

<b>Cultural Information for:</b>	Princessa	Annual
<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>	65°F / 18°C	
<b>Optimum Growing Temperature:</b>	50-59°F / 10-15°C	
<b>Optimum pH:</b>	5.8 – 6.2	
<b>EC – Plug:</b>	0.4 – 0.8 mmhos/cm (1:2) / 0.9 – 2.0 (SME) / 1.1 - 2.6 (Pour Thru)	
<b>EC – Finishing:</b>	0.9 – 1.3 mmhos/cm (1:2) / 2.1 – 3.5 (SME) / 2.7 - 4.6 (Pour Thru)	

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

**Pre-cooling:** Place trays in a chamber at 55°F/13°C for one week and cover with vermiculite and plastic for high humidity. Pre-cooling enhances germination.

**Stage 1 (days 1-14)** Select a sterile substrate with high organic matter. Primula seed requires light for germination, but a light cover of vermiculite is recommended to maintain enough moisture. Optimum germination temperature is 65°F/18°C. Temperatures above 68°F/20°C reduce total emergence. Maintain high humidity levels and if needed place the flats in a germination chamber with lights for 5 weeks or a 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 60-62°F/16-17°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 enough humidity. Fertilize the plants with 100 ppm N as needed to maintain strong growth.

**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 – 13 weeks

**Pots:** Transplant Princessa plugs into 4.5-inch/12 cm pots using a well-drained sterile media.

**Temperature:** Maintain a day/night temperature of 62-65°F/17-18°C to promote vegetative growth and build plant bulk.

**Light Level:** Light levels should range between 1,700 – 2,000-foot candles/18,000 – 21,500, lux with a maximum of 3,000-foot candles/32,000 lux.

**Fertilizer:** A well-balanced calcium nitrate-based formulation is recommended. Apply 125-150 ppm N as necessary to maintain healthy growth. Increasing potassium promotes higher bud count and more compact plants.

**Flower Initiation:** Princessa is a medium-early flowering type. When the plants have 6-10 leaves and a well-established root system, the plants are receptive to flower bud initiation. Princessa requires less vernalization than Primula Danova and optimum initiation temperature is 50-59°F / 10-15°C for six weeks. Cooler temperatures promote higher uniformity. When flower buds are visible (but not before) increase the temperature to 62°F/17°C to force flowering.

Schedule in Weeks*	Plug: 64-68°F 18-20°C	Vegetative: 62-65°F 17-18°C	Initiation: 50-59°F 10-15°C	Flowering: 62°F 17°C
Weeks	8	4	6	3

\*timing may vary slightly depending on climate and location

**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 by 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 a lower rate is best. Do not apply after flower bud set.

Chemical	Rate
B-Nine (daminozide)	2,500 – 5,000 ppm (0.25 – 0.5%)
Bonzi (paclobutrazol) NAFTA	5-10 ppm foliar spray 0.5-1.0 ppm drench

**Culture Watch Point:** In areas with extended periods of low light (early season in the Northwest) a higher percentage of blind or polyanthus types will occur along with longer flower peduncles. Transplanting prior to Week 42 ensures that the plants receive enough light prior to flower bud initiation to prevent blindness and abnormal flowering.

*"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."*