

## Snapdragon Monaco

(*Antirrhinum majus*)

### Germination

- Time of radicle emergence (6-8 days)
- Soil temperature 65-75°F (18-24°C).
- Keep media evenly moist but not saturated.
- Do not cover or bury the seed.
- Light is not necessary for germination until radicle emergence.
- Soil pH 5.5-5.8 and soluble salts (EC) less than 0.75 mmhos/cm (2:1 extraction).
- Cut snapdragon is very sensitive to high salts, particularly high ammonium, during germination.
- Keep ammonium levels less than 5 ppm.

### Plug Production

#### STAGE 1 Time of radicle emergence (6-8 days)

- Soil temperature 65-75°F (18-24°C).
- Keep media evenly moist but not saturated.
- Do not cover or bury the seed.
- Light is not necessary for germination until radicle emergence.
- Soil pH 5.5-5.8 and soluble salts (EC) less than 0.75 mmhos/cm (2:1 extraction).
- Cut snapdragon is very sensitive to high salts, particularly high ammonium, during germination.
- Keep ammonium levels less than 5 ppm.

#### STAGE 2 Stem and cotyledon emergence (7 days)

- Soil temperature 65-70°F (18-21°C).
- Reduce moisture levels once radicle emergence occurs.
- Keep soil evenly moist but not saturated for best rooting.
- Keep soil pH 5.5-5.8 and EC less than 0.75 mmhos/cm.
- Maintain water alkalinity at 60-100 ppm.
- Begin fertilizing with 50 75 ppm N from calcium nitrate and potassium nitrate based fertilizer once cotyledons are fully expanded.
- Snapdragons are very sensitive to high salts and high ammonium levels
- Liquid fertilization may not be necessary at this stage if sufficient nutrition was incorporated in the growing medium before planting.
- 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 (14-21 days)

- Soil temperature 62-65°F (17-18°C).

- Allow the soil to dry thoroughly between irrigations but avoid wilting to promote root growth and control shoot growth.
- 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!
- Occasional leaching with clear water is helpful to reduce soluble salts.
- Attempt to maintain a ratio of approximately 3 potassium: 2 calcium: 1 magnesium in the medium.
- Avoid ammonium-based fertilizer if growing below 65° F (18° C).
- Apply fungicides at the lowest recommended rate to control pythium, rhizoctonia and thielaviopsis.
- Use DIF whenever possible, especially the first 2 hours after sunrise, to control plant height.
- Plant growth regulators are usually not needed for cut snapdragon production.

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

- Soil temperature 60-62°F (16-17°C).
- Allow soil to dry thoroughly between irrigations.
- Maintain soil pH 5.5-5.8.
- Maintain EC less than 0.75 mmhos/cm for shipping, less than 1.0 mmhos/cm for transplanting..
- Fertilize with 14 0 14 or calcium/potassium nitrate feed at 100 150 ppm N as needed.
- Do not use ammonium-based fertilizer.

### Growing On to Finish

#### TRANSPLANTING

- Transplant when the second true leaves unfold.
- When buying in seedlings or plugs, allow seedlings 24 hours to acclimate to the greenhouse conditions, then transplant promptly.
- Delayed flowering and loss of final product quality occurs when seedlings are kept too long in plug trays.
- If holding is unavoidable, store plugs at 36-39°F (2-4°C) under fluorescent lights at 250 foot-candles 14 hours per day.

- Treat with a fungicide prior to storage to prevent botrytis.
- Space plugs at 10-12 plants per ft<sup>2</sup> (100-130 per m<sup>2</sup>).
- Decrease to 8 plants per ft<sup>2</sup> (85-90 per m<sup>2</sup>) during seasons of low light intensity.

## SUPPORT

- Two support nets are the minimum, but three are preferred.
- Mesh sizes of 4" x 4" to 6" x 6" (10 x 10 cm to 15 x 15 cm) are most commonly used.
- Place the first level at 4-6 inches (10-15 cm.) above the soil level.
- Place the second level at 6 inches (15 cm.) above the first level.
- Raise the upper level of the support nets as the stems lengthen.

## TEMPERATURE

**Group 1:** Night - 45-50°F (7-10°C), Day - 50-55°F (10-13°C)

**Group 2:** Night - 50-55°F (10-13°C), Day - 55-60°F (13-16°C)

**Group 3:** Night - 55-60°F (13-16°C), Day - 60-65°F (16-18°C)

**Group 4:** Night - > 60°F (> 16°C), Day - > 65°F (> 18°C)

Generally, the lower temperatures in the ranges give the best quality, but at the expense of a longer crop time.

The lower temperature is advisable during extended periods of low light.

## LIGHT

**Group 1:** low light - 1000-1500 foot-candles

**Group 2:** moderate light - 1500-3000 foot-candles

**Group 3:** moderate to high light - 2500-4500 foot-candles

**Group 4:** high light - 3000-5000 foot-candles

## MEDIA

- The growing medium should allow adequate aeration to the roots yet hold a steady supply of moisture.
- The greater the aeration of the medium, the more forgiving the medium is to over watering.
- Growing media in benches must be better aerated than media used to grow snapdragons directly in

the ground, because the bench bottom creates a "perched water table" which limits water drainage.

- Ground beds in locations with sandy loam soils may be suitable for growing snapdragons without any amendments.
- Heavy soils should be improved prior to planting by tilling in organic material such as peat moss, rice hulls, compost, or decomposed manure.
- Growing medium for raised benches should consist of less than 50 percent field soil, with the remaining percentage consisting of a mixture of more than one of the following: vermiculite, perlite, peat moss, composted bark, or rice hulls.
- Medium must be free of disease-causing organisms.
- If using soil, it will be necessary to disinfect the media.
- Perform a soil test of the growing medium before planting.
- EC should be between 1.0 - 1.75 mmhos.
- Ammonium-based nitrogen less than 10 ppm.
- pH 5.5-6.5.

## FERTILIZATION

- Phosphorus and calcium are usually incorporated into the growing medium prior to planting and the other nutrients are supplied with a soluble fertilizer during growth.
- Super phosphate incorporated at 5 pounds/ 100 ft<sup>2</sup> (2 grams/m<sup>2</sup>) should supply sufficient phosphorus.
- If soil tests show calcium is low, incorporate limestone (if the pH is low), or gypsum (if pH is acceptable), both at 5 pounds/100 ft<sup>2</sup> (250 grams/m<sup>2</sup>).
- Irrigate with clear water after transplanting.
- Begin fertilizing at the second watering.
- Use a low ammonium fertilizer at 150-200 ppm.
- Use constant fertilization, with an occasional clear water leaching.
- High moisture or fertility levels will cause excessive side shoots.

## CONTROLLING HEIGHT

- If height control is necessary, the plants can be allowed to wilt slightly before irrigation.
- Height can also be controlled by withholding fertilizer, especially phosphorous and ammonium-form nitrogen.
- Cut snapdragon are responsive to day/night temperature differential (DIF), and are shorter with a negative DIF.
- Chemical plant growth regulators are not needed for cut snapdragon production.

## GROWING SCHEDULE

North and south are separated at the 38th parallel, extending from San Francisco, California in the West,



through Kansas City, Missouri, to Washington D.C. in the East.

Regional conditions vary. The sowing and harvest dates given are general guidelines only.

#### **NORTH:**

##### **Group 1**

**Sow:** Aug. 15-Aug. 31

**Flower:** Dec. 10-Feb. 15

##### **Group 2**

**Sow:** Sept. 11-Dec. 10

**Flower:** Feb. 15-May 10

**Sow:** July 24-Aug. 09

**Flower:** Oct. 25-Dec. 10

##### **Group 3**

**Sow:** Dec. 10-Mar. 21

**Flower:** May 10-June 30

**Sow:** June 18-July 16

**Flower:** Sept. 10-Oct. 25

##### **Group 4**

**Sow:** Mar. 28-June 10

**Flower:** July 01-Sept. 10

#### **SOUTH:**

##### **Group 2**

**Sow:** Aug. 22-Dec. 20

**Flower:** Dec. 01-May 01

##### **Group 3**

**Sow:** July 06-Aug. 16

**Flower:** Oct. 01-Dec. 01

**Sow:** Jan. 07-Mar. 08

**Flower:** May 01-June 15

##### **Group 4**

**Sow:** Mar. 15-July 02

**Flower:** June 15-Oct. 01

## **Post Production Care**

### **HARVESTING**

- The best quality flowers for the consumer are those cut with a minimum of 5-7 open florets.
- Premature harvesting leads to poor color development and reduced flower size as flowers continue to open.

### **WATER**

- For maximum vase life, place snapdragon stems in water as soon as possible after cutting.
- Remove foliage on the lower third of the stems, then grade and bunch.
- To condition for immediate use or shipping, place the flowers in warm water (70-75°F, 21-24°C) containing floral preservatives.
- Select a floral preservative which contains sucrose as well as 8-HQC (8-hydroxyquinoline citrate) or other bactericide to facilitate water uptake and inhibit stem plugging.

### **TEMPERATURE**

Hold at 45-50°F (7-10°C) at least 6 to 8 hours or overnight.

### **LIGHT**

Color development is enhanced by holding the stems in approximately 200 foot-candles light.

### **STORAGE AND SHIPPING**

- Snapdragons should be stored and shipped upright to prevent curvature of the spikes.
- Place cut stems vertically as soon as possible after harvest; stems placed horizontally may begin to bend upwards in as little as 30 minutes.
- To maintain flower quality, it is important to sleeve the upper portion of the snapdragon bunches and use tall, upright hampers for shipping.
- Snapdragons can be stored for 3 to 4 days, dry or in water at 40°F (4°C).
- If stored dry, rehydrate and condition in the same manner as for freshly cut flowers.
- For longer term storage, 5-10 days, select only the highest quality stems, wrap each spike in plastic to prevent desiccation, and hold the stem in a



preservative at air temperatures of 32-40°F (0-4°C).

- Shattering in response to ethylene can be a problem with some snapdragons. Some shatter tolerant varieties do exist.
- Shattering can be controlled on sensitive varieties with STS (silver thiosulfate).
- Avoid natural sources of ethylene such as ripening fruit and bacterial growth in coolers and containers.
- Ventilate and reduce temperatures to slow ethylene build-up.

## COMMON PROBLEMS

**Insects:** Aphids, Thrips

**Diseases:** Downy Mildew, Botrytis, Rust, Powdery Mildew

