

SOIL FUMIGANT, PLASTIC MULCH, AND VARIETY EFFECTS ON VERTICILLIUM WILT AND YIELD OF STRAWBERRY

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Chemical alternatives to methyl bromide, two types of plastic mulch, and five strawberry varieties were used in replicated field experiments at a coastal site (Monterey Bay Academy) near Watsonville, CA. Strawberry had been grown for several years at the site and *Verticillium dahliae* and *Phytophthora* spp. were present in the soil. Starting mid-September, two-row beds were shaped, drip lines installed, and small cloth pouches containing soil with known populations of *V. dahliae* or vermiculite pieces of cultured *Phytophthora cactorum* were buried under plant row locations at four depths between 15 and 60 cm. Fumigation treatments were then applied as main plots in a split-split plot design. Selected beds were fumigated with shank-applied methyl bromide/chloropicrin (MBC) 67/33 at 325 lb/a (rates per unit treated bed area) and covered with standard black polyethylene mulch or clear virtually impermeable plastic film (VIF). Chloropicrin EC at 200 and 300 lb/a and InLine (Telone C-35) at 283 and 425 lb/a were applied to beds under standard and VIF plastic through drip lines and there were nontreated controls. Chloropicrin EC was also applied at 100 and 150 lb/a under standard plastic in 2002-03. Inoculum pouches were recovered and five strawberry varieties were transplanted into sub-subplots through the plastic mulch 4-6 weeks after fumigation. Conventional practices for annual strawberry production and pest management for the area were followed.

The use of VIF plastic as compared to standard plastic improved the control of buried inoculum of *V. dahliae* significantly where chloropicrin or InLine was used (1,2). In the case of *P. cactorum*, chloropicrin at less than 300 lb/a did not control buried inoculum significantly whereas both MBC and InLine did so; control of *P. cactorum* by chloropicrin at 300 lb/a was intermediate. In general, VIF plastic did not improve the control of *P. cactorum* inoculum significantly. The ranking of the five varieties used for the final incidence of plants with Verticillium wilt (e.g., low 15% to high 85% in 2002) on nontreated soil was Camino Real, Aromas, Diamante, Camarosa, and Ventana (1,2). Control of Verticillium wilt by InLine in the more susceptible varieties Camarosa and Ventana was superior to that obtained with MBC, especially where VIF plastic was used (1). Disease control by chloropicrin at 200 and 300 lb/a was generally less than that by MBC with standard plastic but was improved with VIF plastic (1,2). Verticillium wilt control in the more susceptible varieties by chloropicrin at 100 and 150 lb/a under standard plastic was inadequate in 2003. All fumigation treatments effectively

controlled weed growth through plant holes in the plastic mulch.

The effects of fumigation treatments on berry yields varied with the time of harvest, variety, and somewhat between the years 2002 and 2003 (1,2). In general, the varieties giving the highest yields on MBC treated soil (Diamante, Camarosa, and Ventana) also had the largest yield responses to fumigation in comparison to non-fumigated soil. All the chemical fumigation treatments more than doubled total yields and the effects of the various chemical treatments on the yields of Camino Real, Aromas, and Diamante, were generally similar. For the variety Camarosa, the MBC treatment with VIF gave the highest total yield in 2002, while the lower rate of InLine gave the highest yield in 2003. InLine at 283 lb/a give the highest yields of Ventana in both years. Ventana plants grown in soil treated with InLine at 425 lb/a tended to be more vegetative than those in other treatments. Additional research is needed to optimize methods of soil fumigation with chemical alternatives to methyl bromide for some of the newer strawberry varieties in California.

References Cited:

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