

The Impact of Organic Fertilizer Amendments on Tomato Transplants

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Why use
commercially
produced
transplant
stock in the
Midwest?



- To kickstart the growing season
- To increase plant quality, uniformity, and growth rates
- To reduce labor demands for starting plants

- To increase growth of organic vegetable crops
- May include bone meal, blood meal, feather meal, alfalfa meal, fish emulsion or other substances
- To allow addition of different N-P-K amounts/balance

Why use organic amendments and what are they?



What are the justifications for this study?

- Difficult to find studies that compare dry (powdered) amendments to liquid fish emulsion
- Could address questions related to effective rates of application and impact of different amendments on specific growth parameters
- Transplants are increasingly important to growers in the Midwest and more consistent stock could be produced with greater knowledge of impacts of organic amendments

What was
our study
design?

- Seeds: Organic tomato (*Solanum lycopersicum*) 'Brandywine'
- 25-cell trays in a completely randomized block design, 4 replications, grown for six weeks in two trials
- Organic amendments: bone meal, blood meal, feather meal, liquid fish emulsion, each at two rates; also a control
- Powdered amendments added at sowing, fish emulsion added at beginning of weeks four, five, and six
- Four plants per tray harvested at end of week six for each trial



BLM2



BLM4

No
germination

Fish emulsion and feather meal at low application rates produced more robust plants in comparison to all other amendments and rates

What did the plants look like at the end of six weeks?

BOM2



BOM4



Control



FE2



FE4



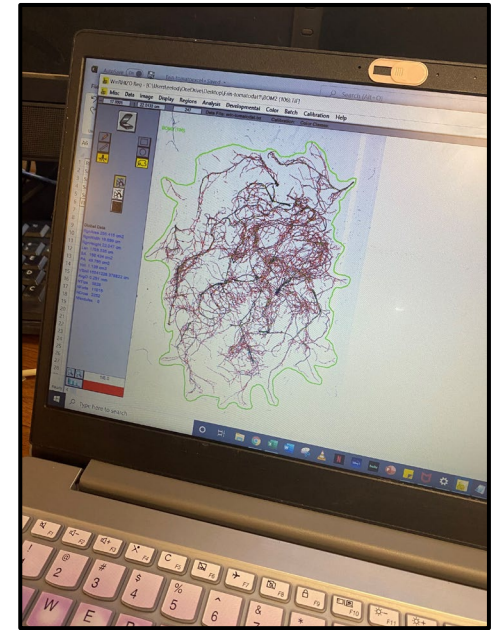
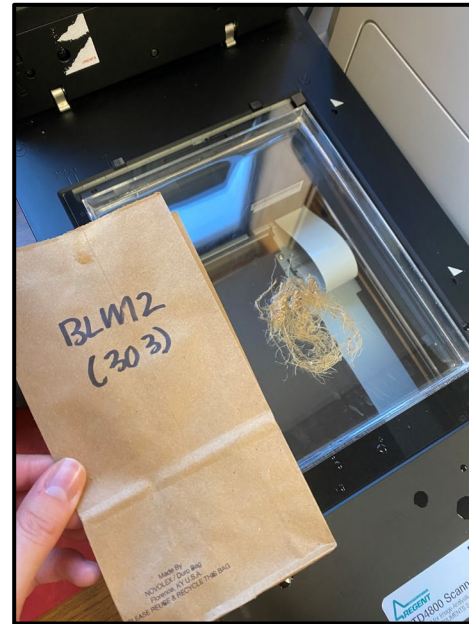
FM2



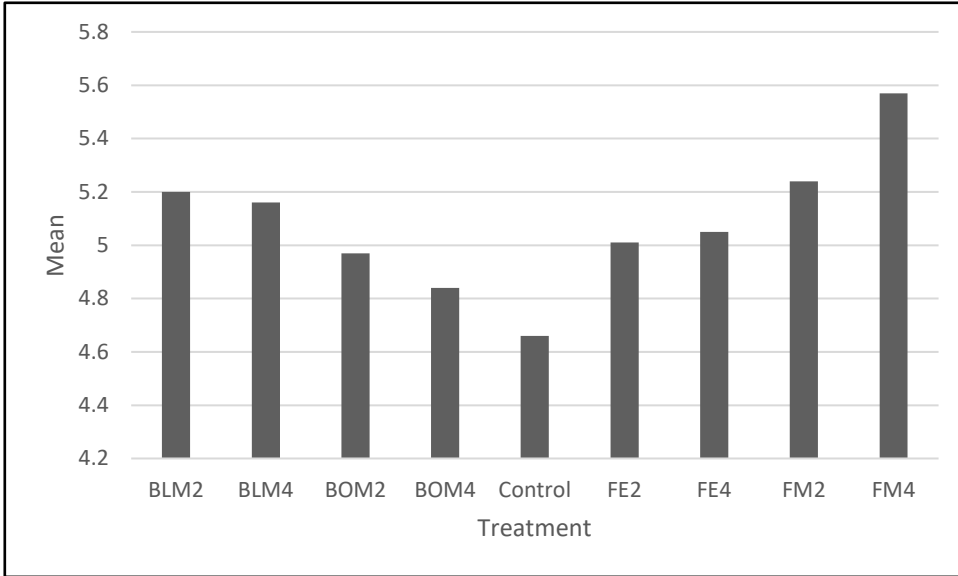
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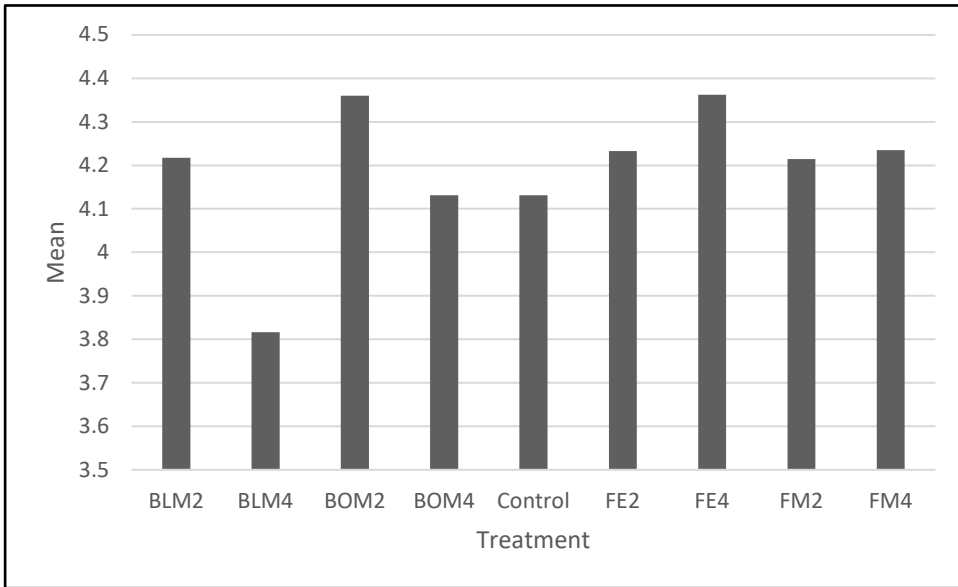
How did we conduct the harvest?



- Removed soil and washed roots of middle four plants from each transplant tray
- Dried three plants per treatment/replication at 67°C degrees for 10 days
- Used one plant for WinRHIZO root system images and measurements



Tomato seedling stem diameter after six weeks in greenhouse (mm) (Trial 1).

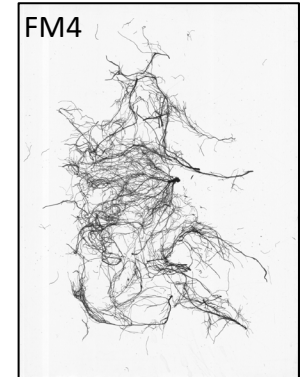
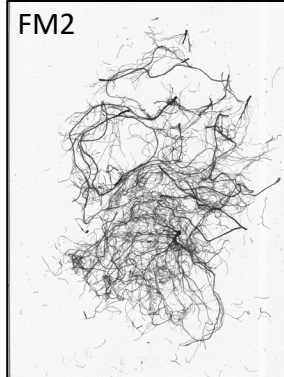
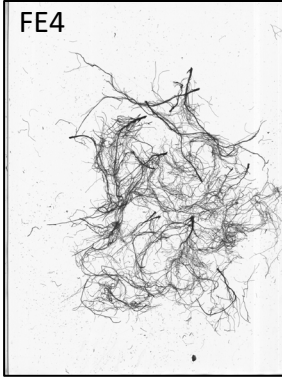
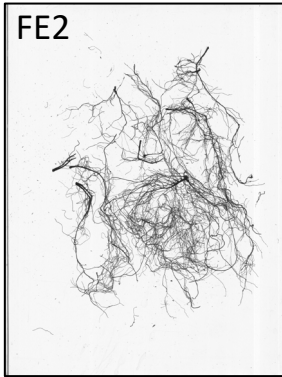
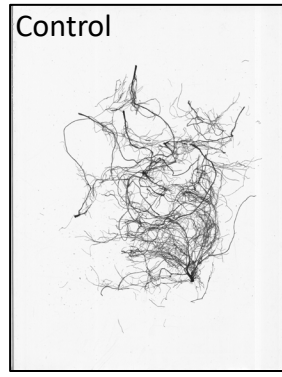
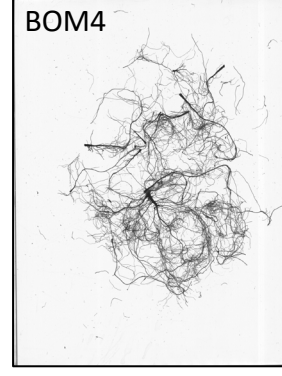
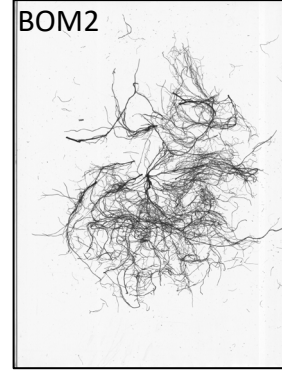
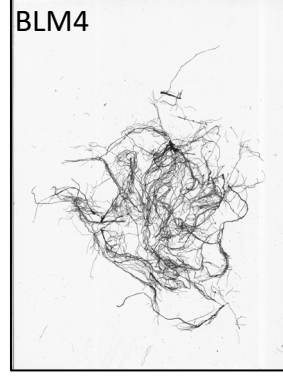
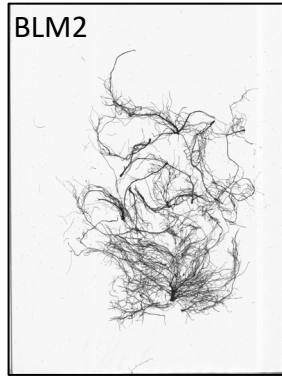


Tomato seedling dry biomass after six weeks in greenhouse (oz) (Trial 1).

What did we find?

One time application of dry amendments was comparable to multiple foliar applications in terms of dry biomass and stem diameter

What did the
root systems
look like?



- Fish emulsion and feather meal produced the densest root systems at both high and low rates
- One-time application of dry (powdered) amendments is a viable option for transplant growth

What
conclusions
did we
make?

- Trial 1 seedlings were larger for all treatments and the control
- In general, lower application rates (for FE more frequent application) of amendments resulted in seedlings that had more total biomass and larger root systems than did control seedlings
- Among amendments, fish emulsion and feather meal consistently produced plants with a combination of more biomass and larger stem diameter

Thank you!

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- Learn more about our other research at:
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