

**Cultural Information for:** Flowering Kale Nagoya Annual

**Common Name:** Flowering Kale

**Botanical Name:** Brassica oleracea

**Seed Count:** 6,500 /ounce 250 / gram

**Optimum Germination Temperature:** 70°F / 21°C

**Optimum Growing Temperature:** 50-68°F / 10-20°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 Production – 28 days (288 / 12 x 24 tray)

**Stage One** (days 1-5) Single sow seed into a 288-plug tray filled with a sterile and well drained media. Optimum temperature is 70°F/21°C. Lightly cover with coarse vermiculite as seed requires light to germinate.

**Stage Two** (days 6-14) As soon as seedlings emerge move the trays to a cool and bright location with good air movement. Optimum temperature is 55-60°F/13-15°C. In summer under high temperature conditions placing trays outdoors under shade cloth works well. Fertilize with 50 ppm N using a well-balanced calcium m nitrate-based fertilizer to strengthen the seedlings.

**Stage Three** (days 15-22) Maintain optimum temperatures, if possible, and fertilize with 100 ppm N as needed to maintain strong growth. To reduce stem elongation, apply B-Nine® (daminozide) at 1,500-3,000 ppm / 0.15-0.3% when first true leaves are formed. Bonzi® (paclobutrazol) at 2-4 ppm is also effective; especially under high temperatures.

**Do not apply growth regulator if the crop is for food consumption.**

**Stage Four** (days 23-28) The seedlings are approaching transplant stage and should have 2 pairs of true leaves. Do not delay transplanting to avoid stretching.

## Transplanting

**Media:** Flowering Kale does best in a soil-based mix (20-30% field soil) but soil less media can also be use with proper management.

**Container:** Flowering Kale Nagoya is targeted for production in 4-6 inch/10-15 cm. pots.

**Spacing:** To maximize plant size, and reduce stretching, allow enough space between the plants.

**Fertilizer:** Fertilize with 150-200 ppm N using a well-balanced calcium nitrate-based fertilizer. Once coloring begins, reduce fertilizer slightly to 100-150 ppm N to maintain plant health and prevent lower leaf yellowing. Studies at NCSU demonstrated no relation between nitrogen and a delay in coloring.

**Light:** Flowering Kale grows well outdoors under full sun, up to 10,000-foot candles/107,000 lux.

**Growth regulator:** Under warm temperatures chemical growth regulation is necessary to keep the plants compact. Drenches with paclobutrazol (Bonzi®) at 2-5 ppm work best. Spray applications of paclobutrazol are not effective. **Applications of daminozide (B-Nine®) are not recommended as it delays color formation.**

**Coloring:** The plants need to be of enough size before color initiation. The leaf color change is related to anthocyanins (a group of water-soluble flavonoids that impart pink to purple colors in leaves) that are always present in the leaves but are hidden by the chlorophyll ~ green color. When the daytime temperature is higher than 77°F and the night temperature is greater than 59°F, the leaves of Ornamental Cabbage and Kale can synthesize chlorophyll. When the daytime temperature is under 72-73°F and the nighttime temperature is between 40-59°F, the synthesis of chlorophyll stops and color (anthocyanins) begins to appear. In the case where cool temperatures come early and the Ornamental Cabbage and Kalen begin coloring and then the weather changes and warmer temperatures return, the color will change back to green (referred to as Green Back) due to the leaf starting to synthesize chlorophyll again.

**Timing:** For 4 inch / 10 cm. pots plan on 8-9 weeks from sowing to the start of color. For 6 inch / 15 cm. pots plan on 9-10 weeks from sowing to the start of color.

**Insects:** Aphids, caterpillars, cut worms

**Disease:** Botrytis, downy mildew

*“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.”*