

**Managing Bacterial Spot in Ontario Field Tomato Production: Time to Hit the Refresh Button**

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| Tier 1 - likely to have the biggest impact |   |
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| Shipping/<br>Picking Up<br>Transplants     | <p><b>One crop per load.</b></p> <ul style="list-style-type: none"> <li>➤ Do not arrive to pick up transplants with a trailer already ½ loaded with host plants (tomatoes, pepper) from another greenhouse.</li> </ul>  |
|  | <p><b>Clean and sanitize plant trailer between loads.</b></p> <ul style="list-style-type: none"> <li>➤ Use appropriate sanitation chemicals &amp; concentrations (see Additional Resources).</li> </ul>   |
| Holding<br>Transplants                     | <p><b>Plants need ventilation.</b></p> <ul style="list-style-type: none"> <li>➤ If holding plants overnight or for an extended period of time, provide adequate ventilation to the plant trailer, to avoid a build-up of humidity and condensation in the trailer, which would promote the growth of bacterial diseases.</li> </ul>   |
| Transplanting                              | <p><b>Clean and sanitize the transplanter (surfaces that contact plants and trays) between fields and varieties.</b></p> <ul style="list-style-type: none"> <li>➤ Use appropriate sanitation chemicals &amp; concentrations (see Additional Resources).</li> </ul>  |
|  | <p><b>Transplanting crew cleans and sanitizes their hands at every break or changes to new disposable gloves.</b></p> <ul style="list-style-type: none"> <li>➤ Bacteria can be spread from plant to plant on workers’ hands.</li> <li>➤ Consider this: at a transplanting rate of 1.5 ac/hour with 6 workers (1/row) and 13,000 plugs per acre, 3,250 plugs are touched per person per hour.</li> </ul>   |
| Tier 2 - some impact expected              |   |
| In-season                                  | <p><b>Avoid planting tomatoes immediately adjacent to other host crops (peppers, other tomatoes).</b></p>   |
|  | <p><b>Clean and sanitize sprayer / cultivator equipment between fields.</b></p> <ul style="list-style-type: none"> <li>➤ Bacteria can be spread from field to field on equipment that comes into contact with the crop.</li> </ul>  |
|  | <p><b>In processing and unstaked fresh market tomatoes, eliminate hoeing beyond 3 or 4 weeks after transplanting.</b></p> <ul style="list-style-type: none"> <li>➤ This will reduce leaf tearing once the rows start to fill in.</li> </ul>   |
|  | <p><b>Eliminate inter-row cultivating beyond 3 or 4 weeks after transplanting.</b></p> <ul style="list-style-type: none"> <li>➤ This will reduce leaf tearing once the rows start to fill in.</li> </ul>  |
|  | <p><b>When working with staked plants (pruning, tying), clean and sanitize tools between each plant. Change gloves or clean and sanitize hands every row.</b></p> <ul style="list-style-type: none"> <li>➤ Bacteria can be spread from plant to plant on tools and workers’ hands.</li> </ul>   |
|  | <p><b>Crop scouts and other visitors instructed to clean and sanitize hands or wear gloves prior to entering each field. Wearing plastic booties which are changed after each field will also limit the spread of soilborne pathogens from field to field.</b></p>  |
|  | <p><b>Use 8 applications of copper + Actigard, applied on a 7-day interval, starting within 7 days of transplanting.</b></p> <ul style="list-style-type: none"> <li>➤ Five years of research trials at Ridgetown Campus have shown that this is the most consistent program for reducing early season disease and in some cases, reducing defoliation. It is the only program that has shown a yield benefit (in 1 year out of 5) in the research trials. See Table 1.</li> </ul> |

| <b>Tier 3 - little impact expected compared to tiers 1 or 2</b> |  |
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| In-season   | <p><b>Controlling weeds in the field.</b></p> <ul style="list-style-type: none"> <li>➤ Weeds are potential hosts for bacterial spot and interfere with air movement and drying of the crop canopy.</li> </ul>  |
|   | <p><b>Fallowing weak areas within the field (historic poor drainage, low areas).</b></p> <ul style="list-style-type: none"> <li>➤ This may be where the severe symptoms show up first, but is probably not the initial source of the inoculum.</li> </ul>  |
| <b>Tier 4 – no impact expected on bacterial spot</b>            |  |
| Pre-season  | <p><b>Crop rotation.</b></p> <ul style="list-style-type: none"> <li>➤ This is beneficial for management of a number of pests, but is not as useful for managing bacterial spot.</li> </ul>   |
| In-season   | <p><b>Applying other protective spray programs, except the program listed in Tier 2.</b></p> <ul style="list-style-type: none"> <li>➤ Five years of bacterial spot efficacy research at Ridgetown Campus has shown minimal to no beneficial impact to any of the spray programs tested, except copper + Actigard as described in Tier 2. See Table 1.</li> </ul> |
|   | <p><b>DSV-based spraying of bactericides.</b></p> <ul style="list-style-type: none"> <li>➤ TomCAST is designed based on the biology of the fungal pathogens that cause early blight, septoria leaf spot, and anthracnose. DSV-based spray timing is not appropriate for bacterial spot management.</li> </ul>  |
|   | <p><b>Using disinfectant on tools, equipment, hands, and other surfaces without pre-cleaning to remove films and organic matter.</b></p> <ul style="list-style-type: none"> <li>➤ Disinfectants must be applied to clean surfaces to be effective.</li> </ul>  |
|   | <p><b>Beginning a program of cleaning and disinfecting tools, equipment, hands, and other surfaces after disease is already established.</b></p> <ul style="list-style-type: none"> <li>➤ Bacteria are present (and can be spread) long before the first symptoms are visible.</li> </ul>  |