Post Methyl Bromide Fumigation Strategies and the Effect on Farm Income of Tomato Growers

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Introduction

Methyl bromide (MBr), by far the most effective fumigant used to control nematodes, soil-borne pests, weeds and plant diseases in agriculture, has been banned in the U.S. due to its ozone depletion effect. It is now only permitted under Critical Use Exemptions (CUEs) in a very limited scale under close government scrutiny. The MBr ban created a technological shock for Florida agriculture, especially the high value added specialty crop industry. The shock, coupled with intense competition from Mexico, has caused tremendous challenge to the Florida tomato industry, the largest fresh tomato supplier in the nation. Florida fresh tomato production decreased from 45 thousand acres in 2001 to 29 thousand acres in 2012. The farm gate value of the industry slumped from $620 million in 2010 to $270 million in 2012 (USDA/NASS, 2013). To address the production challenges and increase market competitiveness, the industry is struggling to find cost-effective methyl bromide alternatives.

Objective and Method

This research aims to identify optimal fumigation strategies through analyzing the cost effectiveness and risk of different methyl bromide alternatives. Partial budgeting and stochastic dominance analyses are performed based on the data acquired from scientific field trials. Yield and input use data were collected from field trials conducted by the University of Florida in fall 2013. Field trials used two MBr fumigant treatments, MBr:Pic (67:33) (*67% of Methyl bromide and 33% of Chloropicrin*) and MBr:Pic (50:50) (*50% of Methyl bromide and 50% of Chloropicrin*); three alternative fumigant treatments, including TE-3 (*Telone II, Chloropicrin,*

and DMDS), PicChlor 60 (*1,3-Dichloropropene and Chloropicrin*), and FL-3 way (*Telone II, Chloropicrin and K-pam*); and a non-fumigated treatment.

Key findings

Research results indicate that MBr:Pic (67:33) produces the highest average yield and net return, followed by MBr:Pic (50:50), TE-3, PicChlor 60, FL-3 way and non-fumigated treatment. Though fumigation costs of MBr:Pic (67:33) treatment are higher than other treatments, its excellent yield performance still makes it the most cost effective fumigation. Taking risks (consistency/volatility of treatment effects) into consideration, the two MBr treatments, MBr:Pic (67:33) and MBr:Pic (50:50), still dominate the other three alternative fumigants and the non-fumigated treatment; likewise, TE-3 dominates PicChlor 60 and FL-3 way.

All fumigation treatments generate positive gross margin except for FL-3 way (–$369.43/acre) and the non-fumigated treatment (–$189.32/acre). MBr:Pic (67:33) has the highest gross margin ($2,440.27/acre), followed by MBr:Pic (50:50) ($1,953.44/acre), TE-3 ($1,584.44/acre), and PicChlor 60 ($769.55/acre). However, all treatments result in negative net profits. MBr:Pic (67:33) has the lowest loss at –$749.32/acre, followed by MBr:Pic (50:50) (–$1,236.15/acre), TE-3 (–$1,605.15/acre), PicChlor 60 (–$2,420.04/acre). FL-3 way incurs the highest loss in net return, reaching –$3,559.02/acre, even higher than the non-fumigated treatment (–$3,378.91).

The results suggest that no alternatives investigated can substitute methyl bromide in terms of cost effectiveness, and all treatments lead to negative farming return, as a result of increased production costs, decreased yields as well as decreased prices because of competition.