



PRELIMINARY REPORT

Integrated Management Tools for Fresh Market Tomatoes

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Goals:

A primary goal is to enhance the efficacy of plant residue mulches (PRMs) and plant growth promoting rhizobacteria (PGPRs) through the use of drip irrigation and fertigation. PRMs and PGPRs may be components of integrated, economical and ecologically-driven crop management strategies. But, water and nutrient availability are thought to impact their effectiveness.

Methods:

The four factors below are applied in combination to create 24 unique treatments:

1. Irrigation→ 50% or 100% of estimated crop evapotranspiration
2. Mulch types→ rye plant residue (PRM) or black plastic
3. PGPRs→ Control (none), MBI 600 (*Bacillus subtilis*), or a combination of GB03 (*Bacillus subtilis*) and IN937a (*Bacillus amyloliquifaciens*)
4. Fungicide→ Control (none) or Bravo Ultrex 82.5, Quadris and Manex II

Outcomes:

This study was conducted on a more limited basis in Fremont, OH in 1999 and 2000, with support from the Ohio Vegetable and Small Fruit Research and Development Program. Data from these preliminary related studies suggested that irrigation regimens, mulch types, and PGPRs may impact crop, weed, and disease variables. The current study is funded in part by the USDA. To date, observations include:

- Maintaining uniform soil moisture levels is easier in plots containing plastic versus PRM.
- Weed growth is less in plots containing plastic versus plant residue mulch.
- Weeds are mainly distributed in close proximity to the drip irrigation line in PRM plots.
- Plant growth is greater in plots receiving more water.
- MBI 600 increased crop plant height compared to the combination or control treatments.
- Dry weather has limited disease development. Therefore, no differences have been found between fungicide-treated and control plots in the level of disease.

Implications:

It is too early to draw conclusions from this year of study. However, preliminary related studies have shown that the long-term benefits of this integrated system may include:

- PRM could be a viable alternative to plastic mulch because it is:
 - 1) less costly to establish and remove than plastic mulch
 - 2) compatible with soil stewardship goals aimed at improving sustainability
 - 3) helpful in reducing off-site nutrient movement
- PGPRs could promote plant growth and control disease in the field.
- Drip irrigation and fertigation could work in conjunction with reduced tillage-PRM systems to offset nutrient immobilization, typical during PRM decomposition.
- As a whole, this integrated system may reduce current production costs, through reducing or eliminating the need for plastic mulch, crop protectants, and/or fertilizer. It may also help growers reduce off-site nutrient movement and improve soil health.