

TREATMENT COMBINATIONS TO IMPROVE EFFICACY IN FIELD-GROWN FLOWERS

Clyde L. Elmore*, University of California, Davis, CA, J. Roncoroni, University of California, Davis, and S. Tjosvold, University of California, Santa Cruz County.

Single treatments for broad-spectrum control of pests is desirable if feasible. It eliminates repeated applications of a single pesticide, trying to fit pesticide combinations, or sequential applications of pesticide treatments. In some locations a single treatment such as soil solarization may control most pests in the field such as in the central valleys of California. However, since most of the flower crops in California are grown in the coastal regions, solarization is not consistently effective.

Field research trials have been conducted to attempt to push the range of effectiveness of soil solarization into the coastal regions by using additives such as Brassicaceae crops, chicken manure, corn gluten meal, low rates of metam and furfural + AITC.

Normally for soil solarization, a single thin (1.1mil) layer of clear polyethylene is sealed over moist soil. Field trials were established with double layers of polyethylene or small and large bubble wrap under a single layer, a Spanish solarization plastic, and a black embossed over white, brown or green polyethylene to evaluate heat capture for soil heating and weed control. Prior to laying plastic, different quantities of chopped broccoli or composted chicken manure were incorporated into soil to evaluate weed control. Furfural (Multigard FF) was applied alone at 47 and 71 gal/A or with AITC (6%) at the same rates and compared to metam alone or in combination with either furfural at 33 gal + 37 gal or 50 gal + 56 gal/A. Drip applications of acetic acid was evaluated in pots in the lathhouse and in the field for the control of annual weeds and nutlets of yellow nutsedge. Soil solarization was combined with a preplant treatment of metam as the standard comparison.

At Davis, CA in the Sacramento Valley, in one study, using a large bubble wrap under a single 1.1 mil layer of polyethylene increased soil temperature over a 6 week solarization period compared to the standard. All plastic treatments gave complete weed control. In a second study the large bubble wrap plus a single layer of polyethylene gave the highest temperature but the Spanish solarization plastic increased soil temperature over a single clear layer of polyethylene even though it started to break up at 4 weeks after laying the material. A double layer of polyethylene was more effective than a single layer. Weed control was similar between treatments except that the black embossed over white plastic gave less weed control than other treatments.

Biofumigation using 5 dry tons of chopped broccoli with soil solarization for 6 weeks reduced annual weeds by 99% at a location three miles from the California coast and was as effective as metam at 50 gal/a plus solarization as compared to soil solarization alone giving 74% reduction. When various combinations were evaluated to control vegetative parts (rhizomes) of Calla lily however, only soil solarization plus 75 gal/A of metam was

effective less than a mile from the coast. Chicken manure (composted) with or without solarization was not effective for weed control in two studies 1 and 3 miles from the coast. Corn gluten meal under clear plastic did not consistently increase weed control. One effect the broccoli may impart is an increase in soil moisture and benefits the effectiveness of soil solarization.

Furfural alone at 600 lb/A was not as effective as when combined with AITC (6 %) at similar rates. Weed control was increased with the addition of metam at 320 lb/A. In pot studies, seeds of rough pigweed were controlled with furfural + AITC at 400 and 600 lb/A, however field bindweed seeds and gladiolus cormlets were not controlled unless metam was added at 320 lb/A. In a field, large pot test, yellow nutsedge was not controlled with either furfural alone at 400 or 600 lb/A or with furfural+ AITC at the same rates. Only when metam was added at 50 gal/A was control achieved. In the same study the annual weed, wild mustard was partially controlled with furfural alone or with AITC but not as well as when metam was added. Little mallow was not controlled from seed with any treatment. Acetic acid at 1.5 to 2.5 % solution dripped onto soil has been effective in reducing yellow nutsedge nutlet germination in pot and field studies.

- Soil solarization is an effective pest control treatment in high radiation zones meeting the criteria for optimum heat collection.
- Addition of organic products has not increased weed control equal to standard chemical products.
- Currently these treatments will not dependably control the broad-spectrum of pests found in many flower fields.
- Combinations of pesticides such as 1,3-D, chloropicrin and metam or dazomet have given good repeatable results.