

Soil Solarization and Anaerobic Soil Disinfestation

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HOS 4932/6932 Weed Management for Organic and Sustainable Cropping Systems

Anaerobic Soil Disinfestation (ASD)

- The use of organic amendments and soil saturation to control soilborne organisms.

Objectives

- Students will understand and be able to explain soil solarization and how it can be used for managing weeds.
- Students will understand and be able to explain the process of anaerobic soil disinfestation.
- Students will be able to discuss how soil solarization can be integrated with ASD and other methods of soilborne pest management to enhance their utility for weed management.

Anaerobic Soil Disinfestation (ASD)

1. Apply a labile carbon source to tilled soil.
2. Place irrigation driplines.
3. Cover with plastic mulch to limit gas exchange.
4. Irrigate to fill the pore spaces with water.

References

- Roskopf, E., N. Kokalis-Burelle, J. Hong, and D. Butler. 2012. Anaerobic Soil Disinfestation (ASD) in Florida. <http://www.crec.ifas.ufl.edu/extension/soilipm/2012%20MBAO/presentations/Roskopf.pdf>
- Roskopf, E., N. Kokalis-Burelle, J. Hong, and D. Butler. 2014. Eliminating obstacles to the adoption of anaerobic soil disinfestation in Florida. http://www.imok.ufl.edu/media/swfrecifasufledu/docs/pdf/vegetomato-institute/presentations/ti2014/veghort_tiz014_Roskopf.pdf

Application of composted poultry litter and molasses



Composted broiler litter (9T/A) applied to "false bed"

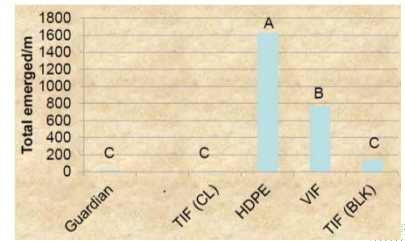
Molasses (3.5T/A dry matter)

Amendments are incorporated, drip lines and solarization film installed



Variation in nutsedge suppression with plastic mulch type

- Clear mulches
 - Guardian (Olefinas, 1.5 mil)
 - TIF (Raven, 1.8 mil)
 - Bromostop (Rimini, 1.4 mil)
- Opaque mulches - black
 - Pliant Blockade (1.25 mil)
 - TIF (Raven, 1.8 mil)
 - HDPE (Hilex)



ASD

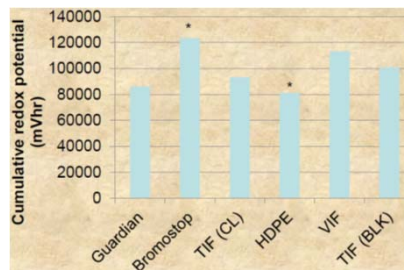
- Film is left in place for 2 to 15 weeks.
- Microbial decomposition of the carbon source results in increased respiration and development to anaerobic conditions.
- A decrease in soil pH is observed

Nutsedge control



Redox potential with clear and opaque HDPE, VIF and TIF mulches

- Clear mulches
 - Guardian (Olefinas, 1.5 mil)
 - TIF (Raven, 1.8 mil)
 - Bromostop (Rimini, 1.4 mil)
- Opaque mulches - black
 - Pliant Blockade (1.25 mil)
 - TIF (Raven, 1.8 mil)
 - HDPE (Hilex)



Effect of ASD on stem yield and weed suppression - dianthus

