

<b>Cultural Information for:</b>	Pageant, Danova, Bicolor, Annual
	Delight, Daniella & Rosanna
<b>Common Name:</b>	Primrose
<b>Botanical Name:</b>	Primula acaulis
<b>Seed Count:</b>	33,000 /ounce                      1,150 /gram
<b>Optimum Germination Temperature:</b>	64-68°F / 18-20°C
<b>Optimum Growing Temperature:</b>	50-59°F / 10-15°C

### Plug Culture – 8 weeks (288 12 x 24 tray)

**Stage 1 (days 1-14)** Select a sterile substrate containing a high amount of organic matter and a pH between 5.5 - 5.8 and EC <0.6 mmhos (2:1 dilution). Primula seed requires light for germination but a light cover of vermiculite is recommended to maintain sufficient moisture. Optimum germination temperature is 64-68°F/18-20°C. Temperatures above 68°F/20°C reduce total emergence. Maintain high humidity levels and if needed place the flats in a germination chamber or shaded greenhouse to provide cool conditions.

**Stage 2 (days 15-29)** When the cotyledons are fully expanded, lower humidity levels but do not allow the plants to dry out. Target 64-68°F/18-20°C to prevent stretching. A light mist 2-3 times per day is beneficial. Primula plants are very sensitive and the leaves can easily burn in strong light (>3,000 foot candles/32,000 lux). A light shade is recommended to protect the plugs from intense sunshine. During periods of high temperatures the plants grow very slowly. Fertilize with 50-75 ppm N to strengthen the plants. Select a well-balanced calcium nitrate based fertilizer to produce strong and healthy seedlings.

**Stage 3 (days 30-48)** The first true leaves have formed. For high quality plugs it is necessary to maintain cool temperatures and sufficient humidity. Fertilize the plants with 100 ppm N as needed to maintain EC levels around 1.0 mmhos (2:1 dilution).

**Stage 4 (days 49-56)** The plants have 3-4 true leaves and are now ready for transplanting. Applying 200 ppm N a week before transplanting helps the plants make the transition from the plug tray to the final container.

**Transplant to Flowering** – 84 (Pageant) to 112 (Daniella & Rosanna) days.

**Pots:** Transplant Pageant, Danova, Delight, Bicolor, Daniella and Rosanna plugs into 4-inch/10 cm pots using a well-drained sterile media. Optimum pH is between 5.5 - 5.8.

**Temperature:** Maintain a day/night temperature of 59-65°F / 15-18°F to promote vegetative growth and build plant bulk.

**Light Level:** A maximum light level of 3,000 foot candles / 32,000 lux is recommended for Primula production.

**Fertilizer:** A well-balanced calcium nitrate based formulation is recommended. Apply 100-150 ppm N as necessary to maintain an EC between 1.0-1.2 mmhos (2:1 dilution).

**Vernalization:** When the plants have 6-10 leaves and a well-established root system, maintain a temperature below 50°F/10°C to initiate flower buds. Depending on the series, maintain this temperature for 4-9 weeks as prescribed below in the chart. When flower buds are visible (but not before) increase the temperature to 53-57°F/12-14°C to force flowering.

**Note:** Although Primula acaulis will initiate flowers at a higher temperature (55°F/13°C), targeting 45°F promotes the greatest uniformity. Exposing plants to temperatures above 55°F/13°C confuses the plants resulting in devernalization (vegetative growth and flower bud abortion).

Schedule in Weeks	Plug: 64-68°F 18-20°C	Vegetative: 59-65°F 15-18°C	Initiation: 39-45°F 4-7°C	Flowering: 53-57°F 12-14°C
Pageant*	8	4	5	3
Danova, Delight, Bicolor	8	4	7	3
Daniella, Rosanna	8	4	9	3

*\*for Pageant bicolors follow Danova schedule.*

**Production Points:** In general, Primula is not attractive to insects, but aphids, thrips, white fly and cut worms are the major concerns. Problems with fungus gnats or shore flies are common during the germination and plug stage. Primula requires cool conditions and high humidity to produce high quality plants which favors the development of botrytis. Good sanitation, watering early in the day and good air movement helps control and prevent this disease.

**Growth Regulation:** In general, Primula growth is controlled with fertilizer and cool temperatures. If necessary, the following chemical growth regulators are effective. Do not apply below 41°F/5°C. To avoid over-regulation, multiple applications at lower rates is best. Do not apply after flower bud set.

Chemical	Rate
Bonzi (paclobutrazol) NAFTA	5-10 ppm foliar spray 0.5-1.0 ppm drench
Banner/Maxx*	2-5 fl. oz./100 gallons Apply at 16 fl. oz. per 100 sq. ft.
<i>*Propiconazole 14% active ingredient</i>	<i>15-40 ml/100 liters Apply at 5 liters/100 m2</i>

*\* apply as needed, but no more than 2 times per week.*

*“All information given is intended for general guidance only and may have to be adjusted to meet individual needs. Cultural details are based on North American conditions and Sakata cannot be held responsible for any crop damage related to the information given herein. Application of recommended growth regulators and chemicals are subject to local and state regulations. Always follow manufacturer's label instructions. Testing a few plants prior to treating the entire crop is best.”*