CULTURE

USEFUL GROWER TIPS

EXPERT CULTURAL

ADVICE

51 years OF EXPERIENCE

CULTURAL CONSULTANT

Jerry Gorchels

Jerry Gorchels is on our team to help you with cultural advice. An independent horticulturist with 51 years in the industry and lots of hands-on experience, Jerry adds another level of expertise to our service. Help avoid costly losses by tapping into his expert advice. If you would like to speak with him regarding any products you have purchased from Jolly Farmer, please give your rep a call.

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CULTURAL CHECK LIST

JERRY GORCHELS

CULTURAL CONSULTANT

Success starts before your plants arrive. I hope the following check lists will get you off to a great start! I'm at your service if you need any assistance.

Before your plants arrive

Have materials ready for planting when the plants arrive. Any delays causing you to hold the plants can decrease their vigor and ability to establish.

Have the greenhouse checked to assure that the heating and ventilating systems are properly functioning. Have there been any changes in or around the greenhouses? New parking lot lights that stay on at night can affect photo periods.

Test the water and soil and make sure that the fertilizer will balance the plants' nutritional needs.

Have sufficient labor to handle the crops when they arrive.

Have a receiving area for the plants that will allow you to unpack them and inspect them on arrival. This is commonly a head house. It should provide sufficient conditions so as not to cause plant stress such as too hot or too bright. I always like to see warm conditions 65-70°F. with about 30-35% shade. Water the plants if dry.

Have a place to keep the shipping documents, to make notes on plant conditions when the plants arrive.

When your plants arrive

Unpack and inspect all of the plants received. Place plants in the receiving area after unpacking prior to planting.

Make notes of any visible problems such as damaged leaves, cold/frost injury, off color leaves, and any disease. Look especially at the growing points. If the growing points are not damaged, most often the plants can establish and develop normally even after damages during shipping. Check the roots for any damage with cold injury. Look for hitchhiking insects.

Plant plugs and liners within 24 hours. Often it is best to allow the plugs and liners to recover overnight after being shipped. If the plants arrive early in the day then they can be transplanted the same day. Do not plant dry plugs or liners. Water them first. Planting dry plugs slows root development. Normally you should see the roots establish in 5-7 days after transplanting.

Make sure that the transplanted plugs and liners are watered in immediately after transplanting to settle the soil and establish contact with the root-ball.

Do not plant the plugs or liners too deep since most plants should not have their crowns planted deeper than the original plug or liner. Marigolds and tomatoes are typically the exception.

Salvia needs to be established under at least 35% shade for the first 5-7 days after transplanting to prevent tip abortion.

Tuberous begonias need at least a 14 hour day length to prevent tubers from forming, which would slow down development.

After transplanting

Place plants into the proper environment. Remember, if you only have one growing area, try to match conditions within the area such as hot or cold, and light or shade. Monitor temperatures. You should have 65-68°F soil temperatures until the newly transplanted seedlings/liners start to develop.

Check for root development. New roots should establish 5-7 days after transplanting. If the roots are not taking off, check the growing conditions. If the roots are not developing and showing a dark/black color, then a fungicide drench might be required.

You should not have to fertilize most crops until they have started to establish.

Establish a scouting program to routinely monitor the crops. This will allow you to take corrective action immediately should a problem occur. Noticing a problem but waiting to act can decrease your ability to correct the problem and save your crop. A good example is the use of yellow sticky traps to identify pest problems when they first arrive. Yellow sticky traps are good for identifying whitefly, winged aphids, leafminer adults, thrips, fungus gnats, and moths. They will not show spider mites, so you have to inspect the plant leaves.

Scout for stressed plants (wilting on bright days after watering), off color foliage, poor root development, brown or black roots, stems and leaf spots and flowers not forming on schedule.

Watering methods should minimize the amount of leaf wetness on the plants after watering. The plant foliage should dry within 2-3 hours after watering. Watering late in the day can keep the leaves wet for too long allowing botrytis and mildews to establish. High humidity in the greenhouse at the end of the day allows moisture to form on the leaves allowing disease to establish. Ventilate and heat to lower the relative humidity at the end of the day.

Diagnosing a plant problem

You need a good visual image of how the plant looks compared to how a healthy plant at the same stage of development should look. How is it different from a healthy plant in the same area? If the whole area is affected, how should they look?

What are the symptoms; such as leaf or stem spots, different color, wilting leaves, poor or dead roots? Look at the plant roots first to determine if they are developing normally. After checking the roots, then look at the stems and leaves. The growing points are critical so try to determine if they are affected. If a problem is observed then look at the plants around them to see if other plants are showing the same symptoms.

After checking the plants, look at the growing environment. Is there a physical problem, such as sitting too close to a heater, or too close to an open vent? I have seen plants show cold injury coming from a door that was not tightly sealed. Are the heaters working properly? Is there a leak in the irrigation system keeping the plants too wet? Is there too much shade or something overhead?

After checking the greenhouse environment conditions go back to the plant to see if there is a cultural problem. Are the plants planted too deep, or is the soil too compact and not draining properly? Have they been fertilized when too dry? Is it too much light, or not a long enough day length? Is there poor air movement which would slow drying and keep the plants too wet? Is your fertilizer rate what it should be? A poorly working fertilizer injector typically underfeeds the calculated rate.

If you observe a growing problem, call as soon as it is noticed to minimize the problem and find corrective action. We want to help you succeed.

Other ideas

Educate yourself. Many good books are available or subscribe to industry e-mails and magazines... Seminars at *Cultivate* and other tradeshows are a great learning opportunity. Growing quality plants takes a lot of good hard work, but remember quality doesn't cost, it pays!

FAQ

An annual is a plant that completes its life cycle in one year. A biannual is a plant that completes its life cycle in two years and a perennial is a plant that grows over a number of years but does not always flower the first year from seed. Plant cycles can be shortened through propagation techniques. A good example is geraniums. A geranium grown from seed requires accumulating light energy units to bloom. A geranium liner already has that accumulated light and will

keep developing buds during the rooting cycle. Handling live plants is always a situational experience. The biggest situation can be shipping since it disrupts the plant from its continuous growth cycle. Healthy developing plants have their day-night temperature, water, and light, as well as their atmosphere conditions interrupted when placed on racks or boxed and shipped. Since you are receiving plants that have had a break in their growing cycle, you will need to restart the growing process. Restarting the plants and finishing them are often two separate events that get grouped into one process at planting.

What are the conditions that affect the plants during shipping?

Too hot, too cold, too wet, and too dry are factors that affect the plants during shipping. We try our best to provide the best moisture in the trays prior to racking or boxing, but the shipping conditions or the delivery systems can vary, affecting the plants' conditions on arrival. Getting the plants out of the boxes and off the racks onto a bench on arrival reduces the stress of shipping. Greenhouse conditions should not be stressful. A moderate temperature of 62-65 degrees and some overhead shade allows the plants to acclimate and recover from shipping. Water dry plants and allow wet plants to dry down overnight prior to planting to help the plugs and liners recover from the shipping stress.

How can I tell if the plugs and liners are taking off as expected?

The best way to monitor the plants is to check the roots. Most newly planted plugs and liners should have root initials growing into the new media within 3-5 days after transplanting. New roots should be visible at the sides and bottom of the container within 10-14 days after transplanting.

If the plants are not taking off after transplanting what should I do to get them back on track?

Check the conditions: if it is too hot or cold, then adjust the conditions. It usually helps to water everything in thoroughly again to help the roots move out of the liner or plug soil.

How do I handle damaged plants on arrival?

Call your Jolly Farmer representative and let them know the problem. Next, assess the damage to determine if the plants need extra treatment such as a fungicide, and note if the growing tips are affected. Most of the time, planting will allow the plants to recover from the damage, and you can see in a week how the plants are progressing.

What and when should I feed the liners and plugs?

See specifics in this culture guide. Fertilizer formulas can be very specific and depending on your water and media, specialized formulation might be required. We do not suggest retail formulations of fertilizer or 20-20-20 since they tend to have too much ammonium and phosphorus for balanced plant growth. A good rule of thumb is never feed a plant under water stress (wilted). First water the plant with clear water, then you can feed after the plant has recovered from the stress.

Do I need to pinch my plants?

This often depends on the plant and its growth development. Some crops such as geraniums have historically been pinched 3 weeks after planting to keep the plant short and increase the number of breaks. New plant varieties have reduced the need for pinching in many cases. Sometimes plants are pinched to shape and fill out hanging baskets. A well fed plant shouldn't need a lot of additional pinching.

What is the difference between a hard pinch and a soft pinch?

A hard pinch takes out the stem and 1 or more internodes on the plant. A soft pinch will just remove the growing point at the tip of the plant.

What causes geraniums liners to have lower yellow leaves?

Often when geraniums are shipped, there is a high ethylene level in the box that results in lower yellow leaves. This typically goes away after transplanting. Some lower leaf yellowing can be a result of low feeding levels in which case you would also see a reddish color to the leaf. Check the roots and if they are fine, then increase the feeding levels to green the plants.

What causes some plants to take off and root out initially and others take longer to establish in the same tray?

If you plant dry plugs or dry rooted liners, the plants might not root out initially. Make sure that the plugs and liners have ample moisture in their root ball prior to planting.

Why should you check a plant's root system?

The root development determines how the plant is progressing. Plants need a well developed root system to provide moisture and nutrients to the plant. A poor root system allows the plant to become easily stressed decreasing its ability to develop on time. Damaged roots can be a result of moisture stress, either too wet or too dry, or fertilizer damage. Often damaged roots allow disease infections to establish. If you see damaged roots, determine the cause of the damage and treat with an appropriate fungicide.

Why use growth regulators in production?

The main reason is to promote a uniformly developed plant in a confined space. Plants need to have a balanced root-to-shoot ratio and appropriate plant growth regulators are used to produce quality plugs or rooted liners.

Can I grow my plants cool?

What you should think of is not cool growing but cool finish. To successfully finish the crops, you need to get the roots established 14-21 days prior to lowering the temperatures. Not all crops should be finished cool such as Impatiens, Vinca, Begonias and Pentas. Just remember with a cool crop, times are longer, so consider your bench space. What some growers do is purchase larger plug and liner sizes which decreases the finish time, saving heat by growing when the weather is warmer. Plants that work well for cool finish are: Snapdragons, Petunias, Geraniums, Marigolds, Calibrachoa and Bacopa.

How do I control diseases such as botrytis and mildew?

Most of these foliar diseases develop because of wet leaves and flowers. Try to keep leaf wetness to less than 2 hours. This is best accomplished by proper venting of the greenhouses. Often moisture develops on the plants at the end of the day, especially on bright days. As the temperature drops, the relative humidity rises to the dew point, resulting in moisture on the plants. It is best to heat and ventilate for an hour at the end of the day by opening the vents and running the heaters to lower the relative humidity before closing the houses at night. Make sure that the air moves through the plant canopy. During cloudy, moist weather you will need to heat and ventilate throughout the day to keep the relative humidity down. If you cannot environmentally control the leaf wetness, then a fungicide is required.

How can I reduce plant stretch without using plant growth regulators?

Plants are programmed to stretch by the difference of day/night temperatures. When we have greater than 10°F of positive difference between day/night temperatures, you will have more internodal plant stretch. Keeping the day/night temperatures to less than 10°F difference is the best way to reduce stretch. Using a negative day/night temperature difference will also keep the plants from stretching. Growers may also lower the temperature 10°F at sunrise for 2 hours which also slows down rapid plant growth. Increasing container size or giving the plants more space also helps keep plant stretch down. Fertilizer choices also can play a role in decreasing plant stretch. High ammonium levels with high phosphate levels increases plant stretch while calcium and potassium-based fertilizers provide better plant tone.

How can I control heat in the greenhouse?

Shading is the best way to control heat. Using a 30% shade cloth will reduce temperatures to allow for optimum plant development. Shade compounds sprayed on the greenhouses, best if applied to the exterior, will also lower the heat build up inside.

SLOW
RELEASE FERTILIZERS

Having worked with slow-release fertilizers for over fifty years, we have experienced both the benefits as well as the potential problems of applying this form of fertilizer to ornamental crops. Remember that most slow-release fertilizers are coated soluble fertilizers that can be incorporated into the soil medium prior to planting or top dressed onto the soil after planting. You can produce high quality plants correctly using slow-release fertilizers.

What is it?

For the purpose of this discussion we will define it as one of the various commercial fertilizers available through the horticulture products distribution. There are several brands of slow-release fertilizer. The most commonly available product is resin coated soluble fertilizers. They are available in different formulations and can vary in release from 3-4 months to formulations that can take 18-24 months to release. Formulations can also vary in the nutrient content with different fertilizers that can include minor elements.

Benefits of slow-release

1. Slow release fertilizers feed the plants without having to apply soluble fertilizers directly or through an injector.

2. They can feed the plants after they leave the production location.

3. They work in combination with soluble fertilizers to provide a consistent level of nutrients for the plants to draw on.

Limitations

1. Fertilizer release rates vary by formulation and temperature.

2. Once the release has started you cannot stop the release of fertilizer. It is only possible to slow it down with cooler temperatures.

3. Fertilizer pellets can be fractured during mixing, making all of the fertilizer available at once.

4. Difficult to leach out high levels of soluble salts in slow growing plants.

5. Can cause severe plant damage when applied too close to the plant stem.

6. Can cause lush plant growth with unseasonably high temperatures, requiring PGR to control the plant habit.

How to use

1. Follow label guidelines and recommendations for use.

2. Soil incorporation prior to planting can uniformly disperse the fertilizer, reducing the risk of root or plant injury from concentrating the fertilizer in one spot. Carefully blend the slow-release into the growing medium so as not to fracture the pellets. If incorporating into the soil, do not apply extra water prior to planting, so the fertilizer release is not initiated.

3. If you choose to top dress, do so after the roots are reaching to the sides or bottoms of the container so that the fertilizer does not concentrate around newly initiated roots. Top dress application should be applied to the soil surface so as not to concentrate the fertilizer at the base of the plants.

4. Select the formulation and application method that works best for your operation and not based on what others are doing.

USING
PLUG SIZES TO YOUR ADVANTAGE

by: **Peter Darrow** *Sales Manager*

Choosing the right plug size can be a somewhat bewildering job, so I've put together some ideas to help you make the decision that is right for your business. First, let's look at the different options, what they are useful for, and see how they can be meshed into your production program.

512 plugs

This is the smallest and most economical plug. It's great for cell pack production, but can also be used in 4" & 6" pots with multiple plants/pot. However, I would suggest the latter only during your better growing conditions since the larger soil volumes take longer to dry down.

288 plugs

These are usually 1 week more mature than the 512. They finish approximately 7-10 days faster than the 512, and since they have a larger root ball, they can survive the stress of transplanting more easily than a 512. The 288 also allows you to grow a greater selection of varieties without as much volume. Late in the season, you might even slip in an extra turn in your greenhouse using 288's for a faster finish.

144 plugs

We offer a complete line of bedding plants in this large plug. A multi-sown product (except certain items like vegetables, Gerberas, and other items you don't want multi-sown) this large plug is excellent for 4", 6" and larger pots or baskets. One 144 will fill out a 4" pot 7-10 days faster than a 288.

26 plugs

Available for premium-seed started items such as Wave® petunias, Cannas, and other items. Suitable for quarts, gallons, or multiple plants in a 2 gallon.

I hope this helps you in your decision-making process,

Peter

26

144

288

512

USING
LINER SIZES TO YOUR ADVANTAGE

by: **Peter Darrow** *Sales Manager*

Choosing the right size liner can be a somewhat bewildering job, so I've put together some ideas to help you make the decision that is right for your business. First, let's look at the different options, what they are useful for, and see how they can be meshed into your production program.

144 liners

Our most economical liner size. It's great for those who are prepared to plant right away-this product should not be held in the tray! If you've been rooting your own liners, consider letting us do that difficult part without hurting your pocketbook! The 144's usually have not been pinched-we do not want to check their growth by holding them too long in the tray. They are generally one week less mature than the 3-26 or 2-51, so allow an extra week of crop time. Tags included.

51 & 26 liners

Our most popular sizes, with an extensive variety listing. These can be used in any size pot or basket with great success. They work well for mixed containers too, and with over 700 varieties to choose from, you'll have a outstanding selection. Tags included.

Peter

2-51
2 STRIPS WITH
50 IN EACH.

3-26
3 STRIPS WITH
25 IN EACH.

144

51

USING
PERENNIAL SIZES TO YOUR ADVANTAGE

by: **Peter Darrow** *Sales Manager*

Choosing the right size perennial plug or liner can be a somewhat bewildering job, so I've put together some ideas to help you make the decision that is right for your business. First, let's look at the different options, what they are useful for, and see how they can be meshed into your production program.

144 plugs

You could put these in 4", 6", or even gallon pots with 2-3 plants per pot depending upon the specie. This size also allows you to purchase only 144 per variety, so you can increase your selection in the same space! They can also be used for starting summer crops.

26 plugs

A good size liner for 6" or larger pots. Use 2-3 plants if growing in 2 gallon pots. Remember-these are not vernalized. You'll see in our catalog those that we mark "first year bloomers". Do not count on the other items blooming the first year.

51 & 26 liners

All our perennials that are not started from seed are grown in one of these two sizes. A good size liner for 6" or larger pots. Use 2-3 plants if growing in 2 gallon pots. Remember these are not vernalized. You'll see in our catalog those that we mark "first year bloomers". Do not count on the other items blooming the first year. Tags are included for vegetative liners, and are available for purchase for seed started liners.

Peter

26

PLANNING + WORK = PROFIT
CALENDAR FOR LATE START-UP

by: **Peter Darrow**, *Sales Manager*

Let's look at some ideas for scheduling, using the various plug and liner sizes that we offer.

Adapt these ideas to what best fits your operation.

(designed for the Northeast)

Early March

Plant May baskets using regular liners: add extra plants for faster finish.

Plant pansy flats. Use a 288 which will finish faster and provide a wider selection of colors.

Plant Osteospermum and Regal Geraniums. Use pre-cooled liners for early to mid-May sales.

Begin planting your premium pots such as New Guineas and Scaevola and other slower growing items using 2-51's or 3-26's.

Late March

Plant bedding plant flats. Since your space is not full, use 512's whenever you are sure you can sell 500 of a color; or use a 288 where 500 is too much. Space out your labor needs by planting 512's first, and then a week later 288's.

Early April

Plant another crop of bedding plants to have fresh product after the first one is sold-provided you have the market!

Late April

Time to plant...re-crops! Space is starting to open up as you ship pansies and other early products. Use that space.

Re-crop flats using 288 plugs for a quick turn product that would be ready for late May.

Re-crop premium pots for early June sales.

Re-crop hanging baskets for June sales.

May **sell! sell! sell!**

CALENDAR FOR LOW INPUT COST WITH LONGER CROP TIMES

(designed for the Northeast)

Early January

Plant pansies and other cool crops. Use 512 plugs (since you have plenty of time and space). Get them established at warm temperatures before cooling them down and growing them slowly through the cold winter months.

Plant hanging baskets. Use 144 size liners (where available) and larger liners to start slower growing items (Fuchsias, Ivy Geraniums, Calibrachoa, Non-Stop Begonias, etc). If you opt to use fewer plants per pot to reduce input costs, you will need to allow for a longer crop time and additional pinching. Finish your basket planting by mid to late February.

Plant Osteospermum, Regal Geraniums (for Easter), and other cool-growing premium items.

Mid February

Plant premium pots. Start with your longest crop time and smallest size plug or liner to reduce input costs.

Plant Regal Geraniums. Using pre-cooled liners for Mother's day sales (plant early March).

Mid March to early April

Plant bedding plant flats. Since your space is not full, use 512's whenever you are sure you can sell 500 of a color; or use a 288 where 500 is too much. Space out your labor needs by planting 512's first, and then a week later 288's. Continue planting for successive crops.

Late April

Time to plant...re-crops! Space is starting to open up as you ship pansies and other early products. Use that space.

Re-crop flats using 288 plugs for a quick turn product that would be ready for late May.

Re-crop premium pots for early June sales.

Re-crop hanging baskets for June sales.

May **sell! sell! sell!**

I hope these scenarios have helped spark your imagination about what you can do to make your business more profitable. There's no "one size fits all" solution, and these ideas are intended only as general guidelines. Our goal is to provide you with as many tools as possible to enhance your success. All the best!

Peter

COMBOS
COMBOKITS™ & WAVE® COMBOS

Combo Kit		Contents	Culture Code
24 Karat Gold	☼	Hakonechloa, Begonia, Lantana	4
After the Rain	☼	Calibrachoa, Bacopa, Lobelia	1
After the Storm	☼	Petunia, Calibrachoa, Coleus	1
Alexander the Grape	☼	Calibrachoa, Bacopa, Lobularia	2
Answer the Call	☼	Petunia, Calibrachoa, Lobelia, Verbena	1
Backyard Fireworks	☼	Coleus, Ipomea, Begonia boliviensis	4
Be My Valentine	☼	Petunia, Verbena	1
Beach House	☼	Petunia, Verbena	1
Beating Heart	☼	Calibrachoa, Verbena, Bidens	1
Berries & Cream	☼	Petunia	1
Berry Smoothie	☼	Petunia, Nemesia	1
Blackberry Tart	☼	Calibrachoa	1
Blue Eyes Cryin'	☼	Petunia, Bacopa, Verbena	1
Blueberry Hill	☼	Calibrachoa, Verbena, Ipomea	1
Blueberry Peach Sangria	☼	Calibrachoa, Verbena	1
Blueberry Tart	☼	Calibrachoa	1
Bolero	☼	Calibrachoa, Bidens, Verbena	1
Candy Shop	☼	Petunia, Calibrachoa, Verbena	1
Capture My Heart	☼	Petunia, Calibrachoa, Verbena	1
Cashmere Rose	☼	Petunia	1
Chalk Art	☼	Petunia, Calibrachoa, Verbena	1
Chloe's Song	☼	Geranium, Begonia, Angelonia, Ipomea	3
Color Parade	☼	Bidens, Verbena, Petunia	1
Color Spark	☼	Verbena	1
Coming Up Roses	◖	Sunpatiens®, Verbena	4
Cosmic Trifecta	☼	Petunia	1
Country Girl	☼	Petunia, Verbena	1
Country Roads	☼	Calibrachoa, Lobelia	1
Crack o' Dawn	☼	Zonal Geranium, Carex, Ipomea, Verbena, Coreopsis	3
Crazy Love	☼	Petunia	1
Cross My Heart	☼	Petunia	1
Dakota Sky	☼	Petunia	1
Dancing 'til Dawn	☼	Petunia, Calibrachoa, Bacopa	1
Daydreams	☼	Calibrachoa, Bacopa, Lobularia	2
Easter Eggs	☼	Lobularia, Pansy	5
Enchanted Evening	☼	Calibrachoa, Petunia, Nemesia	1
Euphoric	☼	Petunia, Calibrachoa, Satureja	1
Evi's Smile	◖	Begonia, Sunpatiens®, Angelonia	4
Eye Candy	☼	Petunia, Calibrachoa, Verbena	1
Fairytale	☼	Calibrachoa	1
Fire & Ice	☼	Calibrachoa, Verbena	1
First Light	☼	Calibrachoa, Bacopa	1
Forever Young	☼	Verbena, Petchoa, Lobelia	1
Frosted Berries	☼	Helichrysum, Petunia	1
Fruit Salad	☼	Petunia, Calibrachoa, Verbena	1
Fun on the 4th	☼	Petunia, Salvia	1
Golden Blush	☼	Petunia, Calibrachoa, Verbena	1
Golden Gem	☼	Petunia, Jamesbrittenia	1
Great Rift	☼	Lobelia	1
Highland Fling	☼	Calibrachoa, Petunia, Verbena	1
Iced Peaches	☼	Calibrachoa, Verbena	1
Itsy Bitsy	☼	Petunia	1
Itsy Trifection	☼	Petunia	1
Land of Mine	☼	Calibrachoa	1
Limelight	☼	Petunia, Begonia, Coleus	4
Lipstick and Lace	☼	Petchoa, Verbena, Calibrachoa	1
Little Memories	☼	Petunia-Mini	1
Little Moments	☼	Petunia-Mini	1
Lollipops	☼	Petchoa, Petunia	1
Love at First Bloom	☼	Petunia, Verbena	1
Madras Plaid	☼	Calibrahoa, Lobelia, Verbena	1
Maggie May	☼	Calibrachoa, Bidens, Salvia	1
Midsummer Night's Dream	◖	Petunia, Torenia, Diascia	1
Muka Laka Hiki	☼	Petunia, Calibrachoa, Verbena	1
Music of the Heart	☼	Petunia, Calibrachoa, Verbena	1
No Filter Needed	☼	Petunia	1
Out of the Blue	☼	Petunia, Lobularia, Verbena	2

Combo Kit		Contents	Culture Code
Paisley Print	☼	Calibrachoa, Bacopa, Verbena	1
Palace Parade	☼	Petchoa, Petunia, Dichondra	1
Perfect Tonight	☼	Petunia	1
Perfectly Purple	☼	Verbena	1
Perhaps Love	☼	Petunia, Calibrachoa, Verbena	1
Pistachio Pops	☼	Pennisetum rubrum, Helichrysum, Ipomea	4
Pixie Stix	☼	Calibrachoa	1
Plum Parfait	☼	Bacopa, Petunia, Verbena	1
Rapunzel	☼	Calibrachoa	1
Remember When	☼	Begonia, Euphorbia, Heuchera	4
Rose Explosion	☼	Bidens, Calibrachoa, Verbena	1
Safari	☼	Petunia, Calibrachoa, Lysimachia	1
Salute	☼	Petunia	1
Sandstone Breeze	☼	Coleus, Petunia, Petchoa	1
Send in the Clowns	☼	Calibrachoa, Lobelia, Verbena	1
Shades of Summer	☼	Calibrachoa	1
Sky Full of Stars	☼	Calibrachoa, Petunia	1
Smoldering Summer	☼	Bidens, Calibrachoa, Verbena	1
Spring has Sprung	☼	Petunia, Ipomea, Lobelia	1
Strawberry Fields	☼	Calibrachoa, Verbena	1
Strawberry Taffy	☼	Calibrachoa, Petunia, Verbena	1
Street Style	☼	Calibrachoa, Petunia, Verbena	1
Strong & Free	☼	Petunia, Bacopa, Verbena	1
Sunshine & Storm	☼	Petunia, Bidens	1
Sweet Dreams	☼	Petunia	1
Sweet Velour	☼	Petunia, Dichondra, Angelonia	1
Tangled Up in Blue	☼	Petunia, Verbena	1

Combo Kit		Contents	Culture Code
Tied Up in Pink	☼	Petunia, Calibrachoa, Verbena	1
Touch of Lavender	◖	Alternanthera, Sunpatiens®, Lamium	4
Twilight Hues	☼	Petunia, Calibrachoa, Verbena	1
Two's Company	☼	Petchoa	1
Unlikely Lime	☼	Angelonia, Calibrachoa, Helichrysum, Celosia	1
Vintage Soiree	☼	Coleus, Verbena, Calibrachoa	1
Watercolors	☼	Petunia, Calibrachoa, Verbena	1
When Stars Come Out	☼	Calibrachoa	1
Whispers of Dawn	☼	Geranium, Sunpatiens®, Ipomea, Verbena	3
Wild Berry Meringue	☼	Petunia, Verbena, Lobelia	1
Wild Blue Yonder	☼	Verbena, Petunia	1
Wine & Cheese	☼	Petunia, Verbena	1
With All My Heart	☼	Petunia, Calibrachoa, Lobelia	1
Herbs	☼	all types	6
Wave® Combos	☼	all types	1

***Growth Regulators:** Always follow the label. High light levels in combination with cool temperatures will help reduce the need for growth regulators. Using a negative DIF (night temperature is warmer than the day temperature) will also help control stretch. A drench with 1-5 ppm Bonzi/Piccolo/Paczol (0.03 to 0.16 fl oz/gal), (concentration will vary with the season) is also very effective.

Growth Regulator general guidelines.

8″ basket: 1-1½ cups per pot (of the solution)

10″ basket: 1½-2 cups per pot

12″ basket: 2-2½ cups per pot

****Pinching Week Numbers:**

Week 0 = week of planting.

Week 2 = 2 weeks after planting...and so on.

Plants Per Pot: Follow patterns provided

Culture Code	Crop Time	Soil pH	Temperature	Fertilizer	Pinching**	Growth Regulator*	Notes
1	10-14 wks	5.5-5.8	60-70°F day 55-60°F night	150-250 ppm N	Bacopa: week 3-5. Calibrachoa: week 4 and again week 8 for a higher quality product. Lobelia: week 3-5.Petchoa: week 3 and again week 6 for larger pots. Petunia: week 4-5. Verbena: at planting and again week 4-5. (Allow 6 weeks after last pinch for bloom time.)	After last pinch, use Bonzi spray at 10 ppm. Use Bonzi soil drench at 3 ppm once plants are filled out and over edge of pot.*	Do not overwater. These are susceptible to root rot. Heavily wilted Bacopa will lose flowers. Recommend preventative treatment for Powdery Mildew. Dead head Verbena for rebloom.
2	10-12 wks		60-70°F day 55-60°F night	150-250 ppm N	Pinch all week 4 - 5.	Use Bonzi 10 ppm spray to control size.	Do not overwater. These are susceptible to root rot.

Culture Code	Crop Time	Soil pH	Temperature	Fertilizer	Pinching**	Growth Regulator*	Notes
3	10-14 wks	6.2-6.5	65-75°F day 60-65°F night	100-200 ppm N	Pinch Zonal Geranium on week 3. Pinch other items as needed.	Can use spray of Bonzi 5 ppm to control size if needed.	Remove early buds or flowers on Zonals to help give more plant body.
4	10-14 wks	5.5-5.8	65-75°F day 60-65°F night	100-200 ppm N	Pinch as needed. Recommend pinching Solenia® Begonia on week. 3. Do not recommend pinch on Sunpatiens®, New Guinea, or Rudbeckia.	Can use spray of Bonzi 5 ppm to control size if needed.	Do not overwater or over feed. Recommend downy mildew and powdery mildew prevention on Dbl. Impatiens, Coleus, Bacopa, and Verbena.
5	8 - 10 wks	5.5-5.8	60-70°F day 55-60°F night	100-150 ppm N	Pinch week 3; then again on week 6.	Can use a light Bonzi spray (as in 1 - 3 ppm) once pot is up to size.	
6	10-14 wks	5.5-5.8	65-75°F day 60-65°F night	100-150 ppm N	Keep trimming herbs as needed until planter looks full. Pinch Basil hard so it doesn't get too tall.		

EASYLINERS™

***Growth Regulators:** Always follow the label. High light levels in combination with cool temperatures will help reduce the need for growth regulators. Using a negative DIF (night temperature is warmer than the day temperature) will also help control stretch. A drench with 1-5 ppm Bonzi/Piccolo/Paczol (0.03 to 0.16 fl oz/gal), (concentration will vary with the season) is also very effective. See general guidelines.

8" basket: 1-1½ cups per pot | **10" basket:** 1½-2 cups per pot | **12" basket:** 2-2½ cups per pot

****Pinching Week Numbers:**

Week 0 = week of planting, Week 2 = 2 weeks after planting, Week 4 = 4 weeks after planting, and so on.

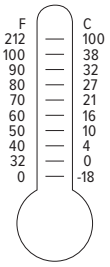
ppp = liners per pot.

	Crop Time in Weeks									
Easy Liner	6"	10"	12"	16"	Soil pH	Temperature	Fertilizer	Pinching**	Growth Regulator	Notes
Calibrachoa	9-12 1 ppp	12-14 2 ppp	12-14 2 ppp	12-14 3 ppp	5.5-5.8	60-70°F day 55-60°F night	150-250 ppm N	Pinch week 4. To get higher quality product pinch again on week 8.	After last pinch use Bonzi spray at 10-30 ppm or give a Bonzi soil drench at 3 ppm for longer lasting control.*	Do not overwater. These are susceptible to root rot.
All others	9-12 1 ppp	12-14 2 ppp	12-14 2 ppp	12-14 3 ppp	5.5-5.8	60-70°F day 55-60 night	150-250 ppm N	Pinch week 3 for all pot sizes. To get a higher quality product pinch again week 6 on 10" pots or larger.	After last pinch use Bonzi spray at 10-30 ppm or give a Bonzi soil drench at 3 ppm for longer lasting control.*	Do not overwater. These are susceptible to root rot. Prevention treatment for Powdery Mildew may be necessary.

ANNUALS

General Recommendations for Growing Packs

Temperature: 55-65°F night. 65-68°F for first week helps some items get established.



Fertilizer: We recommend constant feeding using something like a 13-2-13 at 100-150 ppm until plugs and liners are well established. We do NOT recommend using fertilizers with higher levels of phosphorus (ie: 10-52-10 or 20-20-20) to start your plugs as these formulas are very acidic and can dangerously lower the pH in a soilless mix.

Growth Regulators: Refer to manufacturer's instructions. Tip: a 5-10°F negative "dip" early in the morning (just before it starts getting light), until 3 hours after sunrise, greatly helps to keep bedding plants short.

Important: Always make sure your plugs and liners are well watered before transplanting.

Note for Pansies & Vinca: After transplanting pansies and vinca, do not fertilize or drench with chemicals until the roots start spreading, approximately 5-7 days. This helps prevent Thielaviopsos.

1 ppp - 512's in packs, 288's in 4" pots, or 144's in 6" pots.

From 144 or 25 ct into 10"

Species	Crop Time (in weeks)	Crop Time (in weeks)	Special Notes
Ageratum	6-7		Extreme wet to dry cycles will cause leaf problems.
Alternanthera	4-5		Higher light results in deeper color. Do not use cycocel.
Alyssum	4-5		Feed heavily and spray routinely for downy mildew, bacterial leaf spot, and soft rot.
Amaranthus	11-12	3-4 ppp= 13-15	
Angelonia	8-10		Do not pinch. Keep light levels high.
Asparagus densi	10-12	3-4 ppp= 18-20	Once established, feed every 2 weeks.
Aster	4-5		Sold green. Needs long days till mid-March.
Begonia-Angel Wing	7-11	4-5 ppp= 9-11	Important to plant with leaves pointed outward to make a symmetrical basket.
Begonia-boliviensis ❀			See full culture sheet.
Begonia-Fancy Leaf Gryphon	5-6	3-4 ppp= 7-9	Relatively disease and pest-free. Needs pinching-usually 1-2 pinches-once after getting established (approx 21 days) and possibly another to "shape" 21 days later.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

1 ppp - 512's in packs, 288's in 4" pots, or 144's in 6" pots.

From 144 or 25 ct into 10"

Species	Crop Time (in weeks)	Crop Time (in weeks)	Special Notes
Begonia-Fancy Leaf Silver Spot	12		Relatively disease and pest-free. Needs pinching-usually 1-2 pinches-once after getting established (approx 21 days) and possibly another to "shape" 21 days later.
Begonia-Fibrous	6-7	4 ppp=7-8	Needs heat and high ammonium. Delaying transplanting will cause stretching branches.
Begonia-Landscape Whopper®	6-8	3 ppp = 7-10	
Begonia-Landscape Big		3 ppp= 14-16	
Begonia-Spreading		3 ppp= 14-16	
Begonia-Tuberous	9-11 (for 4-6")	4 ppp= 10-12	Provide at least 10 ftc of light from 10 pm to 2 am from October through March. Plant with leaves pointing outward. Temp should be kept above 60°F and EC's should not rise above 1.5mhos/um or tubers may form and plants won't develop.
Calendula	4-5		Sold green.
Canna	9-12 (for 4")		Root space determines plant height.
Celosia	5-6		Watch for alternaria.
Celosia Premium	6-8		Pinching not necessary. High potassium formula such as 15-10-30 is highly recommended to prevent weak stems and abnormal shaped flowers. Blooms under short days.
Cleome	3-4		Sold green. Reseeds itself.
Coleus	4-5		Spray routinely for downy mildew.
Cosmos	3-4		Sold green.
Dahlia	7-8		Watch for downy mildew. Shear to encourage branching.
Dianthus	6-7		
Dianthus-interspecific Jolt series	12-13	1-3 ppp= 14-18	Can flower all year around, but will take longer to flower under short days than long.
Dichondra	5-6 (for 4")		
Dracaena	8-12 (for 4")		
Dusty Miller	5-6		
Eucalyptus	10-12 (for 4")		Pinch for better branching. Do not let it get root bound-sensitive to root damage and restriction. Does not like to be transplanted after being in ground.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

Species	Crop Time (in weeks) 1 ppp - 512's in packs, 288's in 4" pots, or 144's in 6" pots.	Crop Time (in weeks) From 144 or 25 ct into 10"	Special Notes
Flowering Kale & Cabbage	4-5		Colors up with cold temps and high light. Preventative spray for "black rot".
Gazania	7-8		Flowers close on cloudy days and nights.
Gerbera ❀	9-14 (for 144's in 4")		If planted too deeply or overwatered, you'll get a lot of leaves and no flowers. This plant flowers better with some moisture stress.
Gloxinia	11-14		
Gomphrena	5-6		
Gypsophila	5-6	4 ppp= 10-12	Cool temps enhance color. Needs dead heading.
Helianthus	7-9		Use 4" pots only in winter, use larger pots for other seasons.
Helianthus Sunfinity ❀		7 weeks 2.5 qt-1 gal/8-9 weeks 12" or larger	See full culture sheet. Long days required. Transplant after long days have begun in your area. Retail season summer to fall.
Hibiscus		1 ppp = 6-8	
Hypoestes	5-6		
Impatiens	4-5	3 ppp=6-8	Watch out for downy mildew.
Impatiens Solarscape	9-10	10-12	Needs average daytime temperature of at least 60°F, 66°F is ideal. Do not pinch. Can plant deep.
Lisianthus	10-12		Lisianthus need high light levels and warm temperatures in order to flower properly. They require higher moisture levels especially in early stages which can produce serious problems with fungus gnats.
Lobelia	5-6		Can't tolerate extreme dry down.
Marigold-African	6-8		Requires short days to flower.
Marigold-French & Triploid	5-6		Intolerant to pH < 5.5.
Melampodium	7-9		Keep soil moist.
Orn. Millet	7-9 (for 4-6")		Full sun darkens the leaf color.
Orn. Pepper	4-5		Sold green.
Osteospermum ❀	7-10 (for 4")		See full culture sheet.
Pansy	6-7		Cooler temps make larger flowers. Watch roots for disease pressure such as thielaviopsis and phytopthera.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

Species	Crop Time (in weeks) 1 ppp - 512's in packs, 288's in 4" pots, or 144's in 6" pots.	Crop Time (in weeks) From 144 or 25 ct into 10"	Special Notes
Pansy Spreading	Autumn 4-6 Spring 6-8	3-5 ppp (144 ct) Autumn 6-7 Spring 8-9	Pinching not recommended. Diseases: Damping-off and black root rot. Regular scouting for powdery mildew and preventative measures are recommended.
Pentas	7-9		Needs high temperatures and high light.
Petchoa	6-8	8-9	Apply a paclobutrazol drench at 2-3 ppm at 7-10 days after transplant. Avoid using daminozide spray at visible bud stage or later, as it can reduce the intensity of the yellow flower colour. This item is a "day neutral" response with a 9-hour daylength response.
Petunia	5-7		Make sure to give adequate dry down cycles to promote strong roots, good connections, and avoid "runty" plants.
Petunia-Doubles	6-8		See Petunia.
Petunia-Premium	7-10	3-4 ppp= 10-13	Require more fertilization than other petunia series. For best branching results, PGR's may be needed.
Phlox	8-9		
Portulaca	7-8		Loves heat.
Primula ❀	8-12 (for 4")		Needs cold temps to set bud.
Ptilotus	7-9		Do not overwater. Do not allow to get rootbound - transplant immediately. Do not pinch.
Ranunculus ❀	12-15 (for 4")		See full culture sheet.
Salvia coccinea	6-7 (for 6")	3 ppp= 10-12	Heat lover. Ideal for Spring and Summer.
Salvia farinacea	8-9		
Salvia interspecific	8-13		ADT 68°F, light to 14 hours, daylength extension, do not overlight
Salvia splendens	5-6		Watch for downy mildew.
Seed Geranium ❀	10-12 (for 4")		See full culture sheet.
Snapdragon	6-7		Watch for botrytis
Stock	6-10		Longer grow time is for cooler temps.
Thunbergia	4-5 (for 4")		Vining plant, not recommended in packs. Needs constant moderate moisture. Use caution not to bury when planting.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

Species	Crop Time (in weeks)	Crop Time (in weeks)	Special Notes
	1 ppp - 512's in packs, 288's in 4" pots, or 144's in 6" pots.	From 144 or 25 ct into 10"	
Torenia	6-7		
Verbena	7-8		Watch closely for downy mildew and powdery mildew. Keep warm and dry.
Vinca ❀	6-8	trailing varieties 4-5 ppp= 15-20	Must be kept warm and dry. Watch roots for disease pressure. See specific culture sheet.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

Species	Crop Time (in weeks)	Crop Time (in weeks)	Special Notes
	1 ppp - 512's in packs, 288's in 4" pots, or 144's in 6" pots.	From 144 or 25 ct into 10"	
Viola	5-6		Thrives in cool temps. Day-length sensitive.
Zinnia ❀	4-6		Spray routinely for rhizoctonia and bacterial leaf spot. Keep warm and dry. Try Profusions and Zaharas for ease of growing. See specific culture sheet.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

EDIBLES

Note: ppp = plants per pot

Species	Packs Crop Time	4" Pot Crop Time	Patio/Basket Crop Time	Fertilizer	Temperature	Special Tips
Broccoli, Brussel Sprouts, Cabbage, Cauliflower, Kale	3-4 wks	1 ppp=4		1-2x per week with 50-75 ppm N	50°F night, 60°F day	Keep soil dry and withhold feed to help control growth.
Celery	3-4 wks			1-2x per week with 50-75 ppm N	50°F night, 65°F day	Do not dry out. Can be cut back if too spindly.
Eggplant	4-5 wks	1 ppp=5-6	1 ppp=10-15	1-2x per week with 100-150 ppm N	60°F night, 70°F day	Watch for western flower thrips.
Ground Cherry	3 wks	1 ppp=4	1 ppp=8-12	1-2x per week with 50-75 ppm N	50°F night, 60°F day	Ground cherries self seed prolifically. They are in the same family as tomatoes so use similar growing requirements.
Lettuce	3-4 wks	1 ppp=4-5		1-2x per week with 50-75 ppm N	50°F night, 60°F day	Watch for western flower thrips. Do not dry out.
Onion	5-6 wks			1-2x per week with 100-150 ppm N	50°F night, 65°F day	Do not dry out. Can be cut back.
Pepper	3-4 wks	1 ppp=5	1 ppp=8-12	1-2x per week with 100-150 ppm N	60°F night, 70°F day	Prevent for Bacterial Leaf Spot.
Simply Salad		1 ppp=2-4	4-5 ppp=3-6	1-2x per week with 150-200 ppm N	55-60°F night & day	Harvest to 2-3" from soil. Re-cut every 2-3 weeks.
Strawberry	5-6 wks	1 ppp=7-8	4 ppp=10-13	1-2x per week with 100-150 ppm N	50°F night, 65°F day	Prevent for Powdery Mildew.
Tomato	3 wks	1 ppp=4	1 ppp=8-12	1-2x per week with 50-75 ppm N	50°F night, 60°F day	
Basil	3-4 wks	1 ppp=3-4	3 ppp=5-8	1-2x per week with 100-150 ppm N	60°F night, 70°F day	Watch for Downy Mildew. Pinching improves shelf life.
Chamomile	3-4 wks	1 ppp=3-4	3 ppp=7-10	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Chives	4-5 wks	1 ppp=5-6	3-5 ppp=7-10	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Cilantro	3-4 wks	1 ppp=3-4	3 ppp=5-8	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Curry	6-8 wks	1 ppp=8-10	3-5 ppp=10-15	2-3x per week with 100-150 ppm N	60°F night, 70°F day	

Note: ppp = plants per pot

Species	Packs Crop Time	4" Pot Crop Time	Patio/Basket Crop Time	Fertilizer	Temperature	Special Tips
Cymbopogon Lemon Grass	8-9 weeks	1 ppp=8-10	3-5 ppp=10-15	2-3x per week with 100-150 ppm N	60°F night, 70°F day	Pinching not necessary, but will enhance growth and bushing. PGR's not necessary.
Dill & Fennel	3-4 wks	1 ppp=4-5	3 ppp=6-8	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Lavender	6-8 wks	1 ppp=8-10	3-5 ppp=10-15	2-3x per week with 100-150 ppm N	55°F night, 65°F day	Watch for Bacterial Leaf Spot.
Marjoram	4-5 wks	1 ppp=5-7	3 ppp=6-8	2-3x per week with 100-150 ppm N	55°F night, 65°F day	Watch for Botrytis & provide good air flow.
Melissa	3-4 wks	1 ppp=4-5	3-5 ppp=6-8	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Mint	3-4 wks	1 ppp=5-6	3 ppp=6-10	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Oregano	4-5 wks	1 ppp=6-8	3 ppp=8-12	2-3x per week with 100-150 ppm N	55°F night, 65°F day	Watch for Botrytis & provide good air flow.
Oregano variegated	6-8 wks	1 ppp=8-10	3-5 ppp=10-15	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Parsley	3-4 wks	1 ppp=4-5	3 ppp=6-8	1-2x per week with 100-150 ppm N	55°F night, 65°F day	Keep soil dry and withhold feed to help control growth.
Rosemary	5-7 wks	1 ppp=7-9	3-5 ppp=10-15	2-3x per week with 100-150 ppm N	60°F night, 70°F day	Prevent for Powdery Mildew. Very fine horticultural oil works well. Also be careful not to plant too deeply – at soil level works best.
Sage	4-5 wks	1 ppp=5-6	3 ppp=6-10	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Sage variegated	6-7 wks	1 ppp=7-8	3-5 ppp=8-10	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Satureja	3-4 wks	1 ppp 4 - 6	3-5 ppp= 8 - 10	1-2x per week with 100-150 ppm N	55°F night, 65°F day	Pinch for branching as needed
Stevia	3-4 wks	1 ppp=5-6	3 ppp=6-8	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Tarragon	6-8 wks	1 ppp=8-10	3-5 ppp=10-15	2-3x per week with 100-150 ppm N	60°F night, 70°F day	Prevent for Powdery Mildew.
Thyme	4-5 wks	1 ppp=5-6	3 ppp=8-10	2-3x per week with 100-150 ppm N	55°F night, 65°F day	Watch for Botrytis & provide good air flow.
Thyme variegated	6-7 wks	1 ppp=7-8	3-5 ppp=8-12	2-3x per week with 100-150 ppm N	55°F night, 65°F day	
Verbena aloysia	3-4 wks	1 ppp=4-6	3 ppp=6-8	1-2X per week with 100-150 ppm N	60°F night, 70°F day	Pinch for branching

Note: ppp = plants per pot

LINERS

Species	(wks) 4" pots Crop Time	(wks) 10" pots Crop Time	Temperature	Use lower end of fertilizer rates for pot crops; use higher end for hanger crops. Fertilizer	Special Notes
Acalypha	1 ppp=7-9	4 ppp=12-14	65-75°F day 60-65°F night	150-200 ppm N	Pinch once. Extra iron improves foliage color.
Ageratum	7-8 weeks	13-14 weeks	65-75°F day 60-65°F night	100 ppm N	Shading usually needed to prevent premature blooming while plant sizes up. Pinching and PGRs are also beneficial to promote branching.
Alstromeria ❀					See full culture sheet.
Angelonia	1 ppp=6-7	3-4 ppp=9-11	65-75°F day 60-65°F night	150-200 ppm N	Does not grow well in low light.
Anigozanthos	not advised	1 ppp = 10-12	65 - 75 F day 60-65 F night	*100 ppm N	Avoid overwatering and allow soil to dry between irrigation. Spray with copper-based fungicide to prevent spotting on fans during high humidity. *Alternate with clear to avoid salt buildup. Low feeder.
Argyranthemum	1 ppp=6-9	3 ppp=12-14	60-70°F day 55-60°F night	150-250 ppm N	Soft pinch 2 weeks after planting. Feed similar to Zonal Geraniums. Can be grown cool. Dead-head.
Bacopa	1 ppp=5-7	4 ppp=12-14	60-70°F day 55-60°F night	100-200 ppm N	Do not plant too deep. One pinch produces a bushier plant. Heavy wilt will cause flower damage and bud abortion. Very sensitive to high fertilizer salts. Will stop blooming in high heat.
Begonia x hybrida	1 ppp=7-8	4-5 ppp=12-16	65-75°F day 60-65°F night	100-200 ppm N	Avoid over watering. Keep plants warm to keep them actively growing. Cold, dark days may cause dormancy.
Begonia-boliviensis ❀					See full culture sheet.
Begonia-hiemalis ❀	1 ppp=7-8	3-4 ppp=10-12	65-75°F day 60-65°F night	150-200 ppm N	Growth regulators are recommended for high quality finished product. Give soft pinch 2 weeks after planting.
Begonia-Rex ❀	1 ppp=8 for 6" (n/a for 4")		65-75°F day 60-65°F night	150-180 ppm N	Shady; Apply fungicide every other week for Botrytis and Leaf Spots. Never run these plants dry. NOTE: For first 2 weeks provide deep shade and warmth. High humidity is ideal. Never grow in full sun. Plant liners at same level as the potting soil.
Bidens	1 ppp=6	4 ppp=10	65-75°F day 60-65°F night	150 ppm N constant	Pinch at planting, repeat 3-4 weeks later for hanging baskets. Dead-heading will promote branching and cosmetic look.
Brachyscome	1 ppp=6-8	4 ppp=15-18	65-75°F day 60-65°F night	150-200 ppm N	Pinch 1-2 weeks after planting. Repeat as needed for hanging baskets.
Bracteantha	1 ppp=4-6	4 ppp=11-15	65-75°F day 60-65°F night	100-200 ppm N	Pinch at planting for 6" or larger pots. Avoid deep planting of liners.
Calendula	6-7 weeks		60-70°F day 55-60°F night	150-250 ppm N	Pinch at planting.
Calibrachoa ❀	2 ppp=6-8	4 ppp=14-16	60-70°F day 55-60°F night	150-250 ppm N	Do not plant too deep. Soft pinch at planting. A second pinch will produce a better plant. Do not feed heavily until plants are well rooted.
Celosia Kelos Fire Series	N/A	3-4 ppp=6-10 including pinch	65-75°F day 60-65°F night*	150-200 ppm N	Plant as soon as possible - they do not like sitting in trays too long. Plant the liners deep so that the tip of the liner is one inch above soil level. When the liner roots are well established pinch the liners to leave 6 - 8 leaves. Use Cycocel to keep the plants toned; PGR will give a darker foliage. *After 4 weeks you can lower the temp and finish them cooler.
Cleome	1 ppp=5-6	2 ppp=10-14	65-75°F day 60-65°F night	200-250 ppm N	Cleome may develop edema and leaf yellowing if overwatered. Pinch 1X about 5-10 days after transplant; pinch twice for larger pot sizes. Growth regulators not necessary under high light intensity.
Coleus	1 ppp=4-6	4 ppp=8-9	65-75°F day 60-65°F night	100-200 ppm N	Pinching will produce a bushier plant. Keep temps above 60°F or growth will stall. Environmental issues (ie; PGRs, watering, light levels, heat, etc.) will alter colors.
Cuphea hyssopifolia	2 ppp=7-9	4-5 ppp=14	65-75°F day 60-65°F night	100-200 ppm N	Give 2 pinches; do not overwater. Keep soluble salts low.
Cuphea ignea	1 ppp=6-8	1 ppp=10-12	65-75°F day 60-65°F night	100-200 ppm N	Give 2 pinches; do not overwater. Keep soluble salts low.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

Species	Crop Time (wks) 4" pots	Crop Time (wks) 10" pots	Temperature	Fertilizer (Use lower end of fertilizer rates for pot crops; use higher end for hanger crops.)	Special Notes
Dahlia	1 ppp= 6-8		58-60°F day & night	200-250 ppm N	After transplant, provide supplemental lighting to a minimum of 14 hours of daylength until week 14 to prevent premature budding and flowering. Transplant Dahlias deep (ie: bury the 1st set of leaves); shallow planting produces a floppy plant. Dahlias need a moderate constant moisture. Don't stress them either water logging or dry down. Avoid temps above 60°F.
Diascia	1 ppp=6-8	3-4 ppp=9-11	60-70°F day 55-60°F night	150 ppm N constant	Establish root system at 65°F, then grow cool. Pinch 2-3 times to improve branching. Will reflower within 2-3 wks after planting.
Double Impatiens	1 ppp=6-8	4-5 ppp=10-14	65-75°F day 60-65°F night	100-200 ppm N	Provide shade in summer. Keep evenly moist. Watch out for downy mildew.
Euphorbia	1 ppp=4		65-75°F day 60-65°F night	150-200 ppm N	Moderate moisture. Full sun to part shade.
Evolvulus	1 ppp=8-9	3-4 ppp=8-10	65-75°F day 60-65°F night	150-200 ppm N constant	Needs highest light levels possible. Keep plants moist, not wet. Pinch for fuller baskets.
Fuchsia		4-5 ppp=15	65-75°F day 60-65°F night	150-200 ppm N	Pinch to promote branching allowing 8 wks between last pinch and flowering date. Provide shade in spring when light levels rise. Requires long days to bloom.
Geranium-Interspecific	1 ppp=5-6	3 ppp=10-11	65-75°F day 60-65°F night	200-250 ppm N constant	No pinch necessary.
Geranium-Ivy		5-6 ppp=14	65-75°F day 60-65°F night	200-250 ppm N	To prevent edema: keep soil pH at 5.2-5.7, keep N & iron levels high, high light levels ok if not combined with high temps. Water only in early morning; keep soil moisture light when going into cloudy periods.
Geranium-Regal ❀ From Pre-Budded Liner	1 ppp=8-10		60-70°F day 55-60°F night	200-250 ppm N	Give good dry down to control size. Do not, however, let soil dry out after buds have developed well. Full sun until showing color then provide some shade. Sensitive to high salt levels.
Geranium-Zonal, Brocade, Scented	1 ppp=5-7	4 ppp=10-14	65-75°F day 60-65°F night	100-200 ppm N	Liners yellow quickly in a dark shipping box. Grow under medium shade for one week. Feed well; give full light after first week. Yellowing will not harm the plant if handled properly; allow to dry down between waterings.
Gerbera Garvinea® ❀					See full culture sheet.
Gerbera Patio ❀					See full culture sheet.
Gypsophila	5-6 weeks	4 ppp=9-10 weeks	65-75°F day 60-65°F night	100 ppm N	Avoid high ECe's to prevent tip and root burn. Very susceptible to leaf burn from chemical phytotoxicities. They do not like temperatures that exceed 97°F.
Helianthus ❀					See full culture sheet.
Heliotrope	1 ppp=5-6		65-75°F day 60-65°F night	200-250 ppm N	Pinch to promote branching.
Isotoma	6-8	10-12	65-70°F	100-200 ppm N	Cooler temperatures are tolerated and may improve plant bulking, but will delay flowering.
Jamesbrittenia	1 ppp=6-8	4 ppp=10-12	60-70°F day 55-60°F night	100-200 ppm N	Similar to bacopa except they are more heat tolerant, and more sensitive to mildew. Keep foliage as dry as possible to help prevent disease.
Lantana	1 ppp=5-6	4-6 ppp=14	65-75°F day 60-65°F night	200-250 ppm N	Do not allow to dry out between waterings; likes high heat and lots of sun; pinch to promote branching.
Lobelia	1 ppp=5-6	4-5 ppp=10-12	65-75°F day 60-65°F night	200-250 ppm N	Pinch 2-3 times to promote branching. Very attractive. Do not let it dry out.
Lobularia	1 ppp=4-5	4 ppp=8-11	65-75°F day 60-65°F night	150-200 ppm N	Keep moist but not over watered. Performs well at higher temps-up to 94°F.
Lophospermum	1 ppp = 4-6 wks	3 ppp = 10-12 wks	65-75°F day 60-65°F night	200 ppm Constant	Pinch recommended. Broad spectrum fungicidal drench recommended after planting. PGR's not usually required. Best if kept on slightly dry side, but avoid wilt.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

(wks) 4" pots | (wks) 10" pots | Use lower end of fertilizer rates for pot crops; use higher end for hanger crops.

Species	Crop Time	Crop Time	Temperature	Fertilizer	Special Notes
Mandevilla	1 ppp=4-6	3-4 ppp=10-12	65-75°F day 60-65°F night	200 ppm N	Pinch recommended. To achieve longer vines, skip pinch. Needs warm soil temps. PH 5.8-6.0
Mecardonia	1 ppp = 5-6 (no pinch)	3 ppp = 12-15 (2-3 pinches)	65-75°F day 60-65°F night	150-200 ppm N	Proper water management is critical for proper growth. Soft black rot of underlying foliage can be caused by overwatering, cold temps and/or low media pH.
Nemesia	1 ppp=4-6	3-4 ppp=9-11	60-70°F day 55-60°F night	100-200 ppm N	Keep moist, but not wet. Do not allow it to wilt. Use fresh water regularly so salts do not build up.
New Guinea Impatiens ❀	1 ppp=9-12	3-4 ppp=14-16	65-75°F day 60-65°F night	100 ppm N	Do not over water in the beginning; allow pots to dry down before watering again. Clear water until roots reach sides & bottom of pot. Do not like cool night temps, under 63°F will result in poor growth, small leaves, poor branching, more Botrytis, and root problems; provide shade in spring. No pinch required for branching.
Origanum (Bellisimo)	8-10 weeks	3-5 ppp=10-12	65-75°F day 60-65°F night	100-200 ppm N	Do not over water!
Osteospermum ❀	1 ppp=5		60-70°F day 55-60°F night	150-200 ppm N	See full culture sheet.
Pachystachys	1 ppp=6	3 ppp=12-14	65-72°F day 65-72°F night	150-200 ppm N	Watch for spider mites, whiteflies and aphids.
Pericallis ❀					See full culture sheet.
Petchoa	1 ppp=5-8	3-4 ppp=9-13	60-70°F day 55-60°F night	150-250 ppm N	Recommend pinch wk 1.
Petunia ❀	1 ppp=5-8	3 ppp=8-12	60-70°F day 55-60°F night	150-200 ppm N	Likes high light (5000-9000 fc). Give 1-2 pinches, except Littletunias - no pinch.
Plumbago	not advised	4 ppp = 10 - 14	65-75°F day 60-65°F night	100-200 ppm N	Can suffer from manganese deficiency, Water new plants regularly to keep the soil consistently moist until the plants are established. Once established, plumbago requires watering only when the soil is dry to the touch. Plumbago is considered moderately drought-tolerant, and excessive moisture can lead to root rot.
Portulaca	1 ppp=4-5	4-5 ppp=11-17	65-75°F day 60-65°F night	100-200 ppm N	Likes high light (5000-7500 fc), high heat and is able to thrive in drought-like conditions; good to leach pots every 4 waterings. Likes lower feed.
Rose ❀					See full culture sheet.
Salvia greggii	1 ppp=7-11		65-75°F day 50-60°F night	200-250 ppm N	Pinch once established, approx 10 days after planting. A second pinch is advised for better branching in larger pots, leaving 4 leaves beneath the cut. Salvia greggii is very drought tolerant.
Salvia farinacea	1 ppp=6-8		65-75°F day 60-65°F night	100-200 ppm N	Full sun. Pinch once if you want more plant body.
Salvia (Hummingbird Falls)	6-8 weeks	10-12 weeks	65-75°F day 60-65°F night	150-200 ppm N	Moderate water needs.
Salvia (Salgoon series)	1 ppp=8-12	2-3 ppp=10-14	57-68°F day 50-57°F night	125-150 ppm N	Pinch once, above 2nd internode, 2 weeks after transplanting. Keep the plants relatively cool and dry.
Sanvitalia		3-4 ppp=12-14	65-75°F day 60-65°F night	200 ppm N	Cooler temps retard growth. Pinch multiple times. Sensitive to overwatering; keep on the dry side.
Scaevola	1 ppp=8-10	3-5 ppp=12-14	65-75°F day 60-65°F night	150-200 ppm N	Likes high light (5000-9000 fc). Give 2-3 pinches. Feed little to no phosphorous.
Streptocarpus	1 ppp = 4-6	4-5 ppp = 10-12	70-75°F day 65-70°F night (max temp should not exceed 86°F)	100-200 (too much fertlizer will burn blooms)	Recommend pinching twice. Avoid excessive watering, but does not like to dry out. PGR's are not necessary. Best location in some light, but not direct sun. Avoid cold temperatures.
Sunpatiens® ❀	not advised	1 ppp=10-12	65-75°F day 60-65°F night	200 ppm N low ammonium	1 plant per quart or 6" pot. Grow in full sun with plenty of space to help control stretch. Growth retarding with B-nine while plants are smaller can help to promote good branching. Avoid using Bonzi.
Thunbergia	1 ppp=6-8	3 ppp=10-12	70-80°F day 60-65°F night	175-225 ppm N	Needs warm nights. Never allow to wilt. Use high nitrate feed (not ammonium). Do not transplant crown below soil level.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

Species	Crop Time (wks) 4" pots	Crop Time (wks) 10" pots	Temperature	Fertilizer (Use lower end of fertilizer rates for pot crops; use higher end for hanger crops.)	Special Notes
Torenia	1 ppp=5-8	5 ppp=12-14	65-75°F day 60-65°F night	100-200 ppm N	Very easy to grow, does well in a wide range of growing conditions. One pinch produces a bushier plant. Sensitive to cold irrigation water.
Verbena	1 ppp=6-8	4-5 ppp=11-17	65-75°F day 60-65°F night	200-250 ppm N	Pinch for bushier growth. Do not allow plants to dry out; use a light shade in late spring when light levels rise. Powdery mildew prevention needed; monitor iron levels. Needs deadheading.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

FOLIAGE

Species	Crop Time (wks) 4" pots	Crop Time (wks) 10" pots	Temperature	Fertilizer (Use lower end of fertilizer rates for pot crops; use higher end for hanger crops.)	Special Notes
Alpinea zerumbet	1 ppp=4-6		75-80°F day 70-75°F night	150 ppm N constant	Grow warm; 70-80F, avoid drought stress.
Alternanthera	1 ppp=6		65-75°F day 60-65°F night	200-250 ppm N	Easy to grow.
Artemisia	1 ppp=4-5	6-7	65-75°F day 60-65°F night	100-200 ppm N	Be sure not to bury the crown when transplanting.
Artemisia Sunfern (Olympia)		10 - 12 wks	65-75°F day 60-65°F night	100-200 ppm N	Pinch to help with bulking.
Calathea	1 ppp=8-10		70-80°F day 65-70°F night	150 ppm N constant	Keep humidity high, do not allow to dry out, but don't allow to sit in water either. Avoid large temperature fluctuations.
Centaurea	8-10 weeks	10-12 weeks	65-75°F day	100-150 ppm N	Maintaining good watering techniques and allowing soil to dry (not wilt) between waterings yields the best results. Plants can be held at lower temperatures if needed once rooted out. Plants are quite cold tolerant.
Chlorophytum	1 ppp=8	6-8 ppp=18-24	65-75°F day 60-65°F night	50-100 ppm N	Plants should dry down between waterings but do not let soil dry out. Partial shade.
Colocasia ❀	1 ppp=6 wks in gallon pot		70-80°F day 50°F night	150-200 ppm N	Full sun; moist soil. Sensitive to high salt levels.
Cordyline	1 ppp=14-18		70-85°F day 65-68°F night	150-200 ppm N	Tolerates wide range of conditions. Likes high light and warm temperatures.
Ctenanthe	1 ppp=8-10		70-80°F day 65-70°F night	150 ppm N constant	Grow warm; 70-80F, avoid drought stress.
Didelta	1 ppp=9-12	3-4 ppp=9-12	60-70°F day 55-60°F night	100 - 150 ppm N	Pinch as necessary to encourage branching. Although plants grow slowly initially, Didelta FanciFiller will continue to grow at a steady pace throughout the summer months, so if being paired with other plants in a combination, it should be combined with plants of equal vigour.
Dieffenbachia	1 ppp=8-10		65-75°F day 60-65°F night	150 ppm N constant	Toxic to humans and animals, best to wear gloves when handling; water when top 2" of the soil is dry, then water thoroughly from the base of the plant.
Duranta	1 ppp=6		65-75°F day 60-65°F night	150-200 ppm N	2-3 pinches for shaping.
Eupatorium		3 ppp=10 - 12	65-75°F day 60-65°F night	100-200 ppm N	No pinch or PGR usually needed since height is desireable
Ficus	1 ppp=8-10		65-75°F day 60-65°F night	150 ppm N constant	Lyrata prefers shade; Elastica sun or part shade; avoid large temperature fluctuations.
German Ivy	1 ppp=4-5	4-5 ppp=13-17	65-75°F day 60-65°F night	150-250 ppm N	Easy to grow. Provide shade in spring when light levels rise. Treat like foliage. Do not overwater.
Glechoma	2 ppp=6-7		60-70°F day 55-60°F night	200 ppm N	Full sun to part shade. Pinch once.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

(wks) 4" pots | (wks) 10" pots | Use lower end of fertilizer rates for pot crops; use higher end for hanger crops.

Species	Crop Time	Crop Time	Temperature	Fertilizer	Special Notes
Hedera	1 ppp=5-6	5-7 ppp=20-25	65-75°F day 60-65°F night	150-200 ppm N	Well drained soil with pH between 5.5 and 6.5.
Helichrysum	1 ppp=7-9	3-5 ppp=10-14	65-75°F day 60-65°F night	100-200 ppm N	Pinch at planting to produce a well-shaped plant; trim as needed. Dry down to damp between waterings. Rinse after feeding. Best to step up 4" before planting into large pot.
Homalocladium	6-8 weeks	10-12 weeks	65-75°F day	100-200 ppm N	Environment is critical to great growth after transplanting. At transplant, transition the rooted cuttings into 5000-6000 foot candles with a night temperture no lower than 65°F. Cold night temperatures, under 60°F are problematic to good culture.
Ipomea	1 ppp=4-6	3-4 ppp=8-10	65-75°F day 60-65°F night	150 ppm N	Pinch as necessary. Excellent as an accent. Sensitive to high humidity which can cause cell rupture/oedema.
Iresine	1 ppp=8-10		65-75°F day 60-65°F night	150-200 ppm N	Pinch for bushier growth. Reduce water & feed to control height.
Lamium & Lamiastrum	1 ppp=6-8	3-4 ppp=10-12	65-75°F day 60-65°F night	150-250 ppm N	Pinch at planting, trim as needed. Full sun. Cool bright conditions improve plant habit.
Lysimachia	1 ppp=7-9	3-4 ppp=8-10	65-75°F day 60-65°F night	200 ppm N	1-2 pinches recommended. Allow soil to dry between waterings.
Monstera (Deliciosa Liebm)		6-8 wks	65-75°F day 60-65°F night	100-200 ppm N	Do not allow to get too cold.
Muehlenbeckia	1 ppp=10-12	N/A	65-75°F day 60-65°F night	100-200 ppm N	Recommend pinch at plant. Will tolerate both full sun and partial shade. For baskets, combine with other plants.
Musa	1 ppp=6-10 wks in a 6-10" pot.		65-75°F day 60-65°F night	200-250 ppm N	Keep soil moist. Full sun to partial shade. Plants love a rich soil.
Oxalis	1 ppp=6-8		65-75°F day 60-65°F night	200-250 ppm N	Pinching and PGR's not necessary.
Peperomia	1 ppp=18	3 ppp=24	65-75 day 60-65 night	100-200 ppm N	B9 or pinching will result in better branching
Perilla	1 ppp=5-7	3-4 ppp=8-11	65-75°F day 60-65°F night	150-200 ppm N	Loves heat and full sun. Keep well watered.
Philodendron	1 ppp=8-10	3 ppp=8-10	65-75°F day 60-65°F night	150 ppm N constant	Toxic if eaten. High humidity yields larger leaves and faster growth. Allow to dry out between waterings.
Pilea	1 ppp=10-12	3 ppp=14-16	65-75°F day 60-65°F night	100-200 ppm N	B9 or pinching will result in better branching
Plectranthus	1 ppp=4-5		65-75°F day 60-65°F night	100-200 ppm N	Pinch to promote branching.
Pothos	1 ppp=6-8	3-4 ppp=8-10	65-75°F day 60-65°F night	100-150 ppm N	
Rhoeo	1 ppp=6-8		65-75°F day 60-65°F night	100-150 ppm N	
Scindapsus	1 ppp=10-12	3-5 ppp=12-15	75-80°F day	200-250 ppm N	Do not allow temps to fall below 60°F (day or night). This is a slow growing variety. Does best in indirect light.
Senecio candicans	1 ppp=5-6	3ppp=9-12	65-70°F day 60-65°F night	100-150 ppm N	
Setcreasea	1 ppp=6	4 ppp=10-12	65-75°F day 60-65°F night	200 ppm N	Pinch once if needed. Will tolerate almost any temperature. Full sun to part shade.
Strobilanthes	1 ppp=6-8	4-5 ppp=12	65-75°F day 60-65°F night	200 ppm N	Needs bright light, high humidity, and warm temperatures.
Tradescantia Wandering Jew	1 ppp=4-6	4 ppp=15-18	65-75°F day 60-65°F night	100-150 ppm N	Keep soil moist at all times
Syngonium	1 ppp=8-10	3 ppp=8-10	65-75°F day 60-65°F night	150 ppm N constant	Mildly toxic to dogs and cats. Allow to dry down well between waterings.
Vinca major & minor	2 ppp=6-8		65-75°F day 60-65°F night	100-200 ppm N	Very easy to grow, do not allow to dry out excessively; pinch often to promote branching.
Ferns	1 ppp=10-16	3 ppp=20-30	varies	100-200 ppm N	Do not plant deep. Tropical ferns should be grown at 72°F day and night. Hardy ferns can be grown cooler at 60-65°F day and night.

❀ See specific Culture Sheet. | Note: ppp = plants per pot

ORNAMENTAL GRASSES

Use 1 plug or 1 rooted liner for 4" pots up to 1 gallon.

Weeks @ Cold temp: 47-54°F | N/S=not suggested

Weeks @ Warmer temp: 57-65°F

Specie & Variety	Crop Time	Crop Time	Fertilizer	Hardiness	Sun/Shade	Special Notes
Calamagrostis	N/S	6-8	100-200 ppm N	4-10	☼◖	Allow plants to dry down between waterings
Carex Amazon Mist	N/S	9-10	100-200 ppm N	7-10	☼	
Carex Bronco	N/S	8-9	100-200 ppm N	7-10	☼	
Carex Feather Falls	20-24	9-11	100-200 ppm N	6-8	◖	Prefers part shade. Do not allow to dry out.
Carex Red Rooster	24-28	10-14	100-200 ppm N	7-9	☼	
Cortaderia	N/S	6-8	100-200 ppm N	7-10	☼	Moisture: dry to medium.
Cyperus Little Prince	N/S	8-10	100-200 ppm N	9-11	☼◖	
Hakonechloa	24-28	8-10	100-200 ppm N	5-9	☼◖	Do not allow to dry out.
Isolepis	10-12	5-6	100-200 ppm N	annual	☼◖	Don't allow plant to wilt.
Juncus Blue Arrows	12-14	6-7	100-200 ppm N	5-9	☼●	Can be used in wet locations.
Juncus Blue Dart, Twister	N/S	6-8	100-200 ppm N	5-11	☼●	Can be used in wet locations.
Juncus Twisted Arrows	12-16	6-8	100-200 ppm N	5-9	☼●	Can be used in wet locations.
Lagurus ovatus	N/S	8-9	100-200 ppm N	annual	☼	Broad spectrum fungicide suggested at transplant
Miscanthus	N/S	8-10	100-200 ppm N	6-10	☼	Plants will not establish root growth under cool temps and short days
Muhlenbergia	N/S	8-10	75-150 ppm N	6-10	☼◖	
Pennisetum	N/S	4-6	100-200 ppm N	8-10	☼	Color is brightest under high light.
Stipa	12-16	6-8	100-200 ppm N	7-10	☼	Moisture: medium to moist

SUCCULENTS

Specie	Optimum Pot Size	Crop Time
Slow Growers		
Aloe	2-4"	16-20 weeks
Cotyledon	2-4"	16-20 weeks
Gasteria	4"	16-20 weeks
Haworthia	2-4"	16-20 weeks
Portulaca succulent	4" 3ppp	16-20 weeks
Medium Growers		
Delosperma	4"	10-14 weeks
Graptosedum	2-4"	10-14 weeks
Kalanchoe	4-6"	10-14 weeks
Lampranthus	4-6"	10-14 weeks
Orostachys	2-4"	10-14 weeks
Peperomia	3-4"	10-14 weeks
Sedum creeping	3-4"	10-14 weeks
Sempervivum	3-4"	10-14 weeks
Fast Growers		
Aptenia	4-6"	6-8 weeks
Crassula	4-6"	6-8 weeks
Echeveria	4"	6-8 weeks
Ephiphyllum anguliger	4-6"	6-8 weeks
Hoya kerrii	4"	6-8 weeks
Lithops	2.5"	6-8 weeks
Senecio	4"	6-8 weeks

Special Notes: All succulents prefer warm temperatures and dry-to-moderate soil. Use a high-porosity mix like “cactus mix” to allow optimum drainage. If plants are too wet, they stall or rot. If they are completely dehydrated, they will not grow. For a good balance, we recommend a light watering with fertilizer once a week, only wetting the top layer of soil. Do NOT saturate the media. Omit the watering if the soil is still wet. If possible, do not let water sit in the “rosette” of the plants.

If planting mixed planters such as fairy gardens, you can mix these groups successfully and finish a planter in just a few weeks, depending how densely you place the plants.

Temperature: 65-70°F day / 60-65°F night | Fertilizer: 150-200 ppm

PERENNIALS
FIRST YEAR FLOWERING

Schedules below are suggestions, not a “cookbook”. Compiled from various sources.

Long days: Provide 14 hours or more of daylight, or night interruption lighting for 4 hours.

Specie & Variety	Long days required	Plant	Natural Color	Quart Size: Liner	Quart Size: PPP	Quart Size: Crop Time	Gallon Size: Liner	Gallon Size: PPP	Gallon Size: Crop Time	Other Notes
Achillea	✓	Mid-Late May	Early August				25 ct	1	12-14 wks	
Agastache		Program.	Continuous	50 ct	1	7-9 wks	50 ct	1-2	8-10 wks	Pinch as needed to get more size.
Ajuga		Spring	Sold Green	50 ct	1	6-8 wks	50 ct	1-2	9-11 wks	Plant previous fall if shipping in color.
Alcea Spring Celebrities Mix, Queeny Purple		Spring	Late July & onwards	Any	1	5 wks*	Any	1	8 wks*	Rust prevention advisable; red spiders love this specie so use a good systemic.
Armeria	✓	Program.	Summer		1	12-16 wks				Grows well in salty areas.
Asclepias	✓	Spring	Summer				25 ct	1	7-10 wks	
Bellis		Spring	Spring	144 ct	1	6-8 wks	25 ct	2	8-10 wks	
Brunnera macrophylla (Frostbite)		Spring	Summer				Any	1	10 wks	This specie is grown for the foliage, although you can expect to see some spring flowers after 2nd year.
Buddleia	✓	Mid-Late May	August	50 ct	1	5 wks*	50 ct	1	8-10 wks	
Campanula Champion Series ❀	✓									See full culture sheet.
Campanula Rapido	✓	Spring	Summer	144 ct	1	9-11 wks				Do not bury crown.

❀ See specific Culture Sheet. | PPP = plants per pot. | Program. = Programmable Perennial | *Crop may not be in bloom within the scheduled period, but should be up to saleable size.

Specie & Variety	Long days required	Plant	Natural Color	Quart Size Liner	Quart Size PPP	Quart Size Crop Time	Gallon Size Liner	Gallon Size PPP	Gallon Size Crop Time	Other Notes
Coreopsis	✓	Spring	Summer	50 ct	1	6-7 wks	50 ct	1	7-9 wks	Plant previous fall for sizing up gallons.
Coreopsis Solanna™ Series	✓	See notes	Summer	50/ 25 ct	1	8-9 wks	Any	1	6-8 wks	Spring for quarts, previous Fall for larger containers. Plants need time to bulk up.
Delphinium		Spring	Summer	144 ct	1	5-6 wks*	25 ct	1	10-14 wks	
Dianthus-barbatus		Program.	Summer	144 ct	1	7-9 wks	25 ct	2	10-12 wks	
Dianthus-deltoides		Spring	Summer	144 ct	1	7-8 wks	144 ct	3	7-8 wks	
Digitalis		Spring	June	25 ct	1	6-7 wks*	25 ct	1	9-11 wks*	Do not bury crowns. Would not be sold in color.
Digitalis Dalmatian and Foxy		Spring	Summer	144 ct	1	5-6 wks*	144 ct	1	9 wks	Fully first year flowering. Do not bury crowns.
Echinacea	✓	Spring	Summer/Fall				25 ct	1-2	12-17 wks	Pinch for more branching.
Gaillardia	✓	Program.	Summer		1	8-12 wks	25 ct	1	8-14 wks	
Gaura	✓	Program.	Summer	50 ct	1	8-10 wks	50 ct	2	8-10 wks	Do not bury crowns.
Heliopsis	✓	Spring	Summer				25 ct	1	9-11 wks	
Heuchera		Spring	Sold Green	25 ct	1	6 wks	25 ct	1	10-14 wks	This schedule is not for finished in bloom. Do not bury crowns.
Hibiscus ❀	✓	Spring	Summer/Fall	144 ct	1	8-10 wks	25 ct	1	12-14 wks	See full culture sheet on Luna.
Hydrangea hybrida		Spring/ Summer	Summer	25 ct	1	8 wks	25 ct	3	8 wks (may need a pinch)	Aluminum sulfate recommended around the time of flower initiation (or 6-7 wks from transplant) to intensify colors.
Iberis		Summer	Early Summer	Any	1	6-7 wks	Any	1	6-7 wks	
Leucanthemum	✓	Spring	Summer/Fall		1	8-10 wks*	25 ct	1	8-12 wks*	Some sources suggest overwintering for best performance.
Lobelia	✓	Spring	Summer	144 ct	1	7-9 wks	25 ct	1	8-10 wks	
Lupinus	✓	Spring	Early Summer	144 ct	1	9-10 wks	25 ct	1	9-10 wks	Watch for foliar fungal diseases.
Monarda	✓	May	Late August	50 ct	1	5-7 wks*	25 ct	1-2	13-15 wks	Probably will need pinching for fullness.
Myosotis		Spring	Early Spring	144 ct	1	5-9 wks				Maintain low pH.
Nepeta		Spring	August	50 ct	1	6 wks*	50 ct	1	6-8 wks*	
Perovskia	✓	Spring	Summer	50 ct	1	7-9 wks	50 ct	2	13-16 wks	Pinch once.
Phlox paniculata Flame Series	✓	Spring	Summer	50 ct	1	9 wks	50 ct	2-3	9-11 wks	
Platycodon		Spring	Summer	144 ct	1	10 wks	25 ct	2-3	10-12 wks	
Polemonium		Spring	Early Summer	25 ct	1	5-6 wks*	25 ct	1	6-7 wks*	Vernalization and long days required if flowers are desired.
Rudbeckia except Goldblitz	✓	Spring	Summer	144 ct	1	7 wks	25 ct	1	8-10 wks	Not true perennials. Require good drainage.
Rudbeckia Goldblitz	✓	Mid-Summer	Summer/Fall	Any	1	9 wks*	Any	1	13 wks	
Sagina	✓	Spring	Spring		1-2	5-6 wks				
Salvia		Spring	Spring/Early Summer		1	6-8 wks	25 ct	1-2	8-10 wks	
Salvia guaranitica	✓	Spring After Frost	Summer	25 ct	1	6-8 wks	26 ct			Requires longs days. Not hardy above zone 7.
Scabiosa		Spring	Summer		1	7-9 wks	25 ct	1-2	7-9 wks	Do not bury crowns.
Sedum Upright	✓	Spring	Fall	25 ct	1	8-10 wks	25 ct	2	12-15 wks	Pinch recommended.
Stachys		Spring	Sold Green		1	7 wks		1	8 wks*	Grown for foliage.
Thymus Woolly Thyme		Spring	Sold Green	50 ct	1	9 wks*	50 ct			Used as ground cover or filler.
Verbena	✓	Spring	Summer	144 ct	1	8-10 wks	25 ct	1-2	10-12 wks	Do not finish for early spring sales, needs heat to finish well.

❀ See specific Culture Sheet. | PPP = plants per pot. | Program. = Programmable Perennial | *Crop may not be in bloom within the scheduled period, but should be up to saleable size.

PERENNIALS
VERNALIZATION REQUIRED

Schedules below are suggestions, compiled from various sources.

Vernalization: This group of plants requires over-wintering or "vernalization", either for successful flowering or for "bulking up" the plants. Since Jolly Farmer does not offer over-wintered perennials, there are two ways you could use these products. Either purchase the plants in the summer/fall season and over-winter them yourself (see instructions) or plant them in spring and sell them "green". If the over-wintering was required for bulking the plant, you may need more plants per pot to size them up in one season.

Finish Time Clarification: If you have over-wintered your products, the "Crop Time" columns will indicate how many weeks of warm temperatures it will take for them to fill out and/or bloom again. Period of time for warm up starts when temperatures reach 60-68°F.

If you are growing these plants from a spring planting for sale in the same season, the "Crop Time" columns will give you an indication of grow time. Again be sure to note if the over-wintering was necessary for bulking and add extra plants per pot.

Long days: Provide 14 hours or more of daylight, or night interruption lighting for 4 hours.

Plants that require vernalization:

1. For green spring perennials, use a well drained potting media, and grow on at 60°F night, 70°F day. Feed with 150-250 ppm N.

2. Overwinter your own perennials. Purchase them during the summer. After planting, allow several weeks for plants to become well rooted with mature crowns. Then temperatures can be lowered to 35-40°F for two weeks, then lowered again to 28-30°F. Keep cool for 8-12 weeks. Ship in spring and summer when plants are ready. (See charts.) Overwintering success depends on having well-rooted, established plants BEFORE the cold sets in. If you are not using a greenhouse where temperatures can be controlled, you will need to use thermal blankets, straw or other means of keeping the plants from freezing. Period of time for warm up starts when temperatures reach 60-68°F.

	Long days required			Quart Size			Gallon Size			
Specie & Variety		Plant	Natural Color	Liner	PPP	Crop Time	Liner	PPP	Crop Time	Other Notes
Alcea		Fall	Summer	Any	1	5 wks*	Any	1	8 wks*	
Aquilegia ❀			Early Spring							See full culture sheet.
Carnation		Early Fall	Early Summer	Any	1	9 wks	Any	1	9 wks	
Cerastium		Fall	Early Spring-Early Summer	Any	1	5 wks	Any	1	7 wks	
Digitalis Other		Fall		Any	1	5 wks*	Any	1	9-11 wks*	Do not bury crowns.
Euphorbia	✓	Late Summer	Spring	Any	1	5-6 wks*	Any	1	6-8 wks	
Kniphofia	✓	Mid-Summer	Late Summer	Any	1	9 wks*	Any	1	11 wks	Needs long days to bloom.
Liatris	✓	Mid-Summer	Summer				Any	2	9 wks	
Papaver orientale	✓	Late Summer	Early Summer	Any	1	5 wks*	Any	1	9 wks	
Phlox paniculata other		Spring	Summer	50 ct	1	9 wks	50 ct	2-3	9-11 wks	
Phlox subulata		Late Summer	April-May	50 ct	1	minimal time	50 ct	2-3	minimal time	Blooms very early in spring. For green, spring program allow 9-11 wks.
Thymus creeping	✓	Fall	Summer/Fall	Any	1	9 wks				Needs adequate soil drainage. Prefers cool nights.
Veronica	✓	Mid-Late Summer	Summer	50 ct	1	5-9 wks	50 ct	1	8-12 wks	
Vinca Minor		Mid-Summer	Sold Green	50 ct	1-2	10 wks	50 ct	1-2	10 wks	Needs time to bulk.

❀ See specific Culture Sheet. | PPP = plants per pot. | *Crop may not be in bloom within the scheduled period.

ALSTROEMERIA

Information courtesy of Flamingo Holland

Transplanting

Remove plugs carefully from trays so as not to damage roots. Do not bury plugs when transplanting.

Keep soil surface of plug level with soil surface of finished pot. If buried, number of shoots may be reduced and delayed.

Container Sizes and Crop Times

8-inch (20cm) = 16 weeks

10-inch (25.5cm) = 18 weeks

12-inch (30cm) = 20 weeks

Growing Media

Plant into a well-drained, medium to coarse-textured growing mix. With larger pots and longer crop times, there is greater need for more perlite, pumice, coir, or bark in mix to avoid compaction and shrinkage of media.

Temperature

Ideal average daily growing temperature 55°–58°F (13°–14°C). If grown lower than 50°F (10°C) average, rhizomes can go dormant. Can be grown with warmer days if can keep soil temperature <60°F (15.5°C). Alstroemeria does not grow or flower well at temperatures >80°F (27°C), so plan on growing this crop for spring sales only, unless in Northern regions. If grown cooler than ideal, will delay flowering. If grown warmer than ideal, plants will not be as compact.

Light

Alstroemeria likes high light levels but cool soil temperatures, as the plant is originally from the Andes mountains. Provide light levels >3000 foot-candles or >5 moles per day (DLI). Lower light levels will delay flowering by 7 – 10 days. Avoid high leaf and soil temperatures when using high light levels. Will flower up to 2 weeks faster with longer days and more total light.

Pinching

Do not pinch.

Water and Feed

Alstroemeria is a thirsty crop, so keep even moisture in containers and avoid too dry or too wet.

Feed as needed with 150 – 200 ppm N from balanced fertilizers such as 15-5-15, 17-5-17, or 13-2-13, which contain calcium and magnesium. Avoid using controlled release fertilizers when growing cool, as less N available to plants at that cool temperature and salts may build up. If leaves turning more yellow, increase ppm or feed more often. Keep media pH 6.0 – 6.5 as this plant likes more alkaline conditions. Maintain media EC 2.0 – 2.5 (SME).

Growth Regulators

None needed

Flowering

Controlled more by photoperiod, total light, and cool temperatures. Remove old flowering stalks and leaves by pulling up quickly from the base. This technique will allow continuous flowering of plants. Do not cut them off. If needed, yank out blind shoots to improve flowering.

Insects and Diseases

Thrips, aphids, slugs and snails, fungus gnats, root rots (especially Pythium), Botrytis.

Common Problems and Causes

Plants do not flower

- Soil temp >60°F (15.5°C)
- Short days
- Low light conditions
- Poor rhizome development

Poor plant vigor

- Lack of fertilizer
- Wet soil – Pythium
- Too low of temperature
- Excessive thinning of shoots

Flower bud abortion

- Low light conditions
- Low calcium levels in soil
- High air temperature
- Overwatering

AQUILEGIA
EARLYBIRD™

Temperature

Day: 65–68°F (18–20°C)

Night: 50–54°F (10–12°C)

Lighting

Avoid flowering beneath the foliage in very short natural daylength period. When producing under natural daylength shorter than 11 hours, 15 minutes during flower development stage (about 4 weeks from your target sales date), flowers could hide beneath foliage. Supplemental long day lighting (night interruption from 10 pm to 2 am or 16-hour daylength extension) will achieve flower stem elongation.

Bulking Strategy

For best and richest flowering, allow plants 3-4 weeks to bulk after transplanting; best in the cooler season.

Media

pH: 5.5–6.2

EC: 0.7–1.2 mS/cm (saturated media extract)

Fertilizer

100–150 ppm nitrogen

Pinching

No

Moisture Level

Alternate between a level 4 (wet) and level 2 (medium). Allow soil to dry back to a level 2 (medium) before irrigating up to a level 4 (wet).

Plant growth regulators (PGRs)

If needed, B-Nine (daminozide) at 2,500–5,000 ppm or Bonzi® (paclobutrazol) drench at 10–15 ppm are effective. PGR applications are more effective if applied early in the crop cycle. Please note: Cycocel causes phytotoxicity.

Pests

Leafminer larvae, foliar nematode, aphids, thrips

Diseases

Powdery mildew, Alternaria leaf spot, Pythium, Rhizoctonia, Thielaviopsis, Cucumber mosaic virus (CMV, spread by aphids), Impatiens necrotic spot virus (INSV, vectored by thrips)

Scheduling

Container Size	Crop Time After Transplant	Plants Per Pot	Season
Annual 1.0 quart	12-16 weeks	1	Spring, ADT 55°F
Annual 1.0 gallon	13-16 weeks	2-3	Spring, ADT 55°F
Overwinter 1.0 quart	20-30 weeks	1	Early Spring, ADT 50°F
Overwinter 1.0 gallon	20-30 weeks	2-3	Early Spring, ADT 50°F

BEGONIA
BOLIVIENSIS

Information courtesy of Benary and Selecta

General

Boliviensis is a tuberous begonia originating from a cliff-dwelling species that is extremely water and cold sensitive. They need 14 hours of light, temperatures above 56°F (13°C) and moderate light levels, as well as constant feed to actively grow and achieve satisfying results. You should never grow them like traditional tuberous or other types of begonias. Starting them too early, (when days are short and temperatures are low), will result in waterlogged, dormant plants. The later you start, the easier your crop will be to grow on and the quicker it will finish.

Media

Use a well-drained potting media.

pH of 5.8-6.2 is optimum

EC of 1.0-1.5

Temperature

Night: 57-60°F (13-16°C)

Day: 65-75°F (18-24°C)

Crop can be finished cooler in final weeks of production; maintain temps 58-60°F (13°C).

Average daily temperatures < 57°F (14°C) can result in tuber formation and/or crop delay.

Light

Day length: Boliviensis begonias must be scheduled to grow under long days (12 hrs) to keep plants from producing tubers and to initiate flowering (as you would for a tuberous begonia). Crops produced under short days (less than 12 hours) will result in small plants and poor flowering; or the crop "stalling" altogether.

Light levels: Boliviensis begonia should be grown under moderate light levels of 3,000 to 4,000 fc (30,000 to 40,000 Lux). Higher light levels (>4,000) fc encourage compact growth but use caution because although long days promote flowering, plants will scorch under high light and high temperatures.

Watering

The media should be allowed to dry between watering. Water stress can be used for growth control; however, periods of sustained wilting should be avoided. Excess water will result in unwanted stretch and disease.

Fertilizer

Use a constant liquid feed program of 100 to 200 ppm N. Regular leaching with clear water will help to reduce buildup of excess salts in media. Keep ammonium levels low, otherwise roots become damaged. High "N" levels cause the foliage to become too large. Keep pHs below 6.5 to avoid iron deficiency. Apply chelated iron if chlorosis becomes a problem. To prevent magnesium deficiencies apply magnesium sulfate as needed.

Pinching

Pinching is not recommended or required for Begonia boliviensis. Plants can tend to grow straight up and/or look "skinny", but they will start to bulk/branch out on their own after appropriate time.

Growth Regulators

Always follow the label. A spray with Cycocel at 250-300 ppm two weeks after transplanting is recommended. Cycocel will not hasten flowering, but will increase the number of flowers. If using growth regulators, two applications will likely be necessary. A negative DIF of 2-3°F is also very effective in height control. If using DIF then no additional PGR's should be necessary.

Fungicides

Always follow the label. Apply fungicides during long periods of low light and high humidity.

Common Diseases

Botrytis, Pythium, Rhizoctonia, Powdery Mildew and Tomato Spotted Wilt Virus.

Pests

Primarily aphids and thrips.

Crop Scheduling

Container	Per Container	Total Crop Time
4-5" pot	1 plant	5-7 weeks
6-8" pot	1-2 plants	6-8 weeks
1 gallon	2 plants	7-9 wks
10-12" pot	4-5 plants	10-12 weeks

Cultural Hints

Spacing the plants will increase overall plant quality. Do not grow too wet. Use medium moisture levels because the roots are sensitive to overwatering. Keep humidity levels low to avoid problems with Powdery Mildew. Hanging baskets can produce an abundance of self-cleaning flowers dropping on plants below so hang in an appropriate location at maturity.

BEGONIA
REX

Transplanting

Do not plant liners too deep. The soil level of the liner should match the soil level of the container.

Media

Use a well-drained, disease-free medium with a pH of 5.8 to 6.2 and medium initial nutrient charge. Peatlite mixes work well. High EC will stunt growth and cause marginal leaf burning. Do not exceed an EC of 1.8 SME (Saturated Media Extract).

Light

Rex Begonias are a shade crop. For the first 2 weeks after planting, light levels should be about 900 fc or 70% shade (9,000 lux). From week 3 to finish, light levels should be maintained between 1,500 and 2,500 foot candles or 50% shade (15,000 to 25,000 lux). Rex Begonias are a short day crop (they flower under short days (less than 12 hours) and do not require supplemental lighting.

Temperature

Night: 65 to 70°F (18 to 21°C) with a minimum of 60°F.

Day: 70 to 80°F (21 to 27°C) with a maximum of 90°F. Do not run cool (under 65°F) for the first 14 days after transplanting.

Watering & Fertilizer

Rex Begonias prefer a constant, moderate soil moisture. Wet conditions will encourage root diseases. Moderately moist is ideal, and they should never dry out. Overhead watering is not recommended on Rex Begonias. Constant feed with 100 ppm N with a balanced fertilizer. 20-10-20 or 15-5-15 is recommended.

Growth Regulators

Always follow the label. Growth regulators are generally not necessary, but when light levels are lower than optimum, some stretch can occur. One application of A-Rest 50 ppm will control the stretch.

Pinching

Pinching is not needed.

Spacing

Do not crowd Rex Begonias. Plants should be given plenty of space in all stages of development. Over-crowding results in petiole stretch and often bacterial leaf spots. Plants should be re-spaced when they begin to touch each other.

Common Pests

Aphids, Mealybugs, Thrips

Diseases & Fungicides

Always follow the label. The best control is good ventilation and plenty of space between plants. Foliar spraying is not recommended on Rex Begonias, and should not be a common practice. Apply a rotation of the fungicides below every 2 weeks.

Powdery Mildew - Foliar Spray with Compas-O, Cygnus, Heritage or Phyton 27

Botrytis Blight - Foliar Spray with Dithane, Daconil, Decree, or Endorse

Myrothecium - Foliar Spray with Compass-O, Heritage or Medallion

Bacterial leaf spot - Foliar Spray with Kocide (not recommended close to shipping time because of spray residue.)

General Crop Scheduling

From a 25 count size liner

Size	Per Pot	Crop Time
4-5" Pot	1 liner	6-8 weeks
6" Pot	1 liner	10-12 weeks
8" Pot	2-3 liners	10-12 weeks
10" Basket	3-4 liners	12-14 weeks

BEGONIA
HIEMALIS & HYBRIDS

Introduction
These begonia series offer easy to produce options that are a comfortable fit with most warm climates, high light spring production practices.

Pot Sizes
Begonias are perfectly suited for production in commercial forms of 4", 5" or larger. They are an excellent hanging basket, and can be used in larger basket forms (12" or greater) and in combination planters.

Light
Additional lighting in the initial phases of crop development is very beneficial. Growers can consider using either assimilation lighting for either the entire crop or only for the first four weeks combined with cyclic lighting of 10 minutes per half hour for the balance of the crop. Assimilation lighting should be implemented at the rate of 3.5 watts/sq. ft., with a total day length of 16 to 18 hours. The use of assimilation lighting is especially useful in developing strong vegetative growth during the winter months.

Temperature
Until the transplants are well rooted, temperatures should be maintained at 68°F (day and night). Once plants are well rooted, temperatures can be reduced to 64°F (day and night) for the balance of the growth cycle. For additional plant tone during the last two weeks of the crop cycle, temperatures can be reduced to 58°F. Ventilation should occur when temperatures exceed 75°F.

Transplanting/Pinching
These begonias should be transplanted into a well drained, low to moderate EC substrate. Liners should be transplanted upon receipt or when they have reached maturity in the propagation phase. Liners that are held for even short periods of time before transplanting will not branch as freely as product that is handled at the proper maturity. Plants should be “soft” pinched no later than two weeks after transplanting. The process should leave three (3) to four (4) leaves below the pinch. The pinch removes any pre-mature buds that may have developed in the apical meristem and the subsequent lateral shoots that are developed under long days or supplemental lighted regimes. This will provide the vegetative structure for a successfully proportioned plant.

Fertility
After transplanting and successful rooting out of the original plug, initial feeding practices of 125 ppm N of Calcium Nitrate should be conducted for one to two weeks. From this point forward until week six of the crop, plants should be fed with 150 ppm N 15-5-15. After week six plants can be fertilized with potassium nitrate or a balanced fertilizer high in potassium. It is important to avoid using fertilizer compounds high in ammonical nitrogen; these fertilizers will provide excessive vegetative growth and softer plants, which may be more problematic in transport.

PGRs
Always follow the label. Cycocel® may be applied at the rate of 750 ppm on bi-weekly intervals, or Bonzi® may be applied at the rate of 3 to 5 ppm as a foliar application near the finish of the crop. A negative DIF may also be employed, and the DIF should be managed in the range of 5-7°F throughout the crop.

Crop Scheduling
The following table is offered as a starting point for scheduling certain popular forms of this product. Realize that the stated times are not absolute and subject to the amount of light, temperature and fertility that the crop may receive.

4-5" Container: 1 plant, pinch 2 wks after transplant, 7 wks total crop time.

1 gallon: 1 plant, pinch 2 wks after transplant, 9 wks total crop time.

10" hanging basket: 3-4 plants, pinch 2 wks after transplant, 10 wks total crop time.

12" hanging basket: 4-5 plants, pinch 2 wks after transplant, 12 wks total crop time.

CALIBRACHOA
VEGETATIVE

Media
Always water plants thoroughly before planting. Use a standard, well-drained, disease-free potting mix with medium fertilization. Starting pH should be 5.2-5.8. Maintain a low pH throughout the crop cycle by either using an acid fertilizer or reducing water alkalinity with acidification. Have the water tested at a laboratory to determine alkalinity levels.

Light
Full sun to part shade (particularly in the summer when the temperatures are hot). Low light levels can cause soft, stretchy growth and an unattractive plant habit. High light levels will help produce an excellent product. During short days (less than 12 hours of natural day length), use supplemental lighting of 14¼ hours or more to initiate flowering.

Temperature
Night: 60-65°F (15-18°C)

Day: 68-72°F (20-22°C)

Ave. Daily Temperature: 65-68°F (18-20°C)

Cool temperatures (60°F night and 68°F day) will help produce a quality product, but will require a longer crop time. Note: Grown too cool, calibrachoa is susceptible to root rot.

Watering
Do not allow plants to dry out in any stage. Keep plants moist, but not wet, for the first week or so until rooting is established. Once rooting is established allow moderate dry-down between watering. On larger containers, where larger growth is desired, keep moist for a longer period, then begin dry-down cycles. Regular, moderate stress helps to promote good roots, strong top growth and quick bloom times. Leach pots periodically to prevent salt build up.

Fertilizer
Calibrachoa is a heavy feeder. Constant feed with 200-300 ppm N with average levels of micro-nutrients, and with slightly higher iron levels to maintain green foliage. Use an acid fertilizer such as 21-5-20, 20-10-20, or 23-3-19 plus Magnesium.

Growth Regulators
Always follow the label. High light levels in combination with cool temperatures will help reduce the need for growth regulators. Using a negative DIF (night temperature is warmer than the day temperature) will also help control stretch. A drench with 1-5 ppm Bonzi/Piccolo/Paczol (0.03-0.16 fl oz/gal), (concentration will vary with the season) is also very effective. Here are general guidelines.

8" basket: 1-1½ cups per pot (of the above solution)

10" basket: 1½-2 cups per pot

12" basket: 2-2½ cups per pot

B-Nine/Dazide-2,500-5,000 ppm (0.39-0.79 oz/gal), 1-2 applications after the first pinch.

Pinching
We recommend pinching vegetative calibrachoa at least once in 4-inch to 6½-inch pots, unless you are buying a pre-pinched product. A hanging basket may require 1 to 2 pinches. Allow 7 to 9 weeks from pinch to bloom, longer below 65°F ADT (Average Daily Temperature).

Spacing
4 inch pots-1 to 3 inches between pots

6 inch pots-3 to 5 inches between pots

8 inch pots-4 to 8 inches between pots

Common Pests
Aphids, Thrips

Diseases & Fungicides

Powdery Mildew - Calibrachoa is very susceptible to Powdery Mildew and the frequency of this disease appears to be increasing each year. The early stages of infection can be difficult to see. Sometimes it can begin with the yellowing of lower leaves in the interior of the plant canopy which can turn necrotic and die leaving the center of the plant bare. Scout your crop regularly and carefully, especially the lower, interior leaves taking time to examine the tops and bottoms of any yellow leaves with a hand lens to see if you can discover the tell-tale talcum-like fungal colonies. In addition, increase spacing between plants to lower the humidity of the canopy. If you discover any problem, alternate between systemic fungicides with different modes of action and apply with a protectant fungicide Daconil in order to delay resistance.

A suggested rotation might include:

1st spray: Eagle (Nova), Trinity or Terraguard + Daconil

2nd spray: Pageant (Pristine) + Daconil

3rd spray: Compass + Daconil

Thielaviopsis or Phytophthora - Soil drench with Cleary's/Subdue 1 week after planting. (This is particularly useful on hangers, where treatment can be difficult after hanging.)

General Crop Scheduling

From a 50 count size liner

Size	Per Pot	Crop Time
306 Pack	1 liner/cell	5-9 weeks
4" (10 cm) pot	1-2 liners	5-9 weeks
6½" (16 cm) pot	2-3 liners	6-10 weeks
Basket	4-5 liners	10-16 weeks

CAMPANULA

CHAMPION

Information courtesy of Sakata Seeds

Media

Plant in well-drained media with a starting pH of 5.8-6.2.

Fertilizer

Fertilize the pots weekly with 150ppm N, Calcium Nitrate-based fertilizer.

Plants Per Pot

Plant one plant per 6 inch pot.

Temperature and Scheduling

Week 1 – Week 3 Grow at 68°F to establish the plants.

Week 4 – Week 6 Drop the temperature to 50-55°F and provide long day treatment for 3 weeks (total 16 hour day length). Night interruption from 10pm to 2 am works well using incandescent (mum) lighting. For fuller pots and a rounder look make a soft pinch as the plants begin to elongate vertically.

Week 7 – Week 9 Maintain cool temperatures of 50-55°F, but stop day length manipulation (turn off the lights). Drench the pots with 10-20 ppm of Bonzi with 50 cc per pot at the beginning of week 7*. Use lower rates in northern areas or under lower temperatures and light levels. Champion Blue and White Improved are slightly less vigorous than Pink and require less growth regulation.

*For pinched plants, apply within 2 weeks after pinching, before elongation of side shoots.

Week 10 – Week 13 Raise the temperature to 59°F.

Week 14 Pots should begin flowering. Pots can be sold in the bud stage (big and puffy) as the buds will open nicely indoors; especially if placed near a lamp or bright window.

Note: In mid to late spring the longer photoperiod, higher light levels and warmer temperatures will accelerate flowering.

COLOCASIA

ROYAL HAWAIIAN

Information courtesy of Plant Haven

Hardiness

USDA Zones 7b-11: frost will trigger dormancy.

Light

Full sun for best color.

Soil

Rich, moist. Colocasias are wetland plants. Burnt leaf edges can be a sign of under-watering and/or over-fertilizing.

Temperature

The warmer the better for fast growth.

Fertilizer

Must avoid over-feeding for best results.

Recommended Finished Pot Size

1 gallon and larger.

Finish time

(when grown warm) from liner to:

1 gallon pot: approx. 6 weeks.

5 gallon pot: approx 12-15 weeks.

15 gallon pot: approx. 20-24 weeks (select colors).

Treat as other tropicals. Avoid extended dry periods.

GERANIUMS REGAL

ELEGANCE™ SERIES

Information courtesy of Dummen

Product Forms Available

Single root liners (which are budded but not pinched) are good for 4.5" to 5.5" pots.

Finishing Pre-Budded Regal Geraniums

All product forms: Liners should be transplanted into final container and spaced into the finishing environment.

Grow 6" pots at 1 pot per square foot.

4.5" and 5.5" pots at 2½ pots per square foot.

Temperature

Night: 59°F (15°C)

Day: 65°F (18°C)

If you have heated floors run the soil temperature at 60°F.

Fertility

Supply 200 to 250 ppm nitrogen and potassium constant liquid feed, using a balanced liquid fertilizer complete with micronutrients. Periodic applications of Epsom salts are also beneficial. Maintain EC below 1.0 mmhos. Regals are sensitive to excess soluble salts. If EC is above the recommended range, do not allow the plants to dry excessively. If the EC's below 1.0 mmhos, plants should be allowed to dry slightly between irrigations. Soil pH should range from 5.5-6.2.

Lighting

Regals are light accumulators; high light levels and long days will enhance flowering. Provide 16 hour days September 15th through April 1st. These lights should supply a minimum of 10 foot candles at plant level (similar to Mum lights). Shade if light levels exceed 3,800 fc, until the plants begin to show color. At this time, light levels should be reduced to 2,500 fc to extend the longevity of the flowers.

Moisture Management

Until the first bud appears, the plant should be allowed to dry between irrigations to control vegetative growth. As flowers begin to develop, irrigation frequency should increase to avoid problems with flower bud abortion.

Height Control

If plants are grown under adequate light levels, with moderate moisture and cool nights, height control should not be necessary. If needed, Regals will respond to Cycocel®. Apply Cycocel® at 1,500 to 3,000 ppm as a spray until the buds begin to elongate. Cycocel® can be applied at 7-14 day intervals. If this is the first time working with Cycocel® on Regals test the application on a small number of plants first and always consult the label for further instructions.

Insect and Disease Concerns

Whiteflies can be a concern on a Regal crop. Monitor populations using yellow sticky cards, and make necessary insecticide applications to control populations prior to flower development.

Botrytis is also a major concern at all stages of the crop. Maintain relative humidity below 70% in the finishing environment, and provide good air circulation and ventilation. Water plants early in the day, and avoid overhead irrigation. Weekly fungicide sprays are beneficial for prevention of botrytis.

Crop Timing*

Single budded liner: 8-10 weeks

*Crop timing will vary depending on temperatures and light levels. Crop timing will be extended without the use of supplemental lighting if the crop is scheduled for production during the months between September 15th and April 1st.

Shipping Information

Regals are very sensitive to ethylene in transit. Leaf yellowing and bud abortion may occur if time in transit is prolonged. For best results, ship plants with one or two open flowers and use Ethylblock.

GERANIUMS
SEED

Information courtesy of Syngenta

Flower Initiation

Time Frame when plants are receptive to flower initiation: Days 18-24; 4-6 leaves present.

Flowering

Geraniums are day-neutral plants. Light and temperature trigger flowering. Geraniums are light accumulators, the more light received, the faster the growth and earlier the flowering. DIF treatments may negate flowering.

Finish Bulking/Flower Initiation

Optimum conditions during the vegetative period, beginning at transplant, needed for the root to reach the edge of the container; AND to make the plant receptive to flower initiation.

Media

pH: 6.2-6.5. Low pH symptoms include yellowing of leaves, interveinal chlorosis and necrosis.

EC: 1.2-1.5 High salts may encourage roots to become very brittle.

Light

Hasten Flower Induction: Provide 3500-4500 foot candles (15-20 total moles or 35,000-45,000 lux) to hasten flower induction.

Enhance Shoot and Root Growth: Supplemental lighting under low light conditions at 350-450 foot candles (35,000-45,000 lux) will enhance shoot and root growth.

Induce Early Flowering: Lighting after transplant for 2-3 weeks, at 300-500 foot candles (3000-5000 lux) for 14-18 hours a day will induce early flowering.

Temperature

Night: 60-65°F (16-18°C)

Day: 70-75°F (21-24°C)

Manipulation of night temperatures after buds are visible can speed up or slow down flower development to meet a sales date.

Average Daily Temperature (ADT): 67°F (19°C)

Moisture

Alternate between moisture levels wet (4) and moist (3). Allow media to approach level (3) before re-saturating to level (4). Excessive drying of the media moisture level will concentrate salts around the root system and burn the root hairs. Symptoms of excessive drying include lower leaves turning reddish to yellow, and root tip die-back.

Dehumidify

Provide horizontal airflow to aid in drying down the media through evapotranspiration under cool, low light conditions.

Fertilizers

Constant liquid feed at 200 ppm N with a calcium-based fertilizer (13-2-13 or 14-4-14).

Growth Regulators

A total of 4-5 applications of Cycocel (chlormequat chloride) at 750 ppm beginning when 3-5 true leaves are present will control growth. **Note:** Do not apply Cycocel after the buds have emerged above the foliage. Small and/or malformed flowers will result from late applications of Cycocel. Also responds to A-Rest (ancymidol), Bonzi (paclobutrazol), Sumagic (uniconazol) or B-Nine/Cycocel (chlormequat chloride) tank mix.

Common Diseases

Botrytis, Pythium, Alternaria, Pseduomonas, Rust

Common Pests

Thrips

Scheduling

Transplant To Finish Crop Time:

4" crop: 7-10 weeks

6" crop: 10-12 weeks

Product Use

Pots, containers, mass plantings.

GERBERA
SEED

Information courtesy of Ball Horticultural

Media

Use a light and well-aerated media.

Pot Size

12 cm pots (pH 5.5-6).

Irrigation

Overhead watering is possible until the flower buds appear, but watering directly into pot or grow with ebb/flow floors is preferred.

Density

After potting the density is approx. 80 pl/m^2 for 3-4 weeks; by then the plants need to be spaced to 20-25 pl/m^2 until end of culture.

Temperature

Best results with 66/66°F (19/19°C) or 66/62°F (19/17°C). In darker periods day/night temperatures can be reversed to keep stem length somewhat shorter.

Diseases/Pests

Should any disease or pest (mildew, white fly, thrips) emerge, treat with pesticide.

Fertilization

Gerbera requires relatively high fertilization.

Light

Gerbera likes to be grown under high light conditions. During the darker period of the year, additional lighting can be applied.

Crop Time

Depending on the sowing date, the available light and the required pot/plant ratio, the culture will take approx. 14 weeks from sowing to 50% flowering. The second 50% can be reaped in 10-14 days.

This information is based on West European conditions and is given for general guidance only. No guarantee is given for the result of the crop, nor is liability accepted for the consequences of applying above indications.

GERBERA
GARVINEA®

Information courtesy of Florist Holland B.V.

Media

Use a well draining, coarse substrate for successful rooting. pH between 5.5-5.8. EC around 1.0-1.5. Watch the pH; a high pH can cause chlorotic leaves.

Pot Size

The young plants can be transplanted in 10-21 cm / 4-8" pots. Transplant the plant in the center of the pot, with the top of the plug leveling the surface of substrate. Use pots with at least 4 drainage holes and a lip. After transplanting place the pots pot-tight for an optimal micro climate.

Irrigation

Start with overhead irrigation (for strong root development). When the flower buds appear, ebb/flow or drip tubes are preferred.

Irrigation Timing - in the morning.

Watering - Gerbera prefers a moderate to dry soil condition.

Temperature

Wk	Day & Night
1-3	59-68°F / 15-20°C
4-6	54-64°F / 12-18°C
7-12	day 46-64°F / 8-18°C night 46-54°F / 8-12°C

The drop in night temperature allows the plant to set several buds and finish with a full canopy of color.

Fertilization

Use a basic NPK fertilizer, such as: 18-9-18 or 17-5-17 with added micro elements at 250 ppm. (Heavy feeders)

Light

During dark wintertime, artificial lighting is recommended to maintain the product quality. Add approx. 5,500 lux (510 f.c.) to ensure optimal light levels.

Crop Time

Around 6 to 7 weeks after transplanting the first flowers will appear.

Retail Ready - Timetable after transplanting depends on environmental conditions and pot size. In summer 8 to 12 weeks, in winter 12 to 14 weeks.

Spacing

As soon as the leaves touch, the plants can be spaced. This is approximately 5 weeks after transplanting.

General Remarks

Irrigation management is the key. Overwatering is a common cause of low quality and high crop losses. Garvinea® can be produced at relatively low temperatures and little to no intervention of pesticides. There is no need for plant growth regulators. For custom growing recommendations based on your specific environment please contact Florist Holland.

GERBERA
PATIO

Information courtesy of Florist Holland B.V.

Media

Use a well draining, coarse substrate for successful rooting. pH between 5.5-5.8. EC around 1.0-1.5. Watch the pH; a high pH can cause chlorotic leaves.

Pot Size

The young plants can be transplanted in 21-25cm / 8-10" pots. Transplant the plant in the center of the pot, with the top of the plug leveling the surface of substrate. Use pots with at least 6 drainage holes and a lip. After transplanting place the pots pot-tight for an optimal micro climate.

Irrigation

Start with overhead irrigation (for strong root development). When the flower buds appear, ebb/flow or drip tubes are preferred.

Irrigation Timing - in the morning.

Watering - Gerbera prefers a moderate to dry soil condition.

Temperature

Wk	Day & Night
1-3	64-68°F / 18-20°C
4-6	64-68°F / 18-20°C
7-12	day 64-66°F / 18-19°C night 59-61°F / 15-16°C

These plants require night temperatures below 70°F to continue flowering.

Fertilization

Use a basic NPK fertilizer, such as: 18-9-18 or 17-5-17 with added micro elements at 250 ppm. (Heavy feeders)

Light

During dark wintertime, artificial lighting is recommended to maintain the product quality. Add approx. 5,500 lux (510 f.c.) to ensure optimal light levels.

Crop Time

Around 6 to 10 weeks after transplanting the first flowers will appear. Pinch the first buds to stimulate the plant to create more buds for multiple open flowers at point of sale.

Retail Ready - We advise to have at least 3 flowers open and buds in the plant at time of sale. Timetable after transplanting, depends on environmental conditions and pot size. In summer 8 to 12 weeks, in winter 12 to 14 weeks.

Spacing

As soon as the leaves touch, the plants can be spaced. This is approximately 6 to 8 weeks after transplanting.

General Remarks

Irrigation management is the key. Overwatering is a common cause of low quality and high crop losses. There is no need for plant growth regulators. Common challenges: leaf miner, white fly, thrips, botrytis, powdery mildew, broad mites/cyclamen mites, aphids, pythium and phytophthora. For custom growing recommendations based on your specific environment please contact Florist Holland B.V. email: info@floristholland.com

HELIANTHUS
SUNFINITY, SUNMAZING & SUNBELIEVABLE

General

After all risk of frost has passed, gradually acclimatize sunflower plants to outdoor conditions before planting them directly into beds, borders and cutting gardens of fertile, well drained soil. Or, alternatively, transplant into larger sized premium containers and space during production.

These sunflowers need a constant supply of water and a well-balanced fertilizer at 150 - 200 ppm nitrogen or an application of slow release fertilizer in planting beds. Prolonged periods of drought and wilt will cause yellowing of the lower leaves and poorer plant quality.

These plants need an abundance of light to get the fastest, highest quality blooms. They are facultative long-day plants, so crop time can take up to 2 – 4 weeks longer if plants were propagated under short days (<13 hours of light).

For best branching, allow plant to grow until 6 – 7 nodes develop on the main stem, then pinch off the main stem above the fourth or fifth pair of leaves. This can usually occur within about 2 weeks after transplant.

Growth Regulators

Apply 2-3 ppm Bonzi® (paclobutrazol) drench 1-2 weeks after pinching; 2-3 ppm drench at first sign of visible buds; 2 ppm drench when flowers start cracking color to hold for finish. Higher rates may be necessary under high light and temperature conditions.

Diseases & Pest Control

Insects: Aphid, spider mites, thrips, whitefly, caterpillars

Diseases: Botrytis, Pythium, Rhizoctonia, Powdery Mildew, Downy Mildew, Rust

Preventive fungicide applications for Powdery Mildew and Downy Mildew are recommended, especially in high humidity environments. Palladium®, Micora® and Segovis® fungicides have all been effective at suppressing pathogens.

Plants grown outside can attract chewing insects. Preventive insecticides, such as Mainspring® and Flagship® are effective. Avid® insecticide is also recommended for spider mite control when grown in warm, dry conditions. Avid also has the added benefit of caterpillar and whitefly control.

Scheduling

Facultative long-day plant. Crop time is 2-4 weeks longer if starting with plugs propagated under short days versus long days. For earliest flowering, provide long days, high light levels, and warm temperature.

From a large liner

Size	Per Pot	Crop Time*
6-8" pots	1 liners	7-8 weeks
10-12" pots	1-2 liners	7-8 weeks
3+ gallons	2-3 liners	8-9 weeks

*Estimated finish crop time is from transplant of a four week old 72-cell plug tray, propagated under long days, and finished at an average daily temperature (ADT) of 68°F (20°C). Crop time is one week faster at an ADT of 73°F (23°C) versus 68°F (20°C).

HIBISCUS

LUNA™

Information courtesy of PanAmerican Seed

Growing on to Finishing

Container Size: Luna™ Hibiscus is best suited to quart, gallon or larger containers (15 cm or larger). For quart and gallon containers (15-19 cm), use one plant per pot. For large containers (19 cm) use 1 to 3 plants per pot.

Media

Use a disease-free, peat-based, soilless medium with a pH of 6.0 to 6.5 and a medium initial nutrient charge (EC 0.75 mmhos/cm with a 1:2 extraction). "Nursery mixes" that contain soil can also be used, but may require an additional week of crop time and will have darker green foliage.

Temperature

Day: 70 to 85°F (21 to 30°C).

Night: 65 to 70°F (18 to 21°C).

Warmer growing conditions result in shorter crop times. Do not allow average daily temperatures to drop below 68°F (20°C). Plants can become chlorotic and sensitive to pesticide spray (phytotoxicity) when grown at cooler temperatures.

Light

Keep light levels as high as possible. Plants grow best under full sun. Space plants to allow light to reach basal area. This promotes better branching.

Photoperiod

Luna™ Hibiscus requires a minimum of 12 hours of day-length to flower. Flowering is faster when day-length is 14 hours or longer. Supplemental lighting should be used under shorter days.

Watering

Keep media moist to wet. Consistent soil moisture is important and plants should not be allowed to wilt. Growing plants too dry will result in flower bud abortion.

Fertilizer

Feed plants weekly at 200 to 250 ppm N in a complete fertilizer.

Pinching

Not recommended. Luna™ Hibiscus branches naturally without pinching. Best branching occurs when plants are spaced when the foliage touches the sides of the pot.

Plant Growth Regulators

A tank mix of Cycocel at 750 to 1,000 ppm and B-Nine at 2,500 ppm has been tested in different climates in the U.S. and shown effective. Apply PGR's 2 weeks after transplant. Repeat application 2 weeks later if necessary.

Optional Treatment

Bonzi drench at a very low rate of .25-0.5 ppm with multiple applications (2 to 3 times) is also effective. Be careful when using Bonzi drench as it is very easy to stunt plants, especially for northern growers. If you are growing in a nursery mix that includes soil, less PGR may be needed. One application 3 to 4 weeks after transplanting may be sufficient.

Common Problems

Insect: Thrips, aphids, spider mites.

Disease: No serious problem.

Crop Scheduling

Transplant to flower: 10 to 13 weeks.

The shorter crop times occur under warmer growing temperatures and longer daylength. If using a nursery mix, add one week to total crop time.

In the Garden

Plant Luna™ Hibiscus in full sun locations (at least 6 hours of direct sunlight). Luna™ hibiscus can be planted in soil near ponds or water gardens. It will also tolerate dry conditions once it is established. When planted in a row, Luna™ Hibiscus makes a hedge 2 to 3 ft. (60 to 90 cm) tall and about 2 ft. (60 cm) wide. Luna™ Hibiscus can also be used in larger patio containers. Water and fertilize regularly with an all-purpose fertilizer for best results. If the foliage turns light green, it is an indication that it needs to be fertilized.

Luna™ Hibiscus are perennial to USDA Hardiness Zone 5. Plants die back all the way to the ground in the winter, then usually do not start growing until late May when the soil warms up. Overwintered plants will flower from mid-July on, with flowering decreasing in cooler fall weather.

NEW GUINEA

IMPATIENS

Information courtesy of Danziger

Planting

4" pot: use 1 plant per pot. Ready for sales within 8-10 weeks.

6" pot: use 1-2 plants per pot. Ready in 10-12 weeks.

10" hanging baskets or pots: use 3-4 plants. Ready in 12-14 weeks.

Pinching

Not necessary.

Light Intensity

Partial shade. N.G.I responds to assimilation lighting by enhancing development and flowering. When natural light intensity is less than 4000-5000 fc/40,000-50,000 lux, it is essential to add artificial light of 3000-4000 fc/30,000-40,000 lux, for 14-18 hours a day. Lighting should be given 2-3 weeks after planting. Shading may be required if irradiance levels exceed 5000 fc/50000 lux (late spring).

Temperature

Day: 64-70°F (18-21°C)

Night: 60-70°F (16-21°C). Stem elongation is caused due to high temperatures and the opposite is achieved in low temperatures.

Fertilization

Low levels for the first four weeks. Moderate levels for remaining crop cycle when roots reach the sides of the pot, fertilize up to a level of 150-200 ppm N, 80 ppm P, 150 ppm K. Ensure proper runoff to prevent salt accumulation because of sensitivity to high salt levels.

Irrigation

Keep well watered. Avoid overwatering. Drip irrigation is recommended.

Media

Use a well-drained disease-free mix. pH: 5.8-6.2, EC: 0.5-0.7

Diseases & Pest Control

Insects: Spider Mites, Thrips

Diseases: Botrytis and Myrothecium.

Maintain moderate humidity levels and good air circulation as a preventative. Drench with a broad-spectrum fungicide at liner planting.

ORNAMENTAL GRASSES

TRANSPLANTING

Do not bury the plugs too deeply when transplanting.

Media

Use a well-drained, disease-free, soilless medium with a pH of 5.5 to 6.2 and a medium initial nutrient charge.

Light

Do not shade grasses. High light will improve crop quality (5,000 fc or greater). Maintain light levels as high as possible, if temperature can be controlled.

Temperature

Night: 59 to 64°F (15 to 18°C)

Day: 62 to 74°F (17 to 23°C)

These Grasses can be grown under temperatures as low as 50°F (10°C), but crop time will increase significantly.

Watering

Do not allow plants to wilt. Juncus grasses can be grown in very wet conditions.

Fertilizer

Constant feed with 100 ppm N with a calcium-based fertilizer (13-2-13, 15-0-15 or 14-4-14), or feed weekly with 175-225 ppm N with a calcium-based fertilizer. Avoid using excessive ammonia nitrogen-form fertilizers and overfeeding, as these will result in less upright plants.

Growth Regulators

Always follow the label. PGRs are not needed. However, for Juncus Javelin, a Bonzi (paclobutrazol) spray at 30 ppm (.96 fl oz/gal) 2 weeks after transplant is beneficial to reduce leaf bending by making the plants stronger and more compact.

Pinching

Pinching is not needed.

Spacing

Can be grown pot tight.

Diseases/Recommended Fungicides

No known problems.

Common Pests

Aphids, Whitefly, Thrips

General Crop Scheduling

From a 288 plug size

Size	Per Pot	Crop Time
306 Pack	1 plug/cell	6-8 weeks
4" (10 cm) Pot	1 plug	7-9 weeks
6" pot	3 plugs	6-8 weeks

From a 144 plug size

Size	Per Pot	Crop Time
4" (10 cm) Pot	1 plug	6-8 weeks
6" pot	3 plugs	5-7 weeks

OSTEOSPERMUM

Please note: In the spring of 2024, Jolly Farmer is offering "pre-cooled" Osteospermum liners. This helps with more even flowering, and brings the crop into bloom 2-3 weeks earlier.

We offer two Osteospermum series:

Gelato Series:

This series fits well in a 4-6" pot program and tends to be more upright.

Osticade Series:

This series tends to be more trailing and works well when 3 or more plants are used in a hanger program.

Usage

Grower: Ideal early spring crop in multiple container sizes. Can be grown compatibly with other 'cool' crops like pansies, perennials, cyclamen and regal geraniums.

Consumer: Gardens, patio pots and mixed planters.

Media

Use a well draining, high porosity soiless mix with a pH range of 5.5-6.0 and a moderate nutrient charge.

Irrigation

To establish a quality plant with a strong root system, be careful not to initially over-saturate the media which slows root development. In addition, allow the media to dry down some in between irrigations to promote root growth. Once established, do not allow excessive drying which results in damage to the foliage and flowers. Watering early in the day is best, especially if watering overhead.

Fertilization

7-10 days after transplanting, begin feeding with a complete balanced fertilizer (including some calcium and minors) at 200 – 250 ppm N. Although osteospermum are heavy feeders, make sure the ECe does not rise above 1.0 – 1.2 (1:2 dilution). Provide periodic clear water applications if excess soluble salts accumulate.

Temperature/Humidity

Establish crop at 60-65°F/15-18°C average temperatures. Once established (roots to bottom and sides of container) plant can be finished alongside other "cool-loving" species such as pansies and Regal geraniums. As always, provide good air circulation at all times. Maintain relative humidity below 70% to prevent diseases like Botrytis grey mold.

Light

Bright light is ideal for this crop. Retractable roof greenhouses and field production are suggested. Provide a minimum of 5,000-6,000 foot candles/ 53,800-64,600 lux. Use of supplemental light (14-16 hours, beginning at midnight) is beneficial for early spring flowering.

Pinching

Not recommended for this crop. If you do pinch, add 2 weeks crop time for blooming.

Spacing

Plants can be established pot-tight but should be spaced before foliage touches. Cultivars with a spreading growth habit can be grown closer together to force a more upright form. Spacing required for production:

4" pots: 8-9" centers

6" pots/1 gal: 14" centers

8" pots: 24" centers

Plant Growth Regulators (PGRs)

Cold temperatures and high light are the best control methods for preventing stretch. Chemical growth regulators can be used to maintain crop growth. Applications should be made before flower buds are visible. Spray applications of B-Nine® at 2500 ppm have worked well during the first 3-4 weeks after pinch. Avoid higher rates that delay flowering or later applications that can cause changes in the flower presentation. Drench applications of Cycocel® at 3000 ppm can be used for growth control. Apply the solution volume based on growing container size and label directions. Complete application before visible bud. Spray applications of Cycocel® at 750 ppm may also be used to control height. Using sprays will require 2 or 3 applications starting after pinch and through visible bud stage.

Crop Scheduling

Please note: scheduling osteospermum can be challenging and varies depending on exact temperatures and light levels in a given greenhouse, but here are some general crop times.

Size	Per Pot	Crop Time
4" pot	1 liner/pot	7-9 weeks
6" pot	2-3 liners/pot	7-9 weeks
8-10" pot	3 liners/pot	9-11 weeks

Insects

Aphids, Caterpillars, Fungus gnats, Spider mites, Thrips, Whiteflies.

Disease

Botrytis (gray mold), Root and stem rots, Viruses.

PERICALLIS

Information courtesy of Suntory.

Use

Outdoor patio, bedding plant and hanging baskets.

Growth & Flowering

All Senetti® are upright and bushy in habit. Excellent branching with good vigor, no need for a support system. Numerous quantities of large flowers up to 2.5 inches in size, from early spring until summer. After flowering has finished cut back the plant height by 50% and re-flowering will occur in 3-4 weeks.

Timing

10-14 wks to flowering at 40°F

8-11 wks to flowering at 50-55°F

Plants Per Pot

5-6"= 1 ppp

10" = 3 ppp

Media

Should be well drained with a pH of 5.6.

Temperature

Production is ideal in a cool and airy 35-40° F. This will produce a tough toned finished plant with very little problems with pest or diseases. Ventilation should be used when temperatures reach 48 - 50° F and humidity should be kept low.

Light

Senetti® is a day neutral plant. In periods of long days and high light, shade will be required to the level of 40 - 60% over the crop. This is likely to be at the time of crop maturity, or early fall season when the plants are newly potted. Light levels of 4500 foot candles are ideal.

Watering

Water using a drip system or ebb and flood if available and ensure that the floor remains as dry as possible to keep the humidity low. If overhead watering is necessary, water early in the day and on bright days if possible. Thorough watering will get the required feed levels into the plant and keep the foliage as dry as possible. Senetti® has a large vigorous root system and will require volumes of water regularly.

Fertilizer

Senetti® are heavy feeders and even at times of slow growth in low light conditions will require good levels of feed. It is recommended that a slow release material such as Osmocote 8-9 month formula be added to the base fertilizer at a rate of up to 4.5 lbs per yd3. Senetti® will take up a lot of the fertilizer during periods of slow growth and the option of Osmocote gives availability at times when applications of liquid feed are not frequent due to low water requirements.

Senetti® is an iron lover and will soon show symptoms of iron deficiency. It is recommended to add EDDHA trace elements to your liquid feed stock solution at a rate of 1 gm per liter and feed at a ratio of 1 in 100.

Growth Regulators

Senetti® is very responsive to Plant Growth Regulators (alar or B-Nine). Treatments should start from February onwards on cold grow crops and timings will be dependant on the weather but are likely to be every 14 days at rates of 2000 ppm. Once the buds are clearly visible the crop will still grow at least 2-3 inches in height until the flowers fully open. It is essential to keep applying Daminozide until the flowers are fully open. With the rise in temperatures and light at this time of year the plants will continue to grow quickly.

Bonzi is also effective at low rates. Bonzi must be applied after final potting and it is essential that the roots of the plants have fully reached the side of the pot. This chemical must be applied by drench and not sprayed on the foliage, since spray applications are not effective.

Ethylene in the form of Ethryl (Florel) is also effective at growth control by encouraging side shoots and reducing leaf size when applied at rooted liner stage, before or after potting. However, if this is your first time to use the chemical, do so with caution, always trialling a small number of pots first. This chemical is very effective, but results can be variable (or too effective) depending on weather, relative humidity, light levels and several other environmental factors. Rates of application should be between 500 and 1000 ppm. Do not exceed this dosage.

As always, when applying any chemical, read and follow the manufacturers instructions.

Pinching

If your rooted liners do not come as pinched and breaking plants, it is advisable to do a single pinch. The plants will naturally break and produce well shaped plants.

Diseases

Botrytis and powdery mildew can be avoided by keeping the humidity as low as possible.

PETUNIA
VEGETATIVE

Information courtesy of Danziger

Planting

4" (10 cm) pot: use 1 plant per pot. Ready for sales (from rooted cutting) within 6-8 weeks.

6"(15 cm) pot: use 1-2 plants per pot. Ready in 8-10 weeks.

10" (25 cm) hanging baskets: use 3-4 plants. Ready in 10-12 weeks.

Pinching

Should be pinched once, 2 weeks after planting. Second pinch is recommended for baskets. May be cut instead of pinched.

Following Transplant

During the first 2-3 weeks use water and fertilize moderately E.C. 1.51.8. Allow roots to reach the side of the container before increasing water and fertilization.

Light Intensity

High light intensities, preferably full sunlight is essential for optimum finish (min. 6,000 fc / 60,000 lux). If shaded, the plant will appear stretched and less blooming. During winter supplement lighting is required.

Temperature

Day: 64-75°F (18-24°C)

Night: 55-64°F (13-18°C)

Can grow in temperatures out of this range-nearly freezing point and up to 95°F (35°C).

Fertilization

Vegetative Petunia requires heavy fertilization. Apply a constant feed program with a balanced fertilizer N:P:K=2:1:2, using 250-300 ppm N (micronutrients in average levels with iron slightly higher).

Irrigation

Keep well watered. Sensitive to water surplus. Drip irrigation is recommended. Leach periodically to prevent salt accumulation.

Medium

Use a well-drained peat/perlite disease-free potting mix. pH 5.56.0, EC 0.8-1.2.

Growth Regulators

Optional. Not necessary under high light intensities. 1-3 sprays of ALAR (B-Nine) 2 gr/L according to required plant size. Bonzi is an effective regulator for 4" pot production.

Diseases & Pest Control

Insects: White Flies, Leaf Miners and Aphids.

Diseases: Botrytis, Pythium, Crown Rot.

Plant liners at soil level-not too deep. Avoid excessive moisture on foliage. A standard preventive spray program should be applied to control pests and diseases.

Viral diseases: Viral diseases can be a serious problem; therefore, it is essential to start with virus-free material. All Danziger's Petunias liners are derived from culture and virus-free stock.

PRIMULA

Information courtesy of Syngenta

Flower Initiation

Time Frame when plants are receptive to flower initiation: 8-10 leaves present.

Flowering Type

Facultative Long Day Plant-long days enhance flowering.

Flowering Mechanism

Maturity and irradiance (12-15 moles) trigger flowering.

Transplant Ready

6-8 weeks from a 288 plug tray.

Bulking/Flower Initiation

Optimum conditions during the vegetative period, beginning at transplant, are needed for the roots to reach the edge of the container and to make the plant receptive to flower initiation.

Media

pH: 5.5-5.8

EC: 1.0-1.5

Light

Provide 3000-4000 foot candles (12-15 total moles or 30,000-40,000 lux) to hasten flower development. Long days may enhance growth. Avoid direct sunlight as leaf scorch may occur. NOTE: do not allow light level to exceed 3500 foot candles (35,000 lux) for an extended length of time.

Temperature

Day: 50°-55°F (10°-12°C)

Night: 55°-60°F (12°-16°C) with a negative DIF of 5°-10°F (1°-3°C) from 5:00-9:00 a.m.

Average Daily Temperature (ADT): 54°F (12°C)

Moisture

Alternate between moisture level moist (3) and medium (2). Allow soil to reach level (2) before re-saturating to level (3).

Humidity

40-70%

Dehumidify

Provide horizontal airflow to aid in drying down the media through evapotranspiration, allowing better penetration of oxygen to the roots.

Fertilizers

Finish plants with an N:K ratio of 1:3. In cool weather, maintain low ammonium levels to avoid excessive vegetative growth and root-rot problems. Alternate with calcium-based and nitrate-based fertilizers (12-4-20 at 100-150 ppm N, 14-4-14 at 100-150 ppm N).

Growth Regulators

If grown cool, PGR's should not be necessary. If needed, apply B-Nine (daminozide) spray at 2500-5000 ppm.

Fertilizer

Potassium nitrate at 150 ppm N.

Common Diseases

Ramularia and Botrytis. Provide adequate ventilation between plants and avoid over-saturated conditions. Apply fungicides as needed according to label rates and directions.

Common Pests

Cutworms, Whitefly, Fungus Gnats, Shore Flies, Leafminers, Aphids and Thrips. Scout plants on a regular basis and apply appropriate pesticides according to label rates.

Scheduling

Traditionally sown in July.

Product Use

Beds and borders during cool season months. Primrose is a novelty blooming plant in winter months.

RANUNCULUS

Information courtesy of Syngenta

Flower Initiation

Time Frame when plants are receptive to flower initiation: 10-12 leaves are present.

Flowering Type

Obligate Long Day Plant-Long days required for initiation.

Flowering Mechanism

Days greater than 13.5 hours with high irradiance (15-20 moles) will induce and enhance flowering.

High quality Ranunculus is best obtained with cool night temperatures and short day conditions. Low temperatures and high light levels will result in large flowers with an intense color. Bloom stems will increase in height as the days get longer in early spring. Careful monitoring of watering, proper temperature management and good ventilation are the tools needed to produce a healthy plant.

Bulking/Flower Initiation

Optimum conditions during the vegetative period, beginning at transplant, needed for the root to reach the edge of the container; AND to make the plant receptive to flower initiation.

Media

Select a porous media that drains well. This is important during the cool season when temperatures and light levels are low, and media is slow to dry.

pH: 6.0-6.5

EC: 0.5-1.0

Light

Ranunculus initiates the highest flower count and the best growth under the natural days for spring production. Day length extension in combination with high light will promote earlier flowering.

Temperature

After transplanting, maintain 58°-62°F (14°-16°C) for 2 weeks or until the roots are well developed and foliage has reached the edges of pots.

Once established:

Night: 40°-50°F (5°-10°C)

Day: 50°-60°F (10°-15°C)

Temperatures above 68°F (20°C) may reduce vegetative growth, increase stem length and speed up flowering. High temperatures in combination with long days will stimulate corm formation or promote leaf yellowing.

Moisture

Alternate between moisture levels wet (4) and medium (2). Allow media to approach level (2) before re-saturating to level (4). It is critical to water early in the day to allow foliage to dry quickly before nightfall. Rapid drying of the foliage will discourage disease outbreaks. Avoid overhead watering. Cool temperatures and wet foliage may promote Botrytis infections. Yellow leaves are indicative of drought water stress conditions.

Humidity

40-70%. Provide horizontal airflow to aid in drying down the media through evapotranspiration, allowing better penetration of oxygen to the roots.

Fertilizers

Ranunculus is a moderate to heavy feeder. Once plants are established, constant liquid feed at an EC rate of 1.5 with a calcium-based fertilizer (14-4-14). After flower buds are visible, apply an extra fertilization of potassium nitrate at an EC rate of 2.0-2.4 every 2 weeks. During cool weather production, ammonium based feeds (20-10-20) may encourage root rot problems and stretching to occur.

Common Diseases

Pythium Root Rot, Botrytis,Tomato Spotted Wilt Virus

Common Pests

Aphids, Whitefly, Leafminer, Thrips, Fungus Gnats

Scheduling

Ranunculus is traditionally sown in August/September for January/February sales. Additional crops can be sown in September/October for March/April sales.

Crop Time

Transplant to Finish

4 inch crop: 12-15 weeks

6 inch crop: 13-16 weeks

Product Use

Pots, containers, mass plantings, gift item, garden cut flowers.

ROSE
SUNROSA®

Information courtesy of Suntory Flowers

Potting

Transplant the plug into a 2-gallon pot in well-drained soil. Water at the base of the cutting and keep the foliage dry.

Water

Maintain a good watering routine but do not leave the plants in standing water.

Fertilizer

Fertilize when potted and maintain ongoing fertilizer program for roses.

Light

Grow in full sun for best results.

Temperature

Optimum temperatures are 55-65 °F at night and 70-80 °F days. Maintain good air circulation throughout the production area.

Pruning

For best results, keep plants well trimmed, starting about 4-6 weeks after transplant.

Finish Time

4" pot: 1 pinch = 8 wks growing time

6" pot: 2 pinches = 12 wks growing time

8" pot: 3 pinches = 18 wks growing time

Disease & Pests

In trials, Sunrosa® varieties have been resistant to mildew, downy mildew and blackspot. Monitoring for possible pests and diseases is recommended.

Growth Regulators

No growth regulator is needed. Sunrosa® is naturally compact.

Recommended Applications

Would recommend applications of some type of root enhancers such as Bacillus, kelp extract, biochars, or rootshield plus–does not matter which one, they all seem to enhance root growth.

SEED
GERANIUMS

See Geraniums - Seed for culture information.

SUNPATIENS®

Information courtesy of Sakata

Habit

Upright

Temperature

68°F (20°C) avg.

Timing

8-10 weeks

General

Sunpatiens® do not grow like regular impatiens. They provide the opportunity to shorten production time.

They perform best with an aggressive grow schedule, more light, warm temperatures, and early spacing.

Application

Quart (Compact series)

1 Gallon (All series)

Hanging Baskets (All series)

Transplant as soon as they are ready. Liners will stretch if left in propagation trays which can result in poor basal branching of the finished product!

Media

Mix: Sterile, well-aerated mixes are best.

pH range: Optimum pH range is between 5.8 and 6.2.

Water-Holding Capacity: Consider that the water holding capacity that is best for consumer performance may be greater than what is ideal for production.

Water Quality/Irrigation

EC: below 1.0 mmhos is best. Avoid excess irrigation when plants are young. Maintain even soil moisture once plants are established.

Irrigation: Allow slight wilt between waterings: too much water will result in tall, leggy plants. Use tepid (not cold) water.

Fertilization

Feed with balanced fertilizers at 65-100 ppm N (CLF). E.C. of 0.5 - 0.75. Avoid fertilizers high in ammoniacal nitrogen.

Slow-Release: Use of Osmocote® products, such as 18-6-12, or other appropriate slow-release fertilizers, may be beneficial in supplementing a CLF program and may provide improved performance for the consumer.

Clear Water: Provide periodic clear water applications if excess soluble salts are detected.

Temperature and Humidity

Sunpatiens® grow well under a wide range of temperatures, but will grow fastest when temperatures are warm. Establish crop at an average temperature of 68-70°F (20-21°C) for 10-14 days. Once established, grow at at least 55°F. Avoid wide temperature fluctuations.

Air Circulation: Provide good air circulation at all times.

Relative Humidity: Maintain relative humidity below 70% to help prevent diseases like Botrytis gray mold.

Light

Establish and grow SunPatiens with as much light as possible.

Avoid hanging plants above the crop which shade and drip on the SunPatiens.

Provide light shade only if light intensities result in greenhouse temperatures above 85°F/29°C.

Establishing Phase: 3,000 foot candles of light is ideal during the establishing phase.

Once established, increase light levels to 5,000+ foot candles (53,800+ lux) if possible.

Low Light Conditions: SunPatiens can be finished under low light conditions, but the number of flowers will be reduced and internode stretch will be increased.

Outdoors: Sunpatiens® can also be produced outdoors under full sun, but be careful to acclimate them to the higher light environment to avoid leaf scorch. One week at 5,000 fc is sufficient before moving them to full sun.

Pinching

In general, pinching is not recommended for Sunpatiens®. Pinching may delay flowering by 1-2 weeks and often results in a low, horizontal branching pattern.

Height Control & PGRs

Adequate spacing between plants, careful moisture management, and high light levels are the best way to control stretch on Sunpatiens®.

If needed, Sunpatiens® respond well to A-Rest and B-Nine.

Discontinue all plant growth regulators 2-3 weeks prior to finish. Late applications will distort and possibly abort flower buds.

Spacing

Plants can be established pot-tight but should be spaced once foliage touches. Do not delay spacing, as Sunpatiens® tend to stretch rapidly in response to competition for light!

6" or 1 gal. pots should be provided a minimum of 10-12" centers (approximately 0.75 per sq. ft.).

8" pots should be spaced at 12-14" centers.

10" pots should be spaced at 14-16" centers.

Insects

Aphids, Caterpillars, Fungus Gnats, Thrips, Japanese Beetles

Diseases

Bacterial Leaf Spotting, Viruses, Botrytis, Root and Stem Rots

Crop Scheduling From Transplant

Size	Per Pot	Early Spring	Spring
1 gal (2.6 qt)	1 liner	10 weeks	10 weeks
Hang. Basket	3 liners	10 weeks	8 weeks
Hang. Basket	1 liner	12 weeks	10 weeks
Quarts	1 liner	10 weeks	8 weeks

Crop time is reduced under warmer growing conditions.

VINCA

Information courtesy of Ron Adams, Syngenta & Ball Horticultural

General

This plant loves heat and light, and low to medium fertilizer levels.

Media

Use a well-drained, disease-free, soilless medium with a pH of 5.2 to 5.8 and a medium initial nutrient charge.

Light

Keep light levels between 3,000 and 5,000 fc (30,000 to 50,000 lux). Shade when the light levels are above 5,000 fc (50,000 lux). Supplemental lighting under low light conditions will help flower development.

Temperature

Night: 70 to 74°F (21 to 23°C) Do not allow night temperatures to go below 65°F.

Day: 80 to 85°F (27 to 29°C) or above

Watering

Maintain moderate moisture. A little wilting usually does not cause problems, but avoid repeated, heavy wilting. Water in the morning, to allow the foliage to dry before nightfall. Prolonged periods where the soil or leaves are wet will encourage diseases. Clear water periodically to eliminate any salt build-up in the soil.

Fertilizer

Constant feed with 100-150 ppm N with a balanced, complete fertilizer, or feed weekly 200-300 ppm N with a balanced, complete fertilizer. Maintain soil pH between 5.5 and 6.0. Do not overfeed.

Growth Regulators

Use one. Always follow the product label.

B-Nine: 2,500-5,000 ppm spray (0.39 to 0.79 oz/gal)

A-Rest: 8-10 ppm spray (3.9 to 4.8 fl oz/gal)

Bonzi, Piccolo or Paczol will cause black, disease-like spots on the foliage.

Common Pests

Thrips, Aphids, Fungus Gnats

Diseases & Fungicides

Always follow the label.

Pythium Root Rot-Soil Drench with Subdue MAXX or Hurricane

Rhizoctonia-Heavy Spray or light soil drench with Hurricane, Spectro or Terraclor

Thelaviopsis-Soil drench with Terraguard, Medallion or Cleary's 3336

Botrytis-Foliar spray with Daconil, Decree, Dithane, Endorse or Chipco Daconil. Can burn flowers.

Most Common Mistakes

Too cool growing temperature is the most commonly repeated mistake with vinca, followed by periods of prolonged wetness. Another mistake can be overfeeding young plants (high salts).

Spacing

4 inch pots - Can be grown pot-tight

6 inch pots - 4 to 6 inches between pots

8 inch pots - 6 to 8 inches between pots

General Crop Scheduling Guidelines

From a 512 plug size

Size	Crop Time	Plugs/Pot
Pack	6-8 wks to finish	N/A
4" Pot	7-9 wks to finish	3-4 plugs
6" Pot	8-10 wks to finish	5-6 plugs
8" Pot	8-10 wks to finish	6-8 plugs

From a 288 plug size

Size	Crop Time	Plugs/Pot
Pack	5-7 wks to finish	N/A
4" Pot	6-8 wks to finish	2-3 plugs
6" Pot	7-9 wks to finish	4-5 plugs
8" Pot	7-9 wks to finish	5-6 plugs

From a 144 plug size

Size	Crop Time	Plugs/Pot
4" Pot	6-8 wks to finish	1 plug
6" Pot	7-9 wks to finish	3-4 plugs
8" Pot	7-9 wks to finish	4-6 plugs

ZINNIA
ELEGANS

Information courtesy of Syngenta

Transplanting

Do not hold plugs before transplanting. Rootbound plugs do not root out or grow out well.

Media

Use a well-drained, disease-free, soilless medium with a pH of 5.8 to 6.2 and a medium initial nutrient charge.

Light

Do not shade Zinnias. High light will improve crop quality (6,000 fc or higher). Supplemental light in low light conditions will help improve flower development.

Temperature

Night: 60 to 65°F (15 to 18°C)

Day: 70 to 85°F (21 to 29°C)

Watering

After the plug has begun to root out, allow soil to dry down well between waterings. Water in the morning, to allow the foliage to dry before nightfall. Prolonged periods where the soil or leaves are wet will encourage diseases.

Fertilizer

Constant feed with 50 to 100 ppm N with a calcium-based fertilizer (13-2-13 or 14-4-14), or feed weekly with 200 ppm N with a calcium-based fertilizer (13-2-13 or 14-4-14). Alternate waterings with clear water and 100 ppm N will help with growth control.

Growth Regulators

Use one. Always follow the label.

B-Nine - 2,500 to 5,000 ppm spray (0.39 to 0.79 oz/gal)

Bonzi/Piccolo/Paczol - 15 to 45 ppm spray (0.32 to 0.96 fl oz/gal)

B-Nine + **Cycocel** - 2,500 ppm (0.39 oz/gal) + 1,000 ppm Cycocel (1.08 fl oz/gal) applied as a tank-mix spray

Spacing

4" pot: 2 to 4 inches between pots.

6" inch pot: 4 to 6 inches between pots.

Diseases/Recommended Fungicides

Always follow the label. Zinnias are prone to leaf spots and a number of diseases, and should be put on a regular fungicide program. Below are some recommendations.

Every 10 to 14 days, apply a fungicide rotating the following groups. Use one.

Heritage, Insignia, Compass-O, or Cygnus

Phyton 27 (not recommended for product with flowers)

Daconil (not recommended for product with flowers)

Dithane, Fore, or Protect

Eagle or Banner MAXX

Powdery Mildew - Foliar Spray with Compas-O, Cygnus, Heritage or Phyton 27

Botrytis Blight - Foliar Spray with Dithane, Daconil, Decree, or Endorse

Bacterial Leaf Spot - Foliar Spray with Phyton 27 or Kocide

Alternaria Leaf Spot - Foliar Spray with Chipco, Heritage, Systhane or Terraguard

Common Pests

Aphids, Whitefly, Thrips

Scheduling Guidelines

From a 512 plug size

Size	Crop Time	Plugs/Pot
Pack	6-8 wks	N/A
4" Pot	7-9 wks	2-3 plugs
6" Pot	7-9 wks	4-5 plugs
8" Pot	7-9 wks	4-5 plugs

From a 288 plug size

Size	Crop Time	Plugs/Pot
Pack	5-7 wks	N/A
4" Pot	6-8 wks	1 plug
6" Pot	6-8 wks	3-4 plugs
8" Pot	6-8 wks	4-5 plugs

From a 144 plug size

Size	Crop Time	Plugs/Pot
4" Pot	5-6 wks	1 plug
6" Pot	6-8 wks	2-3 plugs
8" Pot	6-8 wks	3-4 plugs

ZINNIA
(OTHER)

Information courtesy of Syngenta

Transplanting

Do not hold plugs before transplanting. Rootbound plugs do not root out or grow out well.

Media

Use a well-drained, disease-free, soilless medium with a pH of 5.8 to 6.2 and a medium initial nutrient charge.

Light

Do not shade Zinnias. High light will improve crop quality (6,000 fc or higher). Supplemental light in low light conditions will help improve flower development.

Temperature

Night: 60 to 65°F (15 to 18°C)

Day: 70 to 85°F (21 to 29°C)

Does not do well in cold, wet conditions.

Watering

After the plug has begun to root out, allow soil to dry down well between waterings. Water in the morning, to allow the foliage to dry before nightfall. Prolonged periods where the soil or leaves are wet will encourage diseases and leaf spots.

Fertilizer

Constant feed with 50 to 100 ppm N with a calcium-based fertilizer (13-2-13 or 14-4-14), or feed weekly with 200 ppm N with a calcium-based fertilizer (13-2-13 or 14-4-14). Alternate waterings with clear water and 100 ppm N will help with growth control.

Regulators

Use one. Always follow the label.

B-Nine - 2,500 to 5,000 ppm spray (0.39 to 0.79 oz/gal)

Bonzi/Piccolo/Paczol - 10 to 30 ppm spray (0.32 to 0.96 fl oz/gal)

B-Nine + Cycocel - 2,500 ppm (0.39 oz/gal) + 1,000 ppm Cycocel (1.08 fl oz/gal) applied as a tank-mix spray

Spacing

4 inch pots: 2 to 4 inches between pots.

6 inch pots: 4 to 6 inches between pots.

Diseases & Fungicides

Always follow the label. Zinnias are prone to leaf spots and a number of diseases, and should be put on a regular fungicide program. Below are some recommendations.

Every 10 to 14 days, apply a fungicide rotating the following groups. Use one.

Heritage, Insignia, Compass-O, or Cygnus

Phyton 27 (not recommended for product with flowers)

Daconil (not recommended for product with flowers)

Dithane, Fore, or Protect

Eagle or Banner MAXX

Powdery Mildew - Foliar Spray with Compas-O, Cygnus, Heritage or Phyton 27

Botrytis Blight - Foliar Spray with Dithane, Daconil, Decree, or Endorse

Bacterial Leaf Spot - Foliar Spray with Phyton 27 or Kocide

Common Pests

Aphids, Whitefly, Thrips, Mites

Crop Scheduling Guidelines

From a 512 plug size

Size	Crop Time	Plugs/Pot
Pack	5-7 wks to finish	1 plug

From a 288 plug size

Size	Crop Time	Plugs/Pot
Pack	4-6 wks to finish	1 plug
4" Pot	5-7 wks to finish	1 plug

From a 144 plug size

Size	Crop Time	Plugs/Pot
4" Pot	4-6 wks to finish	1 plug
6" Pot	5-7 wks to finish	2-3 plugs
8" Pot	5-7 wks to finish	3-4 plugs

OLYMPIA FARM

GUILFORD, CT

I want to say thank you to the Jolly Farmer team. Your level of service is excellent, and the quality of your plants is simply fantastic. And your packaging is great! In spite of the independent carrier's best effort to destroy one box, I lost only 1 plant! I will never make you guys rich, but I will only buy young plants from Jolly Farmer. Thanks again!

ITALIAN GARDEN SEEDS

ALLISTION, ON

I am extremely happy with the quality and vigor of your plants, as well as the quick delivery and economical pricing. I can tell you that this is the beginning of a great relationship with Jolly Farmer! With the variety of products that you offer, we will be placing more orders in the future!