- Only one soft pinch at planting is needed. Florel® is not recommended on this crop.
- Finishing times: 1 per 4"pot 8 weeks, 4 per 10" basket 10-12 weeks..
- Very few pest problems. Occasionally aphids, broad mites and thrips are problems.
- Responds to 2500 ppm B-Nine® but is seldom required.
- Promoted as a full sun plant but it seems to prefer a morning sun garden location.

Verbena

- 200 ppm constant feed, pH 5.3-6.0.
- Establish plants 65° nights, and then finish at 60-62°. Day temperatures 5-10° higher than nights.
- Pinch at planting and repeat in 2-3 weeks, or two applications of Florel® @ 500 ppm two weeks apart with the first spray applied as soon as plants are established in the final container.
- Finishing times: 1 per 4" pot 5-7 weeks, 4 per 10" basket 8-10 weeks.
- Spider mites, thrips, whiteflies and aphids are common pests. Powdery mildew and a bacterial leaf spot caused by *Pseudomonas* are the most prevalent foliar diseases.
- Height control: B-Nine® 5000 ppm, foliar sprays of Bonzi® at 30 ppm, or Sumagic® at 20 ppm. Bonzi drench at 1-2 ppm can be used.

Appendix:

Fertilizing heavy feeders with slow release fertilizer- Vegetative and "wave" type Petunias and Calibrachoas have higher feed requirements than most other basket material. Growers who traditionally fertilize their baskets at 200 ppm may find it difficult to provide these crops with adequate fertilizer. A potential remedy is to supplement these heavy feeders with slow release so they do not need to set up a separate feeding program just for these items. The following rates are for Osmocote® 15-9-12 (5-6 month), or Nutricote® 13-13-13 (100 day).

Crop	10" hb w/200ppm CLF	10" hb no liquid feed	12" hb w/200ppm CLF	12" hb no liquid feed
Calibrachoa	4 teas	2 TBLS	2.5 TBLS	3 TBLS & 1 teas
Petunia (veg and "Wave" type)	2 TBLS	3 TBLS	3 TBLS & 1 teas	5 TBLS

Growth Regulator Calculations- Use the following conversions to calculate rates of growth regulators:

A-Rest®, .5oz per gallon equals 1 ppm.

B-Nine® WSG, 1 scoop, (2 level teaspoons) per gallon equals 1250 ppm .

Bonzi®, 1 teaspoon per gallon equals 5 ppm, 1 ml per gallon equals 1 ppm.

Cycocel®, 1.6 ounces per gallon equals 1500 ppm.

Florel®, 1.6 oz per gallon is equal to 500 ppm. 1.0 oz per gallon yields 300 ppm.

Sumagic®, 1.25 oz per gallon is equal to 5ppm.

Insects and Diseases- Pest problems mentioned in this bulletin and their treatments are contained in a document from Griffin titled, "Insecticide and Fungicide Options 2007", available at no charge to Griffin customers.

Iron chelate supplements- because iron is an immobile element, deficiency symptoms are seen in the younger growth first. Adjusting soil pH to the recommended range, usually 5.3-5.8 for crops that need a lot of iron, is the best way to avoid iron deficiency. Soil pH above this range reduces the availability of iron. Heavy feeding crops may need additional iron even with the correct soil pH. Green veins with the tissue between veins turning yellow may indicate an iron deficiency. Use a reputable testing lab to confirm the deficiency. Using a chelated source of iron such as Sprint®138 or Sprint 330 makes iron available over a wide range of soil pH's. Foliar applications are not recommended due to the likelihood of phytotoxicity. 3-5 oz per 100 gallons is generally enough to solve iron related deficiencies in herbaceous crops. Apply as a normal irrigation to plants not under water stress. Although Sprint® is compatible with Epsom salts it is best if not mixed with your regular balanced water-soluble fertilizer. Caution: Geraniums (except ivy), and marigolds are subject to iron toxicities so do not use Sprint® on these crops unless clearly indicated by media analysis.

Magnesium supplements- magnesium is a mobile element; therefore deficiency symptoms appear first on the lower leaves. Watch for intervienal chlorosis starting with the lowest leaves. Epsom salts is an inexpensive and safe way to supplement magnesium. Soil drench applications of 8 oz per 100 gallons supply ample amounts of water-soluble magnesium. This can be repeated as needed without risk of burning. At low rates, 1-2 oz per 100 gallons, it can be mixed with non-calcium based water-soluble fertilizers as a continual feed. Peters 18-8-17 contains elevated levels of magnesium as do some other fertilizers.

Soil pH adjustments- Griffin can test your water to help match up fertilizer and acid injection (if needed) programs with the crops you are growing. Even with proper planning soil pH values can rise or fall out of the target range for your crops. Soil pH is critical to the availability of micronutrients, making it well worth your while to monitor and adjust this parameter as needed. Lowering soil pH is usually best accomplished by injecting sulfuric acid through your irrigation water. Sometimes acid forming fertilizers can be used. Raising soil pH can be done in a number of different ways. Cleary's® Limestone-F and potassium bicarbonate have been successfully used to correct low pH problems. If only a small upward adjustment is needed basic reaction fertilizers may be sufficient. Contact the Technical Support Department, or your sales representative at Griffin for detailed help in setting up these treatments.
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