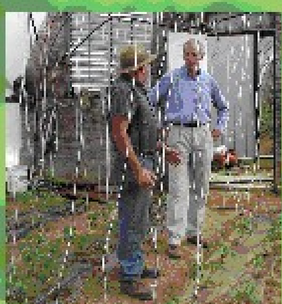
Greenhouse Integrated Pest Management (IPM) for the Amish and Mennonite Community of Lancaster County

Cathy Thomas and Sarah Pickel, Pennsylvania Department of Agriculture, Harrisburg, PA

Introduction

Lancaster County is the number one agricultural county in Pennsylvania (PASS, 2001) and has one of the largest concentrations of Amish and Mennonite farmers in the country. These communities have primarily been made up of dairy and tobacco farmers. In recent years dairy and tobacco prices have been low. Many farmers turned to minor crops including greenhouse vegetables, herbs and flowers to supplement their income.

Amish and Mennonite greenhouse operations involve the whole family and can include intensive use of pesticides. Barefooted children working in and near their parents in pesticide application areas is a concern to the Pennsylvania Department of Agriculture (PDA). By introducing these growers to Integrated Pest Management and biological controls (IPM and biocontrols), PDA hoped to reduce this pesticide use.



US EPA Region III Pesticide Program Coordinator John Butler (r) talks to Lancaster Co. Mennonite tomato grower, Ammon Zimmerman (l).

Objectives

By the end of the two year project growers were expected to:

- learn proper scouting techniques for identification of major greenhouse pests and their life cycles
- reduce traditional pesticide use by at least 50%
- use IPM techniques and biocontrols
- introduce bumble bee population to improve pollination and fruit quality

PDA IPM coordinator, Cathy Thomas (r) and Regina Langton (l), from the Office of Pesticide Programs at the US/EPA look at Mennonite ornamental grower Steve Garman's (c) poinsettia crop.

Methods

Because Amish and Mennonite communities often travel by horse and buggy, their ability to attend educational meetings is limited. Also, traditional educational presentations using slides, videos or PowerPoint are forbidden by many sects of the Amish religion. One-on-one instruction by an IPM specialist teaches greenhouse operators IPM and biocontrol systems specific to their own operation.

Because of weekly one-on-one training with IPM specialist Cathy Thomas (PDA) throughout the production cycles, twenty-three vegetable, herb and flower growers learned:

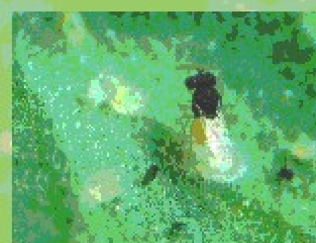
- pest scouting techniques
- pest and biocontrol life cycles
- proper release of biocontrols
- population assessment of both parasitized and non-parasitized pests
- determination of pest thresholds
- integration of soft pesticides compatible with bumble bee populations, encouraging bee pollination, which maximizes fruit production.

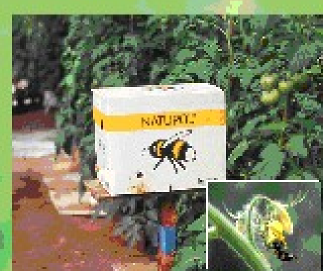
Encarsia formosa, a whitefly parasitoid is being applied to a poinsettia crop

Results/Discussion

This successful IPM/biocontrol program replaced traditional pesticide use with biorational pesticides and biological (natural enemy) controls. During year one, seven greenhouse tomato growers, and three bedding plant growers were project cooperators. During year two, six new vegetable growers and seven new bedding plant growers participated in the project.

All participants reduced pesticide use by at least 50% and over half of the participants completely eliminated traditional pesticide use. Because of the elimination of the traditional pesticides, growers were able to incorporate biocontrols into greenhouse production. They used species such as *Encarsia formosa* for control of whitefly, *Steinernema feltiae* for control of fungus gnat and *Phytoseiulus persimilis* for control of two-spotted spider mite. Growers were also able to introduce bumble bees for pollination.





Above: *Encarsia formosa* adult oviposits in a greenhouse whitefly nymph;
Below: Commercial beehive in a tomato production greenhouse;
Inset: Bumble bee on tomato blossom

The growers participating in this project consisted of retail and wholesale operations. Due to transportation limitations among the Amish and Mennonite community, many horticultural products are marketed at two local auctions (Weaverland and Leola Auctions). Both of these locations are monitored by the Dept of Agriculture Nursery and Greenhouse Inspectors. The inspectors feel this hands on teaching method has greatly improved the quality of plants sold at the auctions.

Mennonite greenhouse grower Ammon Zimmerman shows how *Encarsia formosa* is applied to his tomato production greenhouses in Lancaster County.

Acknowledgements

We thank the U.S. Environmental Protection Agency Office of Pesticide Programs for funding Grant No. R-9834901-0 and also the U.S. Department of Agriculture Northeast SARE Program for funding Research and Education Grant LNT03-176.

References

Hussey, N.W. and N. Scopes. 1985. Biological pest control. The glass house experience, Cornell University Press. Ithaca, N.Y.

PA Agricultural Statistics Service, NASS, USDA. 2001. US & All States County Data - Farm Numbers.

PA IPM. 2001. Making Pennsylvania's Greenhouse Industry More Profitable. Penn State University Publications. State College, PA.

For more information on PA IPM visit http://paipm.cas.psu.edu