

STATUS OF ASD DEVELOPMENT IN FLORIDA

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Anaerobic soil disinfestation (ASD) is a process in which a carbon source (molasses), a nitrogen source (composted broiler litter), and water are added to soil and covered with polyethylene tarp to create conditions conducive for soil bacteria to deplete the soil of oxygen and generate organic acids. The generation of acids and reduced oxygen availability serve to decrease the plant pathogen population (Momma et al, 2006) in the soil and reduce weed propagules. This method is being evaluated as an alternative to soil fumigants for the production of specialty crops in multiple states. In the Florida application of ASD, clear polyethylene tarps have been used to allow for soil solarization in addition to anaerobic conditions.

Recent work on ASD in Florida has included evaluating this approach for the production of strawberries, cut flowers, and solanaceous vegetables. In a microplot trial, purple nutsedge tuber survival could be significantly reduced without the addition of molasses or irrigation (Fig. 1). Similarly, in field trials conducted for the production of a bell pepper/eggplant double crop, weeds emerging in the planting hole could be reduced using solarization and composted broiler litter, without the addition of significant irrigation water, but this effect did not carry through the double crop. Weed control for the duration of the double-crop system was significantly better in treatments that included either 2 or 4 inches of irrigation water combined with solarization, composted litter, and molasses. This effect however, was not correlated with high levels of anaerobicity, as indicated by soil redox potential. Consequently, another trial was conducted in which several types of plastic were evaluated for their effect on generation of anaerobic conditions. While the cumulative anaerobicity during treatment was not impacted by the type of plastic, weed control was significantly better in all plots that were treated with clear plastic during ASD.

While considerable progress has been made to adapt this technology to Florida vegetable (Butler et al., 2012) and California strawberry production (Shennan et al., 2011) systems, recent trials have focused on pathogen and sting nematode control in Florida strawberry production and in the flat application of ASD for production of cut flowers. Control of introduced inoculum of the broad-host range pathogen *Macrophomina phaseolina* with ASD has been significantly better than other approaches that have been tested. This is a pathogen of emerging importance in Florida strawberry production. Optimizing nitrogen management for strawberry will be critical for successful adoption of ASD, as will the ability to minimize food safety concerns.

ASD for cut flowers has produced mixed results, which are highly dependent upon the level of cultivar tolerance to root-knot nematode (RKN). In a recent trial that included three cut flower species with different growth habits, crop duration, and varying levels of tolerance to RKN, ASD-treated plots produced the greatest number of marketable stems for two species. For the most nematode-susceptible crop, snapdragon, ASD and methyl bromide soil treatments produced the largest, most robust plants, but also the most severely galled root systems. For this species, steam treatments resulted in more effective nematode control.

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Figure 1. Total number of purple nutsedge sprouting immediately after ASD treatment with or without the combination of composted poultry litter, solarization, and initial irrigation.

