

Cultural Information for: Marigold 'COCO' Annual
Common Name: Marigold
Botanical Name: Tagetes erecta
Seed Count: 7,100-9,000/oz. 250-320/gr.
Optimum Germination Temperature: 72-75°F / 22-24°C
Optimum Growing Temperature: 68-90°F / 20-32°C

Plug Culture - 3 weeks (200 / 10 x 20 tray)

Stage 1 (days 1-5) Select a well-drained media with a pH between 6.2 and 6.5 with a soil EC of 1.0 mmhos (2:1 dilution). African Marigold is sensitive to iron toxicity at a pH below 5.8, characterized by lower yellow leaves with edge browning/burning. Lightly cover the seeds with medium vermiculite and apply 10-100 foot candles/100-1,000 lux to improve germination. Optimum soil temperature is 72-75°F/22-24°C.

Stage 2 (days 6-10) Marigolds germinate quickly. After emergence place the plug trays in a well-ventilated greenhouse with up to 2,500 f.c./27,000 lux. Reduce moisture and maintain a day temperature of 70°F/21°C and a night temperature of 65°F/18°C.

NOTE: African Marigold is an obligate short-day plant. Provide long day conditions (> 14 hours) in the plug stage to prevent pre-mature flower bud initiation.

Stage 3 (days 11-17) Fertilize at 75 ppm N to strengthen the seedlings and promote healthy growth at least once a week. Watering just before wilt is recommended to avoid lush growth. One should water thoroughly to prevent high EC levels, (> 1.5 mmhos 2:1 dilution). Watering early in the morning allows the foliage to dry thoroughly and prevents potential disease problems.

Stage 4 (days 18-21) Marigold COCO seedlings develop rapidly and are ready to transplant when they reach 4 inches tall with four true leaves. One can drop the air temperature to 62°F/17°C to hold plug trays for a few days. Avoid temperatures below 60°F/16°C as this will invite disease problems. Do not delay transplanting as root-bound will injure crop quality.

Finished Production:

Spacing: Greenhouse production: Regular (5" x 5") & Disbud (4" x 4")
 Field production*: Regular (5" x 5") & Pinch (8" x 8")
 *best grown in single rows with 12-16" between rows

Transplanting: Place the plants slightly deep into the soil as they will root above the stem-soil line. Water immediately as stress severely reduces growth and promotes premature flowering. Transplant on time as overgrown and stressed plants result in poor growth and less flower production.

Bed Preparation: Heavier clay loam soil generally produces larger and greater number of flowers. In lighter, sandy soil, fertility and moisture are more difficult to manage. Work the soil to a depth of 12-20 inches/30-51 cm. prior to planting. Optimum pH is 6.5 to 8.0.

Netting: Provide support netting to avoid lodging.

Temperature: Optimum day temperatures are 79-90°F/26-32°C with nights around 68°F/20°C. Warmer temperatures (65-90°F / 18-32°C) will speed up growth in general from plug stage to finish. Cool night temperatures combined with warm day temperatures promote strong plants and larger flowers.

Fertilizer: Nutrition levels in the soil should be moderate at planting. A general recommendation of key elements in dry soil at planting is listed below.

Nitrate Nitrogen	40-80 ppm
Phosphorus	25-60 ppm
Potassium	250-400 ppm
Calcium	2,500-3,500 ppm
Magnesium	300-350 ppm

After transplanting use a well-balanced calcium-nitrate based fertilizer for the first 6 weeks and then finish with a high potassium formulation. Under-fertilization creates small plants and flowers, while over-fertilization (especially with nitrogen) promotes excessive vegetative growth and fewer flowers. Soil and tissue analyses are the best way to determine if the plants are receiving optimum nutrition. *Marigold is very sensitive to a deficiency of calcium and boron.* Calcium promotes strong cells and reduces calyx breaking. Boron promotes strong tissue in xylem and phloem. To ensure an adequate supply, calcium and boron may be applied as a spray to the plant starting 10 days after transplant and continuing every 10 days until blooming.

Pre-Plant Fertilizer: Incorporating a granular fertilizer, such as 16-20-10, at 300-330 lbs./acre is a common practice in California to improve plant growth, vigor, flower size and yield.

Flower Development: The rate of flower development is related to the day length and temperature. Day lengths of 12 hours or more are recommended for optimum growth.

- Short days (< 12 hours) accelerate flower bud development. Under these conditions the plants will flower earlier on shorter plants and yields may be reduced.
- Long days (>12 hours) will slow flower bud development. Under these conditions the plants flower later on taller plants.

Harvesting: For local markets, cut stems when the flowers are almost fully open with an inch / 2.5 cm. of green showing in the center. For storage and shipping, harvest when 50% of the petals have opened.

Post-Harvest: Harvest in the afternoon for the longest vase life. Recut stems when they are out of water for any duration. For the best vase life, pretreat with a commercial hydrator for 4 hours followed by two days treatment with a commercial holding preservative. Slow-release chlorine tables are particularly effective. Marigolds store dry well.

“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.”

Greenhouse Production:

Production Type	Weeks from Sow	Comment
Spray	13-14 weeks	Space 5” x 5” / 12 x 12 cm.
Disbud	11-12 weeks	Space 4”x 4” / 10 x 10 cm. Day 14 after transplanting start to remove lateral stipules and keep watching continuously every week until blooming.

Field Production

Production Type	Weeks from Sow	Comment
Spray	13-14 weeks	Space 5” x 5” / 12 x 12 cm.
Pinch	15-16 weeks	Space 8” x 8” / 20 x 20 cm. Day 14-21 after transplanting pinch the tip to leave 4-5 shoots.

Insects: Borers, bud worms, leaf chewers, red spider, thrips

Disease: Alternaria, blight, botrytis, leaf spot, phytophthora, pythium