

GETTING READY FOR GARDEN MUM SEASON (PART FIVE): BACTERIAL LEAF SPOT

*Let's discuss bacterial leaf spot (BLS) caused by *Pseudomonas cichorii*. While it is sometimes confused with fungal leaf spots at a glance, there are some key differences in symptoms and conditions for infection that make it a dead giveaway when it shows up in your crop.*

We will begin with factors for infection, symptoms and key characteristics to help you with identification. *P. cichorii* is a soilborne bacteria and needs warm temperatures (about 68 to 82F or 20 to 28C) and free moisture to infect and cause disease. Infection most often occurs from bacteria in the soil splashing up into the canopy (which tends to happen during heavy rain events) or poor sanitation practices, but it can enter your operation on infected cuttings or liners, as well.

Typical BLS symptoms include:

- Water-soaked spots on the foliage and/or stems that develop tan/brownish centers as disease progresses. Lesions sometimes have a yellow halo and are irregular in shape.
- As disease progresses, lesions will become sunken in appearance, dark discoloration in leaf veins may occur, and wilting of affected plant parts may occur as severity increases.
- *Dickeya* and *Pectobacterium* are two other bacteria that can cause blight on mums, but these are more often issues in propagation, not finished production. Both prefer temps above 80F (about 27C), so if similar symptoms occur under high temps, one of these may be the culprit.
- Outbreaks of BLS often occur in mid to late summer, so pay especially close attention and scout for early symptoms in late July through August and into early September.

Disease Management

Once a BLS outbreak occurs, it can rip through your mums at an alarming rate. It spreads via splashing water (another good reason to use drip irrigation and avoid overhead watering) and handling or contaminated tools and equipment. Reduce the amount of free moisture in the canopy and exercise good sanitation practices to prevent it from entering or spreading in your operation.

- Wash hands after handling soil before you work your mums, and sanitize hand tools and change gloves between groups of plants when doing cleanup in your crop. Clean up leaf litter and other organic residue to eliminate places where bacteria can survive.
- If warm temperatures and heavy rains are in your forecast, scout carefully for BLS between rain events. Space plants adequately to ensure rapid canopy dry-down after rain or overhead irrigations and increase air flow through your crop as much as possible.
- *Infected plants cannot be treated curatively and will eventually succumb to a BLS infection.* Best practices are to rogue-out infected plants (throw them away—do not compost symptomatic plants) and treat healthy plants with a bactericide.
- Copper-based products (ex. Phyton, Camelot, etc.) or copper + mancozeb tank mixes are an effective, chemical management approach. Good coverage and canopy penetration is critical. **(Note: Do not apply B-nine/Dazide within seven days of a copper-based bactericide application or phytotoxicity may occur.)**
- Biologicals, such as Cease, can be very effective at preventing BLS infections when applied preventatively.
- Foliar applications of quaternary ammonia products labeled for use on plants (ex. KleenGrow) can also be effective at combating BLS pressure.
- Under high-pressure scenarios, a rotation between copper + mancozeb, a biological *and* quaternary ammonia product, is advisable.