EVALUATION OF ALTERNATIVE MATERIALS FOR METHYL BROMIDE SOIL FUMIGATION.

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A study evaluating alternative materials for Methyl Bromide was applied in field plots near Tifton, GA on a fuquay sand loam soil November 3 and 4. The treatments applied were: Methyl Bromide at 9 lb/100 sq yd.; metham sodium 100 gal/A sprayed on the soil surface and incorporated with a tractor-powered rototiller; 1,3-D C-17 chisel injected to 8-inches; 1,3-D c-17 chisel injected to 4 inches and mixed and incorporated with a tractor-powered rototiller; A combination treatment of Telone C-17 at 13.5 gal/A chiseled in to a depth of 4 inches and metham sodium at 100 gal/A sprayed and incorporated and mixed with a tractor-powered rototiller; a combination treatment of 1,3-D C-17 at 13.5 gal/A chiseled in to a depth of 4 inches and metham sodium at 50 gal/A sprayed on to the soil surface and incorporated and mixed with a tractor-powered rototiller; dazomet at 13 oz/100 sq ft applied to the soil surface and incorporated with a tractor-powered rototiller; and an untreated control. All treatments were applied on 3 November except methyl bromide which was applied 4 November 1993. All plots were covered with 3 mil plastic immediately after treatment, with the exception of the methyl bromide plot which was covered with plastic prior to treatment and injected manually. The average high temperature at a 4-inch soil depth for the application dates was 65°F, and average air temperature was 67°F. The test consisted of a randomized complete block design with 6 replications of each treatment. Plots were 25 ft long and 6 ft wide. All treatments were uncovered on 5 January 1994, except dazomet which was uncovered on 6 December 1993'. On 25 January, after aeration, two rows of "Pip" bell pepper were seeded at the rate of 24 seed/ft in the center of the plot, and two rows of "K-326" tobacco seeded at the rate of 19.2 seed/ft on one side of the bed, and two rows of Coker 371-Gold seeded at the rate of 19.2 seed/ft on the other side of the bed. The plants were again covered with plastic to protect them from the weather. Plots were fertilized as follows: 6-12-6 at 1.425 lb/sq yd applied on 19 January 1994, prior to seeding, and 80 lb/A of 16-O-O on 3 March 1994 as a topdress. Plots were watered as required.

Just prior to covering the plots with plastic, toothpick cultures of Phytophthora parasitica var. nicotianae in nylon mesh bags (2 toothpicks per bag, 3 bags/plot) were placed just below the soil surface in each plot. These were recovered just as the plastic was removed on 6 December 1993 for the dazomet treatment and 5 January 1994 for the other treatments and tested for viability by reculturing and microscopic

examination and inoculation trials. Soil samples collected 20 January 1994 were evaluated for populations of Pythium (P. irregulare & unidentified Pvthium sp.) and Rhizoctonia solani AG-4, using PAR and tannic acid medium, respectively.

Numbers of emerged plants were determined on 3 March 1994 by counting the number of plants in a 10 ft section of the inside row of tobacco for each cultivar, and on 7 March 1994 for pepper. Vigor ratings for plots were made on 8 April 1994 using a 1-10 scale where 1 was least vigorous and 10 was the most vigorous. Weed control data was collected on 5 April 1994, by estimating the % control of weeds in plots relative to the untreated control. Weeds evaluated were Yellow Nutsedge (Cyperus esculentus L.), Florida Pusley (Richardia scabra L.), Purple cudweed (Graphalium purpureum L. var. purpureum) and Cutleaf evening primrose (Oenothera laciniata Hill). Twenty plants were removed from each plot on 15 April and the length of plants recorded.

A wheat/corn seed bait (2 ounces of each) was randomly placed into a 6" diameter hole 1½" deep in each plot on 23 February. Each bait station was covered with soil and allowed to germinate. Beginning on 16 March and continuing until 23 March, all baits plus soil in a two gallon sample was removed, one replication each day, and returned to the laboratory. All soil and bait was sifted and sorted and observed for the presence of arthropod pests.

RESULTS

Phytophthora parasitica var. nicotianae cultures were killed by all treatments while 15 of 18 cultures survived in the untreated control. Pythium spp. colonies were lower than the untreated control in all treatments except methyl bromide. All treatments eliminated Rhizoctonia colony forming units. Stand counts were higher than the untreated control for all treatments except methyl bromide for Coker 371-Gold, and higher than the untreated control for all treatments except 1,3-D C-17 at 27 gal/A injected shallow and rototilled for K-326. All treatments improved stand counts and vigor of pepper. Plant length was generally increased by metham sodium, dazomet and combinations of 1,3-D C-17 and metham sodium. All treatments were effective in controlling weeds, except dazomet which controlled yellow nutsedge poorly. Insect populations were low and only small differences occurred among treatments. Nematode populations were low also, but samples taken on 12 May 1994 had lower populations of ring nematodes in the treated plots than the untreated control.