Sustainability of Methyl Bromide Alternatives – Tomato and Pepper Initial Crop

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Introduction

With the potential for increased costs and a drop in efficacy for current methyl bromide alternatives, growers must receive all of the benefit of these products to maximize yield potential and pest control. A single-season approach to fumigant application can no longer be biologically and economically justified. Instead, growers will need to develop a sustainable program for each field in which they farm. Sustainability will become the key concept motivating programmatic change. It will no longer be possible to correct pest problems in one season when flawed and imperfect programs were used in previous seasons. Pest control will have to become an integrated, programmatic effort to maintain pest populations at their lowest levels and to extend the productive life of methyl bromide alternative programs. The objective of this trial was to determine the sustainability of methyl bromide alternative fumigant programs.

Materials and Methods

In the fall of 2008 a trial was initiated to look at the sustainability of four methyl bromide alternatives in a Florida double crop system. The initial treatments included Methyl Bromide 67:33 at 175 lbs/A, Midas 50:50 at 160 lbs/A, Paladin Pic at 60 gal/A, Telone II at 12 gal/A plus Chloropicrin at 150 lbs/A (2-Way), Telone II at 12 gal/A plus Chloropicrin at 150 lbs/A plus KPam at 60 gal/A (3-Way), and a non-treated control. All treatments were placed at 8 inches below the top of the bed except Telone II which was placed 12 inches below the bed top and KPam which was injected into the beds using two drip tapes. Each treatment had a split plot of herbicide or no herbicide which was applied beneath the plastic on finished bed top just prior to laying of the plastic mulch. The herbicides were applied beneath the plastic mulch and consisted of V10142 (0.3 lbs ai/A) plus Devrinol 50WP (4 lbs/A) in year one (tomato only) and Reflex (1 pt/A) plus Devrinol 50WP (4 lbs/A) in years two and three. This trial consisted of tomato and pepper planted in the initial crop followed by summer squash in the double crop. Only weed control and crop yield for the first two years of the study will be discussed in this paper.

Results

Annual Grass Counts. Our annual grass complex consisted of 85% goosegrass, with the remainder being large crabgrass and crowfootgrass. The application of the herbicide under the plastic mulch increased annual grass control. Paladin Pic and the non-treated control had similar annual grass counts in both year 1 and year 2. All other fumigation treatments had lower annual grass counts and were similar to each other. Paladin Pic had higher annual grass counts than any of the other fumigation treatments. We expect that when Paladin is registered it will come with a recommendation for the addition of a herbicide program. For the 2-Way program we are observing increasing levels of annual grasses from year one to year 2. This may suggest that this fumigant program will be weak on annual grasses and will require a post emergent application of a herbicide for grass control. In our trial we did not use a post emergent herbicide, but starting in

year 3 we will control any grass escapes so we can concentrate on the nutsedge and broadleaf weed control.

Yellow and Purple Nutsedge Counts. The application of a herbicide under the plastic mulch improved nutsedge control. The nutsedge pressure was low in this field at the beginning of the trial and all fumigation treatments provided similar control. We observed a large population increase from year one to year two in the non-treated control. Without the use of herbicides there was a slight increase in nutsedge populations for both the 2-Way and Paladin Pic fumigant programs. This increase still only resulted in a population of one nutsedge plant per 5 to 6 feet of bed.

Tomato Marketable Yield (mediums and greater). The majority of fumigation treatments produced greater yield than the non-treated control. There was no consistent benefit to yield with the use of a herbicide program. The 3-Way treatment consistently produced the greatest yield with all fumigants being similar in year 1 with the use of herbicides. In year 1 without the use of herbicides, only Midas 50:50 and Paladin Pic were similar to the 3-Way. In year two with herbicides, The Methyl Bromide 67:33, 2-Way, and Paladin Pic programs were similar to the 3-Way. In year 2 without herbicides, only Methyl Bromide 67:33 was similar to the 3-Way.

Pepper Marketable Yield (large and greater). There was no differences among treatments in the first year of the study. In year two, only the 3-Way and Midas provided yields similar to the methyl bromide standard. The 2-Way and Paladin Pic had reduced yields due to weed competition with the annual grasses. Paladin Pic had greater yield with the addition of the herbicide.

Summary

All fumigation treatments provided acceptable crop yields in tomato while only methyl bromide, the 3-Way and Midas provided acceptable yields of bell pepper. However, the 3-Way treatment provided the most consistent high yields and weed control. Paladin Pic produced high yields in tomato but also had higher weed counts. These weed counts were greatly reduced with the addition of a herbicide and it would be expected that this product will be required to have a herbicide program as part of its control strategy. In tomato all fumigant systems showed an improvement in weed control with the addition of a herbicide. On Paladin Pic was observed to benefit with the addition of a herbicide for grass control. After year 2 of this trial, all fumigant systems showed promise as a methyl bromide alternative for tomato, but it appears as though a herbicide program may be required for all fumigant systems to improve sustainability, especially that of the 2-Way and Paladin Pic programs. Bell Pepper will require a postemergent grass herbicide for the 2-Way and Paladin Pic to provide good control.