e-GRO Alert


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Ornamental Cabbage and Kale:
Tips on Enhancing Coloration

Coloration of ornamental cabbage and kale is primarily influenced by temperatures below 55F (13C). A few production practices can help enhance the intensity of coloration, but discontinuing fertilization is not one of them.

Enhancing the coloration of ornamental cabbage and kale (*Brassica oleracea* var. *acephala* L.) was discussed in e-GRO Alert 3.45 in 2014, and fertilization recommendations were further defined in the Nutritional Monitoring Guide 1.22 in 2018. This Alert offers a few production practice tips to improve the coloration of your brassicas.

Color development can be enhanced by following a few production tips. (Photo: Brian Whipker)

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Tips

1. Temperatures

Night time temperatures below 55F (13C) are the primary trigger for the development of head coloration in ornamental cabbage and kale. Growing the plants outdoors is the easiest method that allows one to take advantage of cool night temperatures. If the plants are grown under structures, allowing for as much ventilation as possible to cool the plants would help to quicken coloration.

2. Fertilization – Drop, Don't Stop!

As night temperatures become cooler, plant growth slows but does not stop. If one monitors the plant's growth on a dry weight basis, it is easy to determine that ornamental cabbage and kale plants are still growing even though the leaves in the center of the head are smaller. Those newly developing leaves require adequate fertility to mature.

If fertilization is not provided or is too low, the plant will begin to translocate (move) the mobile elements nitrogen (N), phosphorus (P), potassium (K), and magnesium (Mg) from the lower leaves to the younger leaves. How quickly lower leaf symptomology develops depends on the nutrient status of the crop. If the plants were provided a moderate to high level of fertilization during production, we observe that "mining" [translocation] of those nutrient reserves will then take 2 to 3 weeks before lower leaf discoloration occurs. Most growers provide a low to moderate level of fertility in order to control plant growth. This means that the nutrient reserves are lower and the onset of lower leaf discoloration can quickly develop (Figs. 1-4).

Figure 1. A pale green coloration will occur on red leafed cabbage cultivars when the fertility level is inadequate. (Photo: Brian Whipker)

Figure 2. Leaves quickly become a light yellow as symptoms of low fertility continue. (Photo: Brian Whipker)

Soilless substrates used in floriculture production have a low cation exchange capacity. This means the substrate is limited on the amount of nutrients it can retain for plant availability. Therefore, deficiency symptoms can quickly occur in a soilless substrate. In prior M.S. degree research studies conducted at NC State University by Dr. Jamie Gibson (currently Technical Specialist with Syngenta Flowers), it was found that after only 2 weeks of discontinuing fertilization of market ready plants, that the substrate electrical conductivity (EC) values dropped by 90%, and leaf tissue values for N, P, and K decreased by 37%, 40%, and 30%, respectively, in comparison to fertilized plants. With grower samples, we have observed that foliar deficiency symptoms occurred when the root substrate EC readings were <0.30 mS/cm [Saturated Media Extract (SME)].

Therefore, continuing to fertilize ornamental cabbage and kale with 100 to 150 ppm N during head coloration will avoid lower leaf discoloration and loss.

Lower fertilization rates also result in more intense color development as compared to when fertilizer is maintained at levels of 200 to 300 ppm N.

3. Tropical Rains - They are Leachers!

In the Southeast U.S., the frequency of tropical storms dramatically increases in late summer and early fall. These soaker events can dump 1 to 6+ inches of rain as they pass. Given the low cation exchange capacity of the soilless substrates, this results in most of the nutrients being leached out of the container.

The normal production practice is to irrigate once the substrate dries out. In the Southeastern U.S., growers have

Figure 3. With advance stages of nutrient deficiency, lower leaves turn from yellow to brown and abscise. (Photo: Brian Whipker)

realized they cannot wait to fertilize. It may take 3 to 5 days for the substrate to dry down. Instead, they should fertilize the plants soon after the storm has passed. The substrate is already saturated, the pot is at container capacity for water, and the air spaces are already filled with water. So, by fertilizing, nutrient availability is restored and the fertigation is merely exchanging clear rain water for fertilizer water in the already saturated substrate. This avoids plant stall and the onset of nutrient disorders. This practice is typically applied to ornamental cabbage and kale, as well as fall pansies. After the fertilization is made, then the plants are allowed to dry down normally before the next irrigation.

4. Phosphorus – Dial it back

Research by Dr. Josh Henry (currently Division Agronomist at Helena Agri-Enterprises) during his M.S. program established clear advantages of a lower phosphorus (P) fertilization program. Lowering the concentration of P helps moderate plant stretch. In addition, providing adequate, but not excessive P enhanced the development of anthocyanin production and led to more red pigmentation and better coloration of plants. Therefore, for ornamental cabbage and kale, during the later half of the production season using a lower fertilization level of 10 to 15 ppm P [which is 23 to 34 ppm phosphate (P_2O_5), the number found on a fertilizer label] will avoid deficiency symptoms and also enhance pigment development.

Summary

Cooler night temperatures are the primary factor required to color up ornamental cabbage and kale. Plants are still increasing in size, so continual, but lower concentration fertilization is required to avoid lower leaf loss. A low P fertilization program should also be used to aid in coloration. To maintain plant quality, ornamental cabbage and kale should be fertilized with 100 to 150 ppm N until ready for sale.

Figure 4. The added cost of leaf removal prior to shipping can occur if fertilization levels are inadequate. (Photo: Brian Whipker)

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