



# BullsEye™, Elite™, Maverick™, Pinto™, Multibloom™, Orbit™, Orbit Synchro™, Ringo 2000™

## GERANIUM PELARGONIUM X HORTORUM

**Minimum Germination Rate:** 90%

**Seed Product Form:** Coated

### FLOWERING

**Time frame when plants are receptive to flower initiation:** Days 18 – 24; 4 – 6 leaves present.

**Flowering Type:** Geraniums are day-neutral plants.

**Specific Flowering Mechanism:** Light and temperature trigger flowering. Geraniums are light accumulators, the more light received, the faster the growth and earlier the flowering. DIF treatments may negate flowering.

### PLUG CULTURE

**Germination:** Optimum conditions for seedling development that begins the day the crop is sown until cotyledon expansion. Expect radicle emergence in 1 – 3 days.

**Cover:** Cover seeds with a thin layer of medium-sized vermiculite to maintain moisture levels.

**Media:** • pH: 6.4 – 6.5 pH levels <6 may promote shoot tip abortion and allow sodium, iron and manganese to becoming toxic. Symptoms of nutrient toxicity will exhibit itself on the lower leaves.

• EC: 0.75 – 1 High EC discourages rooting into the media.

**Light:** Light is not necessary for germination. If utilizing a chamber, providing a light source of 10 – 100 foot candles (100 – 1,000 lux) will improve germination and reduce stretch.

**Moisture:** Saturated (5) for day 1 – 3. On days 4 – 8 reduce to moist (3). Beginning day 9, reduce moisture further to medium (2). Geraniums have a high oxygen requirement at the root level.

**Humidity:** 100% until radicle emergence then reduce to 40%.

**Dehumidify:** Provide horizontal airflow to aid in drying down the media through evapotranspiration, allowing better penetration of oxygen to the roots.

**Temperature:** 73°F (23°C). Thermodormancy, which causes erratic germination, is induced when temperatures exceed 76°F (25°C). Temperatures below 71°F (22°C) decrease the speed and uniformity of germination.

**Plug Bulking:** Optimum conditions during the vegetative period, beginning at cotyledon expansion, needed for the root to reach the edge of the plug cell.

**Media:** pH: 6.4 – 6.5. EC: 1 – 2

**Light:** Supplemental lighting at 350 – 450 foot candles (3,500 – 4,500 lux) for a 16 – 18-hour day will promote earlier flowering. Supplemental lighting may not be necessary with Multibloom.

**Temperature:** 65° – 70°F (18° – 20°C). Gradually reduce to 62° – 65°F (16° – 18°C) to hold plugs.

**Moisture:** Alternate between moisture levels wet (4) and medium (2). Allow media to approach level (2) before re-saturating to level (4).

**Humidity:** 40 – 70%

**Dehumidify:** Provide horizontal airflow to aid in drying down the media through evapotranspiration, allowing better penetration of oxygen to the roots.

**Fertilizers:** Alternate between calcium-based fertilizers (13-2-13 or 14-4-14) and potassium nitrate (15-5-15) at 50 – 75 ppm nitrogen. Phosphorus should not exceed 10 ppm. Geraniums are sensitive to ammonium. Ammonium levels should not exceed 5 ppm to prevent stretch.

**Gases:** Supplemental carbon dioxide can be applied at 1,000 ppm to enhance flowering under high light conditions.

**Growth Regulators:** Begin applications of Cycocel (chlormequat chloride) at 750 ppm when 3 – 5 true leaves are present.

### GROWING ON

NOTE: Multibloom culture is slightly different than typical Geraniums. Multibloom will set bud in 6 – 7 weeks

from sowing, therefore, it is necessary to keep Multibloom actively growing. Do not stress Multibloom by withholding water or fertilizer. Otherwise, the culture remains the same for all Geraniums.

**Transplant Ready:** 4 – 5 weeks from sow in a '288' tray.

**Finish Bulking/Flower Initiation:** Optimum conditions during the vegetative period, beginning at transplant, needed for the root to reach the edge of the container AND to make the plant receptive to flower initiation.

**Media:** pH: 6.2 – 6.5. Low pH symptoms include yellowing of leaves, interveinal chlorosis and necrosis. EC: 1.2 – 1.5 High salts may encourage roots to become very brittle.

**Light:** Provide 3,500 – 4,500 foot candles (15 – 20 total mols or 35,000 – 45,000 lux) to hasten flower induction. Supplemental lighting under low-light conditions at 350 – 450 foot candles (35,000 – 45,000 lux) will enhance shoot and root growth. Lighting after transplant for 2 – 3 weeks, at 300 – 500 foot candles (3,000 – 5,000 lux) for 14 – 18 hours a day will induce early flowering.

**Temperature:** 60° – 65°F (16° – 18°C) nights and 70° – 75°F (21° – 24°C) days. Manipulation of night temperatures after buds are visible can speed up or slow down flower development to meet a sales date.

**Average Daily Temperature (ADT):** 67°F (19°C)

**Moisture:** Alternate between moisture levels wet (4) and moist (3). Allow media to approach level (3) before re-saturating to level (4). Excessive drying of the media moisture level will concentrate salts around the root system and burn the root hairs. Symptoms of excessive drying include lower leaves turning reddish to yellow, and root tip die-back.

**Dehumidify:** Provide horizontal airflow to aid in drying down the media through evapotranspiration under cool, low-light conditions.

**Fertilizers:** Constant liquid feed at 200 ppm nitrogen with a calcium-based fertilizer (13-2-13 or 14-4-14).

**Growth Regulators:** A total of 4 – 5 applications of Cycocel (chlormequat chloride) at 750 ppm beginning when 3 – 5 true leaves are present will control growth. NOTE: Do not apply Cycocel after the buds have emerged above the foliage. Small and/or malformed flowers will result from late applications of Cycocel. Also responds to A-Rest (ancymidol), Bonzi (paclobutrazol), Sumagic (uniconazole) or B-Nine/Cycocel (chlormequat chloride) tank mix.

**Common Diseases:** Botrytis, Pythium, Alternaria, Pseudomonas, Rust

**Common Pests:** Thrips

PRODUCT USE	GARDEN SPECIFICATIONS
Pots, containers, mass plantings. Multibloom and Elite can also be used in packs.	<b>Light:</b> Full sun <b>USDA Hardiness Zone:</b> 11 <b>AHS Heat Zone:</b> 12 – 1

	Garden Height	Garden Width
<b>Elite, Multibloom</b>	10 – 12" (25 – 30 cm)	10 – 12" (25 – 30 cm)
<b>Orbit, Ringo 2000</b>	12 – 14" (30 – 35 cm)	10 – 12" (25 – 30 cm)
<b>BullsEye</b>	13 – 15" (33 – 38 cm)	11 – 13" (28 – 33 cm)
<b>Maverick</b>	14 – 16" (35 – 40 cm)	12 – 14" (30 – 35 cm)
<b>Pinto</b>	14 – 16" (35 – 40 cm)	12 – 14" (30 – 35 cm)
<b>Ringo</b>	12 – 14" (30 – 35 cm)	10 – 12" (25 – 30 cm)

### GERANIUM SCHEDULING IN WEEKS

	BullsEye	Elite	Maverick	Pinto	Multibloom	Orbit, Orbit Synchro	Ringo 2000
<b>Total crop time</b>	13 – 15	13 – 14	12 – 15	12 – 14	11 – 12	13 – 14	11 – 13
<b>'288' plug crop time</b>	4 – 5	4 – 5	4 – 5	4 – 5	4 – 5	4 – 5	4 – 5
<b>Transplant to finish crop time</b>							
<b>Packs</b>	N/A	11 – 12	N/A	N/A	6 – 7	N/A	7 – 8
<b>4" crop</b>	7 – 10	7 – 10	7 – 10	7 – 10	6 – 8	7 – 10	6 – 8
<b>6" crop</b>	10 – 12	10 – 12	10 – 12	10 – 12	N/A	10 – 12	N/A

Note: These suggestions are only guidelines and may have to be altered to meet individual grower's needs. Check all chemical labels to verify registration for use in your region.