Cyclamen Production

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Acknowledgments

Richard E. Widmer, University of Minn.
The Cyclamen Society
Goldsmith Seeds,
Ball Seed Inc, & Pan American
Penn State University Plant Path. Dept.
UC Davis Plant Path Department
Current Strategies

4” Florist Pot
6” Florist Pot
Pre-Finished Basket (Multi Plant)
Plugs (72 Tray)
Perennial Liners
Cut Flowers
Marketing

Mass Markets
4”, some 6”

Retail Florist
6” or larger
Combo Baskets

Garden Centers
6” or larger
Perennials

Pre-Finish / Plugs
200 or 72 Trays
## Wholesale Prices

### Average Wholesale Price - Cyclamen.

<table>
<thead>
<tr>
<th>Year</th>
<th>Pot Size</th>
<th>1979</th>
<th>1986</th>
<th>2004</th>
<th>2004 Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1979</td>
<td>4” Pots</td>
<td>$1.80</td>
<td>$2.25</td>
<td>$3.75</td>
<td>$0.64 / 8.95</td>
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<tr>
<td>1986</td>
<td>6” Pots</td>
<td>$3.50</td>
<td>$4.75</td>
<td>$7.50</td>
<td>$2.00 / 15.99</td>
</tr>
</tbody>
</table>

*Data Source: Minnesota Florists and Greenhouse Business Magazine*
Business Considerations

Cyclamen require:

• A dedicated production space
• Similar “cool crop” neighbors
• Very different watering practices
• Greater attention to temperature!
• A very long bench requirement
• A careful cost analysis
Production Schedule

From Seed to Liner  20 - 24 weeks

Liner to Finish  - Highly dependent on cultivar sunlight, local greenhouse conditions and your growing skills.

  4”   10 - 18 weeks
  6”   14 - 24 weeks
  Baskets  16 -18 weeks

Pre-Finished  4” or 6”  8 to 9 weeks
Anatomy and Terms

Tuber – A modified stem

Pedicel – Leaf stalk

Peduncle – Flower stalk

Primary Shoot – Top shoot

Axillary Shoot – Side shoot
Florist Cyclamen (Cyclamen persicum) are native to the Middle East, Jordan, Iran, Iraq, Israel, and Syria.

The actual natural micro-environment is areas along streams, rock outcroppings, and underneath shrubbery.
Most Cyclamen species represented in the market place are primarily used as perennial garden plants. There are quite a few species, most are cold tolerant and fragrant.

Cyclamen persicum species are rare, and not used in the florist trade.
Florist Cultivars
The Micro-Mini Hybrids

Super-Series Micro
Midori
Dressy

Cyclamen persicum micro ‘Betti’
Important Cultivars

The Miniatures

Marvel  Miracle
Mini-Mate  Libretto
Musical  Silverado
Melody  Super Series Compact
Metis
Important Cultivars

The Intermediates

Laser
Latina
Canto
SuperSeries $F_1$ Compact
Important Cultivars
Large Standard Hybrids

Macro-Pastel    Pannevis
Majesty         Concherto
Butterfly Mix   Sierra
Halios          Celia
Macro-Pastel    Maxora
Robusta         Royal
Important Cultivars

Heat Tolerant

Rondo
Merry Widow
Pollination Tips

Cyclamen flowers are easily pollinated using a fine artists brush.

Seeds mature is 10 to 12 weeks.

Harvest seeds, Allow to air dry @ 70°F Store at 40°F …very dry! Plant within 4-5 months

Seed over 1 years old is A poor risk. Must use GA_{3}
Seeds vs Plugs

Unless you are a citizen of Alaska or Canada…. forget seeds! It is usually not cost effective.

The most popular plug sizes range from a 120 to a 72 tray. The size you purchase will be Determined by the finished product and your location.

Growers south of the Mason-Dixon line should order the largest plug possible or consider pre-finished material in final pot sizes.
Growing From Seed

Commercial dry seed can be rather difficult to germination uniformly.

Presoak seeds 500 to 1000 parts per million solution of GA$_3$ until the seeds have swollen (usually 24-48 hours).
Seedling Soil Mix
Modified (from R.E. Widmer, 1978)

Use a good quality Canadian Peat Cubic Yd Cubic Meter

Fine Dolomitic Lime 9.7 lbs 7.5 lbs
Magnesium Sulfate 1.0 lbs 12.2 oz
10-10-10 12.0 oz 9.0 oz
14-14-14 (Slow Release) 12.5 oz 9.5 oz
Micronutrients (Fritted) as recommended on Pkg.

Verify the pH! Verify the Nutrient levels! Verify the EC!
Water a large pot of soil and sample 2 days later for testing!
Germination Tips

288 and 120 trays are most commonly used.
Germination takes 30 days!
Captan inhibits germination.
Soil must be friable – well drained
**pH must be 6.5**, this is non-negotiable!
*Never* allow seed medium to dry out!
There are 5 stages!
Germination Onset

Cyclamen seed is germinated in the dark 65°F

You must lime peat! Calcium & nutrient levels should be tested in soil. Do not use ultrafine soils!

20-25 ppm Ca should be present.

pH must be 6.5, soil EC near 0.5, and moist!

Maintain humidity levels at 90% – 100%

Maintain Stage “0” conditions for 21 to 25 days
Germination  Stage 1

Stage “1” is complete when the radicle emerges and a small tuber forms.

Begin checking for radicle emergence at day 14.

Bring seedlings into light when the cotyledons emerge. Keep temperature at 65°F.
Germination Stage 2

Stage “2” is complete when the cotyledon emerges.

If seed coat dries out, the cotyledon may be Constricted. Maintain humidity!
Bring plants into the light once seed coat is thrown

Light levels of 1500 fc (15,000 Lux) Diffuse is best.

Fertilize w/calcium nitrate
At 50 ppm every other watering.
Germination Stage 3

Stage “3” is complete when plants have 2 – 3 leaves. This is the second most mismanaged stage!

Transplant 288 or smaller tray plugs to 72’s or 128’s

Fertilize weekly @100 ppm
Alternate NO₃ and NH₄

Light at 2300 – 3000 fc
(23,000 – 30,000 Lux)
Germination Stage 4

Stage “4” is complete when leaves fully cover the tray medium. Transplant now or seedling will stretch!

Surface of soil can be allowed to dry somewhat.

Reduce humidity to 75%

Increase EC to 1.0
Alternate NO₃ and NH₄

62°F Nights, 65-68°F Days

Light at 3500 Fc (35,000)Lux
Shipping Pre-Finished

Be sure to feed plugs several days before shipping, Feeding the day before increases botrytis! Spraying for disease prevention is optional!

Ship plants with dry leaves! Minimize storage.

Arrange temperature controlled shipments.

Notify recipient of fertility status, days from seed.
Pre-Finished Cyclamen

Current Price Examples: (In U.S. Dollars)

Plugs 160 Tray    $45.00 – $55.00 / 100
Liners 98 Tray    $60.00 – $72.00 / 100
Liners 60 Tray    $65.00 – $80.00 / 100
4.5” Pre-Finished    $140.00 – $170.00 / 100
6” Pre-Finished    $270.00 – $640.00 / 100
8” Pre-Finished    $470.00 – 750.00 / 100
Finishing Cyclamen

Now The Real Fun Begins!
Transplant Tips

The fewer times you handle the plant, the better. Improper or rough transplant can add weeks to production schedules.

Transplant to finished pot size no sooner than the 6-7 leaf stage.

Mature plants can be “bumped up”.

Soil Medium

The “Widmer” soil formulation is best. Use a more coarse grade of peat for the finished material.

Be sure not to use “muck peat” or very fine peat!

Peat-lite mixes are Ok as long as porosity is good, and you are sure of the pH shift characteristics.

Bark mixes are not the best… pH shift is rapid!
pH, EC and $O_2$

**pH:** 58 – 6.2 No Exceptions!

**EC (Soil Conductivity):** 1.2-1.8!
Higher than 2.2 and roots become stressed.
Higher than 2.4 and root hair death begins, especially if left to partially dry out!

**$O_2$:** As much as you can provide!
Soil porosity is essential, and is the number one destroyer of profits!
Temperature

Night temperature of 65°F is generally recommended 1 week after transplant.

Root temperatures of 55°F – 60°F for 6 weeks from leaf 6 to 40 speeds up flowering.

Day temperatures should be 68°F - Cloudy days and 73°F – 75°F during sunny weather.

Lower night temperatures to 62°F after plants have reached the 35 leaf stage.
Temperature

Night temperatures above 68°F causes bud abortion, small flowers and stretched peduncles!

Temperatures above 80°F causes growth delay, flower delay, (1+ month) and increase disease.

Drying out during 80°F = leaf yellowing & drop, flopped over peduncles and botrytis.
Watering

Water to keep the soil moist. If you have good drainage, you will be able to water often and avoid dry-outs.

Once a Cyclamen dries out, it will lose many leaves within 24 to 36 hours. This is an extremely common problem.

Water in the morning, and be sure to have the fans on to dry the foliage to prevent Botrytis.

Leach occasionally to remove excess salts buildup. This is particularly true in dry climates such as Arizona, etc.
Fertility Regime

Begin the finishing process with 100 ppm until pot-bound, (roots showing on soil edge).

Gradually increase it to 150 ppm until the majority of the flowers are open.

Drop fertility to 100 ppm a week or two before shipping. Use only nitrate form.
Light Requirements

Minimum: 14 hour photoperiod

Maximum: 4,000 Foot Candles
44,000 LUX

Minimum: 600 Foot Candles
6,000 LUX

Below 400 Fc, plants will not initiate blooms. Adds weeks!
Airflow and Humidity

Airflow YES…. ALWAYS!
Use the match test! Please!

Humidity …Never lower than 50%
Syringe walkways if need be!

Botrytis takes only 12 hours to
Destroy flower buds.

Strict “morning” watering schedules!
Benefits of CO$_2$

CO$_2$ can be beneficial at 1000 ppm.

CO$_2$ can speed up production by 1 week in winter, or very cloudy periods.
Light Levels

Cyclamen are light hour accumulators.

The more hours of light, the faster the plants will flower, the more flowers it will have!

Light levels should be kept at 5000+ fc (50,000 lux) unless temperatures increase above 75. Reduce light if this happens.
Spacing

Spacing Cyclamen is an art. Too close and they stretch, flop and become susceptible to botrytis. Too far apart and you lose too much money to empty bench space! Leaves should never touch!

4” Pots require 100 sq. inches 
*(maximum of 10” spacing)*

5” pots require 144 sq. inches 
*(Maximum of 12” spacing)*

6” pot requires 225 sq. inches 
*(Maximum of 15” spacing)*
Scheduling

The actual number of weeks from seed to full flower is very dependent upon pot size, cultivar, growing conditions and your growing skills.

No one can predict the outcome except your experience growing under your condition and skills.
Flower Number

Flower number depends upon cultivar, growing conditions, phases of the moon and stars....etc.

Flower number depends upon the number of buds the plant has initiated between leaf #6 and #35.

Therefore, proper attention to rate of growth early in the crop determines the number of flowers at traditional shipping stage....Keep this in mind!
Flower Promotion

Apply GA3 when flower bid initials are 1 cm long and when there are 35 leaves on the plant, and 20 or more unfolded leaves. (About 150 days from seedling).

2 - 10 parts per million GA3 for F₁ Hybrids, and 20 ppm for non F₁ plants, applied as a spray to the crown of plants with 10-20 unfolded leaves accelerated flowering by two to five weeks and provided more uniform flowering.
Disorder Diagnosis

Stall – Slow Growth
*Dried out, $pH$, Heat*

Aborted Flowers
*Dried out, Heat*

Grey Fuzzy Growth
*Too Wet, Air Movement*

Excessive Leaf Size
*NH$_4$ Fertility, Temp*
Disorder Diagnosis

Flower Blast

*Dried Out, Heat, High EC*

Flower Delay

*Temp, Low Light, Pot Size*

Small Flowers

*Heat, High EC*

Stretched Peduncles

*Heat, NH4, Low Light*
Disorder Diagnosis

Stunted Plants
*Disease, High EC*

Hard Growth/Leaves
*Excess NH4, Too Cold*

Yellow Foliage
*Iron, pH, Nitrogen, Dry, Root Rot*

Wilted Leaves
*High EC, Disease, Dry Soil, Light*
Disorder Diagnosis

Nutritional

Nitrogen – *Chlorotic, weak growth*

Phosphorus – *Dark green leaves, purpled petioles*

Potassium – *Increasingly smaller leaves, necrosis*

Calcium – *Downward flexing leaves, peduncles*

Magnesium – *Reduced flower production!!!*

Boron – *Bunched young leaves, curled, small flower buds, short peduncles*

Iron – *New foliage pale green to yellowish*
Diseases

Bacterial Soft Rot – Erwinia
Botrytis Blight - Botrytis cineraria
Fusarium Wilt – Fusarium oxysporium (v. cyclamisinis)
Leaf Spots – Septoria, Gloeosporium, Phyllosticta
Pythium Root Rot - Pythium (many kinds)
Black Rot – Thielaviopsis basicola
Stunt – Ramularia cyclamaniocola
Viruses - INSV, TMV, CMV, etc.
Insects

Cyclamen Mites
Shore Flies
Fungus Gnats
Thrips
Aphids
Spider Mites
Shipping Tips

Cyclamen are very susceptible to ethylene. Clean all debris, old flowers from plants before shipping.

Ship foliage and flowers dry, and soil moist.

Sleeve if practical.

Say a prayer!