# GrowerFacts

## Delphinium Butterfly

(*Delphinium grandiflorum*)

## Germination

- Time of radicle emergence (3-4 days)
- Night temperature: 75-80°F (24-27°C)
- Day temperature: 65-70°F (18-21°C).
- Delphinium germinates best if day/night temperatures are alternated.
- Keep media evenly moist but not saturated.
- Cover the seed with coarse vermiculite.
- Delphinium seed germinates best in the dark.
- Soil pH 5.5-5.8 and soluble salts (EC) less than 0.75 mmhos/cm (2:1 extraction).
- Delphinium is very sensitive to high salts, particularly high ammonium, during germination.
- Keep ammonium levels less than 10 ppm.

## Plug Production

**STAGE 1 Time of radicle emergence (3-4 days)**

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- Delphinium is very sensitive to high salts, particularly high ammonium, during germination.
- Keep ammonium levels less than 10 ppm.

**STAGE 2 Stem and cotyledon emergence (6-8 days)**

- **Night temperature:** 75-80°F (24-27°C).
  **Day temperature:** 65-70°F (18-21°C).
- Reduce moisture levels once radicle emergence occurs! Allow the soil to dry out slightly before watering for best germination and rooting.
- Light levels should be between 500-1000 foot-candles.
- Keep soil pH 5.5-5.8 and EC less than 0.75 mmhos/cm.
- Keep ammonium levels less than 10 ppm.
- Begin fertilizing with 50 75 ppm N from 14 0 14 or a calcium/potassium nitrate feed once cotyledons are fully expanded.
- Alternate feed with clear water.
- Irrigate early in the day so foliage is dry by nightfall to prevent diseases.

**STAGE 3 Growth and development of true leaves (5-7 days)**

- **Night temperature:** 65-70°F (18-21°C).
  **Day temperature:** 60-65°F (16-18°C).
- Allow the soil to dry thoroughly between irrigations but avoid permanent wilting to promote root growth and control shoot growth.
- Gradually increase light levels to 1000-1500 foot-candles.
- Maintain soil pH 5.5-5.8 and EC less than 1.0 mmhos/cm.
- Increase feed to 100 150 ppm N from 20 10 20 alternating with 14 0 14 or other calcium/potassium nitrate fertilizer.
- Fertilize every 2 3 irrigations.
- If using 15-0-15 supplement with magnesium 1 2x during this stage, using magnesium sulfate (16 oz/100 gal) or magnesium nitrate. Do not mix magnesium sulfate with calcium nitrate as precipitate will form!
- Use DIF whenever possible, especially the first 2 hours after sunrise, to control plant height.
- A-Rest, B-Nine, Bonzi, and Sumagic are all effective at controlling height of delphinium.

**STAGE 4 Plants ready for transplanting or shipping (7 days)**

- **Night temperature:** 60-62°F (16-17°C).
  **Day temperature:** 55-60°F (13-16°C).
- Allow soil to dry thoroughly between irrigations.
- Gradually increase light intensity to 1500-2500 foot-candles.
- Maintain soil pH 5.5-5.8 and EC less than 0.75 mmhos/cm.
- Fertilize with 14 0 14 or calcium/potassium nitrate feed at 100 150 ppm N as needed.

**FORCING**

**JANUARY SOWING**

- Seed sown in January will be ready for sale in late April to early May.
- Plants will bloom the same year they are sown, but will be small and should be in one quart containers or smaller.

**JUNE - AUGUST SOWING**

- Plants sown in June - August will bloom the following June-July.

### SOIL TEMPERATURE

- 30-35°F (-1-2°C)

### TRANSPLANT

- Transplant into pots around September 15.

### OVER WINTERING

- Over winter the plants until spring in an unheated greenhouse or cold frame.
- The root system should be developed throughout the soil volume prior to over wintering.
- Pots should be packed as close together as possible.
- If plants are over wintered outside, cover the plants with a thick layer of mulch.

### FERTILIZATION

- Fertilization during dormancy will not be necessary.

### SEPTEMBER - OCTOBER SOWING

- Plants sown in September - October will bloom the following June-July.

### TEMPERATURE

- Night -- 32-35°F (0-2°C)
- Day -- 35-40°F (2-4°C)

### TRANSPLANT

- Transplant to packs in early November.
- Transplant into pots in February.

### OVER WINTERING

- Plants are grown at 40? F (4? C) for 12-15 weeks.
- Perennials grown at this time will compete with other crops for greenhouse space.

### FERTILIZATION

- Fertilize at 75-100 ppm N from 15-0-15 every other irrigation.

## Growing On to Finish

### TEMPERATURE

**Night:** 50-55°F (10-13°C)

**Day:** 55-60°F (13-16°C)

### LIGHT

Maintain medium light intensity, around 3000-5000 foot-candles.

### MEDIA

Use a well-drained, disease-free soil-less medium with a medium initial nutrient charge and a pH 5.5-6.2.

### FERTILIZATION

Fertilize every other irrigation with 15-0-15 at 150-200 ppm nitrogen.

Maintain medium electrical conductivity around 1.0 mmhos/cm (using 1:2 extraction).

### CONTROLLING HEIGHT

Once plants are rooted to the sides of the containers they can be allowed to wilt prior to irrigation to provide some height control.

Height can also be controlled by withholding fertilizer, especially phosphorous and ammonium-form nitrogen.

Delphinium are responsive to day/night temperature differential (DIF), and are shorter with a negative DIF.

A-Rest, B-Nine, Bonzi, and Sumagic are all effective at controlling height of delphinium.

## Post Production Care

### TEMPERATURE

Delphinium should be displayed in a cool, below 70°F (21°C), shady location.

Optimum conditions may be difficult to maintain, especially if plants are displayed outside.

Using a negative DIF will help keep the plants short and of high quality.

### LIGHT

Delphinium prefer full sun to partial shade. Partial shading may be beneficial during retail display.

COMMON PROBLEMS

**Insects:** Aphids; Cut worms

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**Diseases:** Bacterial diseases; Powdery mildew

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