Delphinium Production Tutorial

August 2023

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Plugs and Cut Flower Seed Production

- Specialized cut flowers of various genetics offer a unique opportunity to offer products to the market.
- Higher risk but also higher profit potential.
- The market is looking for greater variety.

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Challenges with Cut Flower Plug Production

- Cut flower farmers need actively growing plugs to maximize stem length.
- Seedling age, photoperiod, temperature and light quality are important factors in the production of cut flowers.

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Chemical Plant Growth Regulators

- To maximize stem length in cut flowers avoid applying chemical growth regulators in the plug stage.
- Employ cultural controls: temperature, humidity, and fertilization.
- Proper planning.

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Delphinium Candle Series F-1 Hybrid

- The Candle series produces uniform flowering with a consistent stem diameter.
- Candle blooms under short day conditions with a minimum photoperiod of 10 hours per day.
- Available in multiple colors.

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Pre-cooling: 21 Days

- Sow the seed into a tray containing a sterile substrate with good drainage.
- Cover the seed with medium vermiculite and water the seed with Terrazole (etidiazole) to avoid problems with diseases (damping-off/stem disease).
- Place the trays in a dark refrigerator maintaining a substrate temperature of 50°F /10°C for 21 days.

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Plug Stage 1: Days 1-14

- If precooling is not an option, sow the seed and follow the procedures on the previous slide. Maintain a temperature between 65-68°F/18-20ºC.

- NOTE: For both pre-cooling and regular sowing, it is very important to keep the substrate saturated to maximize germination. One option is to use a capillary carpet or wrap the tray or cart with plastic.

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Plug Stage 2: Days 15-21

- After the seeds germinate, place the trays in a cool, well-ventilated greenhouse with good light.
- Lightly fertilize at 75-100 ppm N. with a well-balanced fertilizer to ensure a healthy start.
- Calcium-based fertilizers produce strong plugs of high-quality seedlings.
- The optimum germination temperature is 59-65°F/15-18°C.

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Plug Stage 2: Day 15-21 continued

- Subjecting the plugs to high temperatures (above 77°F/25°C) produces plugs of low quality.
- Low temperatures (less than 50° F/10°C) induce the plants to form a rosette*, an induced resting stage.

**A rosetted plant reverts to active growth with an increase in photoperiod from winter to spring.*

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Plug Stage 3: Days 22-35

- True leaves are now formed.
- Maintain an EC between 0.8 and 1.0 mmhos (1:2 extraction) with good air movement to prevent disease.
- Delphinium is sensitive to several foliage and root diseases, (pythium, rhizoctonia and phytophthora). Employ good sanitation practices and irrigate in the morning to allow foliage to dry quickly.

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Plug Stage 4: Days 36-42

- The plugs have 3-4 true leaves and are now ready to transplant into the cutflower bed.
- Delphinium has a strong tap root structure. To maximize plant and flower quality, do not delay transplanting.

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Bed Preparation

- Select an area with good drainage and a pH between 6.0 - 6.5.
- Incorporation of organic material improves the structure and fertility of the cut flower bed.

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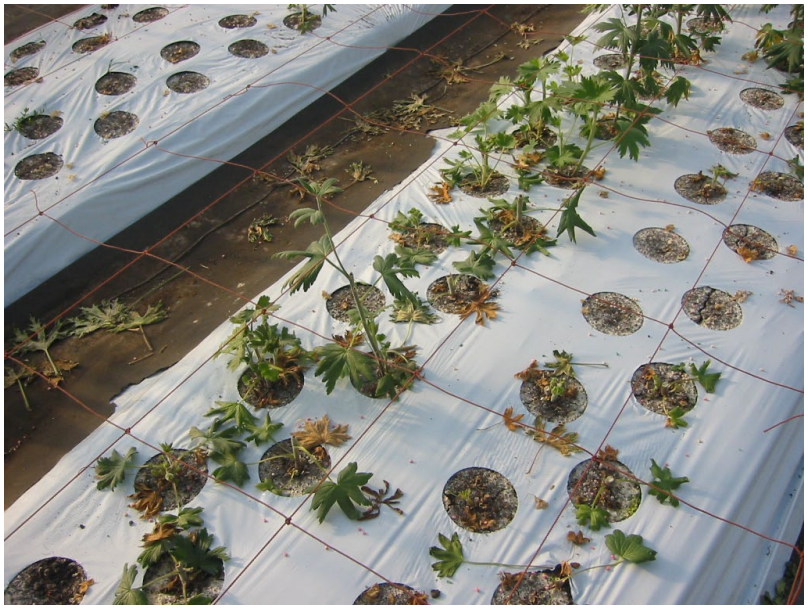
Plant Spacing and Support



- Space the plants 8 inches/20 cm. apart.
- An opening in the center of the bed at a width of 16 inches/40 cm. is recommended to improve air circulation.
- Support wire is required due to plant height and weight.
- Covering the bed with white is an option to keep the soil cooler when temperatures are high.

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Water and Fertilization

- The optimum EC is between 1.0 - 1.4 mmhos (1:2 extraction).
- Calcium Nitrate-based fertilizer produces strong and healthy plants.
- Avoid stressing the crop with moisture which damages the root system and lowers the flower quality.

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Excess Nitrogen

- Avoid excess nitrogen at it causes malformed flowers.

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Excess Potassium

- Excess potassium causes malformed stems and a calcium deficiency.
- A fertilizer ratio of

  4K: 2Ca: 1Mg is ideal.

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Temperature

- The optimum temperature for greenhouse production is 59-77°F/15-25ºC.
- For greenhouse production without heating or for outdoor production, target a temperature of 41-75°F/5-24ºC.

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Blindness Due to High Temperatures

- Temperatures above 79°F/26°C for extended periods increase the risk of blindness.
- Blindness is a condition in which the flower does not fully develop.

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Scheduling

- For fast cropping, maintain a minimum temperature of 59F°/15ºC and a minimum photoperiod of 10 hours.
- The first harvest occurs 18 weeks after sowing.
- A second harvest* (re-cropping) occurs in 10-12 weeks after the first harvest.

**one can expect about 70% of plants to produce a second cutting. The percentage decreases the longer the plants are kept.*

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The Advantage of the Candle Series

- When the first flower is about to open, a new shoot appears at the base for a second crop.
- Delphinium Candle Series can be re-cropped every 10-12 weeks by maintaining a temperature of 59-77°F/ 15-25ºC and a minimum photoperiod of 10 hours.

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Light, Photoperiod, Temperature

- Higher levels of light, longer photoperiods (>13 hours), and higher temperatures reduce crop time, but also plant height.

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Post-Harvest Care

- For wholesale markets, harvest when 1-2 flowers are open. For local markets, cut the stems when half the flowers are open.
- Harvest early in the morning and place the stems in tepid water containing STS* for 4 hours at room temperature. After treating with STS, place the stems in a commercial holding solution.
- Delphinium is sensitive to ethylene so keep the flowers away from ripening fruit.
- Maintain the flowers in a vertical position during the entire post-harvest process, storage and shipping to avoid stem bending. Store the flowers for 2-3 days at 36-39°F/2-4°C.

**Treatment with 1-MCP is also an option.*

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Thank you for your attention!

- Thank you for your support and confidence in our genetics.

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