INCLUSION OF AN HERBICIDE CONTAINING FILM INTO A SYSTEMS APPROACH OF MANAGING NUTSEDGE

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As re-registered fumigant labels take full effect and methyl bromide has become widely unavailable, growers still seek effective alternatives for managing soil-borne pests in plasticulture production of vegetables. Many producers, especially smaller operations are not able to or do not choose to continue using soil fumigants due to increased cost and new label amendments. While they do have varietal resistance available in some crops to nematodes and several soil-borne pests they are left with few options for managing nutsedge (*Cyperus spp.*). There are few herbicides available that have good activity on nutsedge and sufficient crop safety on many vegetables. One such herbicide is halosulfuron (HSM). HSM is labeled in tomatoes and many cucurbit crops for pre and post emergence applications. It has excellent post emergence activity on yellow and purple nutsedge and fair to good pre emergence activity and can be applied to the bed surface under the plastic mulch. New mulch film technology has been developed in which HSM can be incorporated into the film and is released when the plastic is deployed and condensation forms on the underside of the film. Initial results indicate that the activity of HSM is improved when this type of delivery method is used. These experiments were initiated to determine the effectiveness of this technology when incorporated into a pest management system for nutsedge control.

Materials and Methods

A field experiment was conducted during the fall of 2012 at the Virginia Tech Eastern Shore Agricultural Research and Extension Center in Painter, VA. This experiment included six treatments arranged in a randomized complete block design with four replications. Experimental treatments included an untreated white on black virtually impermeable film (WBUT), untreated metalized film (MUT), black film containing HSM plus 300 lb per acre chloroprin (BHSM), metalized film containing HSM plus 300 lb per acre chloropicrin (MHSM), white on black virtually impermeable film plus 300 lb per acre methyl bromide:chloropicrin 50:50 (WBMB), metalized film plus 300 lb per acre methyl bromide:chloropicrin 50:50 (MMB). A white on black formulation of film containing HSM

was not available at this time so the film was painted white the day following application with a solution containing 25% white exterior latex paint. Seedlings of the tomato cultivar Tribute were transplanted into beds eight inches tall by thirty inches wide and rows were spaced six feet center to center. Seedlings were spaced 18 inches apart within the row. Plants were staked and tied as necessary. Crop protection practices similar to local commercial production were used to maintain crop health. Fruit were harvested at the mature green / breaker stage from the center eight plants of each plot on two occasions and graded into medium, large, and extra-large size categories and weighed. Nutsedge plants emerged through the film in the harvested area were counted after the first harvest. Analysis of variance was performed using the GLM procedure in SAS and means separation, when appropriate, was performed using Least Significant Difference.

Results and Discussion

Experimental treatments had a significant effect on nutsedge population. All treatments with either HSM containing mulch or methyl bromide controlled nutsedge significantly better than the untreated controls. While this difference was significant, nutsedge populations were still relatively low and did not compete enough with the tomato crop to significantly reduce yield. There were no differences in nutsedge population between fumigant and HSM film treatments. The untreated controls produced the least tomato yield but were not significantly different from other treatments. There were no symptoms of soil-borne disease visualized in experimental plots so it is not suspected that this was the cause of reduced yield in untreated controls. This trial was conducted near the very end of the tomato growing season and lower temperatures during this time of year likely reduced yield potential. Complete results are presented in Table 1.

Table1. Tomato yield parameters and nutsedge population as affected by mulch, herbicide, and fumigant treatment. Experiments were conducted at the Eastern Shore AREC in Painter, VA during the fall of 2012.

		Yield (lb/acre)			
Treatment	**Emerged nutsedge / ft^2**	**Medium**	**Large**	**Extra large**	**Total yield**
White/black + MB	0.0 b[z]	9297 ns	10295 ns	16386 ns	46857 ns
White/black HSM +Pic	0.0 b	7804	12090	19592	45516
Metal + MB	0.0 b	8206	12417	13545	44120
Metal HSM + Pic	0.0 b	7737	9953	15390	42986
Untreated Metal	3.2 a	6096	8909	15019	37737
Untreated White/black	5.4 a	7525	9559	15443	37525

[z] Values not followed by the same letter are significantly different at $P \leq 0.05$ by LSD. ns = not significant
MB = methyl bromide (300 lb per acre methyl bromide:chloropicrin 50:50)
Pic = chloropicrin (300 lb per acre)