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NEWS RELEASE



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A New Method to Control Soil Borne Pathogens: Biological Soil Disinfestation

Fumigation of soil has been a common agricultural method to rid soil of pathogenic fungi, bacteria, nematodes, and weeds. Various chemicals such as methyl bromide, metam sodium, chloropicrin, and 1,3-dichloropropene have been used as chemicals to fumigate soil. Because of environmental and human safety concerns over the use of these materials, more restrictive regulations and even outright bans of these products have been placed on their use. Millions of dollars have been spent trying to find new alternative chemicals to replace these products.

One relatively new method has been developed in Japan and the Netherlands that takes an old concept and updates it is being called biological soil disinfestations (BSD) or sometimes referred to as anaerobic soil disinfestation (ASD). Adding large amounts of organic matter, green manure for example, has long been known to benefit soil health. Some organic material such as from brassica plants have even been known to produce chemicals that cause a fumigation effect called biofumigation. But researchers in Japan and the Netherlands have discovered that if you cover the incorporated organic material with a plastic tarp, an anaerobic condition develops that causes a disinfestation process to occur that can eliminate many soil borne pathogens.

The concept of BSD is really very simple. Add as much organic matter as possible to the soil. This can be an incorporation of a green manure or adding an organic waste product to the soil. Molasses and rice bran for example have shown to be very effective materials. Once the organic matter is incorporated into the soil, the field is irrigated to add moisture to the soil and then covered with either clear or black plastic tarp. As the organic material begins to decompose an anaerobic condition develops because the plastic tarp prevents oxygen from diffusing into the soil. Once the anaerobic condition develops several things happen. Anaerobic bacteria such as Clostridium, Enterobacter, Acetobacter, and others increase in number as they decompose the organic matter in the oxygen deprived soil. Organic acids are released as these anaerobic bacterial decompose the organic material. The main acids produced are acetic, propionate, and butyric acids. Finally this process also causes the release of volatile organic compounds in the soil that appears to have a fumigate effect.

The end result of all of this is that it kills soil pathogens such as fungi, bacteria, nematodes, and even some weed seeds. This concept is being practiced in Japan and is begun to be studied here in the U. S. and by UC Cooperative Extension researchers. Research by UC has already shown promise and more BSD trials will be done in California in 2009.

