

TECH TRAINING:

ROOT-ZONE MANAGEMENT IN OUTDOOR CONTAINER CROPS

Field-grown container crops including garden mums and fall container programs are subject to fluctuating weather conditions, such as temperature and precipitation extremes, making root zone management especially critical for these crops. Excessive rainfall, nutrient leaching and disease pressure can cause plant stress, poor growth and crop losses. A proactive approach focused on maintaining healthy roots through disease prevention and irrigation and fertility management is key to success.

Tip 1: Stay Ahead of Root Diseases

- Wet, saturated conditions are conducive to root and crown rot pathogens—causing disease.
 - Watch for low spots and improve field drainage.
- Develop a comprehensive fungicide drench rotation covering major pathogens like *Pythium*, *Phytophthora* and *Fusarium*.
 - Utilize labeled fungicides including strobilurins, thiophanate-methyl and etridiazole.
- Incorporate biological options that support root health.
 - Some species of *Trichoderma* and *Streptomyces* are effective.



Fig 1. In mums, *Fusarium* can cause part of a plant to collapse.

Tip 2: Manage Fertility with the Weather in Mind

- Heavy rain can rapidly leach nutrients, leading to deficiencies.
 - Fertilizing immediately after rain replaces low-EC rainwater with essential nutrients.
- Consider a combination of controlled-release fertilizer (CRF) and water-soluble fertilizer (WSF) for consistent fertility.
 - Incorporate a low to medium rate of CRF as a base to buffer against leaching.
 - Use WSF for quick corrections and flexibility.
- Monitor EC and pH regularly to help make fertility decisions.



Fig 2. Heavy rains cause nutrient leaching—leading to deficiencies.

Tip 3: Avoid Irrigation Extremes

- Water based on crop needs and weather, *not* based on a timer.
 - Check moisture using the [1–5 scale](#) or by weight.
 - Let pots dry slightly between waterings to promote deeper rooting.
 - Aim for a 15% leaching fraction (LF).
- Reduce irrigation after rain to prevent excess saturation.
 - Consider the forecast to decide if watering is necessary.
- Prioritize morning irrigations to reduce wet foliage and humid microclimates in the canopy.



Fig 3. Consistently wet substrate causes a dark green crust to form on the surface of the substrate.

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Understanding the Root-Zone Environment: Soilless substrates must balance the ratio of solid components (e.g., peat, perlite, bark) with air- and water-filled pore spaces—ideally around 50% solids, 25% air and 25% water. Containers grown in the field are subject to adverse weather conditions, which can fluctuate throughout the growing season. Heavy summer rains are a major concern for growers as they can leach nutrients and reduce the air-filled pore spaces, stressing the plants and making conditions more favorable for root rot pathogens to cause disease.

Disease Management: Common root and crown rot pathogens include *Pythium*, *Phytophthora*, *Fusarium*, *Rhizoctonia*, and *Thielaviopsis*. Some affect many crops, while others are host specific. Implementing an effective and comprehensive preventative fungicide rotation is essential for protecting the root-zone. An effective rotation uses at least *three* different modes of action (FRAC groups). While you should work with your chemical distributor and *always follow the product label*, the following are examples of some effective active ingredients against one or more of these root rot pathogens:

- FRAC 1 – Thiophanate-methyl
- FRAC 3 – DMIs (metconazole, mefentrifluconazole)
- FRAC 4 – Mefenoxam
- FRAC 11 – Strobilurins (azoxystrobin, pyraclostrobin)
- FRAC 12 – Fludioxonil
- FRAC 14 – Etridiazole
- FRAC 21 – Cyazofamid
- FRAC 40 – Dimethomorph, mandipropamid
- FRAC 43 – Fluopicolide
- FRAC 49 – Oxathiaprolin

Biological fungicides (e.g., *Bacillus amyloliquefaciens*, *Bacillus subtilis*, *Trichoderma harzianum*, *Streptomyces lydicus*, *S. actinobacterium*) can also help protect roots and throughout the crop cycle.

Fertility Management: Water-soluble fertilizers (WSF) and controlled-release fertilizers (CRF) each offer advantages and can be used in conjunction to optimize nutrient management. A common strategy is to provide a constant baseline of nutrition (with a low rate of CRF in the substrate) and use WSFs for the remainder based on crop requirements, growth stage and weather conditions. While heavy rains can leach nutrients, CRF release is driven by temperature, not moisture, so heavy rains will not cause faster release. Regular in-house nutrient monitoring with methods like the [PourThru](#) or 1:2 Dilution is essential to track substrate pH and electrical conductivity (EC) and adjust fertilization accordingly.

Irrigation Management: Drip irrigation controlled by a timer is a common practice in field production, but fixed schedules often overlook weather and crop conditions. Irrigation should be done in response to substrate moisture, crop requirements and the weather. Allow pots to dry slightly between irrigations to encourage healthy root growth but avoid drought stress and overwatering—as both extremes are detrimental to plants and can increase disease pressure.

Field production poses additional challenges to growers, particularly for root-zone management. Prioritize root health through proper irrigation, fertilization and preventative fungicide applications. Frequent scouting and attention to detail will help to minimize stress and enhance crop quality.

For more information, check out these additional resources:

[GrowerTalks 2025 Insecticide, Miticide & Fungicide Guide \(English\)](#)

[GrowerTalks 2025 Insecticide, Miticide & Fungicide Guide \(Spanish\)](#)

[Ball Seed Garden Mum Disease Prevention Tech Sheets \(Scroll Down Page\)](#)