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Marigold: Fall Season Wrap-up

The production cycle for Halloween or Dia de los Muertos marigolds is complete. What were some of the issues that growers faced this season? Part of Best Management Practices is being able to recognize the primary problems that can occur and prevent them.



Figure 1. Bronzing of the lower leaves can indicate a low substrate pH-induced iron toxicity. (© Brian Whipker)

Iron Toxicity

The most common nutritional issue that marigold growers face is low substrate pH-induced iron (Fe) toxicity. The lower leaves develop a bronze coloration (Fig. 1) that can be mistaken for a magnesium (Mg) deficiency. The first step in diagnosing the situation is to conduct a PourThru pH and electrical conductivity (EC) test to determine values. In the case of the plant in Figure 2 the pH was 4.2 and the EC was 0.14 mS/cm. Albano and Miller (1998) reported that the bronzing was primarily an iron toxicity and not a

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manganese (Mn) problem (the other element that is associated with low substrate pH). Tissue values (Table 1) were excessively high in Fe (1630 and 1380 ppm reported in the 2 submitted samples). The other micronutrients were also high in the samples (Mn, zinc, copper, and boron). Maintaining the substrate pH between 5.8 and 6.2, utilizing a basic fertilizer to avoid pH drop, and balancing the fertility rate to avoid downward pH creep will all help in avoiding the problem.

Iron Deficiency

A problem that can occur on the opposite end of the pH spectrum is an iron deficiency (Fig. 3). In our iron deficiency trials at NC State University, we first observed Fe symptomology on the cultivar ‘Zenith Red’, an African-French hybrid. ‘Discovery Orange’ was the first African-type to exhibit mild symptoms, followed much later by ‘Taishan Orange’. ‘Antigua Orange’ did not develop symptoms of Fe deficiency when Fe was withheld from the fertilizer mix. All three African-type cultivars appear not to be especially prone to developing Fe deficiency symptoms under low Fe



Figure 2. Plant from which a leaf tissue sample was analyzed for nutrient concentration. (© Brian Whipker)

Table 1. Leaf tissue analysis results for fall marigolds exhibiting lower leaf bronzing symptoms.

Element	Inca II	Antigua		
Nitrogen (%)	2.59	2.31		
Phosphorus (%)	0.31	0.23		
Potassium (%)	1.78	1.27		
Calcium (%)	1.71	1.54		
Magnesium (%)	0.55	0.57		
Sulfur (%)	0.57	0.44		
Iron (mg/kg, ppm)	1630	1380		
Manganese (mg/kg, ppm)	477	476		
Zinc (mg/kg, ppm)	142	173		
Copper (mg/kg, ppm)	19.8	26.3		
Boron (mg/kg, ppm)	46.3	37.6		
Deficient	Low	Sufficient	High	Excessive

fertilization conditions. Symptoms are more likely to occur when the plants are over-irrigated (which limits Fe uptake by the plant).

Physiological Issues

Dry Side of the Pot

Growing fall marigolds outdoors in a garden chrysanthemum production system can produce an excellent quality plant. For large pots, placement of the drip emitter can affect root development. If the emitter is placed near the center of the pot, root development will be more equally distributed within the pot. The catch in an outdoor system of plants grown in black pots on black landscape fabric is that the south and west sides of the pot can heat up with the sun's exposure. Less root development can result in that side of the pot (Fig. 4). To counter this, placing the drip emitter there and scheduling a short, early afternoon "cool down" irrigation will help moderate root zone temperatures and increase root growth.

Splitting

Excessively tall plants in a multi-seedling pot can result in plant splitting (Fig. 5). Following the production protocol about timing (specifically about providing short days during seedling propagation) will help control excessive growth. Consider a plant growth regulator application to help. (See *the Reference link for the Syngenta production guide.*)



Figure 4. Uneven root development in an outdoor growth plant due to excessive heat on the south and west sides of the pot (right side of the photo). (© Brian Whipker)



Figure 3. Interveinal chlorosis of the upper leaves was the result of an iron deficiency. (© Brian Whipker)



Figure 5. Excessive growth can result in splitting. (© Brian Whipker)

Excessive Seedlings

The recommendation for the number of seedlings in 2-gallon pots is 3 to 5. Excessive seedlings sown per plug can be an expensive proposition and result in plant stress due to overcrowding (Fig. 6).

Lack of Robust Growth

Fall marigolds, when grown utilizing the recommended production system, will result in healthy plants for the consumer. Withholding nutrients and possibly holding the seedlings in the plug stage will stall growth and produce a less-than-ideal plant for the consumer (Fig. 7).

Pest Issues

Several pests were observed this fall on marigolds. Fall marigolds are grown during the warm season, and insect populations can explode during these favorable environmental conditions.

Western Flower Thrips

Western Flower Thrips can be problematic in the summer, especially if insects migrate from held-over spring crops. Scarring and distortion of the foliage, possible distorted flowers, and cigar-shaped, cream-colored insects and be observed on infected plants (Fig. 8).

Spider Mites

The hot, dry, protected growing conditions are the perfect environment for spider mite populations to explode. The two-spotted spider mite is the most common species observed in greenhouses (Fig. 9). Scout the bottom side of the leaf to determine if problems exist. Webbing may be present in high populations.



Figure 6. Sowing multiple seeds per plug can result in an excessive number of seedlings. (© Brian Whipker)



Figure 7. Plant stress can result in less growth, as seen in this pot at a retail location. (© Brian Whipker)



Figure 8. Leaf scarring occurs with western flower thrips feeding. (© Brian Whipker)

Aphids

Aphids can be problematic on marigolds (Fig. 10). Insect movement from other plants outside the greenhouse is a challenge we face each fall.

Caterpillars

We highlighted fall armyworms (Fig. 11) in an earlier e-GRO Alert ([Alert 13.56 Don't Let Fall Armyworms Cut Into Fall Profits](#)). Because this is a migratory species, this is a pest that is primarily a fall problem to watch out for and is likely not observed with a spring marigold crop.

Leafminers

Leafminers can be a minor pest of marigolds. They can be easily identified from the clear tunnels on the leaves (Fig. 12).

Whiteflies

Whiteflies are not a major pest of marigolds, but when grown next to a poinsettia crop, it is possible for cross-contamination (Fig. 13).



Figure 10. Aphids will feed on marigolds. (© Brian Whipker)



Figure 11. Caterpillars are more problematic in a fall crop of marigolds than during the spring. (© Brian Whipker)



Figure 9. Plants grown indoors are more likely to develop spider mite problems. (© Brian Whipker)



Figure 12. Leafminers are typically a minor pest of marigolds. (© Brian Whipker)

Disease Issues

During our scouting, we did not come across many disease issues with marigolds. While *Pythium* root rot, phytoplasmas (historically referred to as aster yellows), leaf spots, and *Botrytis* can occur, we only observed *Botrytis* issues on aged flowers during periods of wet weather (Fig. 14).

Conclusion

Producing high-quality marigolds for fall sales requires balancing many factors, including fertility, environmental conditions, and pest and disease pressures. Consistent monitoring and scouting are important to changing growing practices to ensure high-quality plants for the holiday season.

Additional Resources / References

An excellent production scheduling guide from Syngenta.

[Syngenta's Dia de los Muertos Marigold 2026 Production Schedule](#)

Albano, J.P. and W.B. Miller. 1998. Marigold cultivars vary in susceptibility to iron toxicity. HortScience 33(7):1180-1182.



Figure 13. Whiteflies are typically a minor pest of marigolds. (© Brian Whipker)



Figure 14. *Botrytis* can be an issue during cold, wet growing conditions. (© Brian Whipker)



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