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The Impact on Farm Profitability and Yield Efficiency of Bell Pepper Production of the Methyl Bromide Phase-Out Program in Georgia

Mark Byrd, Esendugue Greg Fonsah, Cesar Escalante, and Michael Wetzstein

The elimination of methyl bromide (MeBr) has been a hot topic for policymakers for more than a decade. As a result, of the Montreal Protocol on Substances that Deplete the Ozone Layer, signatory nations began implementing guidelines aimed at reducing or eliminating a variety of toxic substances, including MeBr, which has been identified as one of the toxic contributors to ozone depletion. In 1997 the Ninth Meeting of the Parties in Montreal recommended an accelerated phase-out schedule for MeBr.

The accelerated phase-out program is a major concern to most U.S. farmers, and in particular to farmers in Georgia, where the product is used not only as an important soil fumigant but also to control both the yellow and purple nutsedge (*Cyperus* sp.). Furthermore, this chemical is used for the production of most of Georgia's economically important vegetable crops such as cucumber, eggplant, green pepper, tomato, squash, and zucchini. If MeBr is phased out without alternatives, the production of these crops will be impossible under Georgia weather conditions. The adverse economic impact to the State of Georgia will be devastating.

Although most of the data used in previous economic-impact analyses regarding the elimination of MeBr has been obtained through the testing of tomatoes and strawberries in Florida and California, this study—which focuses on bell pepper production—is aimed at evaluating the economics of three alternative fumigants and herbicides and determining which alternative will provide the best yield, quality, and profitability for bell pepper in the absence of MeBr. An enterprise budget analysis revealed that C35 and KPAM provided the highest net returns: \$1,768/acre.

Bell pepper is an economically important crop for the state of Georgia. Successful production, marketing and distribution of this crop in Georgia is greatly dependent on the use of Methyl Bromide (MeBr), an important soil fumigant which also controls both the yellow and purple nutsedge (*Cyperus* sp.). The accelerated phase-out program recommended by the Ninth Meeting of the Parties of the Montreal Protocol on Substances that Deplete the Ozone Layer is a major concern for most U.S. farmers and in particular to farmers in Georgia, where the product is used for the production of most of Georgia's economically important vegetable crops such as cucumber, eggplant, tomato, squash, and zucchini. If MeBr is phased out without alternatives, the production

of these crops will be impossible under Georgia weather conditions (UNEP 1995).

According to the Georgia Farmgate Report, bell pepper ranked 24th in 2004 among all Georgia agricultural commodities, generating slightly over \$60 million (Figure 1). Furthermore, Georgia bell pepper production ranked fourth nationwide in 2004 (Boatright and McKissick 2003, 2004; Fonsah 2005; GASS 2002).

The peak bell pepper farmgate value was recorded in 2003, when it generated over \$87 million and was ranked 18th in importance in the state. Planted acreage peaked in 2000, when about 5,200 acres were planted but only 5,000 were harvested. The trend in planted versus harvested acreage has fluctuated (Figure 1) (Boatright and McKissick 2003, 2004; Fonsah 2005; GASS 2002).

Material and Methods

Due to the phase-out program, scientists at the University of Georgia and growers are forced to assess alternative production methods incorporating possible pesticide use to determine a substitute

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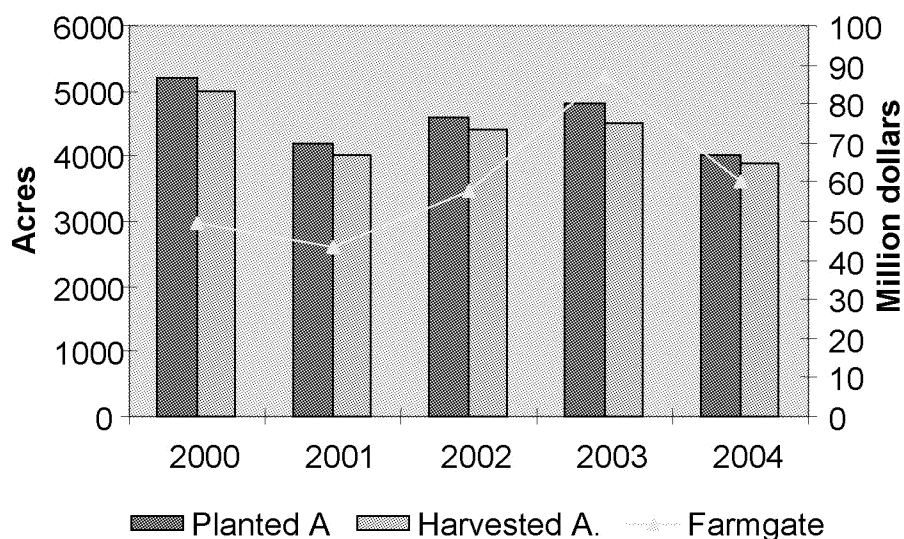


Fig 1. Georgia Bell Pepper Production and Farm Gate Value, 2000-2004.

compound or combination of compounds to replace MeBr. As a part of this assessment, University of Georgia scientists conducted field trials in 2002 and 2003 at the Rural Development Center in Tifton, Georgia to identify technically efficient combinations of fumigant alternatives and herbicides to replace MeBr. (Culpepper and Langston 2000). Three different combinations were tested: C-35 and KPAM, C-35 and Chloropicrin, and Telone II and Chloropicrin.

Results and Discussions

The technically feasible alternatives determined by field trails are further assessed in this study with the objective of determining their financial efficiency. For this analysis, Georgia bell pepper enterprise cost and return estimates were developed for each alternative, technically feasible production system. These cost and return estimates were then analyzed along with a conventional MeBr production system to determine their comparative financial feasibility.

A bell pepper enterprise budget using combined average yields and prices showed that C-35 and KPAM had the highest combined yield, 1,298 cartons per acre. Telone II and Chloropicrin generated the lowest yield, 1,119 cartons per acre (Table 1) (Fonsah and Rucker 2002).

A break-even analysis revealed that C-35 and

KPAM generated the highest break-even revenue and the lowest break-even price of \$10.32 per acre, compared to \$10.38 for MeBr, \$11.05 per acre for C-35 and Chloropicrin, and \$10.68 for Telone II and Chloropicrin. Although C-35 and Chloropicrin showed the highest total variable cost—\$12,468 per acre—compared to the other combinations, it still generated the highest net returns, \$1,768, thus outperforming MeBr, C-35 and Chloropicrin, and Telone II and Chloropicrin (Fonsah 2005; Fonsah and Rucker 2002).

Conclusion

Bell pepper is an important economic crop for the state of Georgia. Successful production, marketing, and distribution of this crop in Georgia is dependent on the use of Methyl Bromide (MeBr), an important soil fumigant which also controls both the yellow and purple nutsedge (*Cyperus* sp.), until an efficient replacement can be found. A bell pepper enterprise budget using combined average yields and prices showed that C-35 and KPAM had the highest combined yield, 1,298 cartons per acre. A break-even analysis revealed that C-35 and KPAM generated the highest break-even revenue and the lowest break-even price, \$10.32 per acre. Finally, although C-35 and Chloropicrin showed the highest total variable cost, \$12,468 per acre, it

still generated the highest net returns, \$1,768, thus outperforming MeBr, C-35 and Chloropicrin, and Telone II and Chloropicrin.

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Table 1. Pepper Enterprise Budgets, Using (Combined) Average Yields and Prices.

| Activity measures | Methyl Bromide | C35 & KPAM | C35 & Chloropicrin | Telone II & Chloropicrin |
|-----------------------|----------------|------------|--------------------|--------------------------|
| Yield (cartons) | 1,167 | 1,298 | 1,155 | 1,119 |
| Gross return | \$13,627 | \$15,156 | \$13,487 | \$13,070 |
| Fumigant cost | \$405 | \$786 | \$1,007 | \$528 |
| Other variable cost | \$10,869 | \$11,682 | \$10,794 | \$10,548 |
| Total variable cost | \$11,247 | \$12,468 | \$11,801 | \$11,076 |
| Total fixed cost | \$860 | \$920 | \$954 | \$879 |
| Net return | \$1,150 | \$1,768 | \$732 | \$1,115 |
| Break-even statistics | | | | |
| Break-even revenues | \$12,107 | \$13,388 | \$12,755 | \$11,955 |
| Break-even Yield | 1,037 | 1,146 | 1,092 | 1,024 |
| Break-even price | \$10.38 | \$10.32 | \$11.05 | \$10.68 |