

Cultural Information for: Celosia Dragon's Breath® Red Annual
Common Name: Celosia
Botanical Name: Celosia argentea plumosa
Seed Count: 37,000-48,000/ounce 1,300-1,700/gram
Optimum Germination Temperature: 70-75°F / 21-24°C
Optimum Growing Temperature: 65-75°F / 18-24°C
Optimum pH: 5.8 – 6.2

EC – Plug: 0.4 – 0.8 mmhos/cm (1:2) / 0.9 – 2.0 (SME) / 1.1 - 2.6 (Pour Thru)

EC – Finishing: 0.9 – 1.3 mmhos/cm (1:2) / 2.1 – 3.5 (SME) / 2.7 - 4.6 (Pour Thru)

Plug Stage – 6 weeks (128 / 8 x 16 tray*)

Stage 1 (days 1-10) - Sow seeds in a well-drained soil mix and cover lightly with medium vermiculite. Maintain the soil temperature at 77°F/25°C. Germination occurs in 7 to 10 days. Since the root system is very delicate do not sow into open flats.

***for production in cell packs, use a 288-plug tray and plan on 5 weeks.**

Stage 2 (days 11-20) - After seedlings emerge, place flats in a well-ventilated area and reduce the temperature to 65-70°F/18-21°C during the day and 61-65°F/16-18°C at night. Fertilize plugs with 50-100 ppm N. Over watering will promote disease; especially botrytis and rhizoctonia.

NOTE: Celosia requires long day conditions (> 14 hours) in the plug stage to maintain vegetative growth and avoid premature flower budding. Plug trays should be exposed to long days immediately after seedling emergence, as flower initiation can begin as soon as 9 days after seedlings are observed.

Stage 3 (days 21-34) - Maintain good air circulation. Celosia is sensitive to day length and any type of stress, like water, low temperature or root banding. Avoid stressing the plugs with low fertilizer or moisture, which promotes premature budding and stunted growth later in production.

Stage 4 (day 35-42) - Plugs are ready for transplanting. Do not delay transplanting. Holding the plugs too long in the plug tray will limit future development of the plant and might cause premature flowering.

Finishing

Transplanting: Celosia has a soft stem and a delicate root system. To avoid damage, use a plug popper to dislodge plugs and only handle seedlings by one leaf. Also avoid deep transplanting to prevent rhizoctonia.

Media: Select a well-drained media with little or no starter charge.

Temperature: Maintain the plants between 65-75°F/18-24°C.

Light: High light, full sun is best.

Growth Regulator: chlormequat, daminozide, fluprimsidol, paclobutrazol and uniconazole are effective. **Do not pinch.**

Fertilization: To promote bright red foliage, avoid excess nitrogen and phosphorus, which promote green leaves; especially when planted in the landscape. Apply 100 ppm N* twice a week for strong growth. *Adequate potassium is necessary since a deficiency results in weaker stems and abnormal shaped flowers.* Therefore, applying a high potassium formulation, such as 15-3-20 or 15-5-30, works well and is highly recommended. Alternate with 15-0-15 or 15-5-15, if needed, to supply calcium and magnesium. An ideal ratio of potassium, calcium and magnesium is 4 : 2 : 0.5. **supply boron at 0.25 ppm to avoid deficiency*

Photoperiod: Dragon's Breath™ Red is an obligate short-day plant and is best sown in early April (Northern Hemisphere) under increasing day length to promote sufficient vegetative growth prior to the start of short days in mid-June. If sowing under short days, provide long day conditions (>14 hours) with either night interruption or day length extension (10 pm – 2 am) in order to promote vegetative growth until the desired plant height is achieved.

Flowering: In the garden with unimpeded root growth plants will flower in late summer as the days shorten. Container grown plants initiated with 3 weeks of short days (< 11 hours) will continue to flower in the container, even under long days, but will revert to vegetative growth under long days if planted in the ground.

Disease/Insects: Celosia is susceptible to botrytis, downy mildew, rhizoctonia, aphids and thrips.

Culture Watch Points: Boron deficiency causes deformed foliage and a witch's broom effect. Celosia is sensitive to vaporized gases of certain herbicides like methylurea, methoxy, dichlorophenyl and dichlorobenzonitrile. Thiophanate-methyl and Mefenoxam (Subdue Maxx) fungicides cause marginal chlorosis; especially when combined with heat and or moisture stress. Avoid low temperatures (under 61°F/16°C).

Late Spring – Summer Scheduling: *vegetative stage without flower formation

Sow	Transplant	Container	Sell
Early April	Early May	Packs	Early June*
Early April	Mid May	6 inch/15 cm.	Mid-June*
Early April	Mid May	10 inch/25 cm.	Late-August

See the following page for detailed scheduling suggestions.

Landscape: Celosia Dragon's Breath™ Red is ideal for planting outdoors. Highly prized for its attractive red foliage from sowing through flowering. Space 16 inches/40 cm. apart. To avoid stem rot, mulch should not contact the plant stem.

Night lighting, from parking lots or street lights, inhibits flowering.

Schedule Options / Northern Hemisphere:

General Comments: Celosia Dragon's Breath™ Red is an obligate short-day plant with no juvenile phase. Initially, the plants require long day conditions in the plug stage to build sufficient vegetative growth. Plants sold with flowers from March through early June with flowers will revert back to vegetative growth in the garden due to the increasing long days and then re-flower again as the days shorten. Plants sold in flower from late-June onwards will continue to flower into autumn.

Production Schedule for Green Plants (without flowers)

Jumbo Packs

Plug Tray	Plug Crop Time	Container	Transplant to Finish	Total Crop Time
288 cell	5 weeks	Jumbo 606	3 weeks	8 weeks
	Long Days (> 14 hours)		Long Days (> 14 hours)	Sold Green

Large pots

Plug Tray	Plug Crop Time	Container	Transplant to Finish	Total Crop Time
128 cell	6 Weeks	6 - 8 inch / 15 - 20 cm.	5-6 weeks	11-12 weeks
	Long Days (> 14 hours)	1 plant per pot	Long Days (> 14 hours)	Sold Green

Production Basics for Plants with Flowers

Natural Season Forcing

Plug Tray	Plug Crop Time /	Container	Bulking	Flower Induction*	Total Crop Time
128 cell	6 weeks	6 - 8 inch / 15 - 20 cm.	5 - 6 weeks	7 - 8 weeks	18 - 20 weeks
	Long Days (> 14 hours)	1 plant per pot	Long Days (> 14 hours)	Short Days (< 11 hours)	Sold in full color

* once the plants receive 3 weeks of short days (< 11 hours), forced short days may be stopped after June 21st due to the natural shortening of the day length.

Pre-initiated plug for 5 inch / 12 cm. pots

Plug Tray	Bulking Stage	Flower Initiation	Container	Transplant to Finish	Total Crop Time
128 cell	4 weeks	2 weeks	5 inch / 12 cm.	6 - 7 weeks	12 - 13 weeks
	Long Days (> 14 hours)	Short Days (< 11 hours)			Sold in full color

Pre-initiated plug for 6 inch / 15 cm. pots

Plug Tray	Bulking Stage	Flower Initiation	Container	Transplant to Finish	Total Crop Time
72 cell	5 weeks	2 weeks	6 inch / 15 cm.	6 - 7 weeks	13 - 14 weeks
	Long Days (> 14 hours)	Short Days (< 11 hours)			Sold in full color

Key Production Points:

- One plant per pot works well up to 8 inch / 20 cm. pots. Larger pots work best with multiple plants.
- From the start of natural short days on June 21st, plants begin to show flower buds (without and photoperiod manipulation) in mid-August (New York) to mid-September (Texas) due to a more dramatic change in photoperiod in northern latitudes.
- The best time to bulk plants (vegetative growth) is prior to flower bud initiation.

"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."



Plugs sown under continuous short days showing pre-mature budding.



1 plant (left) per 6-8 inch / 15-20 cm pot works well, compared to 3 (right).



Provide adequate space for good air movement.



The foliage color turns deep red when plants are exposed to low night temperatures (<55°F/13°C).



Natural season production in Michigan week 39 (sown week 26).



Cercospora celosiae (spots) form under high humidity at a temperature between 61–81°F / 16-27°C. Spray with zineb, chlorothalonil, benomyl or captan and increase ventilation.



High light combined with cool fall nights intensify the flower color and consumer appeal.



Winter performance in south Florida. Sown early November. Four-week-old plug (long days) followed by ambient light.