

IPM FOR VEGETABLE CROPS—2002

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Vegetable IPM Extension Program

There are many risks associated with the use and misuse of pesticides in commercial vegetable production. Some of these risks include, creation of new secondary pest species or resurgence of primary pest(s) populations due to a reduction of natural enemies, resistance, adverse impacts on crop growth, regulatory expenses, pollution of ground and surface waters, unwanted food residues, reduced farm profitability, inadvertent chemical exposure of the public or farm workers, and land devaluation due to real or perceived hazards. UConn's Vegetable Crop IPM Program teaches commercial growers how to use a variety of pest management options designed to minimize pesticide use and associated risks, while protecting their crops and maximizing farm profitability. Growers participating in the vegetable IPM program learn to combine cultural, mechanical, genetic, physical, and biological control techniques to prevent pest problems and to only use chemical pesticides when absolutely necessary, as a last line of defense.

Extension personnel from Connecticut (J. Boucher, R. Ashley, R. Durgy and M. Chase) and New England team up with grower volunteers, service industry representatives, granting agencies, the New England Vegetable & Berry Growers' Association and other partners to help provide commercial vegetable producers around the state and region with IPM education. Commercial vegetable producers are educated through a full-season field training program, through regional and state growers' conferences, a regularly updated Vegetable Management Guide, IPM Manuals, other publications, individual consultations, farm visits, a twilight meeting series, newsletters/web site articles, and a weekly recorded telephone/internet pest message. Growers volunteer time, land, use of equipment, and expertise while serving on steering/planning committees for educational events and grants, to help conduct research and demonstration projects, and by sharing their knowledge as speakers at twilight meetings and conferences.

In 2002, UConn's Extension Agricultural Educator for Commercial Vegetable Crops (J. Boucher) provided weekly on-farm IPM training throughout the growing season for 9 commercial vegetable producers. These growers owned/managed family farms that produce 25 to 800 acres of vegetables. Weekly field educational efforts were targeted at family members and managers that were involved in the daily decision making process of crop production and pest management. These key individuals were taught how to optimize crop health, through proper soil and nutrient management, so that plants were more competitive and resistant to weeds, diseases, insects and other problems. They were encouraged to use resistant varieties when available and learned how to accurately identify and quantify pest and beneficial organisms in their fields. Growers heard about methods of preserving and building up populations of natural enemies and about effective microbial products that spare beneficials. They learned how to trap, exclude and lure insects away from cash crops, how to reduce disease inoculum and how to destroy weed seeds and seedlings. They mastered monitoring techniques like scouting, trapping, and the use of weather stations/models that help forecast future pest populations, and learned to evaluate whether further control efforts are needed by using action thresholds. Finally, they acquire knowledge that helped them select and safely apply products that have the fewest detrimental characteristics, for the times that pesticide applications are warranted. Two growers (R. Blackmer and R. Jackier) hosted twilight meeting that featured innovative, cutting-edge production practices on greenhouse tomatoes, sweet corn, field corn and pumpkins and described their environmentally-sound pest management practices. Over 65 commercial vegetable and field corn producers took time out of their busy schedules to attend the Annual Vegetable Growers' Twilight Meeting (July 25) at the Blackmer Farm in N. Grosvenor Dale, or the Corn Field Day (August 26) in E. Canaan, CT.

The 9 growers that participated in the full-season field training reduced the number of pesticide applications they made to 118 acres of sweet corn, peppers and summer squash by 10% and the amount of active ingredient they used by 2.1 pounds of A.I./acre or 38%. They increased their crop yields by 7%, 12%, and 20% on sweet corn, peppers, and summer squash respectively, and saved \$59,063 (\$501/acre) by reducing pest damage. IPM training and increased farm profitability helps CT maintain a cleaner environment, a source of safe food production and the open space that farmland provides.



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Developing a Perimeter Trap Crop System for Cucurbit

A recently released U. S. General Accounting Office Report on IPM, criticized IPM programs for relying too much on chemical solutions and noted the low adoption rate of biologically-based pest control tactics, which have great potential to reduce the use of pesticides and their associated environmental and human health risks. Perimeter trap cropping (PTC) involves planting a highly attractive plant so that it completely encircles and protects the cash crop like fortress walls. The system functions by concentrating and/or killing the pest population in the border area of a field, while natural enemies in the center are spared to help provide season-long pest control on the cash crop. The efficacy of a PTC system can often be improved by supplementing the trap crop with other biological, mechanical, cultural or chemical control tactics or with pest attractants or repellants. The PTC concept has been successfully employed against papaya fruit flies in Mexico, pepper maggots in Connecticut and the diamondback moth in Florida. We set out to develop a PTC system for cucurbit crop pests to reduce, replace or eliminate broad-spectrum chemical pesticide applications for this crop on vegetable farms in the Northeast. Our research efforts first focused on controlling the striped cucumber beetle on summer squash, because this pest can reduce or destroy plant stands or vector bacterial wilt disease to this popular crop, which is produced on almost every vegetable farm in the Northeast. Also, because the broad-spectrum insecticides that are commonly used to control this pest often cause secondary pest outbreaks (e.g. aphids, mites, etc.) and result in additional pesticide applications. We also looked at PTC's ability to control minor pests like the squash vine borer.

In 2002, replicated experiments were conducted on summer squash PTC at the University of Connecticut Department of Plant Science Research Farm in Storrs, CT. Extension personnel (J. Boucher and R. Durgy) also worked with 6 grower volunteers (R. Blackmer, R. Vinal, N. Cecarelli, G. Burson, S. Bengtson and C. Beckett) who successfully installed commercial cucurbit PTC plantings (1/2 to 5 acres in size) to help evaluate the system under "real-world" conditions. In the spring of 2003, the USDA CSREES NE-SARE program provided over \$139,000 to help continue the research in CT and MA over the next two years and to help popularize the use of PTC on commercial farms in New England. The UConn IPM Web Site was used to post fact sheets on PTC.

In 2002, replicated research trials were conducted at the University of CT and the PTC system was implemented on 6 commercial farms around the state. A perimeter trap crop of Blue Hubbard squash, border-row insecticide applications, attractive yellow plastic mulch, and a combination of the management strategies were evaluated to see if they could protect a centrally-located main crop of summer squash from cucumber beetle damage. Commercial growers planted a row of trap crop around their cucurbit fields and timed insecticide sprays on the outer rows with cucumber beetle colonization in the spring. Beetle numbers and plant injury/damage were recorded and commercial growers were surveyed at the end of the season. A twilight meeting and 5 vegetable conference talks on PTC were presented in CT, MA, NJ and NY.

The combination sprayed perimeter trap crop treatment reduced cucumber beetle infestations on unsprayed summer squash within the research plots by 95% and squash vine bore infestation by 88%. The PTC system also effectively protected the summer squash crop from bacterial wilt, both in small plots and at 6 commercial farms, and reduced insecticide use by 77% (A.I.). Most growers involved in the preliminary trail of PTC stated that they applied less pesticide and that the system was simpler and more profitable to use than spraying entire fields repeatedly with pesticides. All the growers stated that their pest control improved using PTC and rated their crop damage at 23.5% prior to using the technique and at 3.5% in 2002. Results were presented to over 430 Northeast growers at 5 winter conferences and a twilight meeting. The technique and results were described in proceedings for 2 of the conferences and in 3 separate UConn Extension IPM web site fact sheets on trap cropping and cucumber beetle control. Twenty-two southern New England growers volunteered to try PTC in 2003, 7 growers will attempt it on multiple commodities.



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The Annual Connecticut Vegetable & Small Fruit Growers' Conference

The goals of the Annual Connecticut Vegetable & Small Fruit Growers' Conference mirror those of the USDA CSREES of creating and maintaining a safe, secure and highly competitive agricultural system, while protecting natural resources and the environment for a healthy and well-nourished population, through farmer education. Educating farmers in sustainable, profitable and environmentally-sound, food production practices benefits every man, woman and child in the country directly, on a daily basis. This conference helps keep Connecticut's producers current on some of the latest and most innovative ideas and technology. The ideas they take home have a positive impact on their farms, families, products and the environment. The focus of the 2003 conference and trade show emphasized sustainable agricultural practices that benefit both farmers and society. Some of the topics covered included: Good Agricultural (sanitary) Practices for food production, no-till vegetable production techniques, Community Supported Agriculture, Risk Management and alternative IPM methods to control weeds, insects, diseases and wildlife.

The conference and trade show are sponsored by the University of Connecticut Cooperative Extension System and the Department of Plant Science and takes place at the Tolland County Extension Office. The steering committee consists of member of both departments: J. Boucher, R. Ashley, R. Durgy, D. Ellis, L. Los, T. Morris, and L. Pundt. The Northeast Sustainable Agriculture Research & Education Program (NE-SARE) helped improve the conference program through their Sustainable Farmer Educator grant program which sponsored and paid the travel expenses for two out-of-state speakers. USDA-APHIS Animal Control Division from Amherst, MA and The CT AG Experiment Station in New Haven also supported the program by sending speakers. Lunch was provided as a 4-H benefit through the efforts of local club volunteers, the Tolland County 4-H Educator and Extension secretarial staff.

The conference consists of a full day of speakers, covering a diverse set of topics (10), and a small trade show with approximately 15 local vendors. In addition to speakers from the University and other government institutions, the 2003 conference featured talks by six different growers from throughout the Northeast. Hearing how their fellow growers implemented the latest innovations and technologies, and real-world assessments of the potential for the practice to fit into a whole-farm plan, adds a new level of credibility for the audience, beyond what can be provided by institutional "experts." Recruiting new grower-speakers, assisting them in preparing talks and helping them overcome their fear of public speaking, can be a challenge and often represents a substantial investment of time for Educators. The investment is well worth the time, as it results in better educated farmers and willing agricultural advocates and partners. Extension also coordinates with the CT Department of Environmental Protection to offer growers pesticide applicator re-certification credits for attending talks which cover pest control and nutrient management related topics. Over 140 growers and service sector representatives attended the conference on 16 January, 2003.

All the people completing evaluations (n=25) rated the conferences' educational sessions and trade show as "excellent" or "good." Several growers commented that it was impossible to pick the best talk/speaker on the evaluation form, because they were all so good, that to single out any one would imply that others didn't do a great job. According to the evaluations, 100% of the respondents learned new pest management techniques and stated that the information they learned would improve their pest control and crop quality in the future. Eighty-four percent of the respondents said information from the meeting will improve their farm profitability. Six growers improved their public speaking skills and helped to inspire and educate their peers. Wiser and better educated growers help protect the environment and represent a safe and secure source of food production for the region for years to come.

