ENHANCING SOIL SOLARIZATION FOR PEST CONTROL IN FIELD-GROWN FLOWER CROPS.

Clyde L. Elmore, Weed Science Program, University of California, Davis, California. 95616 USA.

Soil solarization has been used as a preplant treatment for control of weeds and soil-borne pathogens. It requires high solar radiation, high soil moisture, little wind and 4 to 6 weeks of treatment to be effective. Soil solarization has been most effective in warmer, high radiation areas of the world. Marginal locations include climates where there is fog, wind or overcast, cloudy conditions during a part or most of the high radiation periods of the year. It is in these areas that high quality flower crops are often grown.

Field studies have been used to evaluate the chemical metham or ammonia as additives to the solarization process. Also, products such as composted chicken manure and corn gluten meal have mixed into the soil before solarization begins. Additional studies have been used to compare polyethylene with other plastic materials in enhance temperature have been evaluated.

Black polyethylene, embossed black polyethylene or black polyethylene under clear polyethylene reduced temperature compared to a single layer of clear polyethylene. Using a small or large bubble wrap plastic under clear polyethylene, temperatures were increased over a single layer of polyethylene. Using a surface-active additive on the underside of the polyethylene to reduce surface tension and eliminate condensation did not increase temperature.

Metham at rates of 76 to 153 l/ha has increased weed control over solarization alone, when drip injected under the tarp. Control with the combination of chemical and polyethylene was increased over the same rates of metham alone. Ammonia at 459 l/ha injected into holes on 30cm centers was not as effective for weed control as l/ha of metham. Composted chicken manure at 7,250 kg/ha increased control of some weeds over solarization alone.

Although weed control with soil solarization can be improved with chemical additives or organic additives, the combinations have not been as effective for broad-spectrum pest control as methyl bromide.