Evaluation of all Components of the 3-WAY Fumigant System for use in Central Florida Tomato.

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As the amount of methyl bromide allocated for CUE crops continues to shrink, the performance of some of the methyl bromide alternatives becomes more important. One of the methyl bromide alternatives currently being used in Florida is that of the 3-Way system consisting of 1,3-dichloropropene, chloropicrin, and metam potassium. Due to the wide ranging areas of Florida tomato production, there are some components of the 3-Way system that may have to be removed or the rates of the fumigants reduced. The objective of this study was to determine what components of the 3-WAY fumigant system are necessary for control of purple and yellow nutsedge, soil disease, and nematodes in Florida tomato.

Materials and Methods

An experiment was conducted in the spring of 2009, spring of 2010, and summer of 2010 at the University of Florida – Gulf Coast Research and Education Center. The trial was organized in a randomized complete block design with four replications. Treatments consisted of all possible combinations of currently used products in the 3-WAY system and covered with either VIF (FilmTec 1.2 mil or Blocade 1.2 mil) or LDPE (Pliant 1.25 mil) plastic mulches. Treatments are listed below:

	Fumigant	Rate (broadcast)	Depth of placement	Plastic
1	Telone II	12 gal/A	12 inches	VIF & LDPE
2	Chloropicrin	150 lbs/A	8 inches	VIF & LDPE
3	KPam	60 gal/A	Applied in Drip	VIF & LDPE
4	Chloropicrin KPam	150 lbs/A 60 gal/A	8 inches Applied in Drip	VIF & LDPE
5	Telone II KPam	12 gal/A 60 gal/A	12 inches Applied in Drip	VIF & LDPE
6	Telone II Chloropicrin	12 gal/A 150 lbs/A	12 inches 8 inches	VIF & LDPE
7	Telone II Chloropicrin KPam	12 gal/A 150 lbs/A 60 gal/A	12 inches 8 inches Applied in Drip	VIF & LDPE
8	PicClor 60	250 lbs/A	8 inches	VIF & LDPE
9	PicClor 60 KPam	250 lbs/A 60 gal/A	8 inches Applied in Drip	VIF & LDPE
10	Telone C35	35 gal/A	8 inches	VIF & LDPE
11	Telone C35 KPam	35 gal/A 60 gal/A	8 inches Applied in Drip	VIF & LDPE
12	Non-treated Control			VIF & LDPE

The land was conventionally prepared and deep shank treatments (12 inch) were applied with a Yetter coulter rig. Pre-beds were pulled with a double coulter system and then the initial bed was formed with injecting the 8 inch applications using 3 shanks in a conventional fumigant rig. The beds were pressed again and the plastic and drip tape applied using a speed roller. Drip applications were made using double drip tape spaced 9 inches apart, delivering 0.25 gal/hr on 12 inch emitter spacing. Drip treatments were injected over a 180 minute time period to maximize the lateral movement of the fumigant.

Results

Only those treatments with the combinations of 1,3-Dichloropropene and chloropicrin (Pic) with and without KPam will be discussed.

Purple nutsedge counts. For the 2-WAY treatments (1,3-Dichloropropene plus Pic), Telone II + Pic and PicClor 60 under LDPE mulch had nutsedge counts similar to the non-treated control. All other 2-WAY treatments were similar and reduced nutsedge 70% or greater compared to the non-treated control. For the 3-WAY treatments (2-WAY plus KPam), all treatments were similar and provided 87% or greater control of purple nutsedge.

Marketable yield. For the 2-WAY treatments, Telone II + Pic and PicClor 60 under LDPE mulch had marketable yield similar to the non-treated control. Telone C35 under VIF mulch produced 1827 boxes/A with only Telone II + Pic under VIF and PicClor 60 under VIF producing similar yields. For the 3-WAY treatments, yield was compromised by injury from KPam. Tomato plants were transplanted too soon after KPam application and caused moderate stunting and increased variability in the trial. VIF treatments were injured greater than LDPE. Despite the injury all 3-WAY treatments had similar yields. LDPE treatments ranged from 1538 to 1568 boxes/A.

Summary

All treatments including KPam provided good to excellent control of nutsedge. All 3-WAY treatments provided excellent nutsedge control and provided adequate yield. The 2-WAY treatments (1,3-Dichloropropene plus Pic) must be applied under VIF plastic and will require a herbicide to provide excellent control of nutsedge and acceptable yields.