

Investigating trade-offs of subsurface drip irrigation in processing tomatoes

Background

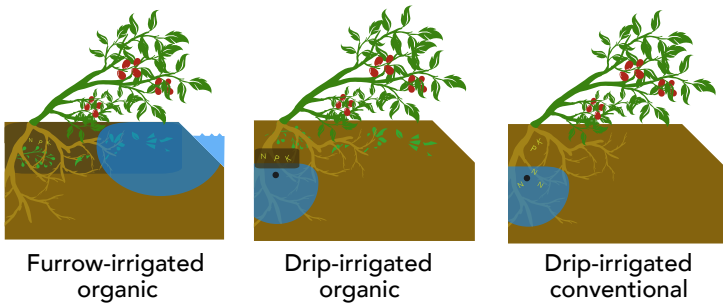
Use of subsurface drip irrigation has rapidly increased in processing tomato production and provides numerous benefits including *lower water use*, *reduced weed pressure*, and *root zone fertigation in conventional systems*.

Fertility sources in organic fields, however, rely on microbes to release nutrients from compost and cover crops, making precision management with subsurface drip irrigation more difficult.

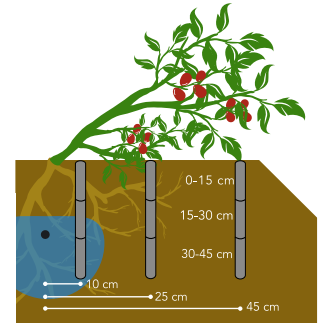
Also, with only a small volume of soil wetted by drip emitters, limited moisture in surface and edge soils may affect other beneficial activities performed by microbes, such as soil organic matter and aggregate formation.

Could the small wetting zone from subsurface drip irrigation have implications for soil health?

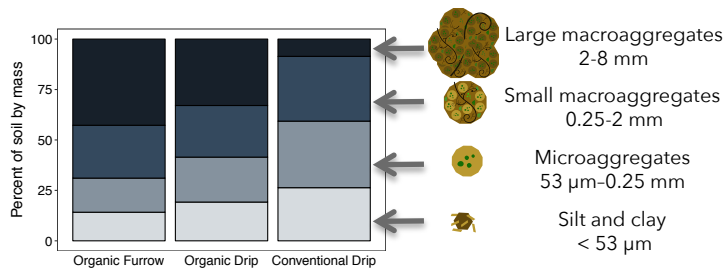
Treatments



We sampled at 3 different distances from the bed center and at 3 depths to capture what was going on spatially.

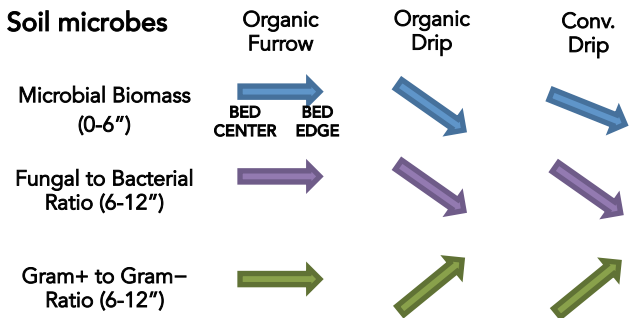


Soil aggregation



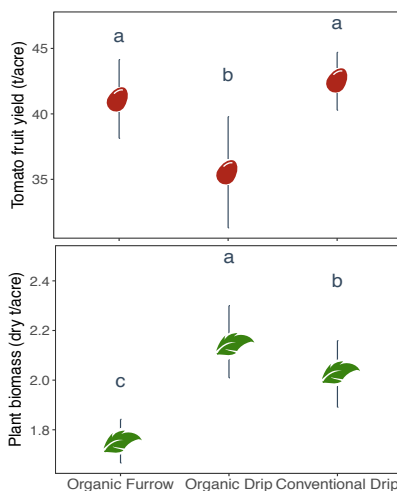
Drip irrigation may *reduce aggregate stability* in surface soils. Organic treatments had more stable aggregation than conventional. (Data from July, 0-6" depth, middle distance)

Soil microbes



Drip irrigation *reduced microbial biomass* at the bed edge in surface soils, and at depth (6-12") is changing which *microbial groups* are able to survive. (Data from August)

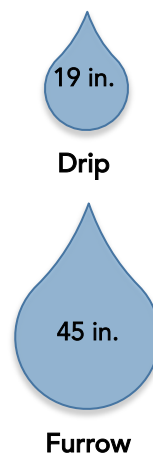
Yield and biomass



Yields in Organic Drip were 16% lower than Conv. Drip and 13.5% lower than Organic Furrow.

Organic Drip had higher vine weights, indicating that there may be a mistiming of nutrient availability.

Water Use



Take-Home Messages:

- Dry areas of the bed in drip irrigated treatments showed *reduced microbial biomass*, and *changes in microbial groups*, which could affect soil organic matter decomposition and formation.
- Organic drip treatments had the *lowest yields*, perhaps due to mistiming of nutrient availability.
- However, *water use and weed pressure* were substantially higher with furrow irrigation.
- There may be negative trade-offs of drip irrigation for soil health.