YIELD OF STRAWBERRIES INOCULATED WITH BIOLOGICAL CONTROL AGENTS AND PLANTED IN FUMIGATED OR NON-FUMIGATED SOIL.

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A mixture of methyl bromide and chloropicrin has been used to ensure high yields in strawberry production. This fumigation mixture controls soilborne plant diseases and weeds, and results in yield increases. Studies suggest that application of liquid fumigants such as vapam through drip lines may be an alternative to methyl bromide/chloropicrin fumigation.

In other systems, biological control agents have been developed which control soilborne diseases of plant pathogens. Results from field trials with biological control agents have been variable. The objective of our work is to determine if strawberry yields can be increased through the use of low rates of soil fumigants followed by application of biological control agents. We hypothesize that the application of soil fumigants will decrease the variability of biological control agents in the field. Because the deadline for methyl bromide use is approaching, we initially used biological control agents which have been shown to control a variety of diseases on a variety of plants while seeking antagonist from the rhizosphere of strawberry which control diseases on strawberry.

Methods and Materials

In this study, we evaluated the potential of combining chemical fumigants with biological control agents to increase strawberry yields. The test was conducted at one field site in Salinas, CA with three replicated plots of 40 plants each per treatment. We compared yield from plants which had been treated or were left untreated with biological control agents, Pseudomonas fluorescens strain Pf-5 and Bacillus cereus strain Soy130 (applied at 1 x 108 CFU/ml, 100 ml/60 plants). Plants were grown in soil fumigated with Vapam (42%) applied through a drip system at 50 gal/ac (on a flat bed basis), methyl bromide/chloropicrin (67/33%) applied by bed fumigation at 425 labs/ac (on a flat bed basis), or not fumigated. Beds were established and fumigated in October of 1997 and plants were treated and planted in November of 1997. Yield was measured from May 1998 through September 1998. Data presented here is cumulative through August 24, 1998.

Results and Discussion

Strawberry yields from plots fumigated with methyl bromide/chloropicrin or vapam were indistinguishable in this study. Both fumigants increased yield over the non-fumigated plots by 9%. No effect could be contributed to the application of biological control agents. The agents did not have an effect on yield in the non-fumigated plots where a larger pathogen pressure may have been present. The biological control agents used for this experiment were chosen because they have been shown to control soilborne diseases on other crops. We are currently screening potential strains which are commercially available or strains from strawberry rhizosphere for control of strawberry diseases. These are preliminary data and the experiments continue.