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**ARTIST® AGERATUM**

**NUTRITION**

**pH:** 5.8 – 6.2  
**EC:** (2:1 extraction method) 0.6 – 0.9  
Constant feeding at 150 – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

**TEMPERATURE**

**Rooting out:** 65 – 72 F  
**Growing on:** 65 – 72 F  
**Holding:** 50 – 60 F

**WATERING**

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. Growing at lower moisture levels can be beneficial towards producing a more compact blooming plant with less PGRs (plant growth regulators) required. This practice can also be used to help “hold” plants.

**TIMING**

*4”–5”*: 4 – 5 weeks with one Standard 84 cell plant per container.  
*6”/1GL Royale™*: 6 – 7 weeks with one Standard 84 cell plant per container.  
*8”*: 4 – 9 weeks with one to three Standard 84 cell plants per container.

**PLANTING**

Standard 84 liner cell plants should be planted into a well-drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually two to four weeks after planting.

**LIGHT/LIGHTING**

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Artist® Ageratum flower very early and supplemental lighting should not be required for early spring flowering.

**GROWTH REGULATORS**

If required, either a light spray of Sumagic® (uniconazole) at 2ppm – 5ppm or a more thorough application (just to the point of runoff) of B-Nine® (daminozide) at 2,500ppm – 5,000ppm is effective. Other materials such as Bonzi® (paclobutrazol), Topflor® (flurprimidol), and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic. Drenches should not be needed. Cooler growing temperatures and especially drier growing practices can be very helpful at managing plant size.

**PEST and DISEASE MANAGEMENT**

There should be little instance of disease if basic cultural guidelines are followed. Whiteflies can be a pest of concern.

**OUTDOOR GROWING SCHEDULE**

Artist Ageratum should be grown outdoors only after the danger of frost has past. The foliage can be damaged from a very light frost. At Four Star, we would only move these outdoors in early to mid-May.

**OTHER TIPS**

The Artist Ageratum can be grown much like a seed Ageratum. Their chief advantages are better form, continual flowering, and much better heat tolerance.

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The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

www.pwfourstar.com  
734.654.6420
Angelface® Angelonia

NUTRITION
pH: 5.8 – 6.2
EC: (2:1 extraction method) 0.6 – 0.9
Constant feeding at 150 – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE
Rooting out: 65 – 72 F
Growing on: 65 – 72 F
Holding: 65 – 68 F

WATERING
Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. To avoid lower leaf soft rots in lower light, cooler temperatures, or higher humidity situations, water early in the day as needed to avoid prolonged exposures of water on lower foliage. Proper air movement is helpful.

TIMING
4” – 5”: 5 – 6 weeks with one 42 cell Supernova® plant per container.
6”/1GL Royale™: 7 – 8 weeks with two or three 42 cell Supernova plants per container.
8”: 8 – 9 weeks with three 42 cell Supernova plants per container.

Supernova 42 liners are used at Four Star and recommended for best flower timing, flower count, and plant size in smaller containers. Supernova 84 liners are produced primarily for longer distanced customers. They often do not perform as well as the Supernova 42s, but usually are better performers than Standard 84s. We recommend one extra week of crop time for containers grown from Supernova 84s, as compared to Supernova 42s. If Standard 84s are used for spring production, supplemental lighting, additional crop time, pinching, and additional PGR (plant growth regulator) applications are required. Standard 84 liners are recommended for summer to fall finished crops.

PLANTING
Angelface® Angelonias should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched – when using Supernova liners, further pinching is not recommended. If using Standard 84 liner plants, a second pinch may be needed in the case of taller material at time of planting or with plants for larger containers. This second pinch can be given for larger containers, usually two to four weeks after planting.

LIGHT/LIGHTING
Angelface Angelonias should be grown in a high light area of the greenhouse for optimal flowering and plant development. Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled well before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. For scheduling considerations Blue, Dark Violet, Pink, Wedgewood Blue, and White flower in roughly this order. Dresden Blue flowers later and should be used for later production. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring to mid-spring finish dates. Additional PGR treatments will also be required on non-Supernova treated plants.

Angelface® Blue – 4.25" Grande™ at 4 weeks

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
GROWTH REGULATORS
If required, either a light spray of Sumagic® (uniconazole) at 2ppm – 5ppm or a more thorough application (just to the point of runoff) of B-Nine® (daminozide) at 2,500ppm – 5,000ppm is effective. Proper growing temperatures and especially drier growing practices can be very helpful at managing plant size. Dark Violet should require little if any PGR treatments and if required 2,500ppm B-Nine is a good starting rate. Blue, Pink, Wedgewood Blue, and White can be treated as needed with a Sumagic spray at 2ppm – 5ppm or B-Nine spray at 2,500ppm – 5,000ppm rate. Dresden Blue should be treated with Sumagic at 5 – 10ppm or B-Nine at 5,000ppm spray rate. Drenches of Bonzi® (paclobutrazol) can be applied at 1ppm to Blue, Pink, Wedgewood Blue, and White and 1 – 2 ppm on Dresden Blue. Bonzi drenches are not recommended for Dark Violet.

Treatments are usually made to smaller containers: seven to 14 days after planting. Treatments to larger containers can be made when a desired “pre-finished” size is attained (two to four weeks after planting). Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base while in more southern areas, the higher rates will probably be needed.

Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi. Florel® (ethephon) should not be used, due to possible leaf tip burn and distortion.

PEST and DISEASE MANAGEMENT
Leaf spotting and soft rots due to improper watering are the most common disease issue. Proper watering practices, high light conditions, and good air movement will greatly reduce any possible issues. Aphids are the most common pest, with whiteflies also a concern.

OUTDOOR GROWING SCHEDULE
Angelface Angelonia should be grown outdoors only after the danger of frost has past. The foliage can be damaged from a very light frost. At Four Star, we would only move these outdoors in early to mid-May based on weather conditions.

OTHER TIPS
Supernova treated liners are highly recommended for most grower uses. For best combination planting performance, vigor considerations should be made of all plants used, if you are mixing Supernova treated plants with non-Supernova treated plants. Angelonia as a genera is a high light and heat loving plant. It is best suited for mid-spring and summer production. If grown too cool, plants can be stunted. Dark Violet is the most sensitive to both cool temperatures and PGRs. The four varieties of Angelface Angelonia available in the 28 count Supernova Thriller™ tray are designed to be used for possible fast finish in larger monoculture containers and especially as the center “Thriller” plant in upright combination plantings.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

www.pwfourstar.com
734.654.6420
Butterfly and Molimba®
Argyranthemum

NUTRITION

pH: 5.8 – 6.2
EC: (2:1 extraction method) 0.6 – 0.9
Constant feeding at 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

Rooting out: 65 – 72 F
Growing on: 62 – 68 F
Holding: 45 – 50 F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to slightly dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. To avoid lower leaf soft rots in lower light, cooler temperatures, or higher humidity situations, water early in the day if needed to avoid prolonged exposures of water on lower foliage. If watering from overhead in poor growing conditions, make sure to supply good air movement to avoid fungal/bacterial diseases.

TIMING

4” – 5”: 4 – 5 weeks with one 42 cell Supernova® plant per container.
6”/1GL Royale™: 5 – 7 weeks with one to two 42 cell Supernova plants per container.
8”: 7 – 9 weeks with two to three 42 cell Supernova plants per container.

Supernova 42 liners are used at Four Star and recommended for best flower timing, flower count, and plant size in smaller containers. Supernova 84 liners are produced primarily for longer distanced customers. They often do not perform as well as the Supernova 42s, but usually are better performers than Standard 84s. We recommend one extra week of crop time for containers grown from Supernova 84s, as compared to Supernova 42s. If Standard 84s are used for spring production, supplemental lighting, additional crop time, pinching, and additional PGR (plant growth regulator) applications are required. Standard 84 liners are recommended for summer to fall finished crops.

PLANTING

All Argyranthemum liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. When using Supernova treated liners, NO pinching is required. If Standard liners are used, 1GL Royale containers planted 1ppp should be pinched and larger containers planted either 1ppp or multiple plants per pot should also be pinched. Butterfly and Vanilla Butterfly® liner trays can dry out quickly and should be planted as soon as possible, or extra watering care should be devoted to them.

LIGHT/LIGHTING

Argyranthemum should be grown in a high light area of the greenhouse for optimal flowering and plant development. Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled well before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring to mid-spring finish dates, and additional PGR treatments will be required, in comparison to plants grown from Supernovas.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
GROWTH REGULATORS
When being grown from Supernova liners, either a light spray of Sumagic® (uniconazole) at 5ppm – 10ppm or a 1ppm Bonzi® (paclobutrazol) drench can be applied to control growth. Treatments are usually made to smaller containers seven to 14 days after planting. Treatments to larger containers can be made when a desired “pre-finished” size is attained (two to four weeks after planting). In more northern areas, the lower rates should be used as a starting base, although no PGRs (plant growth regulators) may be needed in smaller containers. For more southern areas, higher rates of spray or drench will probably be needed. Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs.

Cooler growing temperatures, high light levels, proper spacing, and drier growing practices can be very helpful at managing plant size. Supernova treated plants should require few PGR treatments.

Plants grown from Standard 84 liners will require at least one drench at 1 – 3ppm Bonzi and possibly one to two light sprays of Sumagic at 5ppm – 10ppm. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

PEST and DISEASE MANAGEMENT
Pest and disease practices should be followed as with most crops. Lower leaf spotting/rots due to improper watering is the most common disease issue. In poor growing conditions, a fungicide spray may be needed to prevent or cure leaf/stem soft rots. Copper-based materials are very helpful in these situations.

OUTDOOR GROWING SCHEDULE
Butterfly, Helio White, and Vanilla Butterfly Argyranthemum can be grown outdoors as an early group genera (first out early to mid-April in Michigan), if frost protection is provided. If no frost protection is provided, they are a second out group (late April in Michigan). Molimba® Pink (due to slightly less vigor) should remain indoors and move outdoors third (early May in Michigan).

OTHER TIPS
Supernova treated liners are highly recommended for most grower uses. Supernovas are not recommended or required for baskets and large containers. But, many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different than from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the growing season when not possible from a Standard liner. For best combination planting performance, vigor considerations should be made of all plants used, if mixing Supernova treated plants in with non-Supernova treated plants. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic or Bonzi to any Standard liners used may be helpful to even out plant growth.
Goldilocks Rocks® and Peter’s Gold Carpet *Bidens*

**NUTRITION**

*pH*: 5.8 – 6.2  
**EC**: (2:1 extraction method) 0.6 – 0.9  
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

**TEMPERATURE**

- **Rooting out**: 65 – 72 F  
- **Growing on**: 58 – 68 F  
- **Holding**: 50 – 60 F

**WATERING**

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures.

**TIMING**

- **4” – 5”**: 4 – 6 weeks with one 84 cell plant per container.  
- **6”/1GL Royale™**: 5 – 7 weeks with one 84 cell plant per container.  
- **8”**: 5 – 9 weeks with one to two 84 cell plants per container.  
- **10 – 12”**: 9 – 12 weeks with three to five 84 cell plants per container.

**PLANTING**

84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually three to four weeks after planting.

**LIGHT/LIGHTING**

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Goldilocks Rocks® flowers earlier than Peter’s Gold Carpet and can be used for earlier production. Peter’s Gold Carpet will flower for peak week sales.

**GROWTH REGULATORS**

If required for Goldilocks Rocks, B-Nine® (daminozide) can be applied as a spray at 2,500ppm, or a light spray application of Sumagic® (uniconazole) at 5ppm. Caution should be taken using Sumagic with Goldilocks Rocks, as it is quite responsive to the PGR (plant growth regulator).

Peter’s Gold Carpet is much more vigorous than Goldilocks Rocks and is best suited for larger containers and baskets. One to two pinches after transplanting may be needed. B-Nine applied as a spray at 5,000ppm or Sumagic also at a spray at 5ppm – 10ppm are effective.

**PEST and DISEASE MANAGEMENT**

There should be little instance of disease if basic cultural guidelines are followed. Proper temperature, light levels, and water management will eliminate most disease issues. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be applied at transplant, if desired. In poor growing conditions, Botrytis or Powdery Mildew can develop. Whiteflies, Thrips, and Aphids can be pests of concern.

**OUTDOOR GROWING SCHEDULE**

Goldilocks Rocks and Peter’s Gold Carpet can be finished outdoors as a second group plant for moving outdoors. In Michigan, these are moved outdoors in early to mid-May. Frost protection should be provided if moderate to severe frost is forecast.

**OTHER TIPS**

- Goldilocks Rocks can be finished in small containers up to 10” mono baskets. They also perform well in combinations, when used with less than average to average vigor plants.  
- Peter’s Gold Carpet is best suited for larger containers and combinations containing average to above average vigor plants.  
- Proper soil pH levels should be maintained. Iron deficiency symptoms can develop in high pH situations. Also, if soil pHs reach 5.5 or lower, dark foliage color and plant stunting/distortion can occur.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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734.654.6420
**NUTRITION**

- **pH:** 5.5 – 6.0
- **EC:** (2:1 extraction method) < .6

Constant feeding at 100ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix, or feeding 150ppm – 200ppm nitrogen on an “as needed” basis is recommended.

**TEMPERATURE**

- **Rooting out:** 65 – 72 F
- **Growing on:** 65 – 72 F
- **Holding:** 40 – 50 F

**WATERING**

Maintain dry to moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid wilting, but do not grow moist or with long periods of wet soil, especially at cooler temperatures. Growing at lower moisture levels can be beneficial towards producing a more compact plant that blooms much earlier and requires little or no PGRs (plant growth regulators). This practice can also be used to help “hold” plants.

**TIMING**

- **4” – 5”:** 4 – 6 weeks with one Standard 84 cell plant per container.
- **6”/1GL Royale™:** 6 – 7 weeks with one Standard 84 cell plant per container.
- **8”:** 7 – 9 weeks with 2 – 3 Standard 84 cell plants per container.
- **10” – 12” Hanging Basket:** 9 – 12 weeks with 3 – 5 Standard 84 cell plants per container.

**PLANTING**

Standard 84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants should not require pinching, especially for small containers, unless slightly tall at time of transplant.

**LIGHT/LIGHTING**

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. All varieties flower well for spring finishing and daylength extension lighting should not be required.

**GROWTH REGULATORS**

If required, a light spray of Sumagic® (uniconazole) at 5 – 10ppm is effective. PGR applications will not be required if other culture recommendations are followed. Cooler growing temperatures and especially drier growing practices can be very helpful at managing plant size.

**PEST and DISEASE MANAGEMENT**

Cultural practices should be followed as listed in the general notes to avoid disease issues. In moist, low light, and higher humidity situations with poor air movement, Botrytis, Downy Mildew, and root rots can be a problem.

**OUTDOOR GROWING SCHEDULE**

Bracteantha can be grown outdoors as a third group to go outdoors. At Four Star, we would only move these outdoors in early to mid-May, based on weather conditions. The plants can be damaged from frost, cool, and wet conditions.

**OTHER TIPS**

Proper moisture and fertilizer management practices with high light conditions will produce a fuller, more compact plant that flowers much earlier and without disease issues. Flowering will be delayed if plants are kept moist constantly or fed too much. Fertilize at the lower recommended rates to avoid flower delay.

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The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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734.654.6420
NUTRITION

**pH:** 5.5 – 5.8  
**EC:** (2:1 extraction method) 0.8 – 1.2

Constant feeding at 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

**Rooting out:** 65 – 72 F  
**Growing on:** 55 – 68 F  
**Holding:** 40 – 50 F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to slightly dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. To avoid soft rots or root issues in lower light, cooler temperatures, or higher humidity situations, water early in the day, if possible (to avoid prolonged exposure of water on foliage). Follow the plant grouping suggestions listed below under PGRs (plant growth regulators) to assist in proper water management (Blackberry Punch and Lemon Slice will perform best if watered as an average vigor group plant).

TIMING

4” – 5”: 4 – 6 weeks with one 42 or 84 cell Supernova® plant per container.  
6”/1GL Royale™: 6 – 7 weeks with two 42 or 84 cell Supernova plants per container.  
8”: 7 – 8 weeks with three 42 or 84 cell Supernova plants per container.  
10” – 12” Hanging baskets: 8 – 11 weeks with three to five Standard 84 plants per container.

Superbells® should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days for establishing new rooting. When using Supernova treated liners, NO pinching is required unless deemed taller than desired. If Standard liners are used and if size allows, pinch at transplant. A preventative fungicide drench after planting is often helpful. A good preventative would be Banrot® (etridiazole plus thiophanate-methyl).

LIGHT/LIGHTING

Superbells® should be grown in a high light area of the greenhouse for optimal flowering and plant development. Supernova Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring finish dates. Additional PGR treatments may also be required on non-Supernova treated plants.

Supernovas are not recommended or required for baskets and large containers. But, many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different than from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the year when not possible from a standard liner. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic® (uniconazole) or Bonzi® (paclobutrazol) to the Standard liners is usually required to even out plant growth and vigor.

Larger upright or basket production needed for earlier season finishing should be planned, using varieties listed below as “earliest” to flower and/or grown from Supernova liners.

PLANTING

Superbells® should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days for establishing new rooting. When using Supernova treated liners, NO pinching is required unless deemed taller than desired. If Standard liners are used and if size allows, pinch at transplant. A preventative fungicide drench after planting is often helpful. A good preventative would be Banrot® (etridiazole plus thiophanate-methyl).
GROWTH REGULATORS
As required, either a light spray of Sumagic at 5ppm – 10ppm or Bonzi drench at 1ppm – 3ppm can be applied to control growth. Treatments are usually made to smaller containers seven to 14 days after planting. Treatments to larger containers can be made when a desired “pre-finished” size is attained (two to four weeks before scheduled finish). Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Cooler growing temperatures, high light levels, proper spacing, and drier growing practices can be very helpful at managing plant size. Supernova treated plants should require fewer PGR treatments than Standard 84 liners.

PGR requirements can vary greatly by variety and the plants should be grown if possible in the following groups for best performance:

1) Blue, Plum, Pomegranate Punch, and Yellow are the most vigorous varieties and will require the most PGR attention.
2) Apricot Punch, Blackberry Punch, Cherry Blossom, Dreamsicle, Grape Punch, Lemon Slice, Miss Lilac, Pink, Saffron, Scarlet, Spicy, Tequila Sunrise, Tickled Pink, White, Trailing Blue, Trailing Rose, and Trailing White have average vigor and will need less PGR treatment.
3) Cherry Red, Cherry Star, Coralberry Punch, Red, Sweet Tart, and Yellow Chiffon are less vigorous and should require less PGR treatments.

PEST and DISEASE MANAGEMENT
Preventative treatments for Aphids are recommended and plants should also be scouted well for Thrips. Proper growing environments and watering practices will be followed to avoid Botrytis and various stem or root rots. Superbells are trialed and tested for tolerance to these diseases but in poor conditions, diseases can develop. A preventative fungicide drench at time of planting can be considered.

OUTDOOR GROWING SCHEDULE
Superbells can be grown outdoors as a first (early/mid April in Michigan) out plant, if good frost/freeze protection is provided. If not, they perform best as a plant in the second group (mid April to early May in Michigan) moved outdoors.

OTHER TIPS
Supernova treated liners are highly recommended for growers’ small container uses. For best combination planting, performance vigor considerations should be made of all plants used, if mixing Supernova treated plants in with non-Supernova treated plants. PGR tray drenches or dips should be performed in many cases, if mixing Supernova plants with Standard liner plants.

Maintain proper soil pH levels to prevent possible root rot issues and iron deficiency. Soil test periodically. Test the water source for water nutrient levels and especially alkalinity levels. Select a soil mix and fertilizer blend to best maintain recommended soil pH levels. Soil pH levels below 6.0 should be a priority for proper plant performance.

It has been shown that something in the fungicides Medallion® (fludioxonil) and Palladium® (cyprodinil) can cause an unusual foliar spotting on Coralberry Punch. The symptoms are a “viral” like spotting on the upper most leaves at time of the chemical application. Symptoms usually appear 10 – 14 days after treatment. Foliage below the treated area and all new growth after the chemical treatment will be fine. It is recommended to avoid treatments of these two products to Coralberry Punch.

Flowering from Standard liners:
1) Apricot Punch, Coralberry Punch, Dreamsicle, Miss Lilac, Saffron, Sweet Tart, and Yellow Chiffon flower earliest.
2) Followed by Cherry Blossom, Cherry Red, Cherry Star (flowers early but needs higher light quality), Grape Punch, Lemon Slice, Pink, Pomegranate Punch, Scarlet, Spicy, Tequila Sunrise, White, and Yellow.
3) Blackberry Punch (flowers earlier but needs better light quality), Blue, Plum, Red, Tickled Pink, and Trailing Superbells are best due to flowering time or vigor for peak season and later finishing.

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**NUTRITION**

**pH:** 5.8 – 6.2  
**EC:** (2:1 extraction method) 0.6 – 0.9  
Constant feeding at 100ppm – 150ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

**TEMPERATURE**

- **Rooting out:** 65 – 72 F  
- **Growing on:** 65 – 70 F  
- **Holding:** 60 – 65 F

**WATERING**

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures.

**TIMING**

- **4” – 5”:** 5 – 6 weeks with one 84 cell plant per container.  
- **6”1GL Royale™:** 6 – 7 weeks with one 84 cell plant per container.  
- **8”:** 8 – 9 weeks with one 84 cell plant per container.  
- **10” – 12” Hanging baskets:** 10 – 12 weeks with one to three 84 cell plants per container.

Midi Dalina are best suited for 4” – 5” containers, and Grande Dalina and Mystic Illusion are suited for 6” and larger containers.

**PLANTING**

84 liner cell plants should be planted into a well-drained soil mix selected to match individual water quality and fertilizer blends. It is helpful when planting to do so in such a way that the lowest set of leaves are planted just below the soil surface. By planting slightly deeper, additional roots will develop on this upper portion of the existing root ball.

Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given on an “as needed” basis for larger containers, usually three to four weeks after planting. Mystic Illusion should be watched closely for both second pinching and PGR (plant growth regulator) applications.

**LIGHT/LIGHTING**

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development.

Under short day conditions, *Dahlias* require long-day lighting to grow and flower properly. Plants need long-day lighting through week 13 (end of March). Prior to week 13, plants should be given 14-hour days by using daylength extension lighting. This lighting can be provided by various lighting sources (incandescent, fluorescent, LED – if proper wavelength is supplied – or high pressure sodium).

If long-day lighting is not supplied before week 13, the plants will flower early, plants will be smaller, tubers will form, plant vigor will decline, and plants can be lost due to root rots caused by overwatering and overfertilizing.

**GROWTH REGULATORS**

A spray application of B-Nine® (daminozide) at 1,500ppm – 2,500ppm at can be applied as required for Dalina® Midi and Grande, and for Mystic Illusion. The Midi Dalina are smaller and less vigorous. They will require fewer, if any, PGR treatments, at the lower rate. The Dalina Grande and Mystic Illusion will require PGR treatments, at the higher rate.

For ease in growing, watering, fertilizing, and applying PGRs, group the Midi Dalina separate from the Grande Dalina and Mystic Illusion.

**PEST and DISEASE MANAGEMENT**

A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be applied at transplant, if desired. In poor growing conditions, Botrytis or Powdery Mildew can develop. A preventative spray of a fungicide such as Compass® (trifloxystrobin) can be made if Powdery Mildew has been a problem in the past. Whiteflies, Thrips, and Aphids can be pests of concern.
OUTDOOR GROWING SCHEDULE
Due to long day requirements and sensitivity to frost and severe cold, *Dahlia* are best suited to be grown as a finished crop indoors. In Michigan, only crops planted in mid to late May would be considered for outdoor finishing.

**OTHER TIPS**
- Provide proper growing environment and good air movement to minimize disease issues.
- Supply long-day lighting before April 1st for *Dahlia* crops in production.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
NUTRITION

pH: 5.8 – 6.2
EC: (2:1 extraction method) .6 – .9
Constant feeding at 150 – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

Rooting out: 65 – 72 F
Growing on: 65 – 72 F
Holding: 60 – 65 F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. Growing too dry or wilting will cause leaf yellowing and leaf drop.

TIMING

4" – 5": 4 – 6 weeks with one 84 cell plant per container.
6"/1GL Royale™: 6 – 7 weeks with one 84 cell plant per container.
8": 4 – 9 weeks with one to three 84 cell plants per container.
10" – 12": 9 – 12 weeks with three to five 84 cell plants per container.

PLANTING

84 liner cell plants should be planted soon after arrival to avoid severe drying and possible leaf loss. Plant into a well drained soil mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually two to four weeks after planting. When trimming/pinching Diamond Frost®, do so carefully to only trim the uppermost portion of the plant. Essentially, only trim off the blooming portion of the plant. Trimming severely can cause stunting of the plant with minimal new branching.

LIGHT/LIGHTING

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Diamond Frost flowers very freely and supplemental lighting should not be required for early spring flowering. But, the plants do perform much better in warmer conditions.

GROWTH REGULATORS

If required B-Nine® (daminozide) can be applied at 2,500ppm. Florel® (ethephon) should not be applied to Diamond Frost for either branching or height control. Plants treated with Florel will develop yellow leaves with leaf drop following.

PEST and DISEASE MANAGEMENT

There should be little instance of disease if basic cultural guidelines are followed. Proper temperature, light levels, and water management will eliminate most disease issues. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be applied at transplant if desired. Whiteflies can be a pest of concern.

OUTDOOR GROWING SCHEDULE

Diamond Frost should be grown outdoors only after the danger of frost and cold weather has past. At Four Star, we would only move these outdoors in early to mid-May.

OTHER TIPS

Diamond Frost performs best when grown warm, in a bright location, with moderate soil moisture levels. Do not treat with Florel. Care should be given when applying oil-based pesticides — leaf damage and yellowing can occur. B-Nine is a good PGR (plant growth regulator) for growth control. If needed, Bonzi® (paclobutrazol) can be used as a drench at ½ – 1ppm. Care should be taken due to the strong effect delivered to the plant. If trimming the plant, do so by only removing the blooming portion of the plant.

Diamond Frost is also available in the 28-count Supernova Thriller™ tray. This tray is designed to be used for possible fast finish in larger monoculture containers, and especially as the center “Thriller” plant in combinations.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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NUTRITION
pH: 6.0 – 6.5
EC: (2:1 extraction method) .4 – .6

Constant feeding at 100ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE
Rooting out: 65 – 72 F
Growing on: 70 – 75 F
Holding: 62 – 65 F

WATERING
Maintain moderate to dry soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially with cooler temperatures, lower light conditions, and higher humidity levels.

TIMING
4” – 5”: 7 – 9 weeks with one 84 cell plant per container.
6”/1GL RoyaleTM: 8 – 10 weeks with one 84 cell plant per container. Or, 6 – 8 weeks if planted with two 84 cell plants.
8”: 10 – 12 weeks with one 84 cell plant per container. Or, 7 – 9 weeks if planted with two 84 cell plants.
10” – 12”: 12 – 14 weeks with four to five 84 cell plants per container.

PLANTING
84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of larger material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually four to six weeks after planting.

LIGHT/LIGHTING
These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Blue My Mind™ flowers early and supplemental lighting should not be required for early spring flowering. But, the plants do perform much better in warmer conditions.

GROWTH REGULATORS
Blue My Mind should not require any PGR (plant growth regulator) applications if grown properly and within suggested crop times. To maintain desired plant size, a trimming pinch can be done. Or if required, a B-Nine® (daminozide) spray can be applied at 2,500ppm. Florel® (ethephon) should NOT be applied for branching or height control, as plants may develop leaf edge burn.

PEST and DISEASE MANAGEMENT
There should be little instance of disease if basic cultural guidelines are followed. Proper temperature, light levels, and water management will eliminate most disease issues. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be applied at transplant if desired. Thrip can be a pest of concern.

OUTDOOR GROWING SCHEDULE
Blue My Mind should be grown outdoors only after the danger of frost and cold weather has past. At Four Star, we would only move these outdoors in mid to late May. This plant is best suited for greenhouse production through peak season finish.

OTHER TIPS
- Blue My Mind is also available in the 28-count Supernova Thriller™ tray. This tray is designed to be used for possible fast finish in larger monoculture containers, and especially as a component plant in larger combinations.
- Blue My Mind performs best when grown warm, in a bright location, with moderate to dry soil moisture levels.
- PGRs should not be needed. To maintain proper size and shape, light trimming can be made if needed. Or, B-Nine at 2,500ppm spray is a good PGR for growth control.
- Water earlier in the day, especially in poor weather conditions, to avoid prolonged periods of moisture on foliage.
- Do not over-fertilize. This plant does not require much fertilizer. Excessive fertilization will cause poor growth and leaf edge burning. Fertilize similar to an Infinity® New Guinea Impatiens. Either constant 100ppm feeding or fertilizing one time per week with other irrigations, using clear water only.
- Blue My Mind is best suited for peak week and later finishing dates, due to higher light and warm temperature needs.
NUTRITION
pH: 6.0 – 6.5
EC: (2:1 extraction method) 0.6 – 0.9
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE
Rooting out: 65 – 72 F
Growing on: 65 – 72 F
Holding: 60 – 65 F

WATERING
Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures.

TIMING
4” – 5”: 4 – 6 weeks with one 84 cell plant per container.
6”/1GL Royale™: 6 – 8 weeks with one 84 cell plant per container.
8”: 8 – 9 weeks with one 84 cell plant per container.
10” – 12” Hanging baskets: 7 – 10 weeks with three to five 84 cell plants per container.

PLANTING
84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have not been pinched and it should not be needed, except in the case of taller material at time of planting or a pinch made on plants for larger containers. This pinch can be given for larger containers, usually two to three weeks after planting.

LIGHT/LIGHTING
These plants should be grown in a high to moderate light area of the greenhouse for optimal plant development.

GROWTH REGULATORS
In many cases, PGRs (plant growth regulators) will not be required if grown under recommended conditions. B-Nine® (daminozide) is effective as a spray applied at 2,500ppm. There is a considerable variation in vigor between the various series and varieties of Ipomoea. Variety specifics are:

• Sweet Caroline types are well suited for small containers and perform well in combinations as a less vigorous alternative to more aggressive standard Ipomoea. Bewitched are more upright, not as vigorous as other Sweet Carolines and are best suited for smaller containers and less vigorous combinations.
• Sweet Caroline Sweetheart types are “heart shaped” and slightly more vigorous than the Sweet Carolines, but still less vigorous than standard Ipomoea. Sweetheart types are also well suited for small containers and combinations.
• Illusion® types are more vigorous than Sweet Caroline or Sweetheart varieties. They are more “globe” shaped in habit and less trailing as the other types. Illusion Garnet Lace trails more than Emerald or Midnight Lace. These plants can be produced in both small containers and also in larger containers and combinations.
• Margarita is the most vigorous of the Standard types, followed by Black Heart, Blackie, and Tricolor as least vigorous.

PEST and DISEASE MANAGEMENT
There should be little instance of disease if basic cultural guidelines are followed. Proper temperature, light levels, humidity levels, air movement, and water management will eliminate most disease issues. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be applied at transplant if desired. In poor growing conditions Botrytis, leaf spotting, or Oedema can develop. Whiteflies, Thrips, Spider mites, and Aphids can be pests of concern. Consider preventative treatments, scout often and closely, and treat early and correctly before large populations can develop.

OTHER TIPS
• For best plant growing and performance, group the various series and varieties as suggested under the Growth Regulators section.
• Scouting for insects and mites should be a weekly task. Follow proper IPM measures.
• Water properly in low light, cool temperature, and high humidity conditions. Avoid prolonged periods of water on plant foliage. Bacterial and fungal spotting can occur. This is more prevalent in the dark leaved types.
• In Michigan, Ipomoea are grown indoors and only finished outdoors, possibly in late spring.

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NUTRITION
pH: 5.8 – 6.2
EC: (2:1 extraction method).6 – .9
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE
Rooting out: 65 – 72 F
Growing on: 65 – 72 F
Holding: 50 – 60 F

WATERING
Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures.

TIMING
4” – 5”: 4 – 6 weeks with one 84 cell plant per container.
6”/1GL Royale™: 5 – 7 weeks with one 84 cell plant per container.
8”: 5 – 9 weeks with one to two 84 cell plants per container.
10” – 12” Hanging baskets: 9 – 12 weeks with three to five 84 cell plants per container.

Laguna™ Compact Blue w/Eye may benefit from one additional week of crop time than the others.

PLANTING
84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually three to four weeks after planting.

LIGHT/LIGHTING
These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. They will flower and finish fine under normal growing weather conditions for peak week sales. For earlier crop scheduling, daylength extension lighting should be provided to ensure success.

PEST and DISEASE MANAGEMENT
There should be little instance of disease if basic cultural guidelines are followed. Proper temperature, light levels, and water management will eliminate most disease issues. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be applied at transplant if desired. In poor growing conditions, Botrytis or Powdery Mildew can develop. Whiteflies, Thrips, and Aphids can be pests of concern.

OUTDOOR GROWING SCHEDULE
The Laguna and Lucia Lobelia can be finished outdoors as a second group plant. In Michigan, these are moved outdoors in early to mid-May. Frost protection should be provided if moderate to severe frost is forecast.

OTHER TIPS
• Proper soil pH levels should be maintained. If soil pHs reach 5.5 or lower, dark foliage color and plant stunting/distortion can occur.
• Cooler temperature and moderate moisture levels combined with high light will minimize PGR needs.
• Provide good air movement to minimize disease issues.
• Do not schedule for early season production without considering lighting for daylength manipulation.

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Please adjust the rates and spray applications to your location and facility.

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NUTRITION

pH: 5.8 – 6.2
EC: (2:1 extraction method) .6 – .9
Constant feeding at 150 – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

Rooting out: 65 – 72 F
Growing on: 55 – 65 F
Holding: 50 – 60 F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to moderate levels. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. Growing too dry or wilting will cause leaf yellowing and leaf drop. Large monoculture baskets and containers require above average watering frequency.

TIMING

4” – 5”: 4 – 5 weeks with one 84 cell plant per container.
6”/1GL Royale™: 5 – 6 weeks with one 84 cell plant per container.
8”: 6 – 8 weeks with one 84 cell plant per container.
10” – 12”: 8 – 10 weeks with three to four 84 cell plants per container.

PLANTING

84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching usually will not be needed, except possibly in the case of plants grown too warm, grown without use of PGRs (plant growth regulators), or when used in larger containers. This second pinch can be given for larger containers, usually three to five weeks after planting.

LIGHT/LIGHTING

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. The Knight™ and Princess® Lobularia flower very freely and supplemental lighting should not be required for early spring flowering.

GROWTH REGULATORS

Both Bonzi® (paclobutrazol) and Sumagic® (uniconazole) are effective for controlling growth. These materials can be used either as a light spray or drench. The Knight and Princess Lobularia are all vigorous compared to most plants, but the vigor does vary within the four varieties. To best grow, water, and treat with PGRs, the following grouping should be helpful.

1) Snow Princess and Blushing Princess — Sumagic sprays at 5 – 10ppm applied lightly. First application made seven to 14 days after planting and reapplied as needed. Or, a Bonzi drench at 1 – 3ppm can be made seven to 14 days after planting. Treatments for larger containers can be made when a desired “pre-finished” size is attained (three to four weeks after planting).

2) Frosty Knight and White Knight — Sumagic sprays at 5ppm applied lightly. Applications should be made based on plant development and should be used on an “as needed” basis. Or, a Bonzi drench at 1ppm can be made 14 days after planting. These two varieties start much slower compared to the two Princess varieties and plants should reach the “pre-finished” size before applications are made. Left untreated they will often attain nearly the same size as the Princess varieties. Treatments for larger containers can also be made when a desired “pre-finished” size is attained (two to four weeks before scheduled finish date).

Even the two Princess varieties are quite responsive to Bonzi and Sumagic applications. It’s best to try the lower recommended rates first and adjust as needed. When spraying, be sure to apply lightly — only a misting leaf coverage instead of heavy spray. With drenches, use the lower rate and be certain to also apply only the recommended amount of solution to each container.

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The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi. Applications can be increased for growers in the southern and western U.S. But, read labels closely and apply correctly.

Cooler growing temperatures, high light levels, proper spacing, and the use of a negative DIF can be very helpful at managing plant size.

PEST and DISEASE MANAGEMENT
There should be little instance of disease if basic cultural guidelines are followed. Proper temperature, light levels, and water management will eliminate most disease issues. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be applied at transplant if desired. Thrip and whiteflies can be pests of concern.

OUTDOOR GROWING SCHEDULE
The Princess varieties can be grown outdoors as a first (early/mid April in Michigan) out plant, if good frost/freeze protection is provided. If not, they perform best as a plant in the second group (mid April to early May in Michigan) moved outdoors. The Knight varieties are better to move outdoors in the third group (mid May in Michigan). This is due to their slower initial growth habit in comparison to the Princess varieties.

OTHER TIPS
- *Lobularia* should be transplanted soon after delivery of the rooted cuttings. Stress in the 84 tray can lead to plant loss.
- For proper watering, fertilizing, and PGR application, group the varieties as suggested in the “Growth Regulators” recommendations.
- Lower leaf yellowing and leaf drop can occur if grown either too dry or too hungry.
- Watch for leaf “graying” in Snow Princess and White Knight as a sign of dry plants.
- Leaf “purpling” can occur if grown extremely cool (phosphorus deficiency).
- Provide high light conditions, grow cool, control high humidity, and water as needed earlier in the day to avoid prolonged periods of moisture on plant foliage, especially in poor weather.
- Blushing Princess often times will have whitish colored blooms in the greenhouse. This occurs most often in earlier spring production. Higher light levels and cool temperatures will produce the lavender blush bloom color. The blooms will quickly develop the blush when moved outdoors.
- Frosty Knight, due to its foliage coloration, is better to grow for peak week sales and later. Plants can struggle in early season production due to shorter days, lower light levels/quality, and poorer overall growing conditions.
- It is best to mix Snow Princess in combinations with other extremely vigorous plants, Blushing Princess with extremely vigorous to average vigor plants, Frosty Knight with average vigor plants, and White Knight with average to less average plants.
- Avoid applying pesticides with Judd™ (spiromesifen) or Pedestal® (novaluron) in them. The Princess and Knight *Lobularia* are sensitive to these products. Growth and flowering can be stunted and distorted if applied.

*The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.*

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**NUTRITION**

**pH:** 5.5 – 5.8  
**EC:** (2:1 extraction method) 0.6 – 0.9  
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

**TEMPERATURE**

**Rooting out:** 65 – 72 F  
**Growing on:** 55 – 68 F  
**Holding:** 50 – 60 F

**WATERING**

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially in cooler temperature, low light, and high humidity conditions.

**TIMING**

**4” – 5”:** 4 – 5 weeks with one 42 Supernova® plant per container, or one 84 cell plant per container with Opal Innocence® (not offered as a Supernova).  
**6”/1GL Royale™:** 5 – 7 weeks with one or two 42 cell Supernova plants per container, or one to two 84 cell plants per container with Opal Innocence (not offered as a Supernova).  
**8”:** 7 – 9 weeks with two or three 42 cell Supernova plants per container, or two to three 84 cell plants per container with Opal Innocence (not offered as a Supernova).  
**10” – 12”:** 9 – 12 weeks with three to five 84 cell plants per container.

Supernovas are not recommended or required for baskets and large containers. But many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different than from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the year when not possible from a Standard liner. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic® (uniconazole) or Bonzi® (paclobutrazol) to the Standard liners may be helpful to even out plant growth and vigor.

**PLANTING**

*Nemesia* rooted liners should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually three to four weeks after planting.

**LIGHT/LIGHTING**

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. They flower quite early and lighting should not be needed for regular season crops. Daylength extension lighting of 14 to 16 hours total daylength can be helpful for early finish crops. This is especially true if using Standard 84 liner tray plants.

**GROWTH REGULATORS**

A light spray application of 5ppm – 10ppm Sumagic or a 1ppm Bonzi drench can be applied as needed, based on plant growth and growing conditions. Opal Innocence should not require any PGR treatments if grown properly. Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.
Watering practices, weather, and greenhouse environment can greatly affect plant growth and performance.

When using Supernovas, please refer to the separate Supernova cultural guide for additional recommendations.

**PEST and DISEASE MANAGEMENT**

Proper temperature, light levels, and water management will eliminate most disease issues. Avoid darker, warmer, and more humid areas with poor air movement. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful when applied at transplant if desired. In earlier crops and poor growing conditions, watch for Botrytis. Maintain a soil pH of 5.5 – 5.8.

**OUTDOOR GROWING SCHEDULE**

- **Bluebird Nemesia** can be finished outdoors as a second group plant for moving outdoors if freeze/frost protection is provided. In Michigan, these are moved outdoors in late April to early May. Once acclimated, they are quite cold tolerant and perform well as an early spring blooming plant.

- **Compact Innocence®** and **Compact Pink Innocence®** are slightly thinner and softer. They are best moved outdoors in the third group. In Michigan, this is usually done in early to late May.

- **Opal Innocence** is usually finished indoors until late May or June, due to its smaller and more compact nature. It is quite cold tolerant but difficult to “size up” in cooler outdoor environments.

**OTHER TIPS**

- A well drained soil mix will lead to better water management and root growth.

- Maintain cooler growing temperatures, moderate soil moisture, proper soil pH, bright growing conditions, controlled humidity levels, and good air movement for best plant performance.

- For ease of growing, Bluebird, Compact Innocence, and Compact Pink Innocence can be grouped together and usually watered and treated with PGRs the same.

- Opal Innocence can be grouped separately and treated based on its needs. This plant usually will require fewer irrigations and little or no PGR applications.

- To help reduce flowering early in the crop cycle before plants “size up for sale,” a spray application of Florel® (ethephon) at 500ppm can be applied. Plants should re-flower in three to four weeks for sale.

- Care should be taken with Opal Innocence to avoid plant stunting. No more than one application of Florel should be made and trialing at 300ppm – 350ppm may be best.

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The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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NUTRITION

pH: 5.5 – 5.8  
EC: (2:1 extraction method) 6 – 9
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

Rooting out: 65 – 72 F  
Growing on: 55 – 68 F  
Holding: 50 – 60 F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially in cooler temperature, low light, and high humidity conditions. Sunsatia® perform best if grown drier than many crops.

TIMING

4”—5”: 4 – 5 weeks with one 84 cell plant per container.  
6”/1GL Royale®: 5 – 7 weeks with one to two 84 cell plants per container.  
8”: 7 – 9 weeks with two to three 84 cell plants per container.  
10”—12”: 9 – 12 weeks with three to five 84 cell plants per container

PLANTING

84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually three to four weeks after planting.

LIGHT/LIGHTING

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Sunsatia Nemesia flower slightly later than Bluebird or Opal Innocence® Nemesia, but lighting should not be needed for regular season crops. Daylength extension lighting of 14 to 16 hours total daylength can be helpful for early finish crops.

GROWTH REGULATORS

Moisture management alone is an effective method of controlling growth. Not only does growing Sunsatia “on the dry side” produce the healthiest plants, it also produces fuller and more compact plants. A light spray application of 5ppm – 10ppm Sumagic® (uniconazole) or a 1ppm Bonzi® (paclobutrazol) drench can be applied as needed. Mango and Raspberry are more upright and may require PGR (plant growth regulator) treatments at a different level and schedule than Coconut, Cranberry, or Lemon. Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Watering practices, weather, and greenhouse environment can greatly affect plant growth and performance.

PEST and DISEASE MANAGEMENT

Proper temperature, light levels, and water management will eliminate most disease issues. Avoid darker, warmer, and more humid areas with poor air movement. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful when applied at transplant, if desired. Thrip are a major concern to Sunsatia, due to the plants’ sensitivity to INSV (Impatiens necrotic spot viruses). Maintain a soil pH of 5.5 – 5.8.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
OUTDOOR GROWING SCHEDULE

Sunsatia Nemesia can be finished outdoors as a second group plant for moving outdoors if freeze/frost protection is provided. In Michigan, these are moved outdoors in late April to early May. Once acclimated they are quite cold tolerant and perform well as an early spring blooming plant.

OTHER TIPS

- Sunsatia Nemesia should be transplanted soon after delivery of the rooted cuttings. Stress in the 84 tray can lead to plant loss.
- A well drained soil mix will lead to better water management and root growth.
- A sign of possible over-watering is reddish main leaf veins in the foliage.
- Maintain cooler growing temperatures, drier soil, proper soil pH, bright growing conditions, controlled humidity levels, and good air movement for best plant performance.
- Scout for Thrip and treat as needed.
- The improved varieties are much stronger and easier to produce than the original varieties.
- These are great performers for early flowering production.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
Soprano® Osteospermum

NUTRITION
pH: 5.8 – 6.2
EC: (2:1 extraction method) .6 – .9
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE
Rooting out: 65 – 72 F
Growing on: 55 – 68 F
Holding: 40 – 50 F

WATERING
Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially in cooler temperature, low light, and high humidity conditions. Osteospermum perform best if grown drier than many crops.

TIMING
4" – 5": 5 – 7 weeks with one 84 cell plant per container.
6"/1GL Royale™: 6 – 8 weeks with one 84 cell plant per container.
8": 7 – 9 weeks with two to three 84 cell plants per container.
10" – 12" Hanging Baskets: 10 – 12 weeks with three to five 84 cell plants per container.

PLANTING
84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Pinching should not be needed, except in the case of taller material at time of planting or a pinch on plants for larger containers. This pinch can be given for larger containers, usually three to four weeks after planting.

LIGHT/LIGHTING
These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Soprano® Osteospermum develop and flower often one week later than Symphony Osteospermum, but lighting should not be needed for regular season crops. Daylength extension lighting of 14 to 16 hours total daylength can be helpful for early finish crops.

GROWTH REGULATORS
Moisture management and cooler growing alone are effective methods of controlling growth. Not only does growing Sopranos “on the dry side” produce the healthiest plants, it also produces fuller and more compact plants. A light spray application of 5ppm – 10ppm Sumagic® (uniconazole) or a 1ppm Bonzi® (paclobutrazol) drench can be applied, if needed. Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR (plant growth regulator) treatment needs. Soprano Osteospermum are more upright than Symphony types and can get tall if crop times are too long or growing environment needs are not met. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Watering practices, weather, and greenhouse environment can greatly affect plant growth and performance.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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PEST and DISEASE MANAGEMENT
Proper temperature, light levels, air movement, humidity control, and water management will eliminate most disease issues. Avoid darker, warmer, and more humid areas with poor air movement. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful when applied at transplant, if desired. Scout for Botrytis and consider a follow-up preventative fungicide application if pinching or trimming plants. Also scout for any plant “melting.” This soft rot is usually a sign of overwatering and poor growing conditions. Medallion® (fludioxonil), Pageant® (pyraclostrobin + boscalid) or Cease® *(Bacillus stultilis)* are effective to minimize the spread of soft rot. Leaf burn and spotting from the use of copper-based fungicides are a concern. Thrip can also be a concern and crops should be scouted on a regular basis.

OUTDOOR GROWING SCHEDULE
Soprano *Osteospermum* should be finished outdoors as a second or third group crop. They are quite cold tolerant, but will grow very slowly in extremely cool conditions. In Michigan, these are moved outdoors in mid to late May, based on weather conditions.

OTHER TIPS
• Soprano *Osteospermum* should be transplanted soon after delivery of the rooted cuttings. Stress in the 84 tray can lead to plant loss.
• A well drained soil mix will lead to better water management and root growth.
• Maintain cooler growing temperatures, drier soil, proper soil pH, bright growing conditions, controlled humidity levels, and good air movement for best plant performance.
• Scout for thrip and treat as needed.
• Purple is the most vigorous and should be watched more closely for possible PGR needs.
• Sideshow® Yellow Glow *Osteospermum* from the Proven Selections® collection can also be grown following these recommendations.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
**Symphony Osteospermum**

**NUTRITION**

**pH:** 5.8 – 6.2  
**EC:** (2:1 extraction method) 6 – 9

Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

**TEMPERATURE**

- **Rooting out:** 65 – 72 F  
- **Growing on:** 55 – 68 F  
- **Holding:** 40 – 50 F

**WATERING**

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially in cooler temperature, low light, and high humidity conditions. Symphony *Osteospermum* perform best if grown drier than many crops.

**TIMING**

- **4” – 5”:** 4 – 6 weeks with one 84 cell plant per container.  
- **6”/1GL Royale™:** 5 – 7 weeks with one 84 cell plant per container.  
- **8”:** 7 – 9 weeks with one to two 84 cell per container.  
- **10” – 12” Hanging Baskets:** 9 – 12 weeks with three to five 84 cell plants per container.

**PLANTING**

84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Pinching should not be needed except in the case of taller material at time of planting or a pinch on plants for larger containers. This pinch can be given for larger containers, usually three to four weeks after planting.

**LIGHT/LIGHTING**

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Symphony *Osteospermum* flower early and lighting should not be needed for regular season crops. Daylength extension lighting of 14 to 16 hours total daylength can be helpful for early finish crops.

**GROWTH REGULATORS**

Moisture management and cooler growing alone are effective methods of controlling growth. Not only does growing Symphonies “on the dry side” produce the healthiest plants, it also produces fuller and more compact plants. A light spray application of 5ppm – 10ppm Sumagic® (uniconazole) or a 1ppm Bonzi® (paclobutrazol) drench can be applied, as needed. Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR (plant growth regulator) treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Watering practices, weather, and greenhouse environment can greatly affect plant growth and performance.

**PEST and DISEASE MANAGEMENT**

Proper temperature, light levels, air movement, humidity control, and water management will eliminate most disease issues. Avoid darker, warmer, and more humid areas with poor air movement. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful when applied at transplant, if desired. Scout for Botrytis and consider a follow-up preventative fungicide application if pinching or trimming plants. Also scout for any plant “melting.” This soft rot is usually a sign of overwatering and poor growing conditions. Medallion® (fludioxonil), Pageant® (pyraclostrobin + boscalid) or Cease® (*Bacillus subtilis*) are effective to minimize spread of the soft rot. Leaf burn and spotting from the use of copper-based fungicides are a concern. Thrip can also be a concern and crops should be scouted on a regular basis.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application.  
Please adjust the rates and spray applications to your location and facility.

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Symphony *Osteospermum*

**OUTDOOR GROWING SCHEDULE**

Symphony *Osteospermum* can be finished outdoors as an early crop if basic freeze/frost protection is provided. In Michigan, these are moved outdoors in mid to late April, based on weather conditions. Once acclimated, they are quite cold tolerant and perform very well as an early spring blooming plant. These are one of the plants that perform the very best when grown outdoors or in very bright and cool greenhouses.

**OTHER TIPS**

- Symphony *Osteospermum* should be transplanted soon after delivery of the rooted cuttings. Stress in the 84 tray can lead to plant loss.
- A well drained soil mix will lead to better water management and root growth.
- Maintain cooler growing temperatures, drier soil, proper soil pH, bright growing conditions, controlled humidity levels, and good air movement for best plant performance.
- Scout for Thrip and treat as needed.
- These are great performers for early flowering production.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application.

Please adjust the rates and spray applications to your location and facility.

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**NUTRITION**

**pH:** 5.5 – 5.8  
**EC:** (2:1 extraction method) 1.0 – 1.5  
Constant feeding at 200ppm – 250ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

**TEMPERATURE**

- **Rooting out:** 65 – 72 F  
- **Growing on:** 55 – 68 F  
- **Holding:** 40 – 50 F

**WATERING**

Maintain moderate soil moisture. Allow the soil to cycle from moist to slightly dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. To avoid soft rots in lower light, cooler temperatures, or higher humidity situations, water early in the day if possible to avoid prolonged exposure of water on foliage. Follow the plant grouping suggestions listed below under Growth Regulators to assist in proper water management.

**TIMING**

- **4” – 5”:** 4 – 6 weeks with one 42 cell Supernova® plant per container.  
- **6”/1GL Royale™:** 6 weeks with one 42 cell Supernova plant per container.  
- **8”:** 7 – 8 weeks with one 42 cell Supernova plant per container.  
- **10” – 12” Hanging baskets:** 9 – 11 weeks with three to five Standard 84 plants per container.

Supernova 42 liners are used at Four Star and recommended for best flower timing, flower count, and plant size in smaller containers. Supernova 84 liners are produced primarily for longer distanced customers. They often do not perform as well as the Supernova 42s, but usually are better performers than Standard 84s. We recommend one extra week of crop time for containers grown from Supernova 84s, as compared to Supernova 42s.

If Standard 84s are used for spring production, supplemental lighting, additional crop time, pinching, and additional PGR (plant growth regulator) applications are required. Standard 84 liners are recommended for summer to fall finished crops.

Supernovas are not recommended or required for baskets and large containers, but many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the year when not possible from a Standard liner. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic® (uniconazole) or Bonzi® (paclobutrazol) to the Standard liners may be helpful.

Larger upright or basket production needed for earlier season finishing should be planned using varieties listed below as “earliest” to flower and/or grown from Supernova liners.

**PLANTING**

Supertunias should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days for establishing new rooting. When using Supernova treated liners, NO pinching is required unless deemed taller than desired. If Standard liners are used, pinch at transplant if size allows. Supertunias branch quite well and pinching is not necessarily needed, except for “shaping” purposes.

**LIGHT/LIGHTING**

Supertunias should be grown in a high light area of the greenhouse for optimal flowering and plant development. Supertunia Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring finish dates. Additional PGR treatments may also be required on non-Supernova treated plants.

**GROWTH REGULATORS**

As required, either a light spray of Sumagic at 5ppm – 10ppm or a 1ppm – 3ppm Bonzi drench can be applied to control growth. Treatments are usually made to smaller containers seven to 14 days after planting. Treatments to larger containers can be made when a desired “pre-finished” size is attained (two to four weeks before scheduled finish). Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern
areas, the higher rates will probably be needed. Other materials such as Topfior® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Cooler growing temperatures, high light levels, proper spacing, and drier growing practices can be very helpful at managing plant size. Supernova treated plants should require fewer PGR treatments than Standard 84 liners.

PGR requirements can vary greatly by variety and the plants should be grown – if possible – in the following groups for best performance.

1) Giant Pink, Lavender Skies, the Mini Supertunias, Pretty Much Picasso®, Vista Bubblegum, and Vista Silverberry are the most vigorous varieties and will require the most PGR attention.
2) Bordeaux, Citrus (is average vigor but can “stretch” and a PGR treatment is recommended), Double Dark Blue, Double Peppermint, Picasso in Pink™, Priscilla®, Raspberry Blast, Red, Royal Magenta, Royal Velvet, Vista Fuchsia, White, and White Russian have average vigor and will/may need a PGR treatment. Note that White Russian begins as a less vigorous plant, but once established grows like an average vigor plant. PGR treatments may need to be delayed on White Russian until active growth is seen and then group 2 PGR recommendations can be followed.
3) Bermuda Beach, Flamingo, Indigo Charm, Orchard Charm, Pink Charm, Sangria Charm, and Watermelon Charm are less vigorous early in their production and should require little, if any, PGR treatments.

Pretty Much Picasso should be treated more heavily than other Supertunia varieties. A 3ppm – 5ppm Bonzi drench is often required. This variety finishes very nicely and much easier when grown outdoors.

Please use the flowering guide below as a further reference to help group plants together for easier production.

PEST and DISEASE MANAGEMENT

Pests are not much of an issue with Supertunias. Proper growing environments and watering practices should be followed to avoid Botrytis and various stem or rootrots.

OUTDOOR GROWING SCHEDULE

Supertunias can be grown outdoors as a first out crop if good frost protection is provided. Bordeaux, the Charms, Citrus, Mini Rose Veined, Mini Strawberry Pink Veined, and White Russian should move outdoors in the last group, due to sensitivity to colder temperatures and/or later flowering.

OTHER TIPS

Supernova treated liners are highly recommended for small containers. For best combination planting performance, if mixing Supernova with non-Supernova treated plants, consider vigor of all plants.

Plants grown below an average daily temperature of 60 F can experience delay in flowering or reduced flower coverage, especially in poor weather conditions.

Citrus and White Russian flower early; schedule for peak week and later finish due to plant vigor. Planting after Week 8 or 10 results in better plant performance.

Avoid scheduling the Charms early from Standard 84 trays, as they are more daylength/light quality sensitive and plants can become overgrown before flowering.

To best manage watering and PGR applications, it may be helpful to group the Supertunias as suggested by vigor into the three plant groups. Maintain proper soil pH levels to prevent possible root rot issues and iron deficiency. Soil test periodically and test the water source for water nutrient levels, and especially alkalinities levels.

Earliest flowering from Standard liners;

1) Citrus, Flamingo, Picasso in Pink, Royal Velvet, Vista Bubblegum, Vista Silverberry, and White Russian flower the earliest. However, it is better to schedule Citrus and/or White Russian for peak season and later, due to plant vigor.
2) Followed next by Bermuda Beach, Bordeaux, ‘Lavender Skies,’ Mini Silver, Pretty Much Picasso (early but needs good light quality), Red, Royal Magenta, Vista Fuchsia and White.
3) Last to flower are Double Dark Blue, Double Peppermint, Giant Pink, Indigo Charm, the other Mini Supertunias, Orchard Charm, Pink Charm, Priscilla, Raspberry Blast, Sangria Charm, and Watermelon Charm. These are best scheduled later, due to flowering time or vigor for peak season and later finishing.
NUTRITION

pH: 5.8 – 6.4  
EC: (2:1 extraction method) .8 – 1.2  
Constant feeding at 200ppm – 300ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

Rooting out: 65 – 72 F  
Growing on: 55 – 68 F  
Holding: 50 – 60 F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially in cooler temperature, low light, and high humidity conditions. Intensia® Phlox perform best if grown drier than many crops.

TIMING

4" – 5": 4 – 5 weeks with one 84 cell plant per container.  
6”/1GL Royale™: 5 – 7 weeks with one to two 84 cell plants per container.  
8": 7 – 9 weeks with two to three 84 cell plants per container.  
10" – 12": 9 – 12 weeks with three to five 84 cell plants per container.

PLANTING

84 liner cell plants should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in thoroughly without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days to establish new rooting. Plants have already been pinched and further pinching should not be needed, except in the case of taller material at time of planting or a second pinch on plants for larger containers. This second pinch can be given for larger containers, usually two to three weeks after planting.

LIGHT/LIGHTING

These plants should be grown in a high light area of the greenhouse for optimal flowering and plant development. Intensia Phlox flower fairly early and lighting should not be needed for regular season crops. Daylength extension lighting of 14 to 16 hours total daylength can be helpful for early finish crops.

GROWTH REGULATORS

Moisture management alone is an effective method of controlling growth. Not only does growing the Intensias “on the dry side” produce the healthiest plants, it also produces fuller and more compact plants. The Intensias are quite responsive to PGRs (plant growth regulators) and care should be taken when making applications. A light spray application of 2ppm – 5ppm Sumagic® (uniconazole), a 2,500ppm – 5,000ppm standard spray of B-Nine® (daminozide), or a 1ppm Bonzi® (paclobutrazol) drench can be selected, as needed. Blueberry, Lavender Glow, Pink and Star Brite are all more aggressive and should be watched closely for PGR needs. Cabernet and White should require lower PGR rates or possibly no applications. Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Watering practices, weather, and greenhouse environment can greatly affect plant growth and performance.

PEST and DISEASE MANAGEMENT

Proper temperature, light levels, and water management will eliminate most disease issues. Avoid darker, warmer, and more humid areas with poor air movement. A broad spectrum fungicide such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful when applied at transplant, if desired. Scout for Fungus Gnat Larvae. A preventative Fungus Gnat treatment could be considered.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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OUTDOOR GROWING SCHEDULE

Intensia Phlox can be finished outdoors as a second or third group plant for moving outdoors if freeze/frost protection is provided. In Michigan, these are moved outdoors in late April to mid-May, based on weather conditions. Try to avoid cool rainy conditions when moving young Intensias outdoors.

OTHER TIPS

• Intensia Phlox should be transplanted soon after delivery of the rooted cuttings. Stress in the 84 tray can lead to plant loss.

• Grow drier without causing severe dry down or wilting. A well drained soil mix is important and will lead to better water management and root growth.

• After rooting into the finished container, maintain cooler growing temperatures, drier soil, proper soil pH, bright growing conditions, controlled humidity levels, and good air movement for best plant performance.

• Do not grow small containers under high density hanging baskets.

• The Intensias are fairly aggressive plants and heavy feeders, but also require less frequent irrigations. Fertilize with each irrigation at 200ppm – 300ppm nitrogen, and monitor soil fertilizer levels for optimum plant performance.

• These are great garden performers and best suited for peak and later finishing dates. Do not plan early season crops.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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734.654.6420
**NUTRITION**

**pH:** 5.8 – 6.2  
**EC:** (2:1 extraction method) 0.6 – 0.9  
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

**TEMPERATURE**

- **Rooting out:** 65 – 72 F  
- **Growing on:** 62 – 68 F  
- **Holding:** 50 – 60 F

**WATERING**

Maintain moderate soil moisture. Allow the soil to cycle from moist to slightly dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures.

**TIMING**

- **4”–5”:** 4 – 5 weeks with one 42 cell Supernova® plant per container.  
- **6”/1GL Royale™:** 5 – 6 weeks with one to two 42 cell Supernova plants per container.  
- **8”:** 7 – 8 weeks with two to three 42 cell Supernova plants per container.  
- **10” – 12” Hanging baskets:** 9 – 11 weeks with three to five Standard 84 plants per container.

Supernovas are not recommended or required for baskets and large containers, but many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different than from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the year when not possible from a standard liner. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic® (uniconazole) or Bonzi® (paclobutrazol) to the Standard liners may be helpful to even out plant growth and vigor.

**PLANTING**

*Babylon® Verbena* should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days for establishing new rooting. When using Supernova treated liners, NO pinching is required unless deemed taller than desired. If Standard liners are used, pinch at transplant if size allows. Babylon branch quite well and pinching is not necessarily needed, except for “shaping” purposes. A broad spectrum fungicide drench with a material such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful.

**LIGHT/LIGHTING**

*Babylon® Verbena* should be grown in a high light area of the greenhouse for optimal flowering and plant development. Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring finish dates. Additional PGR treatments may also be required on non-Supernova treated plants.

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The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

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GROWTH REGULATORS
Either a light spray of Sumagic at 5ppm – 10ppm or a 1ppm Bonzi drench can be applied to control growth, as required. Treatments are usually made to smaller containers seven to 14 days after planting. Treatments to larger containers can be made when a desired “pre-finished” size is attained (two to three weeks before scheduled finish date). Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Proper cool growing temperatures, high light levels, proper spacing, and good growing practices can be very helpful at managing plant size. Supernova treated plants should require fewer PGR treatments than Standard 84 liners.

When using Supernovas, please refer to the separate Supernova cultural guide for additional recommendations.

PEST and DISEASE MANAGEMENT
Whitefly, Thrip, and Aphids can be an issue. Preventative treatments or regular scouting should be considered. Proper growing environments and watering practices should be followed to avoid Botrytis, Powdery Mildew, and various stem or root rots. A preventative Powdery Mildew treatment with a material such as Compass® (trifloxystrobin) can also be helpful.

OUTDOOR GROWING SCHEDULE
Babylon Verbena can be an early group crop to move outdoors for growing if frost/freeze protection is provided. In Michigan, Babylon are usually moved outdoors in mid to late April based on weather conditions.

OTHER TIPS
• Babylon varieties usually flower and finish one week earlier than other Verbena.
• Supernova treated liners are highly recommended for growers’ small container production.
• For best combination planting performance, consider vigor for all plants used, especially if mixing Supernova treated plants in with non-Supernova treated plants.
• Maintain proper soil pH levels. A soil pH below the upper 5s can lead to iron toxicity. This will show in the older foliage as a fine rusty to brown leaf spotting.
• Scout for possible Botrytis and Powdery Mildew. Preventative treatments can be very helpful.
• Avoid long periods of cool, wet, humid, and low light levels in the greenhouse if possible when growing Verbena. Various diseases can develop, especially if proper air movement is not provided. Also, under these growing conditions, proper fertilizer levels in the soil and plant must be maintained or foliage will discolor or develop a “reddish purple spotting” pattern.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
Superbena® & Superbena® Royale Verbena

NUTRITION

pH: 6.0 – 6.4
EC: (2:1 extraction method) 0.6 – 0.9
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

Rooting out: 65 – 72°F
Growing on: 65 – 72°F
Holding: 50 – 60°F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to slightly dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures. Follow the plant grouping suggestions listed below under Growth Regulators to assist in proper water management.

TIMING

4” – 5”: 4 – 6 weeks with one 42 Supernova® plant per container.
6”/1GL Royale™: 6 – 7 weeks with one to two 42 Supernova plants per container.
8”: 7 – 8 weeks with two to three 42 Supernova plants per container.
10” – 12” Hanging baskets: 9 – 11 weeks with three to five Standard 84 plants per container.

Supernova 42 liners are used at Four Star and are recommended for best flower timing, flower count, and plant size in smaller containers. If Standard 84s are used for small container production, supplemental lighting, additional crop time, pinching, and additional PGR (plant growth regulator) applications may be required. Standard 84 liners are recommended for summer to fall finished crops. Crop time ranges are based on early season to later peak season plant performance and wholesale grower to retail size expectations. Supernovas are not recommended or required for baskets and large containers, but many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different than from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the year when not possible from a standard liner. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic® (uniconazole) or Bonzi® (paclobutrazol) to the Standard liners may be helpful to even out plant growth and vigor.

PLANTING

Superbena® should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days for establishing new rooting. When using Supernova treated liners, NO pinching is required unless deemed taller than desired. If Standard liners are used, pinch at transplant if size allows. Superbena branch quite well and pinching is not needed, except for “shaping” purposes.

LIGHT/LIGHTING

Superbena should be grown in a high light area of the greenhouse for optimal flowering and plant development. Superbena Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring finish dates. Additional PGR (plant growth regulator) treatments may also be required on non-Supernova treated plants.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.

www.pwfourstar.com
734.654.6420
GROWTH REGULATORS
Either a light spray of Sumagic at 5ppm – 10ppm or a 1ppm – 2ppm Bonzi drench can be applied to control growth, as required. Treatments are usually made to smaller containers seven to 14 days after planting. Treatments to larger containers can be made when a desired “pre-finished” size is attained (three to four weeks before scheduled finish date). Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Proper growing temperatures, high light levels, proper spacing, and good growing practices can be very helpful at managing plant size. Supernova treated plants should require fewer PGR treatments than Standard 84 liners.

PGR requirements vary between the standard Superbena and Royale Superbena. For supplying proper watering practices and PGR applications, they can be grown in the following two groupings:

1) Burgundy, Coral Red, Dark Blue, Large Lilac Blue, Pink Shades, Purple, and Violet Ice. Within this group, Burgundy and Large Lilac Blue are the most vigorous and should be watched for possible additional or higher treatments.

2) Royale Chambray, Royale Iced Cherry, Royale Peachy Keen, Royale Plum Wine, Royale Silverdust, and Royale Whitecap are less vigorous and should require lower rates or no PGR treatments.

PEST and DISEASE MANAGEMENT
Whitefly, Thrip, and Aphids can be an issue. Preventative treatments or regular scouting should be considered. Proper growing environments and watering practices should be followed to avoid Botrytis, Powdery Mildew, and various stem or root rots.

OUTDOOR GROWING SCHEDULE
Supernova can be a late group crop to move outdoors for growing if frost protection is provided. In Michigan, Superbena are usually moved outdoors in mid to late May, based on weather conditions.

OTHER TIPS
- Supernova treated liners are highly recommended for growers’ small container production.
- For best combination planting performance, consider vigor for all plants used, especially if mixing Supernova treated plants in with non-Supernova treated plants.
- Maintain proper soil pH levels. A soil pH below the upper 5s can lead to iron toxicity. This will show in the older foliage as a fine rusty to brown leaf spotting.
- Superbena are fairly heavy feeders and especially the more vigorous varieties need to be fed on a regular basis with adequate fertilizer levels, to maintain proper growth and leaf coloration.
- Royale Iced Cherry, Royale Chambray and Royale Silverdust are slower to flower than other Superbena or Royale types.
- Scout for Powdery Mildew. Consider a preventative treatment with a material such as Compass® (trifloxystrobin).

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
NUTRITION
pH: 5.5 – 5.8
EC: (2:1 extraction method) .6 –  .9
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE
Rooting out: 65 – 72 F
Growing on: 65 – 72 F
Holding: 50 – 60 F

WATERING
Maintain moderate soil moisture. Allow the soil to cycle from moist to slightly dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures.

TIMING
4” – 5”: 4 – 6 weeks with one 42 cell Supernova® plant per container.
6”/1GL Royale™: 5 – 7 weeks with one to two 42 cell Supernova plants per container.
8”: 7 – 9 weeks with two to three 42 cell Supernova plants per container.
10” – 12” Hanging baskets: 9 – 11 weeks with three to five Standard 84 plants per container.

Supernova are not recommended or required for baskets and large containers, but many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different than from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the year when not possible from a standard liner. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic® (uniconazole) or Bonzi® (paclobutrazol) to the Standard liners may be helpful to even out plant growth and vigor.

PLANTING
Tapien® Verbena should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days for establishing new rooting. When using Supernova treated liners, NO pinching is required unless deemed taller than desired. If Standard liners are used, pinch at transplant if size allows. Tapien branch quite well and pinching is not necessarily needed except for “shaping” purposes. A broad spectrum fungicide drench with a material such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful.

LIGHT/LIGHTING
Tapien Verbena should be grown in a high light area of the greenhouse for optimal flowering and plant development. Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring finish dates. Additional PGR treatments may also be required on non-Supernova treated plants.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
GROWTH REGULATORS
Either a light spray of Sumagic® (uniconazole) at 5ppm – 10ppm or a 1ppm Bonzi® (paclobutrazol) drench can be applied to control growth, as required. If proper growing conditions are maintained, few or no PGR applications should be required. Treatments are usually made to smaller containers seven to 14 days after planting, if needed. Treatments to larger containers can be made when a desired “pre-finished” size is attained (two to three weeks before scheduled finish date). Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol) and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Proper growing temperatures, high light levels, proper spacing, and good growing practices can be very helpful at managing plant size. Supernova treated plants should require fewer PGR treatments than standard 84 liners.

When using Supernovas, please refer to the separate Supernova cultural guide for additional recommendations.

PEST and DISEASE MANAGEMENT
Whitefly, Thrip, and Aphids can be an issue. Preventative treatments or regular scouting should be considered. Proper growing environments and watering practices should be followed to avoid Botrytis, Powdery Mildew, and various stem or root rots. A preventative Powdery Mildew treatment with a material such as Compass® (trifloxystrobin) can also be helpful.

OUTDOOR GROWING SCHEDULE
Tapien Verbena can be a late group crop to move outdoors for growing if frost protection is provided. In Michigan, Tapien are usually moved outdoors in mid to late May based on weather conditions.

OTHER TIPS
• Supernova treated liners are highly recommended for growers’ small container production.
• For best combination planting performance, consider vigor for all plants used, especially if mixing Supernova treated plants in with non-Supernova treated plants.
• Maintain proper soil pH levels. Unlike the other Verbena series, the Tapien require a soil pH of 5.5 – 5.8. If soil pH levels rise above 6.0, iron deficiency symptoms can occur.
• Scout for possible Botrytis and Powdery Mildew. Preventative treatments can be very helpful.
• Avoid long periods of cool, wet, humid, and low light levels in the greenhouse if possible when growing Verbena. Various diseases can develop, especially if proper air movement is not provided. Also, under these growing conditions, proper fertilizer levels in the soil and plant must be maintained or foliage will discolor or develop a “reddish purple spotting” pattern.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
NUTRITION

pH: 6.0 – 6.4
EC: (2:1 extraction method) 0.6 – 0.9
Constant feeding at 150ppm – 200ppm nitrogen with a fertilizer selected for grower’s water quality and soil mix is recommended.

TEMPERATURE

Rooting out: 65 – 72 F
Growing on: 65 – 72 F
Holding: 50 – 60 F

WATERING

Maintain moderate soil moisture. Allow the soil to cycle from moist to slightly dry. Avoid both severe dry downs/wilting and long periods of wet soil, especially at cooler temperatures.

TIMING

4” – 5”: 4 – 6 weeks with one 42 cell Supernova® plant per container.
6”/1GL Royale™: 6 – 7 weeks with one to two 42 cell Supernova plants per container.
8”: 7 – 8 weeks with two to three 42 cell Supernova plants per container.
10” – 12” Hanging baskets: 9 – 11 weeks with three to five Standard 84 plants per container.

Supernovas are not recommended or required for baskets and large containers, but many growers are beginning to use them for early hanging basket and upright needs. Growth habit and timing may be different than from Standard 84 liners, but flowering time and “retail ready” containers can be produced in portions of the year when not possible from a standard liner. If mixing Supernova and Standard liners in combination plantings, a pre-plant drench of Sumagic® (uniconazole) or Bonzi® (paclobutrazol) to the standard liners may be helpful to even out plant growth and vigor.

PLANTING

Tukana® and Lanai® Verbena should be planted into a well drained soil mix selected to match individual water quality and fertilizer blends. Water in without saturating the mix and maintain a constant moderate soil moisture level for the first seven to 10 days for establishing new rooting. When using Supernova treated liners, NO pinching is required unless deemed taller than desired. If Standard liners are used, pinch at transplant if size allows. Tukana and Lanai branch quite well and pinching is not necessarily needed except for “shaping” purposes. A broad spectrum fungicide drench with a material such as Banrot® (etridiazole plus thiophanate-methyl) can be helpful.

LIGHT/LIGHTING

Tukana and Lanai Verbena should be grown in a high light area of the greenhouse for optimal flowering and plant development. Supernova liners have been treated for earlier flowering and will not require additional grower lighting. If very early crops are scheduled before the onset of 12-hour natural daylengths, daylength extension lighting is helpful. Also, if growing from Standard 84 liners, additional lighting to 14 hours/day lighting is required for early spring finish dates. Additional PGR treatments may also be required on non-Supernova treated plants.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
GROWTH REGULATORS
Either a light spray of Sumagic at 5ppm – 10ppm or a 1ppm Bonzi drench can be applied to control growth, as required. Treatments are usually made to smaller containers seven to 14 days after planting. Treatments to larger containers can be made when a desired “pre-finished” size is attained (two to three weeks before scheduled finish date). Watch for the “softening” look and lighter green appearance of new growth as an indication for PGR treatment needs. In more northern areas, the lower rates should be used as a starting base, while in more southern areas, the higher rates will probably be needed. Other materials such as Topflor® (flurprimidol), and Piccolo® (paclobutrazol) can be used at rates that correspond with the degree of treatment recommended for Sumagic or Bonzi.

Proper growing temperatures, high light levels, proper spacing, and good growing practices can be very helpful at managing plant size. Supernova treated plants should require less PGR treatments than Standard 84 liners.

When using Supernovas, please refer to the separate Supernova cultural guide for additional recommendations.

PEST and DISEASE MANAGEMENT
Whitefly, Thrip, and Aphids can be an issue. Preventative treatments or regular scouting should be considered. Proper growing environments and watering practices should be followed to avoid Botrytis, Powdery Mildew, and various stem or root rots. A preventative Powdery Mildew treatment with a material such as Compass® (trifloxystrobin) can also be helpful.

OUTDOOR GROWING SCHEDULE
Tukana and Lanai Verbena can be a late group crop to move outdoors for growing if frost protection is provided. In Michigan, Tukana and Lanai are usually moved outdoors in mid to late May, based on weather conditions.

OTHER TIPS
• Supernova treated liners are highly recommended for growers’ small container production.
• For best combination planting performance, consider vigor for all plants used, especially if mixing Supernova treated plants in with non-Supernova treated plants.
• Maintain proper soil pH levels. A soil pH below the upper 5s can lead to iron toxicity. This will show in the older foliage as a fine rusty to brown leaf spotting.
• Avoid long periods of cool, wet, humid, and low light levels in the greenhouse if possible when growing Verbena. Various diseases can develop, especially if proper air movement is not provided. Also, under these growing conditions, proper fertilizer levels in the soil and plant must be maintained or foliage will discolor or develop a “spotting” pattern.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
These are our primary fungicide rotations of chemicals used to treat the disease issues that may develop in Proven Winners® and Proven Selections® crops.

### BOTRYTIS

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liner prevention</td>
<td>Daconil® foliar (note some residue)</td>
<td>1.4 pts.</td>
<td>Weekly</td>
<td>Botrytis (Powdery Mildew)</td>
</tr>
<tr>
<td>Stock prevention</td>
<td>Daconil foliar, but not if show/finish flowers</td>
<td>1.4 pts.</td>
<td>Depends</td>
<td>Botrytis (PM)</td>
</tr>
<tr>
<td>Has Botrytis, or at risk (in Action plan)</td>
<td>Pageant</td>
<td>12 oz.</td>
<td>0 – 14 days</td>
<td>Botrytis (Downy Mildew, Powdery Mildew, Alternaria Leaf Spot, Anthracnose)</td>
</tr>
<tr>
<td></td>
<td>Spectro™ (residue an issue if show/finish)</td>
<td>2 lbs.</td>
<td>At 14 days</td>
<td>Botrytis (Fusarium, PM, Rhizoc, Anthrac)</td>
</tr>
<tr>
<td></td>
<td>Protect™</td>
<td>1 lb.</td>
<td>At 21 days</td>
<td>Botrytis (works well for Botrytis)</td>
</tr>
<tr>
<td></td>
<td>Decree®</td>
<td>1.5 lb.</td>
<td>27 days</td>
<td>Botrytis (rated as one of the better controls for Botrytis per Ann Chase)</td>
</tr>
<tr>
<td></td>
<td>Veranda™</td>
<td>.5 lb.</td>
<td>35 days</td>
<td>Botrytis</td>
</tr>
</tbody>
</table>

### POWDERY MILDEW

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action plan with Powdery Mildew rotation</td>
<td>Cease</td>
<td>2.5 gal.</td>
<td>0 – 14 days</td>
<td>PM (Anthrac, Phytop, Downy Mildew, Rhizoc, Fusarium, Thielaviopsis)</td>
</tr>
<tr>
<td></td>
<td>Milstop®</td>
<td>5 lbs.</td>
<td>At 21 days</td>
<td>PM (Anthrac, Botrytis, Downy Mildew)</td>
</tr>
<tr>
<td></td>
<td>Milstop</td>
<td>5 lbs.</td>
<td>At 28 days</td>
<td>PM (Anthrac, Botrytis, Downy Mildew)</td>
</tr>
<tr>
<td></td>
<td>Compass®</td>
<td>2 oz.</td>
<td>At 35 days</td>
<td>PM (Anthrac, Phytop, Downy Mildew, Botrytis, Rhizoc)</td>
</tr>
<tr>
<td>Plants that show PM conditions</td>
<td>Compass</td>
<td>2 oz.</td>
<td>0 – 7 days</td>
<td>PM (Anthrac, Phytop, Downy Mildew, Botrytis, Rhizoc)</td>
</tr>
<tr>
<td></td>
<td>Cease/Heritage® – ½ rate (note some residue)</td>
<td>8 qt. + 2 oz.</td>
<td>At 7 days</td>
<td>PM (Anthrac, Phytop, Downy Mildew, Rhizoc, Fusarium, Thielaviopsis)</td>
</tr>
<tr>
<td></td>
<td>Daconil</td>
<td>1.4 pts.</td>
<td>At 21 days</td>
<td>PM (Botrytis)</td>
</tr>
</tbody>
</table>

### ROOT ROT

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plants in propagation – Undiagnosed trouble</td>
<td>Cease® + Pageant®</td>
<td>8 qts. + 12 oz.</td>
<td>0 and 7 days</td>
<td>Phytophthora/Pythium + cover all but Thielaviopsis. Cease (broad control), Pageant (Sclerotinia, Fusarium, Rhizoctonia, Powdery Mildew, Downy Mildew)</td>
</tr>
<tr>
<td>Plants moving from propagation – Undiagnosed trouble</td>
<td>OHP 6672™ / Truban®</td>
<td>16 oz. + 8 oz.</td>
<td>Once</td>
<td>Phytophthora (OHP: Rhizoc, Botrytis, Fusarium) per action plans</td>
</tr>
<tr>
<td>Problem ID’d: Phytopathogen or Pythium</td>
<td>Fenstop® drench</td>
<td>14 oz.</td>
<td>0 – 21 days</td>
<td>Phytop/Pyth (Rhizoc)</td>
</tr>
<tr>
<td></td>
<td>Hurricane® drench (if on Superbells®, use next chem)</td>
<td>4 oz.</td>
<td>At 21 days</td>
<td>Phytop/Pyth (Downy Mildew) 2 MOAs (modes of action), very effective control</td>
</tr>
<tr>
<td></td>
<td>Alude™ drench</td>
<td>12 oz.</td>
<td>At 35 days</td>
<td>Phytop/Pyth</td>
</tr>
<tr>
<td>Preventative drench</td>
<td>Cease</td>
<td>8 qts.</td>
<td>7 – 14 days</td>
<td>Pythium/Phytop (biweekly on ColorChoice® shrubs)</td>
</tr>
</tbody>
</table>
## EFFECTIVE CHEMICALS IN 3 DIFFERENT MOA CLASSES

<table>
<thead>
<tr>
<th>Disorder</th>
<th>Effective Chemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial Blight</td>
<td>Coppers, Protect, Medallion®, Firewall™, Cease</td>
</tr>
<tr>
<td>Crown Rot</td>
<td>Pageant, Companion®, Cease, Alude, Fenstop, done as sprays</td>
</tr>
<tr>
<td>Downy Mildew</td>
<td>Alude, Coppers, Orvego™, Micora™, Strobilurins</td>
</tr>
<tr>
<td>Erwinia</td>
<td>Dumping the crop, Camelot™, Phyton®, Firewall/Agri-Mycin®</td>
</tr>
<tr>
<td>Fusarium</td>
<td>OHP, Medallion, Heritage</td>
</tr>
<tr>
<td>Leaf Spot</td>
<td>Heritage, Spectro, Pageant, Palladium™, Biofungicides, Terraguard®</td>
</tr>
<tr>
<td>Rhizoctonia</td>
<td>Medallion, OHP, Pageant, Compass, Heritage</td>
</tr>
<tr>
<td>Rhodo/Agro</td>
<td>Phyton, Mancozeb, Coppers, Firewall</td>
</tr>
<tr>
<td>Thielaviopsis</td>
<td>Medallion, OHP, Chipco® 26019</td>
</tr>
</tbody>
</table>

Updated 12/2012
These are our primary insecticide rotations of chemicals used to treat the pest issues that may develop in Proven Winners® and Proven Selections® crops.

### Aphids

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets &amp; Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pressure/Quick Knockdown</td>
<td>Thionex®</td>
<td>1 lb.</td>
<td>Severe infestation</td>
<td>All stages of Aphids and use only as an emergency.</td>
</tr>
<tr>
<td>Aphid Rotation</td>
<td>Endeavor</td>
<td>2.5 oz. – 5 oz.</td>
<td>At first sign</td>
<td>All stages of Aphids. Causes them to stop feeding.</td>
</tr>
<tr>
<td></td>
<td>Flagship®</td>
<td>2 oz. – 4 oz.</td>
<td>3 – 5 days later</td>
<td>All stages of Aphids; takes a few days to see death.</td>
</tr>
<tr>
<td></td>
<td>Aria® / TriStar®</td>
<td>20 g / 1.3 oz.</td>
<td>3 – 5 days later</td>
<td>All stages of Aphids. Aria stops feeding and Tristar is a translaminar neonicotinoid.</td>
</tr>
<tr>
<td></td>
<td>Safari®</td>
<td>4 oz. – 8 oz.</td>
<td>3 – 5 days later</td>
<td>All stages of Aphids.</td>
</tr>
<tr>
<td></td>
<td>Molt-X / Botanigard</td>
<td>8 oz. / 1 lb.</td>
<td>3 – 5 days later</td>
<td>Molting inhibitor.</td>
</tr>
<tr>
<td></td>
<td>Kontos®</td>
<td>50 ml</td>
<td>3 – 5 days later</td>
<td>Systemic and contact.</td>
</tr>
<tr>
<td></td>
<td>Orthene / Marathon® II</td>
<td>4 oz. / 50.2 ml</td>
<td>3 – 5 days later</td>
<td>Use where products above are not achieving desired control and/or for quick knockdown.</td>
</tr>
</tbody>
</table>

### Fungus Gnats

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets &amp; Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pressure/Quick Knockdown</td>
<td>Mesurol sprench</td>
<td>1 lb.</td>
<td>Severe infestation</td>
<td>For active adults and heavy infestation of larvae</td>
</tr>
<tr>
<td>Fungus Gnat Rotation</td>
<td>Citation® sprench</td>
<td>2.66 oz.</td>
<td>At first sign, follow cultural procedure</td>
<td>Larvicide</td>
</tr>
<tr>
<td></td>
<td>Distance® sprench</td>
<td>2 oz. – 6 oz.</td>
<td>3 – 5 days later</td>
<td>Immatures, Whiteflies, Scales, Mealybugs</td>
</tr>
<tr>
<td></td>
<td>Adept® sprench</td>
<td>.5 oz. – 2 oz.</td>
<td>3 – 5 days later</td>
<td>Immatures, Whiteflies, Leafminers</td>
</tr>
<tr>
<td></td>
<td>Gnatroil® sprench</td>
<td>13 oz. – 26 oz.</td>
<td>3 – 5 days later</td>
<td>Larvicide with a foul odor associated with it</td>
</tr>
</tbody>
</table>

### Mites

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets &amp; Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mite Rotation</td>
<td>Floramite / Ovation®</td>
<td>8 oz. / 2 oz.</td>
<td>First day</td>
<td>Adult Mites and eggs.</td>
</tr>
<tr>
<td></td>
<td>JudoTM / Hexygon®</td>
<td>4 oz. / 2 oz.</td>
<td>3 – 7 days later</td>
<td>Adults, nymphs, and eggs.</td>
</tr>
<tr>
<td></td>
<td>Pylon</td>
<td>5.2 oz.</td>
<td>3 – 7 days later</td>
<td>Adults and nymphs. Also great for Thrips and Whiteflies</td>
</tr>
<tr>
<td></td>
<td>Triact® 70 (neem oil)</td>
<td>256 fl. oz.</td>
<td>3 – 7 days later</td>
<td>All life stages, plus Thrips, Whitefly, Aphids</td>
</tr>
<tr>
<td></td>
<td>Avid / Floramite</td>
<td>8 oz. / 4 oz.</td>
<td>3 – 7 days later</td>
<td>Mites, Thrips</td>
</tr>
<tr>
<td></td>
<td>Suffoil-X®</td>
<td>256 fl. oz.</td>
<td>3 – 7 days later</td>
<td>All life stages, plus Thrips, Whitefly, Aphids</td>
</tr>
<tr>
<td></td>
<td>Akari®</td>
<td>12 oz. – 24 oz.</td>
<td>3 – 7 days later</td>
<td>Adults and nymphs</td>
</tr>
<tr>
<td></td>
<td>Pylon / Ovation</td>
<td>5.2 oz. / 2 oz.</td>
<td>3 – 7 days later</td>
<td>Adults, nymphs, and eggs</td>
</tr>
<tr>
<td>Winter Rotation for ColorChoice®</td>
<td>Triact 70, Soaps, Oils</td>
<td>256 fl. oz.</td>
<td>Scout for pressure once a week</td>
<td>Effective on all life stages, including Botrytis and Powdery Mildew. Spray once weekly or biweekly, depending on pressure.</td>
</tr>
</tbody>
</table>
# Insecticide Rotation Guide

## Shorefly

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets &amp; Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pressure/Quick Knockdown</td>
<td>Mesurol sprench</td>
<td>1 lb.</td>
<td>Severe infestation</td>
<td>For heavy infestation of active adults and larvae</td>
</tr>
<tr>
<td>Shorefly Rotation</td>
<td>Citation sprench</td>
<td>2.66 oz.</td>
<td>At first sign, follow cultural procedure</td>
<td>Larvicide</td>
</tr>
<tr>
<td></td>
<td>Distance sprench</td>
<td>2 oz. – 6 oz.</td>
<td>3 – 5 days later</td>
<td>Immatures, Whiteflies, Fungus Gnats, Leafminers</td>
</tr>
<tr>
<td></td>
<td>Safari sprench</td>
<td>4 oz. – 8 oz.</td>
<td>3 – 5 days later</td>
<td>Adults and larvae</td>
</tr>
</tbody>
</table>

## Thrips

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets &amp; Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pressure/Quick Knockdown</td>
<td>Mesurol® or Orthene®</td>
<td>1 lb. or 4 oz.</td>
<td>At first sign of heavy pressure</td>
<td>Thrips, Aphids, Whitefly, Beetles, Fungus Gnats Adults</td>
</tr>
<tr>
<td>Thrips Rotation</td>
<td>Molt-X® / Botanigard®</td>
<td>8 oz. / 1 lb.</td>
<td>First day</td>
<td>Thrip pupae and young adults, Whitefly, Aphids, Fungus Gnats (IGR + bacteria)</td>
</tr>
<tr>
<td></td>
<td>Pylon® or Pylon/Endeavor®</td>
<td>5.2 oz.</td>
<td>3 – 7 days later</td>
<td>All life stages of Thrips, Mites, Whitefly (tank mix with Endeavor for control of Aphids)</td>
</tr>
<tr>
<td></td>
<td>Pedestal® / Discus® NG</td>
<td>6 oz. / 25 oz.</td>
<td>3 – 7 days later</td>
<td>Thrips, Aphids, Whitefly (use twice in a row for best results; watch Phyto). Do not use Pedestal on Lobularia.</td>
</tr>
<tr>
<td></td>
<td>Avid® / Floramite®</td>
<td>8 oz. / 4 oz.</td>
<td>3 – 7 days later</td>
<td>Thrips and Mites (good contact kill)</td>
</tr>
<tr>
<td></td>
<td>Overture® / Decathlon®</td>
<td>8 oz. / 1.3 oz.</td>
<td>3 – 7 days later</td>
<td>Thrips, Aphids (translaminar that has great control when not used often)</td>
</tr>
<tr>
<td></td>
<td>Conserve® / DiPel® Pro</td>
<td>22 oz. / 4 oz.</td>
<td>3 – 7 days later</td>
<td>Thrips, Mites, Aphids</td>
</tr>
<tr>
<td></td>
<td>Mavrik®</td>
<td>8 oz.</td>
<td>3 – 7 days later</td>
<td>Thrips, Aphids, Whitefly</td>
</tr>
</tbody>
</table>

## Whitefly

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets &amp; Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Pressure/Quick Knockdown</td>
<td>Thionex</td>
<td>1 lb.</td>
<td>Severe infestation</td>
<td>Effective on all life stages. Use as an emergency only.</td>
</tr>
<tr>
<td>Whitefly Rotation</td>
<td>Sanmite®</td>
<td>4 oz. – 6 oz.</td>
<td>At first sign</td>
<td>Eggs, nymphs, and adults</td>
</tr>
<tr>
<td></td>
<td>Pedestal</td>
<td>6 oz. – 8 oz.</td>
<td>3 – 5 days later</td>
<td>IGR effective on nymphs</td>
</tr>
<tr>
<td></td>
<td>Molt-X / Botanigard®</td>
<td>8 oz. / 1 lb.</td>
<td>Every 3 days</td>
<td>Molting inhibitor effective on eggs, nymphs and adults.</td>
</tr>
<tr>
<td></td>
<td>Safari</td>
<td>4 oz. – 8 oz.</td>
<td>3 – 5 days later</td>
<td>Effective on all life stages</td>
</tr>
<tr>
<td></td>
<td>Talstar®</td>
<td>10 oz. – 40 oz.</td>
<td>3 – 7 days later</td>
<td>Effective on all life stages</td>
</tr>
<tr>
<td></td>
<td>Scimitar®</td>
<td>1.5 oz. – 5 oz.</td>
<td>7 – 14 days later</td>
<td>Effective on all life stages</td>
</tr>
<tr>
<td></td>
<td>Judo</td>
<td>2 oz. – 4 oz.</td>
<td>7 – 14 days later</td>
<td>Adults</td>
</tr>
</tbody>
</table>

## Other Pests

<table>
<thead>
<tr>
<th>Category</th>
<th>Treatment</th>
<th>Rate per 100 gal.</th>
<th>When</th>
<th>Main Target/Other Targets &amp; Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beetles</td>
<td>Talstar</td>
<td>10 oz. – 40 oz.</td>
<td>First sign</td>
<td>Effective on all life stages</td>
</tr>
<tr>
<td>Caterpillars</td>
<td>Orthene / Marathon II</td>
<td>4 oz. / 50 ml</td>
<td>First sign</td>
<td>Effective on all life stages</td>
</tr>
<tr>
<td>Loopers</td>
<td>Conserve / DiPel® Pro</td>
<td>10 oz. / 1 lb.</td>
<td>First sign</td>
<td>Effective on all life stages</td>
</tr>
<tr>
<td>Moths</td>
<td>Conserve / DiPel Pro</td>
<td>10 oz. / 1 lb.</td>
<td>First sign</td>
<td>Effective on all life stages</td>
</tr>
</tbody>
</table>

Updated 11/2012
Supernova® liners have been treated to provide a blooming, salable plant in a 4” – 6” container in four to six weeks. While not recommended for hanging baskets or uprights, some growers use them for better flower coverage for early season plantings.

Treatments given to Supernova liners to control vigor are temporary and will lose effectiveness in three to six weeks, depending on growing conditions.

As a general guideline, follow the cultural guidelines and the growth regulator information below for helpful tips on growing Supernova liners. More specific information can be found on Four Star’s individual variety culture sheets.

**NUTRITION**

**pH:** 5.8 – 6.2. For Superbells® Calibrachoa, maintain a lower pH of 5.5 – 5.8

**EC:** (2:1 extraction method) .5 – .8

As is true with all Proven Winners®, soil pH and EC levels must be properly maintained.

**TEMPERATURE**

Supernova liners grow and perform best at an average temperature of 65 – 68 F. Colder temperatures are possible but will delay flowering. Angelface® Angelonia do not flower well below 68 – 72 F.

**WATERING**

Containers grown from Supernova liners should be kept moderately moist, but not saturated. More frequent, lighter watering is best, as over-watering and fertilization encourages vegetative growth and flower delay.

**LIGHT/LIGHTING**

Placing in the brightest greenhouse location available is recommended. Low light and warm temperatures will produce a soft plant that grows together rapidly, produces fewer blooms, and may require more PGR (plant growth regulator) treatments.

**PINching**

None is required or recommended. This would remove the initiated flowers.

**FLOREL® (ETHEPHON)**

It is not recommended on most Supernova varieties as initiated flowers would be aborted. However, Nemesia flower very readily and often benefit from one application of 500ppm four to six days after planting.

**GROWTH REGULATORS**

Certain varieties within a genera may require different growth regulator treatments, depending on plant size and vigor. Under Four Star Greenhouse growing conditions, we use this chart as a guideline. These rates are based on ½-GL of solution per 100 square feet for sprays. Follow recommended levels for drenches, based on container size. Do not apply under bright, sunny conditions, as this can cause leaf burn.

A Growth Regulator Treatment Guide is shown on the following page.
### GROWTH REGULATOR TREATMENT GUIDE

<table>
<thead>
<tr>
<th>Variety</th>
<th>Growth Regulator Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Superbells® <em>Calibrachoa</em> Blue, Pomegranate Punch, Yellow</td>
<td>For Superbells, apply a 1ppm – 2ppm Bonzi® (paclobutrazol) drench with a possible followup 1ppm drench later if needed. For Pretty Much Picasso, apply a 2ppm – 3ppm Bonzi drench 10 days after planting, plus may need an additional 1ppm drench later, based on plant and growing conditions.</td>
</tr>
<tr>
<td>• Supertunia® <em>Petunia</em>: Pretty Much Picasso®</td>
<td></td>
</tr>
<tr>
<td>• Argyranthemum</td>
<td>Sumagic® (uniconazole) spray (5ppm — 10ppm) or Bonzi drench (1ppm). Up to two applications — the first application 10 to 14 days after planting, and a second application only if necessary.</td>
</tr>
<tr>
<td>• Superbells Blackberry Punch, Cherry Blossom, Lemon Slice, Scarlet,</td>
<td>Sumagic spray (5ppm — 10ppm) or Bonzi drench (1ppm). One application 10 to 14 days after planting. These are less vigorous varieties, so a second application may not be needed.</td>
</tr>
<tr>
<td>Tickled Pink, Trailing varieties</td>
<td></td>
</tr>
<tr>
<td>• Supertunia</td>
<td></td>
</tr>
<tr>
<td>• Surfina® <em>Petunia</em></td>
<td></td>
</tr>
<tr>
<td>• Lanai®, Tukana®, Superbena® and Babylon® <em>Verbena</em></td>
<td></td>
</tr>
<tr>
<td>• Superbells: Dreamsicle, Grape Punch, Miss Lilac, Pink, Saffron, Spicy,</td>
<td></td>
</tr>
<tr>
<td>Tequila Sunrise, White</td>
<td></td>
</tr>
<tr>
<td>• Tapien® <em>Verbena</em></td>
<td></td>
</tr>
<tr>
<td>• Angelface® <em>Angelonia</em></td>
<td>Sumagic spray (5ppm — 10ppm); no Bonzi drench. Possibly one application 14 to 21 days after planting. Angelface Dark Violet should only be drenched if necessary. If spraying Dark Violet, use 2,500ppm B-Nine® (daminozide) spray.</td>
</tr>
<tr>
<td>• Superbells: Cherry Red, Cherry Star, Coralberry Punch, Red, Sweet</td>
<td></td>
</tr>
<tr>
<td>Tart, Yellow Chiffon</td>
<td></td>
</tr>
<tr>
<td>• Flying Colors® <em>Diascia</em></td>
<td></td>
</tr>
<tr>
<td>• <em>Nemesia</em></td>
<td></td>
</tr>
<tr>
<td>• <em>Scaevola</em></td>
<td></td>
</tr>
<tr>
<td>• Sunpatiens® <em>Impatiens</em></td>
<td>Supernova <em>New Guineas</em> need 70 — 80% relative humidity. Maintain average daily temperature of 68 F. Fertilize only as needed. Infinity <em>New Guinea Impatiens</em> should not need any PGRs. Sunpatiens and <em>Salvia</em> may need a 2,500ppm B-Nine spray.</td>
</tr>
<tr>
<td>• Infinity® <em>New Guinea Impatiens</em></td>
<td></td>
</tr>
<tr>
<td>• Evolution/Blue Frost <em>Salvia</em></td>
<td></td>
</tr>
<tr>
<td>Supernova 84 liners</td>
<td>These liners are tighter and have more growth regulators applied already, so they typically will take longer to finish and will require less growth regulator treatment than Supernova 42 liners.</td>
</tr>
</tbody>
</table>

*Note: These are Four Star Greenhouse recommendations when grown indoors, under glass, in Michigan with greenhouse temperatures between 65 and 68 F. Time of year, southern location, warmer temperatures or lower light levels could require more growth regulators. Cooler temperatures may require little to none. This information is provided as recommendations only. Please adjust as necessary, based on your geographic location and growing environment.*
Cool Crops Benchrun Collection
For Grande™ production in 4” – 5” containers

Criteria:
• A mix of colors and top-selling varieties.
• Four to five weeks in a Grande™ container from a Supernova® 42 liner (unless otherwise noted).
• Moderate water requirements.
• Similar PGR (plant growth regulator) rates:
  — 1ppm Bonzi® (paclobutrazol) drench two weeks after transplant.
  — 5ppm – 10ppm Sumagic® (uniconazole) spray as needed after that.
• Rooting out temperatures: 65 F night, 72 F day. Growing on temperatures 65 F night, 68 F day.
• Read and follow specific cultural recommendations from the Supernova Culture Guide.
• Refer to specific crop culture guides for additional information.

Varieties
1. Butterfly Argyranthemum
2. Goldilocks Rocks® Bidens (from a Standard 84)
3. Superbells® Blue Calibrachoa
4. Superbells Cherry Star Calibrachoa*
5. Superbells Grape Punch Calibrachoa
6. Superbells Lemon Slice Calibrachoa
7. Superbells Miss Lilac Calibrachoa
8. Superbells Pink Calibrachoa
9. Superbells Pomegranate Punch Calibrachoa
10. Superbells Saffron Calibrachoa
11. Superbells Spicy Calibrachoa
12. Lucia® Dark Blue Lobelia (from a Standard 84)
13. White Knight™ Lobularia (from a Standard 84)
14. Sunsatia® Lemon Nemesia
15. Supertunia® Bordeaux Petunia
16. Supertunia Picasso in Pink™ Petunia
17. Supertunia Raspberry Blast Petunia
18. Supertunia Royal Velvet Petunia
19. Supertunia Vista collection Petunia
20. Supertunia White Petunia
21. Surfinia® Red Petunia
22. Superbena® Royale Chambray Verbena
23. Superbena Royale Iced Cherry Verbena
24. Superbena Royale Plum Wine Verbena
25. Superbena Royale Whitecap Verbena

*May perform better if given only 5ppm – 10ppm Sumagic spray later as needed instead of the Bonzi drench after transplant.

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application. Please adjust the rates and spray applications to your location and facility.
Warm Crops Benchrun Collection
For Grande™ production in 4” – 5” containers

Criteria:
• A mix of colors and top-selling varieties.
• Four to five weeks in a GrandeTM container from a Standard 84 liner (unless otherwise noted).
• Moderate water requirements.
• Similar PGR (plant growth regulator) rates: 2,500ppm B-Nine® (daminozide) spray.
• Rooting out temperatures: 65 F night, 72 F day. Growing on temperatures 65 F night, 72 F – 75 F day.
• Read and follow specific cultural recommendations from the Supernova® Culture Guide.
• Refer to specific crop culture guides for additional information.

Varieties:
1. Angelface® Blue Angelonia (from a Supernova 42)
2. Diamond Frost® Euphorbia
3. Sweet Caroline Bewitched Ipomoea
4. Sweet Caroline Light Green Ipomoea
5. Sweet Caroline Raven Ipomoea
6. Sweetheart Light Green Ipomoea
7. Luscious® Berry Blend™ Lantana
8. Luscious Citrus Blend™ Lantana
9. Whirlwind® Blue Scaevola (from Supernova 42)
10. Lemon Coral™ Sedum
11. Chocolate Drop Solenostemon/Coleus
12. ColorBlaze® Dipt in Wine Solenostemon/Coleus
13. ColorBlaze Keystone Kopper™ Solenostemon/Coleus
14. ColorBlaze Kingswood Torch Solenostemon/Coleus
15. Fishnet Stockings Solenostemon/Coleus
16. Gays Delight Solenostemon/Coleus
17. Strawberry Drop Solenostemon/Coleus
18. Catalina® Gilded Grape Torenia
19. Catalina Grape-O-licious Torenia
20. Catalina Midnight Blue Torenia

The rates and chemicals listed are based on our southeast Michigan growing conditions, and are not recommended for nationwide application.
Please adjust the rates and spray applications to your location and facility.

www.pwfourstar.com
734.654.6420
Streamliners™ are liners of multiple varieties grown together into one, to allow a grower to plant only one plug for an instant combination.

**STREAMLINER BENEFITS**

- Labor savings and increased accuracy when planting combinations
- Fewer liner trays per combination reduce shipping costs
- Only two to three liners need per 10” – 12” basket and larger
- Only one liners needed per 1GL container
- Crop times finish the same as when planted from Standard liners:
  - Eight to 10 weeks for a 10” – 12” basket
  - Six to seven weeks for 1GL size
- Large combination-specific tag available for each combination to reduce tag waste and increase brand recognition at purchase
- More than 15 top-selling and top-performing combinations available for success in the greenhouse and at retail

**GROWER INFORMATION**

- Available as a 50-count liner
- Order six weeks in advance to ensure availability
- Availability weeks follow the same guidelines and restrictions as other Proven Winners® liners
- Tag exchange is available for hanging baskets and upright containers. Follow standard tag exchange instructions.

Streamliners™ Multi-Liners™

- Strawberry Kiss *NEW*
  - SUPERBELLS® Pink
  - SUPERBENA® White
  - SUPERTUNIA® Mini Appleblossom

- Bahama Beach *NEW*
  - SUPERTUNIA® Bordeaux
  - SUPERBELLS® Lemon Slice
  - LAGUNA® Sky Blue

- Banana Colada
  - SUPERBELLS® Lemon Slice
  - SUPERTUNIA® White
  - SUNSATIA® Coconut

- Bermuda Skies
  - SUPERTUNIA® Bermuda Beach
  - LAGUNA® Sky Blue
  - SUPERBELLS® Yellow Chiffon

- Berrygum *NEW*
  - SUPERTUNIA® Vista Bubblegum
  - SUPERTUNIA® Vista Silverberry

- Candyland
  - SUPERBELLS® Pink
  - SUPERBELLS® Yellow
  - SUPERBELLS® Dreamsicle

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Streamliners™ Multi-Liners™

Grandiose **NEW**
- SUPERTUNIA® Indigo Charm
- SUPERTUNIA® Sangria Charm
- WHIRLWIND® White

Main Street USA
- SURFINIA® Red
- SUPERTUNIA® Royal Velvet
- SUPERTUNIA® Mini White

Raspberry Parfait
- SUPERTUNIA® Raspberry Blast
- SUPERBENA® Dark Blue
- SUPERTUNIA® White

Sangria
- SUPERTUNIA® Bordeaux
- SUPERTUNIA® Mini Silver
- SUPERBENA® Burgundy

Starry Night **NEW**
- SUPERTUNIA® Royal Velvet
- SURFINIA® Red
- SUPERBELLS® Lemon Slice

Summer Daze
- SURFINIA® Red
- SUPERBELLS® Yellow
- SNOWSTORM® GIANT SNOWFLAKE®

Velvet Crush
- SURFINIA® Red
- SUPERTUNIA® Royal Velvet
- SUPERBELLS® Dreamstic

Velvet Skies
- BLUSHING PRINCESS™
- SUPERTUNIA® Royal Velvet
- SUPERTUNIA® Mini Silver

You Got Pizazz **NEW**
- SUPERTUNIA® Raspberry Blast
- SUPERTUNIA® Royal Magenta
- LAGUNA® White
## Annual Plant Grouping

<table>
<thead>
<tr>
<th>Growing Temp</th>
<th>Low pH 5.5 – 5.8</th>
<th>Mid pH 5.8 – 6.2</th>
<th>High pH 6.0 – 6.5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A 55 – 65 F</strong></td>
<td>Sundaze® Bracteantha*, Million Bells® and Superbells® Calibrachoa, Sunsatia® and other Nemesia, Supertunia® Petunia</td>
<td>Argyranthemum, Bidens, Flying Colors® and Flirtation® Diascia, Karalee® and Stratosphere® Gaura, Princess® and Knight™ Lobularia, Symphony and Soprano® Osteospermum, and Intensia® Phlox</td>
<td>Flambé® Chrysocephalum, ColorBlaze®, and Proven Selections® Coleus, King Tut® and Baby Tut® Cyperus, Diamond Frost® Euphorbia, Ipomoea, Boldy™ and Timeless™ Pelargonium, Superbena®, Lanai®, and Tukana® Verbena</td>
</tr>
<tr>
<td><strong>C 70 – 75 F</strong></td>
<td>Angelface® Angelonia, Slightly Strawberry™ Anisodontea, Luscious® and Proven Selections® Lantana, Catalina® and Summer Wave® Torenia</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fertilizer: 150 – 200 Constant Liquid Feed (CLF)**

*100 – 150 CLF,
† 200 – 300 CLF

## Perennial Plant Grouping

<table>
<thead>
<tr>
<th>Growing Temp</th>
<th>Low pH 5.5 – 5.8</th>
<th>Mid pH 5.8 – 6.2</th>
<th>High pH 6.0 – 6.5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A 55 – 65 F</strong></td>
<td>Decadence Baptisia, Fruit Punch Dianthus, Hosta, Lemon Drop Oenothera®, ’Shock Wave’ Phlox, Garnet Brocade™, ’Pure Joy’ and ’Maestro’ Sedum</td>
<td></td>
<td>Hemerocallis, Pink Chablis* Lamium</td>
</tr>
</tbody>
</table>

**Fertilizer: 150 – 200 Constant Liquid Feed (CLF)**

*100 – 150 CLF,
† Tender Perennial
Grower Team Contact Info

Dennis Crum
734-654-7471
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Director of Growing Operations
21 Years of Service

Brian Bourdon
734-654-7476
bbourdon@pwfourstar.com
15 Years of Service
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