Effects of VIF and Solvent Carrier on control of Nutsedge and on populations of Trichoderma at Two Nurseries in 2003

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Introduction

To maintain effectiveness of fumigation with less MBr, two options hold most promise. One is to increasing the chloropicrin combined with MBr and the other is to reduce the loss of both from the soil after application. Co-extruded, multi layer films (VIF) which greatly reduce the loss of MBr after application increase effectiveness. Although VIF is available there are problems with its adoption. It costs more and it is more difficult to glue together for continuous application.

Materials and Methods

We evaluated the effects of VIF on numbers of nutsedges and on populations of two soil fungi at two nurseries. VIF tarps were used for two rates of chloropicrin, for two rates of chloropicrin dissolved in solvent, over two rates of 67% methyl bromide plus 33 % chloropicrin (MC33) and on not fumigated soil (for a VIF control). These were compared to a control of 350 lbs/ac MC33 under HDP tarp, and to chloropicrin without tarped.

Numbers of nutsedge were determined at Glennville on May 12 and at Ashburn on May 21, respectively, 34 and 44 days after fumigation. At Glennville the nutsedge is almost all yellow (*Cyperus esculentus*) and its abundance was estimated as clumps believed to have originated from a single parent. At Ashburn the nutsedge is primarily purple (*C. rotundus*) and percent cover was estimated. Soil samples were take from Ashburn on May 21 and from Glennville on July 7 to assess soil fungi. Soil from each treatment plot was mixed into 0.2% water agar and transferred to media selective for Fusarium and for Trichoderma. Counts of nutsedge and of fungi were analyzed for differences attributable to fumigation using SAS ANOVA or GLM.

Results:

The effects of fumigation on the soil fungi *Trichoderma* and *Fusarium* and on nutsedge abundance are presented in Table 1. The paraffin based solvent did not effect fungal populations. Fewer colonies of Fusarium came from fumigated soils but numbers did not differ among treatments. There was less *Trichoderma* in not fumigated than in tarped chloropicrin treatments which had more *Trichoderma* than those with MBr. In May, there was more nutsedge in not tarped compared to tarped treatments. By September post-emergent herbicides and a discing (at Ashburn) had reduced nutsedge and differences between treatments. The only difference for September nutsedge was that between not fumigated and other treatments. At Glennville but not at Ashburn, September nutsedge correlated with that in May ($r = 0.75$ $P = < 0.01$). May data are believed to more accurately assess fumigation's effects on nutsedge.

Table 1. The effects of fumigant and of tarp on selected soil fungi and on nutsedge abundance at Glennville and at Ashburn GA in 2001.

Fumigant	Rate†	Tarp†	Trichoderma††	Fusarium††	May Plants‡‡	Sept Cover
None	NA	VIF	4.3 d	1.9 a	106 a	35 a
Chloropicrin - Solvent	300	none	7.1 abcd	0.3 b	37 b	11 b
Chloropicrin - Solvent	200	VIF	9.6 ab	0.1 b	11 b	11 b
Chloropicrin - Solvent	300	VIF	10.9 a	0.1 b	21 b	6 b
Chloropicrin	200	VIF	9.1 abc	0.2 b	11 b	6 b
Chloropicrin	300	VIF	9.7 ab	0.3 b	6 b	6 b
MC33	150	VIF	5.6 cd	0.5 b	5 b	3 b

MC33	250	VIF	6.5 bcd	0.6 b	8 b	4 b
MC33	350	HDP	6.1 bcd	0.1 b	7 b	2 b
	lsd 0.05%		*3.5*	*0.6*	*34*	*13*

† Rate is pounds per acre, MC 33 is 67% methyl bromide and 33% chloropicrin.
†† Numbers are the averages for two nurseries and represent colony forming units (cfu's) per 0.005 gm of soil.

Discussion

Table 1 indicates that VIF tarp increased the activity of both MBr and of chloropicrin with respect to nutsedge control and the assessed soil fungi. It is encouraging that 150 lbs of MC33 under VIF was as effective as 350 lbs under HDP and that 200 lbs of chloropicrin (with or without solvent) under VIF was more effective than 300 lbs applied without tarp. Testing the efficacy of the VIF was the main reason for this study. There were some apparent "natural" (if non-significant) breaks in the distributions of Trichoderma and of May nutsedge that suggest that the tarped chloropicrin treatments were similar among themselves and different from the MC33 treatments. Tarped chloropicrin treatments appear to have more Trichoderma than the three MC33 treatments and nutsedge seems to have been more abundant in the tarped chloropicrin treatment than in the MC33 treatments.