

1/24/96

Cinnamon Hill Farm

71 Traugers Crossing
Kintnersville, PA 18930

SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION PROGRAM PRODUCER GRANT FINAL REPORT

Project Number: FNE94-75

Project Goals

The objective of this project was to demonstrate and evaluate the herbicidal effectiveness of reduced application rates of a mixture of atrazine and metolachlor in sweet corn when applied in conjunction with Garden-Mate™, a novel, organically derived, proprietary spray adjuvant with unique properties.

Vita Update

Beginning in May, 1995, we marketed our produce at the new Farmers' Market at the Allentown Service Plaza on the Pennsylvania Turnpike in addition to our stand at the Quakertown Growers' Market. Mr. Zimmerman held the position of Market Master of the Allentown market during 1995. Mr. Zimmerman suffered a fracture of the right hip as the result of a fall in April, 1995. This, in addition to the drought during the summer of 1995, forced us to reconsider our product line. As a consequence, Cinnamon Hill Farm now markets an ever expanding line of baked goods, and jams and jellies which Mr. Zimmerman produces in the family kitchen. The market for these products has proven sufficiently strong for us to consider the construction of a dedicated production area elsewhere on the premises, as well as the hire of a new employee to help with the kitchen work. Jams and jellies are also sold at Crafters' Cottage in Montgomeryville, PA. We plan to continue with both fruits and vegetables, and baked and canned goods in 1996.

Cooperators and Their Roles

We collaborated with PRS Materials, Inc. of West Chester, PA, the producers of Garden-Mate™. Their function has been to provide in-kind contributions of supplies, technical assistance, cost sharing, and assistance with the outreach program.

Protocol

General Application Procedures:

Garden-Mate™ (55 grams, 1.6 ounces; PRS Materials, Inc.) was suspended in about 1 gallon of water containing 1 tablespoon of liquid dish detergent by vigorous agitation with a mechanical stirrer to afford a uniform paste. The detergent has been found to reduce the viscosity of the Garden-Mate™ suspension with no apparent adverse effects upon its desirable wetting and dispersal properties; it also aids in accelerating the rate of dispersion. The Garden-Mate™ suspension is then added to about 25 gallons of water and, with continued mixing, further diluted to 55 gallons with water. Agitation of the suspension is maintained by use of a high pressure roller pump adjusted to afford minimal back pressure, that is, maximal bypass flow. Any additional adjuvants, such as, water soluble fertilizers, insecticides, and fungicides were added to the suspension of Garden-Mate™ before the final dilution. Maximal agitation of the resultant material was maintained for a minimal period of 15 minutes to ensure complete dispersion of the ingredients. Back pressure was adjusted to 100 – 125 psi immediately before product application. The herbicide mixture was introduced into the sprayer from a separate tank as a concentrate by means of a calibrated injection system.

Results

Sweet corn (Silver Queen) was planted in double rows 56 inches wide beginning on 25. April, 1994. The sprayer and injector were calibrated before the initial herbicide application, and recalibrated thereafter on a regular basis. In addition to the atrazine – metolachlor mixtures, Lorsban 4E was applied at the rate of 3 pints per acre. Control areas were left untreated.

<u>Plot Number</u>	<u>Treatment (pints/ acre)</u>
plot 1	Atrazine 4L (2.5)/ Dual 8E (1.5); (pre ¹)
plot 2	Atrazine 4L (1.5)/ Dual 8E (1.0); (pre)
plot 3	Atrazine 4L (1.0)/ Dual 8E (0.0); (post ²)
plot 4	Atrazine 4L (2.5)/ Dual 8E (0.0); (post)
plot 5	Atrazine 4L (1.5)/ Dual 8E (0.0); (post)
plot 6	Atrazine 4L (2.5)/ Dual 8E (1.5); (pre)
plot 7	Atrazine 4L (1.0)/ Dual 8E (0.6); (pre)
plot 8	Atrazine 4L (1.0)/ Dual 8E (1.0); (pre)
plot 9	Atrazine 4L (0.6)/ Dual 8E (1.0); (pre)
plot 10	Atrazine 4L (0.6)/ Dual 8E (1.5); (pre)

¹ preemergent

² postemergent

The results were documented photographically and are tabulated below.

<u>Plot Number</u>	<u>Results</u>
plot 1	complete control
plot 2	complete control
plot 3	moderate grasses
plot 4	some foxtail
plot 5	some foxtail
plot 6	complete control
plot 7	complete control
plot 8	complete control
plot 9	complete control
plot 10	complete control

Control areas were heavily infested with various foxtails; ragweed, dogbane, and smartweed were also evident, with lambsquarter and pigweed present to a lesser extent.

Dogbane and Canada thistle were not controlled under any of the experimental conditions.

Plots 1, 2, and 6 through 10 showed complete control of the target weeds throughout the season.

The postemergent treatments, as in plots 3, 4, and 5, showed good broadleaf control; however, escaped foxtails, especially giant foxtail, although suppressed, were problematic to varying extents. One cultivation was necessary to effect complete control. Sections left uncultivated outgrew the weeds although harvest was difficult due to the undergrowth.

Although corn has been grown in the trial field for several years without rotation, severe weed pressure still existed as indicated by the control areas. This condition is most likely due to the continued use of low levels of herbicides together with rotation into fallow areas. The fallow areas are spring plowed but left to grow in weeds; the growth was mowed several times through the course of the summer.

Economic Conclusions

The recommended application rate for an Atrazine - Dual tank mix for 1996 is 1.233 lb of Atrazine and 1.60 lb of metolachlor per acre. Our results demonstrate that these levels can be reduced to at least 41% and 62.5 %, respectively, of these amounts with minimal loss of weed control. By using only 0.5 lb of atrazine and 1.0 lb of metolachlor per acre, a farmer can save \$7.89 per acre in chemicals expenses and still achieve an acceptable degree of weed control. Problems caused by atrazine carryover are negated. In our best case only 0.3 lb/ acre of atrazine was used with acceptable levels of control.

Suggestions for Further Investigation

Future studies should focus on optimizing the rate of metolachlor application such that grass control is obtained with the minimum of chemical applied. This would afford additional savings since metolachlor is relatively expensive.

Recommence

Not only will we continue to use the methodology developed in this experiment, we will continue to refine it to a level such that our savings are maximized. We are also studying the effects of the application of Garden-Mate™ on the pesticide input in other crop areas.

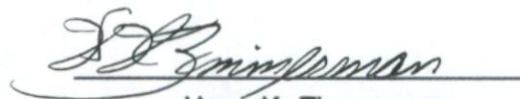
Outreach

PRS Materials, Inc. has been advised as to the outcome of the study and will circulate product information containing the results.

The Pennsylvania State Cooperative Extension Service has been advised of the results of the study. Copies of this report will be forwarded to the attention of the editors of Pennsylvania Farmer, Lancaster Farming, The Grower, and American Vegetable Grower.

A copy of the report has been sent to the Pennsylvania Vegetable Growers' Association.

I have mentioned the positive aspects of the project to many of the growers with whom I am familiar.



Harry K. Zimmerman

15. January, 1996

Illustrations



Photo 1



Photo 2

Illustrations



Photo 3



Photo 4