Cool Wave® Pansies Production Handbook

COOL wave® PANSIES

Spring Production

Fall Production

Spring Cool Wave Production

SPRING PROPAGATION KEY TIPS

1. USE THE RIGHT PLUG SIZE

Cool Wave plants develop lateral branches faster in larger plug sizes, spreading faster and filling out your baskets and containers more quickly. Smaller plug sizes restrict the plant growth and increase crop time. *Plug sizes smaller than 288 are not recommended.*

288 plug (left) and 128 plug (right) sown on the same day. Lateral branches develop and spread faster in larger plugs such as a 128.

Cool Wave baskets at 4 weeks (top) and at 6 weeks (bottom) after transplant. In each photo: left basket was started with standard 288 plugs and right basket was started with 128 plugs.

2. WORK WITH A YOUNGER 288 PLUG

Cool Wave plugs sown on the same date will spread, flower and finish significantly faster when using a larger plug or a younger 288 plug. *Using a younger 288 plug only 3 to 3.5 weeks old (about 2.5 to 3-leaf stage) finishes faster, saving 10 to 14 days crop time.*

Younger 288 plug (left) versus a standard 288 plug (right).

Cool Wave pansies 4 weeks after transplant. Left: 5-week-old standard 288 plug; center: 3.5-week-old younger 288 plug; right: 5-week-old 128 plug.

3. START WITH LOWER PGR RATES

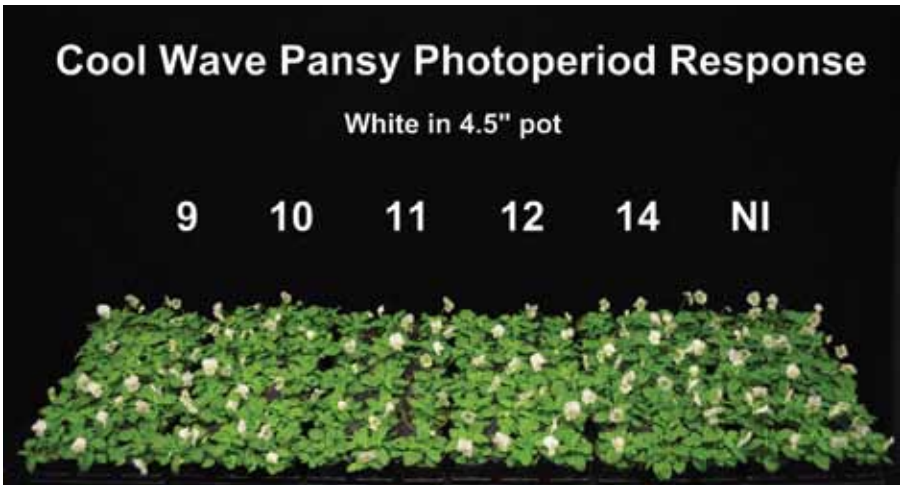
Compared with standard pansies, Cool Wave plants require fewer PGRs in the plug stage. Under ideal conditions, no PGRs are required. *This ensures that the spreading habit isn't delayed or stunted.*

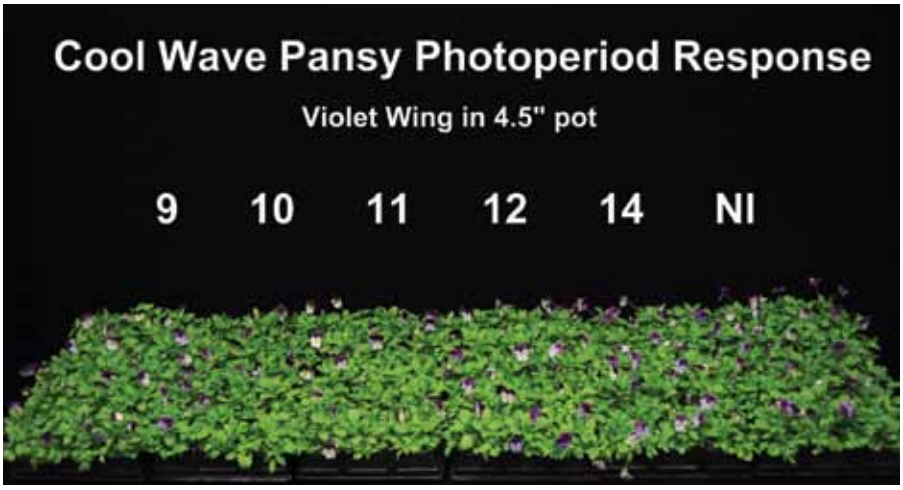
Plants treated with ancymidol (A-Rest) 5 ppm at Weeks 2 and 4. Not all varieties respond uniformly to ancymidol.

Plants treated with daminozide (B-Nine) 2,500 ppm/chlormequat (Cycocel) 500 ppm at Week 3. This treatment is recommended for uniform responsiveness across varieties with good control.

4. COOL WAVE PANSIES HAVE VERY MINIMAL RESPONSE TO CHANGES IN DAYLENGTH

There is no difference in the days to flower for Cool Wave Golden Yellow, Frost or White when growing under different daylengths. Cool Wave Yellow, Violet Wing and Purple showed to be slightly later (2 to 3 days) under 9 hours when compared with 14-hour daylength.





COOL WAVE SPRING PLUG PRODUCTION

Media: pH 5.4 to 5.8, phosphorus as low as possible to avoid initial stretch

Sowing: medium cover of coarse-grade vermiculite to maintain humidity

Plug Tray Size: 105-cell or similar, 288-cell. *Smaller than 288-cell is not recommended.*

Germination: 2 to 3 days

PGRS:

• Cool Wave pansies require less PGRs than standard pansies in the plug stage.

• If needed, apply foliage spray once when first set of true leaves is fully open – daminozide (B-Nine/Alar) 2,500 ppm (3.0g/l 85% formulation or 4.0g/l 65% formulation) & chlormequat (Cycocel) 300 to 500 ppm (2.5 to 4.2 ml/l 11.8% formulation or 0.4 to 0.7ml/l 75% formulation).

	Stage 1	Stage 2	Stage 3	Stage 4
Temperature	Germination: 65-70°F/18-21°C	65-72°F/18-22°C	65-70°F/18-21°C	62-67°F/16-19°C
Light	Not required	Up to 2,500 fc (26,900 Lux)	Up to 2,500 fc (26,900 Lux)	Up to 5,000 fc (53,800 Lux)
Media Moisture	Level 4	Level 3-4	Level 3	Level 3
Relative Humidity	95-97%	–	–	–
Fertilizer	–	Less than 100 ppm N/Less than 0.7 mS/cm EC of nitrate-form, low phosphorus	Increase rate to 100-175 ppm N/0.7-1.2 mS/cm EC; maintain media pH 5.4-5.8 and EC 0.7-1.0 mS/cm	Maintain rate at 100-175 ppm N/0.7-1.2 mS/cm EC; maintain media pH 5.4-5.8 and EC 0.7-1.0 mS/cm

SPRING FINISHED PRODUCTION KEY TIPS

1. USE FEWER PLANTS PER BASKET

Less is more! Cool Wave pansies are easy to produce with fewer plants per basket than standard pansies.

Cool Wave baskets 6 weeks after transplant: (Left) recommended planting with 3 plugs per basket and (right) overcrowded planting with 7 plugs per basket, showing undesirable upright growth and stretch.

2. PGRS ARE RARELY NEEDED IN SPRING FINISHED PRODUCTION

If needed, use light applications of daminozide (B-Nine/Alar) and chlormequat (Cycocel) tank mix foliar spray.

3. FEED YOUR COOL WAVE PANSIES

Cool Wave pansies build plant mass. *Heavier feeding is required through finishing.*
Low feed can cause chlorosis, purple foliage and small flowers.

4. APPLY TOP DRESSING FERTILIZER

Top dressing fertilizer will maintain plant quality in-store and for the consumer.

Cool Wave Golden Yellow baskets 4 weeks after production ship date: (Left) control basket shows purpling and chlorosis on foliage and (right) basket with slow-release fertilizer shows healthy foliage and quality blooms.

SPRING CROP SCHEDULING

CROP SCHEDULING FROM LARGER CELL PLUG 105, 128, 144, ETC.*

Container	Plugs per pot/cell	Weeks from transplant to finish**
4.5-in./10.5-cm, Quart	1	6 to 7
6-in./15-cm, Gallon	1	7 to 8
10-in./25-cm basket	3	8 to 9
12-in./30-cm basket	4	8 to 10

* Cool Wave pansies benefit from a larger size plug. Larger plugs promote quicker growth and allow the laterals to initiate and spread in the plug stage, saving time in the finished crop.

** Spring crop time varies depending on temperatures used. If grown frost-free, plan longer crop times.

CROP SCHEDULING FROM 288 PLUG OR SIMILAR SIZE.*

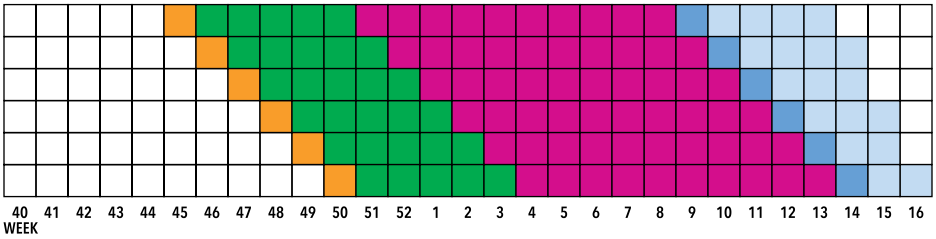
Container	Plugs per pot/cell	Weeks from transplant to finish
306 pack (or equivalent)	1	6 to 7
4.5-in./10.5-cm, Quart	1	6 to 7
6-in./15-cm, Gallon	1	8 to 9
6-in./15-cm, Gallon	3	6 to 7
10-in./25-cm basket	4	9 to 10
12-in./30-cm basket	5	9 to 11

* Cool Wave pansies can be produced from 288 or similar plugs; however, the larger plug size will promote stronger lateral growth and quicker finish with more flowers. Smaller plug sizes restrict the plant growth and increase crop time.

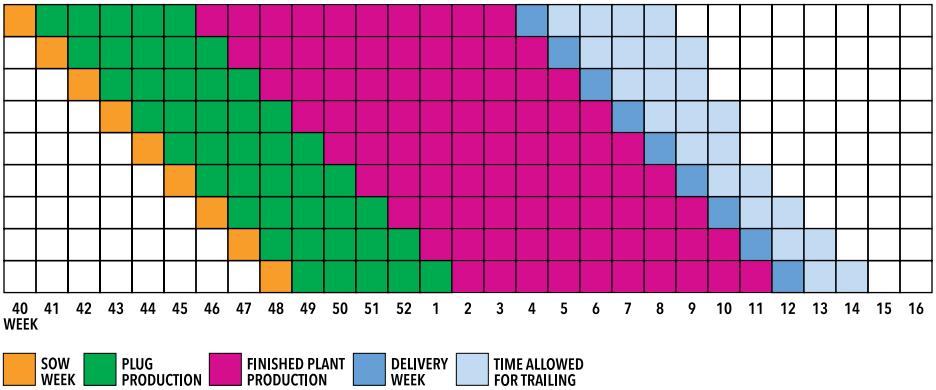
** Spring crop time varies depending on temperatures used. If grown frost-free, plan longer crop times.

SPRING PRODUCTION WEEK CALENDARS FOR BASKETS USING LARGE PLUGS

NORTHERN CLIMATE (SPRING PRODUCTION)



SOUTHERN CLIMATE (SPRING PRODUCTION)



Note 1: If using a younger 288 plug, plan the same overall crop time, with 1.5 weeks less in plug production and 1.5 week longer in finished plant production in this chart.

Note 2: If using a standard 288 plug, plan up to 2 weeks longer finished plant production in this chart.

SPRING TROUBLESHOOTING

What you see: *Light green/chlorotic or purpling foliage*

Problem: Cool Wave plants are lacking appropriate nutrition.

- Inappropriate fertilizer
- Inappropriate pH
- Poor root development from disease

Solutions:

- Test soil EC, pH. If the roots do not look healthy, also test for presences of disease in plant tissues.
- Depending on test results, take corrective measures for EC and pH. We recommend EC at 1.25 to 1.5 mS/cm and pH at 5.4 to 5.8.
- If a disease is identified, use label-appropriate chemicals depending on pathogen involved.

What you see: *White growth on surface of leaves*

Problem: Powdery Mildew

- High powdery mildew pressure
- Plant stressed by inadequate feed can develop powdery mildew easier.

Solutions:

- Scout for presence of this disease.
- Use preventative and corrective sprays for powdery mildew.
- Increase airflow.
- Morning watering is recommended; use fans to dry the foliage and avoid water on the foliage overnight.

Grower Facts

COOL WAVE SPRING PRODUCTION

Viola x wittrockiana

Approximate seed count: 21,200-32,600 S/oz. (750-1,150 S/g)

PLUG PRODUCTION

Media

Use a well-drained, disease-free media. A pH range of 5.4 to 5.8 and EC less than 0.75 mmhos/cm (2:1 extraction) is recommended. Keep the phosphorus level as low as possible to avoid initial stretch.

SOWING

Plug Tray Size

Can be produced in a 288-cell or 128-cell size tray (105, 128, 144 or equivalent) with 1 seed per cell. The larger size of 128-cell will promote stronger lateral growth and quicker finish, with more flowers. Smaller plug sizes restrict the plant growth and increase the crop time; we do not recommend plug sizes smaller than 288.

A medium covering of coarse-grade vermiculite is recommended at sowing to help maintain humidity around the germinating seed for better germination performance.

Stage 1 – Germination takes approximately 2 to 3 days.

Germination temperature: 65 to 70°F (18 to 21°C)

Light: Light is not required for germination.

Moisture: Keep soil wet (level 4) during Stage 1.

Relative humidity: Maintain 95 to 97% relative humidity until cotyledons emerge.

Stage 2

Temperature: 65 to 72°F (18 to 22°C) days; 60°F (16°C) nights

Light: Can be up to 2,500 f.c. (26,900 Lux).

Media moisture: Keep the media medium (level 3) to medium wet (level 4).

Fertilizer: Apply fertilizer at rate 1 (less than 100 ppm N/ less than 0.7 mS/cm EC) with a nitrate-form fertilizer with low phosphorous.

Stage 3

Temperature: 65 to 70°F (18 to 21°C) days; 60°F (16°C) nights

Light: Can be up to 2,500 f.c. (26,900 Lux).

Media moisture: Keep the media medium wet (level 3) during Stages 3 and 4.

Fertilizer: Increase the fertilizer rate to 2 (100 to 175 ppm N/0.7 to 1.2 mS/cm EC). Maintain a media pH of 5.4 to 5.8 and EC at 0.7 to 1.0 mS/cm (1:2 extraction). A higher pH (greater than 6.2) can induce Boron deficiency.

Stage 4

Temperature: 62 to 67°F (16 to 19°C) days; 55°F (12°C) nights

Light: Light levels can be up to 5,000 f.c. (53,800 Lux) if temperatures can be maintained.

Fertilizer: Same as Stage 3.

Plant Growth Regulators

When compared to standard pansies, Cool Wave pansies require fewer PGRs, or under ideal conditions they require no PGRs, in the plug stage. This is to ensure that the spreading habit isn't delayed or stunted.

If needed, treat with a foliage spray of daminozide (B-Nine/Alar) 2,500 ppm (3.0 g/l 85% formulation or 4.0 g/l of 64% formulation) and chlormequat (Cycocel) 300 to 500 ppm (2.5 to 4.2 ml/l 11.8% formulation or 0.4 to 0.7 ml/l 75% formulation), applied once when the first set of true leaves is fully open.

Note: Some varieties are more sensitive than others to ancymidol (A-Rest); you may notice less uniformity between varieties if using ancymidol (A-Rest) in plug production.

Transplant the plugs "on time" to avoid flower bud initiation in the plug stage.

GROWING ON TO FINISH

Container Size: 306 packs, 4.5-in. (10.5-cm) pots, quarts, 6-in. (15-cm), and 10 to 12-in. (25 to 30-cm) or similar size hanging baskets.

Media

Use a well-drained, disease-free media with a pH of 5.4 to 5.8 and a medium initial nutrient charge.

Temperature

Night: 45 to 55°F (7 to 12°C)

Day: 62 to 70°F (16 to 21°C)

For a faster finish and to increase spread which is particularly important for Spring production, grow in a warmer zone for 2 weeks after transplant at 55 (12°C) night temperature. This will encourage quicker spread.

Light

Keep light levels as high as possible while maintaining appropriate temperatures.

Fertilizer

Starting a week after transplant, apply nitrate-form with low phosphorus fertilizer once a week at rate 3 (175 to 225 ppm N/1.2 to 1.5 mS/cm EC).

For constant feed programs, apply fertilizer at 125 ppm N/1.0 mS/cm using predominantly nitrate-form fertilizer with low phosphorus. If needed, alternate with a balanced ammonium and nitrate-form fertilizer to encourage growth and balance the media pH. Maintain the media EC at 1.25 to 1.5 mS/cm and pH at 5.4 to 5.8. If the media pH is greater than 6.2, take corrective measures.

Because Cool Wave pansies are vigorous and spreading, they require more fertilizer to maintain good flowering in the landscape and for consumers. It is recommended to use slow release fertilizer such as Osmocote 15-9-12 at low to medium rate as a top dressing before shipping.

Irrigation

Maintain optimal media moisture, i.e. not too wet or not too dry.

Plant Growth Regulators

Since this is a spreading type pansy and mostly grown in larger containers such as hanging baskets, minimal to no plant growth regulators are needed.

If needed, you can use tank mix foliar sprays of daminozide (B-Nine/Alar) at 5,000 ppm (5.9 g/l of 85% formulation or 7.8 g/l of 64% formulation) and chlormequat (Cycocel) at 500 ppm (4.3 ml/l of 11.8% formulation or 0.7 ml/l of 75% formulation) to control plant growth.

Pinching

Pinching is not recommended.

Crop Scheduling

Sow to transplant:

Winter/Spring: It takes approximately 5.5 weeks to finish a 128 cell plug. It takes approximately 4 weeks to finish a 288 cell plug.

At 4 weeks, you may not get fully rooted plugs but this younger plug will finish substantially faster for the finished grower. At 5 or more weeks, Cool Wave may become rootbound and check the growth in a 288 plug.

Transplant to finish:

Note: Overcrowding plugs can result in a more mounded basket that will not trail over the sides as much.

Common Problems

Insects: Check/monitor for fungus gnats and shore flies during plug production and for aphids after transplant.

Diseases: Damping-off and black root rot.

Regular scouting for powdery mildew and preventative measures are recommended.

Note: Growers should use the information presented here as a starting point. Crop times will vary depending on the climate, location, time of year, and greenhouse environmental conditions. Chemical and PGR recommendations are only guidelines. It is the responsibility of the applicator to read and follow all the current label directions for the specific chemical being used in accordance with all regulations.

Cool Wave Spring basket timing from transplant of large plug to finish: (left to right) 2 weeks, 5 weeks, 8 weeks. Top photo: Golden Yellow, bottom photo: Violet Wing.

CROP SCHEDULING FROM LARGER CELL PLUG 105, 128, 144, ETC.

Container	Plugs per pot/cell	Weeks from transplant to finish*
4.5-in./10.5-cm, Quart	1	6 to 7
6-in./15-cm, Gallon	1	7 to 8
10-in./25-cm basket	3	8 to 9
12-in./30-cm basket	4	8 to 10

* Spring crop time varies depending on temperatures used. If grown frost-free, plan longer crop times.

CROP SCHEDULING FROM 288 PLUG OR SIMILAR SIZE

Container	Plugs per pot/cell	Weeks from transplant to finish*
306 pack (or equivalent)	1	6 to 7
4.5-in./10.5-cm, Quart	1	6 to 7
6-in./15-cm, Gallon	1	8 to 9
6-in./15-cm, Gallon	3	6 to 7
10-in./25-cm basket	4	9 to 10
12-in./30-cm basket	5	9 to 11

* Spring crop time varies depending on temperatures used. If grown frost-free, plan longer crop times.

Fall Cool Wave Production

FALL PROPAGATION KEY TIPS

1. USE THE RIGHT PLUG SIZE

Cool Wave plants develop lateral branches faster in larger plug sizes, spreading faster and filling out your baskets and containers more quickly. Smaller plug sizes restrict the plant growth and increase crop time. *Plug sizes smaller than 288 are not recommended.*

288 plug (left) and 128 plug (right) sown on the same day. Lateral branches develop and spread faster in larger plugs such as a 128.

Cool Wave baskets at 4 weeks (top) and at 6 weeks (bottom) after transplant. In each photo: left basket was started with standard 288 plugs and right basket was started with 128 plugs.

2. WORK WITH A YOUNGER 288 PLUG

Cool Wave plugs sown on the same date will spread, flower and finish significantly faster when using a larger plug or a younger 288 plug. *Using a younger 288 plug only 3 to 3.5 weeks old (about 2.5 to 3-leaf stage) finishes faster, saving 10 to 14 days crop time.*

Younger 288 plug (left) versus a standard 288 plug (right).

Cool Wave pansies 4 weeks after transplant. Left: 5 week-old standard 288 plug; center: 3.5-week-old younger 288 plug; right: 5-week-old 128 plug.

3. PGR RATES

Compared with standard pansies, Cool Wave plants require a different PGR regime in the plug stage. *This ensures that the spreading habit isn't delayed or stunted.*

Plants treated with ancymidol (A-Rest) 5 ppm at Weeks 2 and 4. Not all varieties respond uniformly to ancymidol.

Plants treated with daminozide (B-Nine) 2,500 ppm/chlormequat (Cycocel) 500 ppm at Week 3. This treatment is recommended for more uniform responsiveness across varieties with good control.

COOL WAVE FALL PLUG PRODUCTION

Media: pH 5.4 to 5.8, phosphorus as low as possible to avoid initial stretch

Sowing: medium cover of coarse-grade vermiculite to maintain humidity

Plug Tray Size: 105-cell or similar, 288-cell. *Smaller than 288-cell is not recommended.*

Germination: 2 to 3 days

PGRS:

• Cool Wave pansies require less PGRs than standard pansies in the plug stage.

• Apply foliage spray once when first set of true leaves is fully open – daminozide (B-Nine/Alar) 2,500 ppm (3.0g/l 85% formulation or 4.0g/l 65% formulation) & chlormequat (Cycocel) 500 ppm (4.2 ml/l 11.8% formulation or 0.7ml/l 75% formulation).

	Stage 1	Stage 2	Stage 3	Stage 4
Temperature	Germination: 65-70°F/18-21°C	65-72°F/18-22°C	65-70°F/18-21°C	62-67°F/16-19°C
Light	Not required	Up to 2,500 fc (26,900 Lux)	Up to 2,500 fc (26,900 Lux)	Up to 5,000 fc (53,800 Lux)
Media Moisture	Level 4	Level 3-4	Level 3	Level 3
Relative Humidity	95-97%	–	–	–
Fertilizer	–	Less than 100 ppm N/Less than 0.7 mS/cm EC of nitrate-form, low phosphorus	Increase rate to 100-175 ppm N/0.7-1.2 mS/cm EC; maintain media pH 5.4-5.8 and EC 0.7-1.0 mS/cm	Maintain rate at 100-175 ppm N/0.7-1.2 mS/cm EC; maintain media pH 5.4-5.8 and EC 0.7-1.0 mS/cm

FALL FINISHED PRODUCTION KEY TIPS

1. USE FEWER PLANTS PER BASKET

Less is more! Cool Wave pansies are easy to produce with fewer plants per basket than standard pansies.

Cool Wave baskets 6 weeks after transplant: (Left) recommended planting with 3 plugs per basket and (right) overcrowded planting with 7 plugs per basket, showing undesirable upright growth and stretch.

FALL FINISHED PRODUCTION KEY TIPS (CONTINUED)

2. PGR RATES

PGR applications are needed during Summer production for improved look and shelf life. In 6-in. (15-cm) or smaller pots, use a weekly treatment of daminozide (B-Nine/Alar) 5,000 ppm and chlormequat (Cycocel) 500 ppm tank mix foliage spray. You can skip a few treatments for larger containers and hanging baskets. To improve the look and retail shelf life, finish with a light rate paclobutrazol (Bonzi) drench.

Paclobutrazol (Bonzi) drench in Summer production: (Left) Bonzi drench at 0.125 ppm keeps blooms closer to the foliage for neater presentation and (right) B-Nine/Cycocel in the last application produces stretching with smaller blooms.

3. FEED YOUR COOL WAVE PANSIES

Cool Wave pansies build plant mass. *Heavier feeding is required through finishing.*
Low feed can cause chlorosis, purple foliage and small flowers.

4. APPLY TOP DRESSING FERTILIZER

Top dressing fertilizer will maintain plant quality in-store and for the consumer.

Cool Wave Golden Yellow baskets 4 weeks after production ship date: (Left) control basket shows purpling and chlorosis on foliage and (right) basket with slow-release fertilizer shows healthy foliage and quality blooms.

FALL CROP SCHEDULING

CROP SCHEDULING FROM LARGER CELL PLUG 105, 128, 144, ETC.*

Container	Plugs per pot/cell	Weeks from transplant to finish
4.5-in./10.5-cm, Quart	1	4 to 5
6-in./15-cm, Gallon	1	5 to 6
10-in./25-cm basket	3	6 to 7
12-in./30-cm basket	4	6 to 8

* Cool Wave pansies benefit from a larger size plug. Larger plugs promote quicker growth and allow the laterals to initiate and spread in the plug stage, saving time in the finished crop.

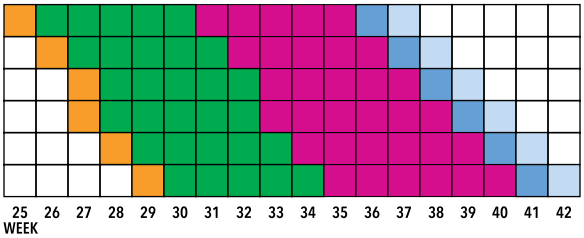
CROP SCHEDULING FROM 288 PLUG OR SIMILAR SIZE*

Container	Plugs per pot/cell	Weeks from transplant to finish
306 pack (or equivalent)	1	4 to 5
4.5-in./10.5-cm, Quart	1	5 to 6
6-in./15-cm, Gallon	1	6 to 7
6-in./15-cm, Gallon	3	5 to 6
10-in./25-cm basket	4	7 to 8
12-in./30-cm basket	5	7 to 9

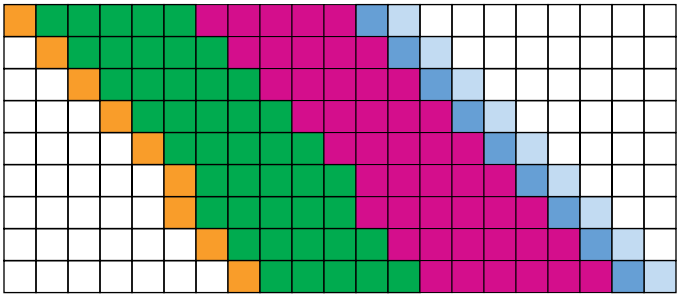
* Cool Wave pansies can be produced from 288 or similar plugs; however, the larger plug size will promote stronger lateral growth and quicker finish with more flowers. Smaller plug sizes restrict the plant growth and increase crop time.

FALL PRODUCTION WEEK CALENDARS FOR BASKETS USING LARGE PLUGS

NORTHERN CLIMATE (FALL PRODUCTION)



SOUTHERN CLIMATE (FALL PRODUCTION)



SOW WEEK | PLUG PRODUCTION | FINISHED PLANT PRODUCTION | DELIVERY WEEK | TIME ALLOWED FOR TRAILING

Note 1: If using a younger 288 plug, plan the same overall crop time, with 1.5 weeks less in plug production and 1.5 week longer in finished plant production in this chart.

Note 2: If using a standard 288 plug, plan up to 2 weeks longer finished plant production in this chart.

FALL TROUBLESHOOTING

What you see: *Light green/chlorotic or purpling foliage*

Problem: Cool Wave plants are lacking appropriate nutrition.
- Inappropriate fertilizer
- Inappropriate pH
- Poor root development from disease

Solutions:
- Test soil EC, pH. If the roots do not look healthy, also test for presence of disease in plant tissues.
- Depending on test results, take corrective measures for EC and pH. We recommend EC at 1.25 to 1.5 mS/cm and pH at 5.4 to 5.8.
- If a disease is identified, use label appropriate chemicals depending on pathogen involved.

What you see: *Plants stretching upright and long peduncles*

Problems:
- Overcrowding in the container
- Warm night temps in Fall production
- Insufficient PGR regime in Fall production

Solutions:
- Use the appropriate number of plants per container. 10-in. (25-cm) baskets should get 3 to 4 plugs and 12-in. (30-cm) baskets should get 4 to 5 plugs (depending on plug size).
- Avoid shipping to retail stores before Week 34 for Fall production.
- For Fall production, we recommend tank mix foliage sprays of daminozide (B-Nine/Alar) at 5,000 ppm and chlormequat (Cycocel) at 500 ppm for packs, 4-in. (10-cm) pots and 6-in. (15-cm) pots. In Spring and for larger containers, the frequency can be reduced. If additional control is needed, a very light rate of paclobutrazol (Bonzi) can be applied as a drench. When plants have reached desired size, apply 0.125 ppm paclobutrazol (Bonzi).

Grower Facts

COOL WAVE FALL PRODUCTION

Viola x wittrockiana

Approximate seed count: 21,200-32,600 S/oz. (750-1,150 S/g)

PLUG PRODUCTION

Media

Use a well-drained, disease-free media. A pH range of 5.4 to 5.8 and EC less than 0.75 mmhos/cm (2:1 extraction) is recommended. Keep the phosphorus level as low as possible to avoid initial stretch.

Sowing

Plug Tray Size

Can be produced in a 288-cell or 128-cell size tray (105, 128, 144 or equivalent) with 1 seed per cell. The larger size of 128-cell will promote stronger lateral growth and quicker finish, with more flowers. Smaller plug sizes restrict the plant growth and increase the crop time; we do not recommend plug sizes smaller than 288.

A medium covering of coarse-grade vermiculite is recommended at sowing to help maintain humidity around the germinating seed for better germination performance.

Stage 1 – Germination takes approximately 2 to 3 days.

Germination temperature: 65 to 70°F (18 to 21°C)

Light: Light is not required for germination.

Moisture: Keep the soil wet (level 4) during Stage 1

Relative humidity: Maintain 95 to 97% relative humidity until cotyledons emerge.

Stage 2

Temperature: 65 to 72°F (18 to 22°C) days;
60°F (16°C) nights

Light: Can be up to 2,500 f.c. (26,900 Lux).

Media moisture: Keep the media medium (level 3) to medium wet (level 4).

Fertilizer: Apply fertilizer at rate 1 (less than 100 ppm N/ less than 0.7 mS/cm EC) with a nitrate-form fertilizer with low phosphorous.

Stage 3

Temperature: 65 to 70°F (18 to 21°C) days;
60°F (16°C) nights

Light: Can be up to 2,500 f.c. (26,900 Lux).

Media moisture: Keep the media medium wet (level 3) during Stages 3 and 4.

Fertilizer: Increase the fertilizer rate to 2 (100 to 175 ppm N/0.7 to 1.2 mS/cm EC). Maintain a media pH of 5.4 to 5.8 and EC at 0.7 to 1.0 mS/cm (1:2 extraction). A higher pH (greater than 6.2) can induce Boron deficiency.

Stage 4

Temperature: 62 to 67°F (16 to 19°C) days;
55°F (12°C) nights
Light: Light levels can be up to 5,000 f.c. (53,800 Lux) if temperatures can be maintained.
Fertilizer: Same as Stage 3.

Plant Growth Regulators

When compared to standard pansies, Cool Wave pansies require fewer PGRs, or under ideal conditions they require no PGRs, in the plug stage. This is to ensure that the spreading habit isn't delayed or stunted.

If needed, treat with a foliage spray of daminozide (B-Nine) 2,500 ppm (3.0 g/l 85% formulation or 4.0 g/l of 64% formulation) and chlormequat (Cycocel) 500 ppm (4.2 ml/l 11.8% formulation or 0.7 ml/l 75% formulation), applied once when the first set of true leaves is fully open.

Note: Some varieties are more sensitive than others to ancymidol (A-Rest); you may notice less uniformity between varieties if using ancymidol (A-Rest) in plug production.

Transplant the plugs "on time" to avoid flower bud initiation in the plug stage.

GROWING ON TO FINISH

Container Size: 306 packs, 4.5-in. (10.5-cm) pots, quarts, 6-in. (15-cm), and 10 to 12-in. (25 to 30-cm) or similar size hanging baskets.

Media

Use a well-drained, disease-free media with a pH of 5.4 to 5.8 and a medium initial nutrient charge.

Temperature

Night: 55 to 60°F (12 to 15°C)
Day: 62 to 70°F (16 to 21°C)

Light

Keep light levels as high as possible while maintaining appropriate temperatures.

Fertilizer

Starting a week after transplant, apply nitrate-form with low phosphorus fertilizer once a week at rate 3 (175 to 225 ppm N/1.2 to 1.5 mS/cm EC).

For constant feed programs, apply fertilizer at 125 ppm N/1.0 mS/cm EC using predominantly nitrate-form fertilizer with low phosphorus. If needed, alternate with a balanced ammonium and nitrate-form fertilizer to encourage growth and balance the media pH. Maintain the media EC at 1.25 to 1.5 mS/cm and pH at 5.4 to 5.8. If the media pH is greater than 6.2, take corrective measures.

Because Cool Wave pansies are vigorous and spreading, they require more fertilizer to maintain good flowering in the landscape and for consumers. It is recommended to use slow release fertilizer such as Osmocote 15-9-12 at low to medium rate as a top dressing before shipping.

Irrigation

Maintain optimal media moisture, i.e. not too wet or not too dry.

Plant Growth Regulators

Use tank mix foliar sprays of daminozide (B-Nine/Alar) at 5,000 ppm (5.9 g/l of 85% formulation or 7.8 g/l of 64% formulation) and chlormequat (Cycocel) at 500 ppm (4.3 ml/l of 11.8% formulation or 0.7 ml/l of 75% formulation) to control plant growth. Weekly applications are recommended for 306 packs, 4.5-in. (10.5-cm) pots, quarts, 6-in. (15-cm) pots. You will likely be able to skip a few applications in larger containers.

If additional control is needed, very light rate of paclobutrazol (Bonzi) can be applied as a drench. When plants have reached desired size, apply 0.125 ppm (0.03 ml/l of 0.4% formulation) paclobutrazol with the following volume depending on container size: use 1.3 ounces for 306 packs, 2.5 ounces for 4.5-in. (10.5-cm) pots and quarts, 4 ounces for 6-in. (15-cm) pots, 10 ounces for gallons, and 12 ounces for 10-in. baskets.

Pinching

Pinching is not recommended.

Crop Scheduling

Sow to transplant:

Summer/Fall: It takes approximately 4.5 to 5 weeks to finish a 128-cell or similar size plug. It takes approximately 3.5 weeks to finish a 288-cell plug.

At 3.5 weeks, you may not get fully rooted plugs but this younger plug will finish substantially faster for the finished grower. At 5 or more weeks, Cool Wave may become rootbound and check the growth in a 288 plug.

Transplant to finish:

CROP SCHEDULING FROM LARGER CELL PLUG 105, 128, 144, ETC.

Container	Plugs per pot/cell	Weeks from transplant to finish
4.5-in./10.5-cm, Quart	1	4 to 5
6-in./15-cm, Gallon	1	5 to 6
10-in./25-cm basket	3	6 to 7
12-in./30-cm basket	4	6 to 8

CROP SCHEDULING FROM 288 PLUG OR SIMILAR SIZE

Container	Plugs per pot/cell	Weeks from transplant to finish
306 pack (or equivalent)	1	4 to 5
4.5-in./10.5-cm, Quart	1	5 to 6
6-in./15-cm, Gallon	1	6 to 7
6-in./15-cm, Gallon	3	5 to 6
10-in./25-cm basket	4	7 to 8
12-in./30-cm basket	5	7 to 9

Note: Overcrowding plugs can result in a more mounded basket that will not trail over the sides as much.

Common Problems

Insects: Check/monitor for fungus gnats and shore flies during plug production and for aphids after transplant.

Diseases: Damping-off and black root rot.

Regular scouting for powdery mildew and preventative measures are recommended.

Other Key Tips:

When temperatures are too high in late Summer/ early Fall, Cool Wave pansies will have smaller flowers and diminished shelf life at retail. For this reason we recommend mid to late season Fall programs; retail weeks prior to Week 38 are usually not recommended.

Note: Growers should use the information presented here as a starting point. Crop times will vary depending on the climate, location, time of year, and greenhouse environmental conditions. Chemical and PGR recommendations are only guidelines. It is the responsibility of the applicator to read and follow all the current label directions for the specific chemical being used in accordance with all regulations.

Cool Wave Pot, Tag & POP Suppliers

BRANDED POTS

Summit Plastic Company
800 814-3496
Fax: 330 633-9738
summitplastic.com

East Jordan Plastics, Inc.
800 353-1190
Fax: 231 536-9246
eastjordanplastics.com

Landmark Plastic Corp.
800 242-1183
Fax: 330 785-9200
landmarkplastic.com

Myers Industries, Inc.
Lawn & Garden Group
800 225-7712
Fax: 440 632-5093
myerslawnandgarden.com

Pöppelmann Plastics
866 886-1556
Fax: 828 466-9529
poppelmann.com

TAGS

John Henry Company/MPS
866 448-8300
Fax: 800 968-2598
jhc.com

MasterTag
800 253-0439
Fax: 800 828-0003
mastertag.com

POP

Ball Horticultural Company
800 879-BALL
Fax: 800 234-0370
ballhort.com

Photos show representative sample only – contact your preferred supplier for specifics

PanAmerican Seed®

Order Cool Wave Pansy seed, plugs and plants through your preferred distributor or call PanAmerican Seed.

630 231-1400 or 800 231-7065
Fax: 630 293-2557
panamseed.com
wave-rave.com

Scan or go to youtube.com/pasvideotv

Learn more in our Cool Wave culture video

Watch the Cool Wave culture webinar