1993 Ohio IPM Block Grant Reports

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Mid-America Tomato Integrated Pest Management Program

1993 North Central Ohio Tree Fruit IPM Program

Principal Investigator:
Ted W. Gastier, Extension Agent, Huron County

Abstract:

Fourteen apple and peach producers, representing Erie, Huron, Lorain, Ottawa, and Sandusky Counties, enrolled 26 blocks of commercial production. Insect pests monitored weekly by traps included spotted tentiform leafminer (STLM), codling moth (CM), apple maggot (AM), San Jose scale (SJS), redbanded leafroller (RBLR), Oriental fruit moth (OFM), peach tree borer (PTB), and lesser peach tree borer (LPTB). Other fruit pests monitored by scouting included various aphids, leafhoppers, and European red mites. In addition, the following beneficials were identified at various locations and times during the growing season: syrphid fly, lacewing, *Stethorus punctum*, Cecidomyiid larvae, phytoseiid mite ('fallacis'), and ladybird beetle. Their presence was noted to allow for their protection (whenever possible), thus providing for natural control of tree fruit pests.

Late season STLM were controlled on 66 treated acres with Dimilin under an Experimental Use Permit label. Results showed apparent reduction of live mines without harming *Stethorus punctum* which were controlling European red mite. Additional experimentation is planned for 1994 with an earlier starting date.

Twenty-two issues of a newsletter covering timely fruit notes based on scouting and trapping reports were mailed to cooperators, District and State Specialists, and all Agricultural Agents in the NE District.

A majority of growers used the IPM generated recommendations throughout their orchards, whether the blocks were enrolled or not. Generally, growers made fewer applications of pesticides than would be expected when using a calendar spray schedule. An average of two cover sprays and one miticide application were eliminated. This cost savings of materials and operator/machinery time covered or exceeded the calculated expense of $35.87 per acre for the program. According to harvest surveys and grower evaluations, excellent quality fruit which was free of pest damage was harvested with a few exceptions of SJS damage.

A table has been included detailing trap counts of STLM, CM, AM and SJS with the inclusion of cumulative degree days base 50 degrees F. The percent of blocks where beneficial arthropods were recorded is shown under the columns entitled "Beneficials" (OM, LW, LB, WM, PM). (There were 15 blocks in the eastern portion and 11 in the western portion.) Time restraints did not allow for scouting of beneficials; their presence was reported as part of the normal visit. No attempt was made to reconcile the differences in cumulative degree days between Fremont and Milan.

It should be noted that miticide use was greatly reduced or eliminated where heavy populations of *Stethorus punctum* were allowed to flourish. Growers should be commended for the patience they displayed as they allowed European red mite numbers to build to serve as a food source for the *Stethorus punctum*.

This exciting use of a beneficial will certainly be encouraged next season. Further studies will be made of the relationship between pest and predators for the establishment of guidelines suitable for northern Ohio

Extension Program Implementation:

All participants desire a continuation of some type of IPM program, with some growers indicating a desire to add more blocks to the program. Our goal of having growers commit to more time involvement with orchard scouting has not been met, due to their time restraints. Therefore, hired technicians are necessary for the continuation of this type of program. Expansion into other production areas in Ohio will provide additional data for testing tentative thresholds for use as IPM guidelines for the state. Winter meetings are planned to share our experiences with other agents and producers to increase the use of IPM.

EAST DISTRICT AVERAGES

14 apple & 1 peach block														
		Pests									Beneficials			
DATE	DD50	STLM	CM	AM	SJS	ERM	RBLR	OFM	PTB	LPTB	OM	LW	LB	WM
											% blocks where noted			
5/6	151	1189					175							
5/13	225	1006					131							
5/20	271	406	0.24				17							
5/27	337	163	0.50				1	1				13		
6/3	409	91	1.19			2.24	1	1		18		7	14	
6/10	514	70	1.05			1.13	0	1		38			14	
6/17	641	269	3.69			3.52	0	0		94		27	33	
6/24	813	899	4.48			9.12	1	6		106		7	50	27
7/1	976	1133	2.67			7.0	47	1		91	14	33	14	67
7/8	1199	1020	1.59			9.23	32	1		83	14	33	33	27
7/15	1388	1150	0.76			4.64	26	3		58	40	60	60	27
7/22	1543	926	1.00	2.14	13.7	8.71	42	0		56	20	80	73	33
7/29	1729	609	5.17	4.14	47.3	6.71	22	0		41	33	87	80	53
8/5	1865	671	6.02	3.43	57.9	7.43	14	0		32	7	87	87	47
8/12	2009	912	3.55	3.43	8.9	9.14	31	0	5	57	7	100	73	33
8/19	2196	933	5.43	3.86	50.6	4.79	36	0	7	74	7	100	87	53
8/26	2372	1030	7.17	1.43	9.1	5.43	78	4	0	46	0	100	100	33
9/2	2553	917	3.71	0.93	8.7	1.36	56	4	0	42	0	100	73	0
9/9	2658	206	0.81	0	0	1.0	5	0	0	4	-	-	-	-

WEST DISTRICT AVERAGES

8 apple & 3 peach block														
		Pests									Beneficials			
DATE	DD50	STLM	CM	AM	SJS	ERM	RBLR	OFM	PTB	LPTB	OM	LW	LB	WM

											% blocks where noted			
5/6	130	495					80							
5/13	195	1042					94					18		
5/20	241	233			16		25							
5/27	309	50	0.46		0		1.7							
6/3	402	15	1.33		0	3.83	0.5	1		23				
6/10	497	15	0.96		0	1.24	0.3	1		8.7				
6/17	605	313	4.08		0	7.38	0	1	0.7	25				
6/24	770	1187	4.67		0	4.52	8.3	1	2.0	36			9	
7/1	945	1149	3.04		0	6.70	57	0	2.0	48	36		18	
7/8	1167	1155	2.33		0	15.3	88	4	4.7	57	73		18	
7/15	1295	1007	1.67	0.13	0	3.63	103	0	4.3	24	18	55		
7/22	1435	575	0.58	0.38	55	5.63	56	0.3	8.0	26	18	73		
7/29	1606	1006	1.79	1.13	128	2.38	17	0	7.0	26	45	55	18	
8/5	1726	1235	4.46	1.88	152	6.50	24	0.7	8.3	10	9	73	18	
8/12	1865	1316	1.59	0.50	33	6.63	65	0	11	28	18	82	18	9
8/19	2043	1395	5.43	3.63	117	6.75	54	0.3	12	44	9	91	36	
8/26	2206	1066	2.17	0.25	41	5.88	128	0	4	23	9	82	64	
9/2	2384	496	1.88	0	14	4.75	65	1	3	32		82	64	
9/9	2490	311	0.58	0	6		22	2.3		13				

KEY: DD50 = degree days, base 50F; STLM = spotted tentiform leafminer; CM = codling moth (average of 3 traps/block); AM = apple maggot (3 trap/block total); SJS = San Jose scale; ERM = European red mite (number of infested leaves per 25 leaf sample); RBLR = redbanded leafroller; OFM = Oriental fruit moth; PTB = peach tree borer; LBTB = lesser peach tree borer; BENEFICIALS: OM = orange maggot (cecidomyiid fly); LW = lace wing; LB = lady beetle including *Stethorus punctum*; WM = white maggot (syrhid fly); PM = phytoseiid mite ('fallacis').

For further information contact Ted W. Gastier Extension Agent, Ohio State University Extension, Huron County or the Ohio IPM Office.

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A Demonstration School IPM Program for Appalachian Ohio

Principle Investigator:

Hank Bartholomew, Athens Co.

Abstract:

In September, 1992, Appalachian Ohio Public Interest Center's Committee for Pesticide Reform (AOPIC CPR) successfully lobbied the Athens City School (ACS) to suspend monthly routine indoor spraying of organophosphate and carbamate insecticides and to co-sponsor an IPM training session for custodial personnel. To ensure than IPM would be implemented, CPR subsequently initiated an IPM advisory support group which began to develop further training materials for ACS and to work with the ACS maintenance supervisor on development of an IPM program. Members include ACS administrators, teachers (including high school biology teacher), and parents' members of AOPIC CPR; Ohio University's Environmental Health Sciences' Program Director, OSU Agricultural Extension Agent, Athens County; and, on a consulting basis, OU Professor of Entomology.

The OSU Extension Mini-grant was sought in order to:

- develop a successful model school IPM program
- facilitate adoption of economical IPM practices having minimal environmental impact and human exposure to pesticides
- promote integration of cultural, mechanical, biological, and least toxic chemical pest management practices
- reduce off-target pesticide movement by minimizing use of organic solvents and liquid spray formulations and by confining pesticide applications to last-resort status, to crack and crevice treatments or enclosed bait formulations wherever feasible
- educate students, staff and parents on IPM principles and practices
- foster interdisciplinary cooperation between public schools, Ohio State University Extension, Ohio University Department of Environmental Health Sciences, and NGO's
- serve as a pilot to demonstrate feasibility of school IPM in Ohio
- enhance IPM information dissemination by participating organizations

Rationale:

- Organophosphate and carbamate insecticides are neurotoxins which may contribute to health effects even at low doses(1) and to which the young are particularly vulnerable(2). Pesticide usage is associated with increased cancer risk in children(3). Persistence of pesticides indoors is a significant problem(4) as is off-target movement of pesticides in schools(5).

- School IPM has been advocated by the US EPA, American Cancer Society, American Academy of Pediatrics, and national PTA and mandated by cities (L.A., San Diego, Milwaukee), counties (Dade, FL), and states (Maryland, Michigan, and Texas)(6).
- IPM has been implemented, successfully and economically, in a number of school districts but not yet in Ohio(7).
- IPM has important educational implications, teaching insect and rodent biology, critical thinking, and problem-solving skills. It also shapes the attitudes of tomorrow's adults, encouraging environmentally positive problem-solving and discouraging entophobia.

Status of project as of January 25, 1994:

- A procedures manual has been written, revised with input from ACS administrators, and provided (ten copies in notebooks) to ACS. The manual specifies objectives and standards, procedural steps, roles and responsibilities of school personnel, principles of pest monitoring, tolerance level setting, identification information, control strategies, and tolerance levels for common pests, guidelines on pesticide use, and record-keeping procedures. It contains floor plans of ACS buildings developed by students in OU's Environmental Health Sciences Program (enlargements of which were also provided to ACS) and IPM report forms developed by the IPM Support Group. Appendices include color identification plates, recent articles on IPM for particular pests and on the rationale for school IPM, MSDS and other product information on several least-toxic pesticides, and IPM materials written for ACS. The manual relies on and gives frequent page references to Common-sense Pest Control (Olkowski, W., et al, 1991).
- Color identification and IPM strategy charts for major pests were developed by project coordinator and an OU Environmental Health Sciences student and provided, in multiple copies to ACS.
- Copies of Common-sense Pest Control and EPA's School IPM Manual (draft) have been provided to each building of Athens City Schools.
- An in-service has been provided to ACS custodial, maintenance, kitchen, cafeteria, and teaching staff on IPM principles and practices with supplementary written materials provided. ACS has purchased monitoring sticky traps and have been instructed in use and placement.
- Consultations with ACS maintenance staff, including help with identification and site inspections, have been provided as needed.
- A survey questionnaire on ACS custodial staff understanding of IPM has been developed and conducted in conjunction with Ohio University Environmental Health Sciences Program Director and students. Results have been shared with ACS and are being used to guide project work.
- A proposed IPM policy statement for consideration by the ACS Board of Education has been developed, submitted, revised with board members' input, and resubmitted for a first reading by the board on January 27, 1994.
- The IPM advisory group has met regularly to discuss progress, develop materials, plan and carry out project work.

Problems encountered and goals still to be addressed:

- The process of implementation and education have been slower and more difficult than anticipated. Receiving less time for teacher in-service than had been agreed upon, not having expected access to a quarterly district newsletter because it was suspended for '93-'94 due to a school levy failure, staff illness that caused the maintenance supervisor to cancel a district-wide IPM in-service in December, 1993, and some lack of follow-through on agreed-upon actions by ACS personnel have all aggravated the problem.
- Adoption of an IPM policy, hoped for by 4/94, should bolster the IPM program by encouraging school personnel to take IPM more seriously and to follow through on responsibilities more consistently.

- Further staff in-services and distribution of educational materials to teachers and parents will be conducted.
- Further evaluation of the project and dissemination of progress and results will be conducted through cooperation among participating agencies and NGO's.

We are optimistic that we will be successful in demonstrating the feasibility of school IPM in Appalachian Ohio so that this project may serve as a pilot and facilitate adoption of school IPM throughout our state and region.

FOOTNOTES

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3. Gold, E., et al. Risk factors for brain tumors in children. American iournal of epidemiology 103 (3):309-319, 1979; Lowengart, R., et al. Childhood leukemia and parents' occupational and home exposures. Journal of the National Cancer Institute 79:39, 1987; Reeves, J.D. Household insecticide-associated blood dyscrasias in children. (letter) American iournal of pediatric hematology/oncology 4:438-439, 1982.

4. U.S. EPA. Nonoccupational pesticide exposure study. Atmospheric Research and Exposure Assessment Laboratory, 1990; Lewis, R. et al. Determination of routes of exposure of infants and toddlers to household pesticides: a pilot study. Methods Research Branch, US EPA, 1991; Fenske, R.A. Potential exposure and health risks of infants following indoor residential pesticide applications. American journal of public health 80:689-693, 1990.

5. USEPA OPP (h7506c) Pest Control in the School Environment: Adopting Integrated Pest Management August 1993; Forbes, W. From spray tanks to caulk guns: Successful school IPM in Montgomery County, Maryland. Journal of pesticide reform 10(4):9-11, 1990.

6. Northwest Coalition for Alternatives to Pesticides. Least-toxic nest management for school and grounds, 1992.

7. Cooper, S. The pesticide problem: Is any amount safe? PTA today, April, 1991.

For further information contact Hank Bartholomew , Extension Agent, Ohio State University Extension, Athens County or the Ohio IPM Office.

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Alfalfa/Grass Mixtures vs Alfalfa: Profitable Alternatives to Deter the Potato Leafhopper

Principal Investigators:

Roger Bender, Shelby County
Mark Sulc, Agronomy
Harold Willson, Entomology
Bruce Eisley, IPM

Abstract:

A field research project, to compare the effect of alfalfa/grass mixtures with pure alfalfa stands, on potato leafhopper populations, was planted May 1, comparisons included a standard alfalfa variety with 1 lb. of orchardgrass and with 2 lb. of orchardgrass, standard alfalfa alone. (control), and a reputed potato leafhopper resistant alfalfa variety. These 4 plantings were randomly replicated 4 times for a total of 16 plots. The seeding appeared to have a good start but was adversely affected by extremely wet weather throughout June, particularly when more than 10" of rain was received the last week of June.

A decision was made to renovate that stand in a manner that would disrupt the original research objectives, so a completely new seeding was done at a nearby location. The original plan was used in the seeding on August 16, following wheat harvest and straw removal.

The soil was tilled twice to level the seedbed, hill existing weeds and volunteer wheat, and to incorporate fertilizer. An excellent stand was established, despite very dry conditions 2 weeks after the planting date.

No data was taken to date, although it was observed that the PLH resistant variety appears to germinate in cool wet conditions (spring planting) better than in hot dry conditions, relative to the standard (control) variety.

If the stand survives the winter, comparison of the plots will begin in 1994, with PLH populations, yield and palatability records gathered for 2nd and subsequent cuttings. The research project is planned for a 3 to 5 year period, depending on the vitality of the stand.

Potato Leafhopper (PLH) is the insect causing the most damage to alfalfa in the Midwest and as a result demands the highest use of insecticides. Alternative strategies to control the pest are critically needed. Some experimental evidence suggest that growing grass in mixture with alfalfa may reduce PLH populations and the resulting damage sustained by the crop.

This type of research has not been done at all in Ohio and only in small plots elsewhere. The plants are

planted on land involved in the Lake Loramie Water Quality Incentive Project (WQIP) and could result in reduced insecticide use.

Field sized replicated plots to compare infestations of PLH have been planted, not small research areas previously utilized in other studies. Large plots are critical to accurately assess the impact of control strategies on PLH populations because of their mobility.

PLH population variations, yield checks, and economic analysis of all factors will be evaluated and utilized for Extension publications, newsletters, field day presentations and journal articles.

The potato leafhopper is the most serious insect pest of alfalfa in the Midwest and therefore requires the greatest use of pesticides for control. Since alfalfa is the most important forage crop in the Midwest and little or no resistance to PLH is evident in varieties, the use of grass seeded with alfalfa may provide a cultural practice to farmers, enabling them to produce a forage crop similar to pure alfalfa in feed and market value, with reduced inputs and impact on the environment. Evaluation of the proposed project will provide valuable insight for analysis of this cultural practice.

Accessing the WQIP activities in the Lake Loramie watershed utilizes long term commitments in the area.

For further information contact Roger Bender Extension Agent, Ohio State University Extension, Shelby County or the Ohio IPM Office.

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Alternative ICM Approaches to Powdery Mildew, Viruses and Their Vectors and Cucumber Beetle Control on Pumpkins

Principal Investigators:

Robert J. Precheur, Extension Horticulture
Celeste Welty, Extension Entomology
R. M. Riedel, Plant Pathology

Abstract:

Ohio produces over 3000 acres of pumpkins with much of the crop shipped to the wholesale market. Many small enterprises generate significant additional income from pumpkins which may be as high as 30-40% of their gross income. Despite the crop's value, many growers ponder whether they should commit much money to a pest control program. Economically important diseases include: powdery mildew, numerous mosaic viruses and bacterial wilt that attack pumpkins and can cause as much as a 20-50% reduction in yield and quality. Powdery mildew attacks every year and rapidly defoliates vines. Bacterial wilt spread by cucumber beetles is usually prevented by Furadan but many small growers are not licensed to use this restricted use pesticide. Over the past 3 years, two thirds of Ohio has had significant losses of pumpkins due to various mosaic viruses. Practical alternative strategies are now required to control the array of pests that attack pumpkins.

The objectives for this study were: 1. To compare chemical and alternative fungicides for control of powdery mildew and 2. To evaluate physical barriers such as P10 row covers for aphid and beetle control, straw mulch for fruit rot control and reflective mulch for aphid control and traditional chemical protection methodology for control of cucumber beetles, bacterial wilt, aphids and mosaic virus.

Plots were established at the Horticultural Research Farm, The Ohio State University, Columbus, OH (Franklin Co.) and at a farm near Springfield, OH (Clark Co.). In Springfield, fungicide plots consisted of single 40 ft rows of pumpkins and insect control plots were 5 rows. In all Springfield plots, pumpkins were seeded one ft apart in the row on 17 June. Rows were 8 ft apart. In Columbus, pumpkins were seeded 8 June in hills 3 ft apart in single 40 ft rows, 10 ft apart for both fungicide and insect control plots. Reflective mulch was not included in the single row plot at Columbus. All treatments were replicated 4 times in a randomized complete block design.

CHEMICAL CONTROL OF POWDERY MILDEW ON PUMPKIN, Columbus: Pumpkins were harvested 21 September and graded into cull and marketable categories. Foliage was rated for powdery mildew development on 2 and 21 September. Powdery mildew was first observed in the plots on 29 July (see Table 1). Disease development was rapid and severe. Following the second application of irrigation water, a new

flush of vine growth occurred. Anthracnose lesions were common on the foliage in early July. Dry weather in late summer suppressed Anthracnose development. Nova, RH 0611, ASC 66902 and Bravo +Benlate treatments controlled foliar damage significantly better than check at both rating dates. The two unconventional materials, Kasil and oil + sodium bicarbonate, did not significantly reduce foliar damage. None of the treatments significantly affected total weight of usable harvest of pumpkin fruit.

Fruit Rots: In Columbus and Springfield, straw mulch did not affect the quantity or weight of cull fruit. The side of the fruit laying on the straw developed enlarged lenticels (scar tissue) rendering most fruit unusable.

In Columbus, there was no significant effect of fungicide and insect control treatments on yield of marketable fruit. Only Adios alone for insect control and Bravo + Benlate alone for disease control produced fruit significantly larger in size than other treatments.

CHEMICAL CONTROL OF POWDERY MILDEW ON PUMPKIN, Springfield, OH: Plots were established on 17 June. Pumpkins were harvested 29 September and graded as cull, marketable with good handles or marketable with bad handles. Foliage was rated for powdery mildew development on 26 August and 17 September. Powdery mildew was first observed in the plots on 28 July. Disease development was rapid and severe. All fungicide treatments controlled foliar damage significantly better than check at the first rating (see Table 2). At the second rating, all treatments except Kasile #6 and spray oil + sodium bicarbonate controlled Powdery Mildew better than check. None of the fungicide treatments were better than check in terms of tons of usable harvest/A. ASC 66902 treatments gave significantly better handle quality than control

CONTROL OF ZUCCHINI YELLOWS MOSAIC IN PUMPKIN, 1993: Treatments in Springfield consisted of an untreated control, standard pesticide (Furadan 15G + Sevin), reflective mulch + Furadan 15G, row cover (aphid and cucumber beetle control) and Adios (cucumber beetle control). Alanap 2L (naptalam) 4 qt/A plus Prefar 4E (bensulide) 2 qt/A were applied preemergence for weed control. Silver colored, 5 ft wide reflective mulch was laid by hand prior to planting and seed was planted through punched holes. Row cover plots were covered immediately after planting with Agryl P10, 8 ft wide, light weight row cover material. Row Covers were removed at the time of flowering on 22 July. Standard and reflective mulch plots received Furadan 15G at planting, 2 foliar applications of Sevin XLR, 1 application of Bravo 720 and 1 application of Benlate 50DF. Row cover plots received all pesticide treatments except Furadan. Pumpkins were harvested 30 September and graded as virus infected and marketable fruit. Two inches of water was added to the plots by overhead irrigation in mid-August.

Foliage and fruit with symptoms of zucchini yellows mosaic (ZYM) were observed by the third week of July. At harvest, ZYM was common in the plots. Infection averaged 22% of the total yield and ranged from 12 to 40%. Incidence of virus infected fruit was lowest in reflective mulch plots (see Table 3), but no treatments differed significantly from control. Infected fruit wt in reflective mulch treatments was significantly lower than plots with row covers. There were no significant differences in infected fruit number, marketable yield and average fruit size. No bacterial wilt or beetle feeding on fruit were detected.

Extension Program Implementation:

A pumpkin twilight meeting was held on 23 August 1993 in cooperation with Clark and Greene County Extension. Approximately 50 growers were in attendance from several southwestern and western counties of Ohio. Powdery mildew, insect and disease control strategies were presented to the audience. Later, specialists held individual consultations and plot tours.

Results of the project will be shared with growers at the Washington/Meigs Vegetable school, the Annual Muck Crops school and the 1994 Ohio Fruit and Vegetable Congress. Final reports will be printed for distribution at winter meetings and in extension bulletins on pumpkin production. These data will serve as a basis for developing reduced input strategies.

For further information contact Robert Precheur Associate Professor, Dept. of Horticulture, The Ohio State University or the Ohio IPM Office.

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Economic Thresholds for Codling Moth and Apple Maggots in Commercial Apple Plantings in East Central Ohio

Principal Investigators:

Howard Siegrist, Licking Co.
Mark Mechling, Muskingum Co
Celeste Welty, Extension Entomologist

Abstract:

This project was designed to further study and evaluate the effectiveness of the use of insect lure traps and mechanical traps as a tool in determining the need and timing of insect control measures in commercial apple production.

Pest monitoring techniques tested included (1) weekly scouting using a general procedure of weekly monitoring of traps during critical periods of likely pressure from codling moth and apple maggot.

Three traps for each insect pest were located at strategic locations in each orchard. Fruit growers were trained prior to the start of the growing season on target insect identification, trap construction and management. Cooperators read the traps and replaced lures as needed. Weekly field reports of trap findings were mailed to the Ohio State University Entomology Extension Office. Findings assisted the ICM Newsletter staff in alerting growers to potential peaks in insect pressure. Findings were shared through the state-wide Newsletter as well as shared during regional field meetings held during the 1993 growing season by the authors.

Growers were instructed to follow the Michigan State University guidelines for codling moth: As soon as pheromone traps catch an average of three moths per trap per week, use that time as the "bio-fix" to start counting degree days and apply a cover spray after 250 degree days have accumulated. Growers were conveyed information on degree day accumulation supplied for various communities by the Ohio Agricultural Statistics Service. Many growers compiled their own degree day information through reporting from weather band radios.

Baited apple maggot traps were placed in orchards in very late June to early July. Traps were read each week, cleaned and renewed for the following week. No treatment of insecticide was recommended until a cumulative total of five apple maggot flies per trap are caught. Once a cumulative total of five flies per trap (or 15 flies per planting) are collected, a spray was recommended. Traps were maintained through August.

Growers were provided update information on insect identification, trap maintenance, and the use of trap findings through three regional field meetings during the 1993 growing season, telephone consultations,

special new alerts and the ten issue "East District Fruit Newsletter compiled by the mini-grant authors.

CODLING MOTH PHEROMONE TRAPPING - EAST DISTRICT, OHIO - 1993 (MEAN OF 3 TRAPS)

FAIRFIELD CO.		MUSKINGUM CO.		MORGAN CO.		COSHOCTON CO.	
(Hugus)		(Thomas)		(Cherry)		(Siegrist)	
DATE	MEAN	DATE	MEAN	DATE	MEAN	DATE	MEAN
5/12(7d)	1.3	5/7 (-d)	1.3				
5/19(7d)	0.7	5/14(7d)	1.7			5/16(7d)	1.0
5/25(7d)	0.0	5/21(7d)	0.3	5/23(12d)	0.3	5/23(7d)	0.0
6/2 (7d)	1.0	5/28(7d)	0.7	5/30(7d)	0.0	5/30(7d)	0.3
6/7 (7d)	1.0	6/4 (7d)	0.0	6/6 (7d)	0.0	6/5 (6d)	0.0
6/15(7d)	1.3	6/11(7d)	0.3	6/13(7d)	0.3	6/12(7d)	0.7
6/22(7d)	0.3	6/20(9d)	0.0	6/20(7d)	1.3	6/20(8d)	0.3
6/29(7d)	1.7	6/26(7d)	0.0	6/27(7d)	0.7	6/27(7d)	0.7
7/6 (8d)	0.3	7/3 (7d)	0.0	7/11(7d)	0.3	7/6 (8d)	0.0
7/13(7d)	0.3	7/10(7d)	0.3	7/18(7d)	1.0	7/11(7d)	0.0
7/20(7d)	1.3	7/16(7d)	0.0			7/18(7d)	0.3
8/3(14d)	2.7	7/27(8d)	0.3	8/1 (7d)	0.0	7/26(7d)	0.3
8/11(8d)	2.7	8/6(11d)	1.0	8/8 (7d)	1.3	7/31(6d)	0.7
8/18(8d)	3.3	8/16(10d)	0.3	8/15(7d)	0.3	8/7 (6d)	0.7
8/25(8d)	1.7	8/20		8/21(7d)	2.7	8/15(8d)	0.3
9/1 (8d)	0.0			8/29(7d)	0.3	8/22(7d)	1.0
				9/5 (7d)	2.0	8/31(7d)	0.0
				9/12(7d)	1.7	9/5 (7d)	0.0
				9/19(7d)	0.0		
				9/27(7d)	0.0		

LICKING CO.	LICKING CO.	LICKING CO.	LICKING CO.	2 EXTRA TRAPS

(Maloney)		(Heartland)		NW/Highwater)		Lynd-Rush)		BY PACKING HOUSE
								(Lynd's)
DATE	MEAN	DATE	MEAN	DATE	MEAN	DATE	MEAN	
		5/10	0.0	5/13(5D)	7.0	5/7	0.0	
(1 trap only)								
5/16(7d)	7.0	5/17(7d)	1.0	5/20(7d)	4.7	5/14(7d)	2.0	
(3 trap)								
5/23(7d)	0.0	5/24(7d)	0.0	5/26(6d)	1.0	5/21(7d)	0.7	
5/30(7d)	8.7	5/31(7d)	2.0	6/2 (7d)	4.0			
6/6 (7d)	3.0	6/7 (7d)	1.3	6/9 (7d)	3.3	6/4 (14d)	3.7	
6/13(7d)	9.7	6/15(8d)	0.0	6/18(9d)	3.3	6/11(7d)	2.7	
6/20(7d)	4.3	6/21(6d)	0.0	6/26(8d)	4.7	6/18(7d)	2.0	11,13
6/27(7d)	5.7	6/28(7d)	0.0	7/3 (7d)	3.0	6/25(7d)	5.0	1,7
7/4 (7d)	2.3	7/7 (9d)	0.0	7/9 (6d)	0.0	7/2 (7d)	0.7	3,4
7/11(7d)	2.0	7/12(5d)	0.0	7/16(7d)	0.0	7/9 (7d)	1.0	4,8
7/18(7d)	3.7	7/19(7d)	0.0	7/22(6d)	2.0	7/16(7d)	0.0	1,3
(new lure)								
7/25(7d)	3.0	7/26(7d)	1.3	7/29(7d)	2.3	7/23(7d)	1.0	0,0
8/1 (7d)	5.3	8/3 (8d)	0.0	8/5 (7d)	6.3	7/30(7d)	1.0	1,10
8/8 (7d)	7.0	8/10(7d)	0.0			8/16(7d)	0.7	0,5
8/15(7d)	6.3	8/17(7d)	0.0			8/24(8d)	2.3	0,12
8/22(7d)	12.3	8/24(7d)	0.0					
8/29(7d)	11.0	8/31(7d)	0.0					
9/5 (7d)	2.7							

APPLE MAGGOT TRAPPING - EAST DISTRICT, OHIO 1993
(MEAN OF 3 TRAPS)

FAIRFIELD CO.		MUSKINGUM CO.		MORGAN CO.		COSHOCTON CO.	
(Hargus)		(Thomas)		(Cherry)		(Siegrist)	
DATE	MEAN	DATE	MEAN	DATE	MEAN	DATE	MEAN
7/6 (8d)	0.0	7/3 (7d)	0.0				
7/13(7d)	0.0	7/10(7d)	0.0	7/11(7d)	0.0	7/11(7d)	0.0
7/20(7d)	0.0	7/16(7d)	0.0	7/18(7d)	0.0	7/18(7d)	0.0
8/3(14d)	0.7	7/27(8d)	0.7			7/26(7d)	0.3
8/11(8d)	0.0	8/6 (11d)	0.0	8/1 (7d)	0.0	7/31(6d)	1.0
8/18(8d)	0.0	8/16(10d)	0.0	8/8 (7d)	0.0	8/7 (6d)	0.3
8/25(8d)	0.0	8/20(10d)	--	8/15(7d)	0.0	8/15(8d)	0.0
9/1 (8d)	0.0			8/21(7d)	0.0	8/22(7d)	0.7
				8/29(7d)	0.3	8/31(7d)	0.0
				9/5 (7d)	0.0	9/5 (7d)	0.0
				9/12(7d)	0.7		
				9/19(7d)	0.0		
				9/27(7d)	0.0		

LICKING CO.		LICKING CO.		LICKING CO.		LICKING CO.	
(Maloney)		(Heartland)		(NW/Highwater)		(Lynd-Rush)	
DATE	MEAN	DATE	MEAN	DATE	MEAN	DATE	MEAN
						6/25(7d)	0.0
7/4(6d)	0.0					7/2 (7d)	0.0
7/11(7d)	0.0	7/7 (9d)	0.0			7/9 (7d)	0.0
7/18(7d)	0.0	7/12(5d)	0.0			7/16(7d)	0.0
7/25(7d)	0.7	7/19(7d)	0.0	7/22(6d)	0.0	7/23(7d)	0.0
8/1 (7d)	0.0	7/26(7d)	0.0	7/29(7d)	0.0	7/30(7d)	0.0
8/8 (7d)	0.0	8/3 (8d)	0.0	8/5 (7d)	0.0	8/16(7d)	0.3

8/15(7d)	**0.0**	**8/10(7d)**	**0.0**			**8/24(8d)**	**0.0**
8/22(7d)	**0.0**	**8/17(7d)**	**0.0**				
8/29(7d)	**0.0**	**8/24(7d)**	**0.0**				
9/5(7d)	**0.0**	**8/31(7d)**	**0.0**				

For further information contact Howard Siegrist Extension Agent, Ohio State University Extension, Licking County or the Ohio IPM Office.

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Evaluating Hairy Vetch Underseedings for Weed Control in No-till Corn

Principal Investigators:

P. R. Thomison, Agronomy
E. E. Regnier, Agronomy
M. L. Townsend, Agronomy

Abstract:

This study was conducted to determine the efficacy of late spring plantings of hairy vetch and medium red clover as weed suppressive cover crops for no-till corn. The competitiveness of each cover crop at two seeding rates with corn grown for grain vs. silage was also evaluated. Experiments were established at the OARDC Northwest Branch near Hoytville and the OARDC Western Branch near South Charleston. Corn was planted 26 May at Northwest and 21 May at Western. The hairy vetch and medium red clover cover crops were planted 29 June and 9 July at Northwest Branch and Western Branch, respectively, at low and high seeding rates (27 vs. 40 lb seed/A for hairy vetch and 11 vs. 21 lb seed/A for red clover).

These underseedings followed the final cultivation and coincided with corn developmental stages V6 to V8 - later than was originally planned due to wet weather conditions in June. A Tye no-till drill with chutes removed over corn rows was used to seed vetch and clover. A randomized complete block split-split plot design was used with corn hybrids (early vs. late maturity) as whole blocks, cover crop treatments as subplots and grain/silage harvest as sub-subplots. Cover crop treatments consisted of the two cover crops planted at two seeding rates, a weed free control, and a weedy control. Biomass of above ground cover crop was determined before frost and weed populations were rated at the time of corn maturity. Grain was harvested by plot combine and corn silage by hand at Hoytville and mechanical silage chopper at South Charleston.

In 1994 before planting corn, plots will be sampled again for above ground cover crop biomass. Biomass samples will be analyzed for percent nitrogen. In 1994 corn will be grown on plots with and without vetch at varying N rates to assess the potential N fertility contribution from the legume cover. The cover crops will be killed with an application of glyphosate immediately following no-tillage planting of corn. The severity of weed infestation and weed species composition will be recorded before and after corn planting.

Extension Program Implementation:
Plots were open for visual inspection during presentations at field days at both Hoytville and South Charleston in 1993. Project data will serve as a basis for developing extension recommendations for using hairy vetch and red clover cover crops in no-till corn. Results of the study will be summarized in extension bulletins and the ICM newsletter.

For further information contact Peter Thomison Associate Professor, Dept. of Horticulture & Crop Science, The Ohio State University or the Ohio IPM Office.

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Ohio Integrated Pest Management — The Ohio State University Extension

Geauga County Fruit and Vegetable IPM Scouting Program

Principal Investigators:

Brad R. Bergefurd, Geauga Co
Randall E. James, Geauga Co

Abstract:

Fourteen fruit and vegetable producers, representing Geauga, Portage and Trumbull Counties enrolled over 100 acres of commercial production. These commercial acres consisted of apples, blueberries, strawberries, raspberries, muskmelon, watermelon, pumpkins, summer and winter squash, cucumbers, peppers, tomatoes, potatoes, sweet corn, broccoli, cabbage, cauliflower, beans and some miscellaneous crops. A single scout individually scouted each growers enrolled acres at least two times each week and more often if heavy pressures or serious problems occurred.

Heliothis traps and lures were used to help monitor corn earworm and European corn borer in sweet corn plantings and for monitoring European corn borer in pepper plantings.

Scouting reports and insect and disease monitoring reports were shared with participating cooperators following each visit, with other growers in Geauga, Portage, Stark and Summit counties via a monthly tri-county cluster fruit and vegetable newsletter written by the Geauga County Extension Agent. Scout reports were also shared with growers at monthly field nights held throughout the season. A majority of growers used the IPM generated recommendations throughout their operations. Whether the acres were enrolled or not. Generally, growers made fewer applications of pesticides than would be expected when using a calendar spray schedule. This cost savings of materials, operator/machinery time, and increased produce quality covered or exceeded the calculated expense of an average of $40.00 per acre for the program. According to harvest and market evaluations and growers observations, excellent quality produce which had very little pest damage was harvested.

A list and time table has been included detailing the insect, disease and production problems encountered during the scouting sessions. The IPM scout also noted crop problems and stress associated with the very dry conditions this season. Under these dry conditions the scout also was monitoring the growers irrigation practices, so they were applying irrigation water when irrigation was necessary.

Extension Program Implementation:

All participants and area produce buyers desire a continuation of some type of IPM scouting program, with many other growers interested in participating in future programs. This program encouraged involvement with growers and actual "hands-on" education as many growers went to the field with the IPM scout and observed his scouting techniques and findings. However, all growers did not take advantage of this opportunity due to time restraints. We hope to increase grower participation and involvement in the future. A hired scout is necessary for a program of this type, again due to growers time restraints and the growers lack of experience and knowledge with IPM scouting. Experiences and data accumulated from this program will also be shared at this years winter grower meetings and crop production schools to help establish a basis for IPM scouting and to increase the use of IPM techniques on other growers operations.

This IPM scout program has been very useful to area growers since most growers are new to growing fruit and vegetables with a majority of the acreage planted only in the last two seasons.

Insect and disease problems observed at threshold levels on horticultural crops scouted.

	First Day of Observation Week									
Crop & Pest Problem	**6/7**	**6/14**	**6/22**	**6/28**	**7/6**	**7/12**	**7/19**	**7/26**	**8/2**	**8/9**
Crucifera:										
Flea beetles	**X**	**X**	**X**	**X**			**X**			
Cabbage loopers			**X**	**X**				**X**	**X**	
Curcubits:										
Cucumber beetles	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		
Bacterial wilt			**X**	**X**		**X**	**X**	**X**		
Powdery mildew							**X**	**X**	**X**	**X**
Downy mildew								**X**		
Leaf spot							**X**	**X**		
Fusarium wilt								**X**		
Blossom end rot								**X**		
Sunscald								**X**		
Solinacea:										
Cutworms	**X**									
Colorado potato beetles	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**		
Aphids				**X**					**X**	
Flea beetles			**X**			**X**	**X**	**X**		
European corn borer								**X**		
Early blight							**X**	**X**	**X**	
Blossom end rot									**X**	**X**
Sunscald									**X**	**X**

Sweet corn:										
Cutworms	**X**									
Corn earworm									**X**	**X**
European corn borer				**X**		**X**	**X**			
Strawberries:										
Slugs	**X**									
Spittlebug				**X**		**X**				
Black vine weevil							**X**			
Crown rot				**X**			**X**			
Leaf spot				**X**						
Leaf blight						**X**				
Apples:										
Plum curculio						**X**				
Mites					**X**	**X**	**X**			
Fireblight						**X**				

For further information contact Brad R. Bergefurd Extension Agent, Ohio State University Extension, Geauga County or the Ohio IPM Office.

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Integrated Management of Phytophthora Blight of Peppers in Ohio

Principal Investigators:

Sally A. Miller, Plant Pathology
A. F. Schmitthenner, Plant Pathology

Abstract:

Phytophthora blight of peppers and other vegetables is a continuing problem in Ohio, and in some years causes significant yield losses. Currently few Ohio growers utilize practices needed to properly manage this disease. Biological, cultural and chemical components of Phytophthora blight management, namely disease suppressive compost, raised beds and Ridomil applications, were evaluated. Due to extended periods of dry weather, particularly in July and August, Phytophthora blight development was highly localized and did not appear to be affected by any of the treatments. In order to obtain representative data, this trial must be repeated under more appropriate environmental conditions.

The test plot for this study was established at the Muck Crops Research Branch station in Celeryville, Ohio (Northwest Ohio), in a field previously determined to be naturally infested with Phytophthora capsici, the causal agent of Phytophthora blight of peppers and other vegetable crops. The trial was set up in a 2 x 2 x 4 split block design, and replicated six times. Each counts and yield data were taken from one row. Pepper fruits were harvested three times during the growing season, and yield data are presented as total yield of marketable fruit. The plot was irrigated by overhead irrigation three times at two week intervals beginning in mid-July, through the end of August. Sixteen treatments were evaluated, which combined the presence or absence of four management practices: 1) addition of disease-suppressive yard waste compost, banded on the soil 8 wks before planting and worked into the surface 4 in of soil just prior to planting; 2) use of raised planting beds; 3) application of Ridomil (2 qt/A) at planting and again 30 and 60 days after planting; and 4) use of disease-suppressive planting mix for greenhouse production of pepper seedlings. Development of Phytophthora blight was highly localized in this trial. Several foci of disease were observed; however, due to the dry conditions occurring in July and August, disease spread from the early-developing foci was slow and limited. Several treatments showed 0% stand loss (100% stand; Table 1), but this appeared to be related to location of the replicates in the field. Stand losses among replicates ranged from 0% to 62.5%. It is suggested that the lack of wind-driven rainstorms at this location during the 1993 growing season resulted in a lack of spread of Phytophthora blight in its typical manner. Therefore, an accurate evaluation of the biological, cultural and chemical management practices that were a part of this trial was not possible. Additional trials are needed under conditions more conducive to disease development.

Extension Program Implementation:

This trial was made available to growers for observation at the Muck Crops Branch Open House on July 29, 1993. Progress reports on the trial were also made to growers throughout the season at the monthly Muck Crop and Processing Vegetable Growers breakfasts. A final report will be made to the growers at the Ohio Fruit and Vegetable Growers* Congress in February 1993 in Columbus.

Table 1. Plant stands and yield of peppers in soil naturally infested with Phytophthora capsici. Treatments in which the effects of disease-suppressive compost soil amendment, raised beds, application of Ridomil and use of disease-suppressive planting mix were evaluated. Values are the means of six replicates.

Component						
Treatment	**Compost**	**Raised beds**	**Ridomil**	**Suppressive mix**	**% Stand**	**Yield (kg)***
A	+	+	+	+	90.0	8.35
B	+	-	+	+	92.8	12.37
C	+	+	-	+	96.0	9.62
D	+	+	+	-	100.0	11.46
E	+	+	-	-	98.3	10.84
F	+	-	-	-	87.8	11.69
G	+	-	-	+	92.8	15.15
H	+	-	+	-	96.7	13.18
I	-	+	+	+	98.9	11.43
J	-	-	+	+	98.3	13.90
K	-	-	-	+	93.3	16.67
L	-	-	-	-	97.2	14.36
M	-	+	+	-	100.0	11.84
N	-	+	-	-	98.4	11.87
O	-	+	-	+	87.8	11.14
P	-	-	+	-	93.3	11.56

* Yield represents a total of three harvests of marketable fruit

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For further information contact Sally A. Miller Assistant Professor, Dept. of Plant Pathology, The Ohio State University or the Ohio IPM Office.

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Mid-America Tomato Integrated Pest Management Program

PRINCIPLE INVESTIGATORS:

David East and Jim Jasinski

The 1993 Mid-America Tomato Integrated Pest Management (IPM) Program served processing tomato growers in three states -- Ohio, Michigan and Indiana. The aim of the project is to reduce the fungicide and insecticide inputs by monitoring insect populations and environmental conditions conducive to disease.

The TOM-CAST portion of the Mid-America program utilizes hourly temperature and leaf wetness data collected at 10 stations in Ohio, Michigan, and Indiana to provide fungicide scheduling information for tomato growers. The information (regional Disease Severity Values or DSV) is updated 6 days per week and made available to growers, field representatives, researchers and extension agents via a toll-free phone message service. Insect scouting reports, summaries of pheromone trap catches of cabbage looper, variegated cutworm, and tomato fruitworm moths, and computer predictions of Colorado potato beetle emergence were also included on this phone message. The phone service was based at The Ohio State University (Columbus) and received an average of 11 calls per day during the peak tomato growing months of June through September.

As part of the insect management portion of the Mid-America program, a comprehensive IPM program was tested at eight commercial tomato farms located in Ohio, Michigan and Indiana. At each farm, a 20-acre field was divided into an IPM half and a conventional half. Forty plants on both the IPM and conventional halves were scouted by Ohio State University personnel, and insecticide applications to the IPM half were made based on preliminary OSU spray guidelines (see Table). Fungicides were applied to the IPM half based on the TOM-CAST system. The conventional half was sprayed on the growers own spray program for both insecticides and fungicides.

OSU Spray Guidelines

Pest	Threshold/Guideline	Plant Growth Stage
Colorado Potato Beetle	>1.0 adult per plant	Seedling only
Variegated Cutworm	>1 caterpillar per 20 plants	>= Green Fruit
Cabbage Looper	>1 caterpillar per plant	>= Green Fruit
Tomato Fruitworm	>1 caterpillar per 20 plants	>= Green Fruit
Flea Beetles	>4 per plant	Seedling only

Aphids	**>1 per leaf**	**All stages**
Tomato/Tobacco Hornworms	**>1 caterpillar per 30 plants**	**All stages**

The yield of good red fruit was not significantly different between the IPM (19.4 tons per acre) and conventional (23.8 tons per acre) fields. These yields are similar despite the fact that three IPM fields had reduced yields from severe flooding, while no conventional fields were flooded.

Total fruit mold (ground rot, anthracnose and early blight) was significantly higher in the IPM (18.9%) than the conventional (12.5%) fields. Severe flooding contributed to increased mold counts in three IPM fields.

Variegated cutworm, tomato fruitworm or hornworm damaged fruit averaged 1.3% of yield (pre-sort) for the IPM fields compared with 1.5% for the conventional fields. Stink bug damaged fruit averaged 1.6% of yield (pre-sort) for the IPM fields compared with 1.3% for the conventional fields. Both of these differences were not statistically significant.

To determine if the IPM program was successful in reducing pesticide use, spray records were requested from all cooperators. Thus far, 5 of 8 growers have submitted written spray records for the 1993 season. On average, growers made 1.2 more insecticide and 1.0 more fungicide applications on the conventional half than on the IPM half. Based on interviews, this trend is expected to continue on the 3 remaining fields. Interviews have also indicated that at least one grower "cheated" and reduced insecticide applications on the conventional half based on OSU recommendations for the IPM half. This particular grower averaged 6-7 insecticide applications per field in previous years.

These preliminary results indicate that field scouting and OSU insect spray guidelines substantially reduced insecticide applications and maintained good tomato quality, when compared with conventional grower practices. However, further research is needed to streamline and improve certain scouting procedures; particularly for variegated cutworm and stink bugs. Pheromone trapping showed potential as a practical method for monitoring initial and peak variegated cutworm moth activity. The test results demonstrated that the TOM-CAST system reduced fungicide applications and maintained competitive yields.

For further information contact Jim Jasinski Extension Agent, Ohio State University Extension, Southwest District or the Ohio IPM Office.

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Multiple Strategies for Sweet Corn Pest Management

Principle Investigators:

Celeste Welty, Entomology
Sandra Alcaraz, Entomology
Robert J. Precheur, Horticulture

Abstract:

Progress in the development and implementation of sweet corn IPM has been made in Ohio during the past 5 years, with emphasis on optimal timing of insecticide applications for control of three key pests: European corn borer, corn earworm, and fall armyworm. This project was undertaken in 1993 so that extension work could be done to promote optimal timing of insecticides, and research could be initiated on broadening the sweet corn IPM program to include tactics other than chemical control, specifically the incorporation of biological control.

The extension component of this project encouraged sweet corn growers to begin or to continue using traps to monitor adult populations of corn earworm and European corn borer in order to better choose an appropriate insecticide spray schedule for silking corn. A letter was sent to 54 sweet corn growers asking if they were interested in participating in a trap network. Responses were received from 22 growers, including 20 who wanted to access the weekly trap counts by telephone, and 12 who intended to monitor traps and share their results. Trap network participants were sent a set of 12 pre-stamped pre-addressed postcards; cards were sent in once per week to report the number of moths trapped. Instructions were included on how to use traps and where traps and fresh lures could be purchased. Trap catches were summarized in articles for the weekly 'Ohio ICM Newsletter' and for a recorded telephone message. A notice announcing the message phone number was placed in the 'Ohio ICM Newsletter' along with an invitation for additional growers to participate in trap monitoring. The phone message was updated 12 times between early July and late September. In addition to announcing pheromone trap catches from participating growers, we included catches of European corn borer in blacklight traps monitored on research sites in central and northern Ohio; during part of the season a site in southern Ohio was also included.

The research component of this project addressed the question of whether acceptable pest suppression could be obtained by conservation and enhancement of indigenous generalist predators, either alone or in combination with a microbical insecticide. The predators of interest were the lady beetle *Coleomegilla maculata* and the insidious flower bug *Orius insidiosus*. Predator enhancement was attempted by spraying a commercial sugar-protein product designed as an attractant and food supplement for lady beetles, lacewings, and syrphid flies. Relative abundance of pests and natural enemies were assessed weekly and ear quality was assessed at harvest in two experiments, each conducted in an early and a late planting, at both Columbus and

Fremont. One experiment evaluated pest infestation with and without conservation and enhancement of natural enemies, using a split-split-plot design; one set of main-plots was predator-attractant spray vs no predator-attractant spray, the second set of main-plots was carbofuran at-planting vs no carbofuran at planting, and four sub-plot treatments were B.t. granules in whorls, permethrin granules in whorls, standard sprays of thiodicarb during silking, and untreated checks. A separate experiment evaluated releases of commercially-reared lacewings for pest suppression; treatments included four variable factors: crop stage when lacewings released (whorl vs silk), release frequency (single vs double), lacewing life stage released (egg vs pre-fed larva), and release rates (2 eggs, 5 eggs, 1 larva, vs 2 larvae/plant). Although weekly scouting data had documented increased natural enemy activity in plots not treated with conventional insecticides, analysis of harvest quality in the first experiment showed significantly lower damage only in plots where conventional insecticide was used during silking; damage was not significantly reduced in plots where the predator attractant was used or where the microbial insecticide B.t was used (Table 1). Data analysis will be completed during winter 1994.

Table 1. Quality of sweet corn harvested after treatments to manage key caterpillar pests by conventional insecticides and by conservation and enhancement of natural enemies.

	Mean % of ears with damaged kernels*			
Treatment	Early planting		Late planting	
	Fremont	Columbus	Fremont	Columbus
Sub-plots:				
B.t. in whorl	15 a	17 a	71 a	99 a
permethrin in whorl	16 a	16 a	72 a	97 ab
thiodicarb on silk	9 b	10 b	30 b	37 c
untreated	17 a	14 ab	81 a	90 b
Main plots:				
predator attractant	13 a	15 a	62 a	78 a
no predator attractant	14 a	13 a	65 a	84 a
Main plots:				
carbofuran	17 a	11 b	-	-
no carbofuran	10 b	17 a	-	-
* Within each column and within each treatment group, means followed by the same letter are not significantly different ($P < 0.05$), least significant difference test.				

Extension Program Implementation:

Pest monitoring results and suggested spray schedules were announced weekly from early July to late September in newsletter articles and on a recorded telephone message. A talk on insecticide spray schedules, including the use of traps, will be given at the Ohio Fruit & Vegetable Growers Congress in February 1994. After a second year of research in the 1994 field season, suggestions for how growers may use natural enemy enhancement will be added to the sweet corn chapter of the Ohio Vegetable Production Guide.

For further information contact Celeste Welty , Assistant Professor, Dept. of Entomology, The Ohio State University or the Ohio IPM Office.

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Planting Date Effects on Severity of Sclerotinia Crown and Stem Rot in Alfalfa, 1993 Report.

Principal Investigator:

Mark Sulc, Agronomy

Abstract:

Sclerotinia crown and stem rot (SCSR) is one of the most destructive diseases of alfalfa (*Medicago sativa* L.) and other perennial forage legumes in the eastern USA. Sclerotinia is most severe in alfalfa seeded in late summer or early fall, especially when minimum tillage practices are used to establish the crop. This presents a production dilemma for producers, because both of these practices allow reduced pesticide and fuel use and promote soil conservation. In addition, late summer is the best time to establish alfalfa in the eastern USA. All commercially available alfalfa varieties are susceptible to this disease; however, progress is being made in selection of germplasm with disease resistance. The fungicide vinclozolin (Ronilan) is an effective control, but is not registered for control of Sclerotinia in alfalfa. Based on limited lab studies, late summer planting date may influence the relative severity of Sclerotinia crown and stem rot in alfalfa. The objectives of this project were to evaluate under field conditions the effect of planting date on the severity of Sclerotinia crown and stem rot in alfalfa, and to develop guidelines for an integrated approach to controlling Sclerotinia crown and stem rot in alfalfa.

The field experiment was successfully established in 1993 at the OSU Horticulture Farm, Columbus, in a grass-legume sod uniformly infested with sclerotia of *Sclerotinia trifoliorum*. Two cultivars differing in field resistance to SCSR were seeded with a no-till drill at four different dates (April and early, mid-, and late August). Plots were irrigated regularly to ensure uniform establishment. Each planting date-cultivar combination was subdivided into fungicide-treated (vinclozolin) and untreated plots so that data from each treatment combination can be expressed relative to a disease-free control. Treatments were replicated four times in a split-split-plot randomization of a randomized complete block design. Planting dates were whole plots, cultivars subplots, and fungicide treatments sub-subplots.

Weather conditions were favorable for sclerotia germination during the Fall of 1993. Apothecia emergence was substantial in all plots, so innoculum loads were heavy. Sclerotinia disease severity ratings will be taken in late winter through early spring of 1994 when the disease symptoms become apparent in the plots. Plant canopy height will be measured in early May 1994 as an indicator of degree of stunting and overall plant vigor, and yield data from four cuttings will be taken during the summer of 1994.

A second grass-legume field was inoculated in November 1993 with grain inoculum of *Sclerotinia trifoliorum* in preparation for a second seeding of this experiment in 1994.

Extension Program Implementation:
A field day will be offered to county Extension Agents and agribusiness representatives in early spring 1994 and 1995 when SCSR injury is most apparent in the plots. The plots will also be part of a tour organized by Landon Rhodes in September 1994 for representatives of the alfalfa breeding industry. Preliminary results will be reported at the North American Alfalfa Improvement Conference in July 1994. Upon completion of the project, the data will be reported in: 1) an Ohio State University Extension Fact Sheet, 2) The Ohio Forage Report, 3) Ohio ICM Newsletter, 4) Journal of Production Agriculture, and 6) Biological and Cultural Tests for Control of Plant Disease. The results will be used to develop guidelines for an integrated approach to controlling Sclerotinia crown and stem rot in summer-seeded alfalfa. This information will be shared with Extension Agents and taught in Extension winter meetings for producers.

A report of the results from the 1993 experiment will be submitted in November 1994. A final report of the project will be submitted in November 1995.

For further information contact Mark Sulc Assistant Professor, Dept. of Horticulture & Crop Science, The Ohio State University or the Ohio IPM Office.

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Reduced Rates of Postemergence Herbicides in Drilled No-till Soybeans

Principal Investigators:

Mark M. Loux, Agronomy
James E. Beuerlein, Agronomy
David C. Savage, Agronomy
Chuck Gamble, CEA (ANR), Logan County

Abstract:

Field experiments were conducted at 4 locations in 1993 to determine the effectiveness of reduced rates of postemergence herbicides in drilled no-till soybeans. Two of the locations were farmer-cooperators in Shelby and Ashland Counties. Other locations were the Logan County Farm and the OSU Research Farm in Columbus. 1993 was the first year of no-till at Columbus, while the other sites had been in no-till production for 6 to 23 years. Postemergence herbicide programs varied among locations, and were chosen based on the cooperator's previous experience and/or the weed history in the field. Herbicides were applied at rates equivalent to 1/4 of the labeled rate (1/4X) approximately 6 days after weed emergence (DAWE), 1/2X approximately 12 DAWE, or at the labeled rate when postemergence herbicide would typically be applied. At Logan County and Columbus, experiments included two planting dates and additional treatments consisting of 1/4X followed by 1/4X and 1/2X followed by 1/2X, with the second application made about two weeks after the first.

Giant foxtail was the predominant weed species at all locations. Infestations of common or giant ragweed, or common lambsquarters were sufficient at two locations to evaluate control. Foxtail control was always reduced at 1/4X, compared to later applications at the labeled rate. Application at 1/2X resulted in reduced control also, but only in early-planted soybeans (where experiments included two planting dates). Foxtail control was reduced to less than 90% in 1/4X and 1/2X treatments, but was not less than 80% except in early-planted soybeans at one location. Control of giant ragweed (at one location only) was reduced at 1/4X in early-planted soybeans, and at 1/4X and 1/2X in later-planted soybeans. Treatments consisting of sequential applications of 1/4X or 1/2X provided 95% or better control of giant foxtail and giant ragweed, which was similar to that from the labeled rate. Control of common ragweed and common lambsquarters was greater than 90% in all treatments. Soybean yield did not vary significantly with herbicide rate and application timing, but there was a trend at two locations for lower yield in the 1/4X treatments in early planted soybeans.

Our experience with reduced-rate postemergence programs in 1993 indicates some promise for this approach to weed control in no-till soybeans. It was evident that the 1/4X or 1/2X rates applied once will not always

provide control equal to that from a labeled rate, but that the level of control may often be sufficient to avoid yield loss. This is somewhat dependent upon planting date; single applications of low rates should have a decreasing rate of failure as planting is delayed from early May into early June. While yield may not be reduced where single applications of low rates are applied, return of weed seed to the soil in treatments where control was reduced could increase weed control problems in future years. Weed control from sequential applications of 1/4X or 1/2X rates was equal to that at the labeled rate. We see little potential for producers to use sequential applications of the 1/2X rate, since this involves an additional trip across the field and no reduction in herbicide applied. Sequential application of 1/4X rates could be used by producers with little risk of failure, and this program reduces herbicide use by one-half. However, producers are still resistant to making an additional trip across the field due to time constraints. For that reason, this program may fit best in areas where herbicide reduction efforts are encouraged to preserve water quality, or where future government regulations may mandate herbicide reductions.

Extension Program Implementation:

Additional research is needed before a reduced-rate postemergence herbicide program can be recommended by OSU Extension, but we anticipate being able to make recommendations in 1995. Field plots were shown to producers at several field days in 1993, and there appears to be great interest in reduced-rate programs. Research results will be reported at the 1993 North Central Weed Science Society annual meeting in December, and the Ohio Association of Independent Crop Consultants annual meeting in early 1994.

For further information contact Mark Loux Associate Professor, Dept. of Horticulture & Crop Science, The Ohio State University or the Ohio IPM Office.

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Reduction of Stand Losses in No-Till Corn With Row Cleaners

In Fairfield County during the spring of 1993, the county Extension agent (J. Skeeles) cooperating with a local grower (D. Brandt) with support of a grant from the Piketon Center set up an on-farm experiment to demonstrate the efficacy of two row cleaner systems (Dawn and Yetter) plus a number of coulters on corn planted no-till into three habitats, namely corn stubble, soybean stubble, and hairy vetch. Although the experiment was not conducted in a randomized replicated manner, the repeated field length employment of the mechanical devices did enable replicated comparison of the implements on parallel rows. Subsequent evaluation of the impact of the row cleaner devices on stand loss due to slug injury was conducted by OSU/IPM Program personnel assisted by the Fairfield County project technician (D. Sweeny).

The corn was planted May 11th with a John Deer Maximerge no-till six row planter. A Dawn row cleaner employed on 1st row and Yetter row cleaners were employed on the 5th and 6th rows. No row cleaners were used on the 3rd and 4th rows. As a result, the final row pattern repeated across a portion of each field included two rows cleaned by Dawn row cleaners, two rows without row cleaning, and four rows cleaned by Yetter row cleaners. To evaluate the effect of stand establishment, row #1 cleaned by the Dawn units was compared to the parallel row #2 without cleaners, and row #4 cleaned by the Yetter unit was compared to the parallel row #3 without cleaners. In the comparisons, stand counts were taken on June 7 and June 10 on 50 meter row samples from five sets of parallel rows. Observations were also taken on 10 randomly selected plants per row sampled in the corn stubble and soybean stubble sites to determine the level of stand exhibiting foliar slug injury. Since planter performance per rows could possibly be a variable, stand counts were taken on four sets of rows of corn planted in adjacent soybean stubble (which exhibited minimal slug injury) without cleaners to determine the potential baseline of stand establishment and potential differences among the four planter units.

Parallel results of stand counts were subjected to a matched pair T-test to determine significant differences between Treatments. Data on Dawn and Yetter units was pooled and subjected to regression analysis to evaluate the relationship between stand counts of row samples cleaned and not cleaned in relation to different levels of stand loss.

In the field where corn was planted in corn stubble, the use of row cleaners reduced estimated stand loss from 18.2% to 7.5% when compared to the baseline of corn stand achieved in corn planted into an adjacent portion of the field planted into soybean stubble (see Table 2.1.1). A similar reduction of stand loss was observed in the corn planted into hairy vetch (see Table 2.1.2). Although the data suggests that the Dawn cleaners may have been more effective than the Yetter cleaners, analysis of the data indicated that stand loss reduction increased as stand loss increased in the parallel rows not cleaned, and the difference in loss protection observed between the two types of row cleaners was due to the fact that the Dawn plots had heavier initial slug activity.

In summary, this evaluation of row cleaners in fields having significant slug activity demonstrated that row cleaners may reduce stand losses in no-till corn due to slug feeding activity.

Table 1: Stand counts of corn planted into corn stubble without tillage with and without two types of row cleaners.

Treatment	Plants per 50 Meters of Row	Plants per Acre Equivalent	% Plants Slug Inj.	% Reduction from Baseline
Dawn Cleaner Used	214.6 a	22,799	74	9.4
Parallel Rows Not Cleaned	179.4 b	19,059	88	24.3
Yetter Cleaner Used	223.6 a	23,755	76	5.6
Parallel Rows Not Cleaned	208.0 a	22,098	90	12.2
Cleaner Used (Dawn & Yetter)	219.1 a	23,277	75	7.5
Parallel rows Not Cleaned	193.7 b	20,579	89	18.2

Difference in alpha character following means of paired data sets represents significant statistical difference at p = 0.05.

Table 2: Stand counts of corn planted into hairy vetch without tillage with and without two types of row cleaners.

Treatment	Plants per 50 Meters of Row	Plants per Acre Equivalent
Dawn Cleaner Used	209.0 a	22,204
Parallel Rows Not Cleaned	189.8 b	20,159
Yetter Cleaner Used	210.8 a	22,390
Parallel Rows Not Cleaned	197.5 b	20,982
Cleaner Used (Dawn & Yetter)	209.9 a	22,297
Parallel Rows Not Cleaned	193.6 b	20,570

Difference in alpha character following means of paired data sets represents significant statistical difference at p = 0.05.

For further information contact James Skeeles Extension Agent, Ohio State University Extension, Fairfield County or the Ohio IPM Office.

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Ohio Integrated Pest Management

THE OHIO STATE UNIVERSITY EXTENSION

The Southern Ohio Diagnostic Field Day and Fayette County Agronomic Plot Program

Principal Investigator:

Larry Lotz, Fayette County

Abstract:

This project was designed to 1. increase the educational value of 30 long term plots established in 1990 on the Fayette Co. Farm to compare the economics of three tillage methods and three crop rotations utilizing three input levels, and 2. establish and conduct a Southern Ohio Crop Diagnostic Field Day utilizing these 30 plots. More specific goals included: 1. to provide agriculture clientele hands on experience in crop pest detection and management via a series of field days highlighted by a special June 23 diagnostic field day, 2. compare economic and yield results of high, standard, and low input plots emphasizing evaluation between cultural/mechanical pest control measures versus chemical control, 3. to correlate the use of infra-red photography to actual crop problems, and 4. to provide data to farm managers to aid in those decisions that yield the most optimum combination of economics, yield, and environmental quality.

The major activity conducted in regards to this project was a Southern Ohio Crop Diagnostic Field Day held June 23, 1993 with 150 farmers and agribusiness personnel attending. Sessions included:

1. Corn Growth and Development - Using corn demonstration plots planted at 2 week intervals, Dr. Peter Thomison discussed corn growth characteristics and regrowth potential.

2. Herbicide Performance Properties and Injury Diagnosis - Dr. Mark Loux, Extension Weed Specialist, explained how different classes of herbicides prevent weed growth. A plot was planted including 14 rows each 200 ft. long consisting of 4 crops and 10 weeds. Twenty different herbicides were then sprayed across all 14 rows to demonstrate effectiveness and control properties.

3. Forage Production and Pest Control - Dr. Mark Sulc, Extension Forage Specialist, discussed the latest in forage production with emphasis on alfalfa. A discussion of insects was a major part of this session.

4. The Effect of Soil Compaction on Plant Growth - Dr. Randall Wood demonstrated soil compaction over various tillage methods using different axle loads and tire arrangements.

5. Crop Insect I.D. and Control - Dr. Hal Willson lead this session on the identification of field crop insects and the practical, economical control of harmful insects including chemical and non-chemical control measures.

6. New Sprayer and Application Technology - Mr. Kirby Kretchner, Agricultural Specialist for the Spraying Systems Co., demonstrated new developments and sprayer technology designed to improve pest control. Sprayer calibration was also emphasized.

7. Prescription Farming Technology Update - Mr. David Slater from RDI Technologies in DeKalb, Illinois presented the latest in prescription farming technologies including the use of on-board combine computers and yield monitors, global positioning system satellites, field gridding, and infrared photography and its role as a crop diagnostic tool.

The following day a diagnostic workshop was conducted for Ohio and Indiana Countrymark personnel focusing on many of the same topics as those listed above. Forty-four attended this field day. On August 26 the Southwestern Ohio Corn Growers also held their field day at this site with 550 attending. The plots were used to discuss a number of crop problems encountered during the growing season along with IPM practices. The site was also used for many informal teaching activities during the year including a visit by a group of farmers from Pennsylvania. In addition, 125 aerial infrared photographs were taken of the plots and farm fields around the county. These were used to diagnose crop problems.

For further information contact Larry Lotz Extension Agent, Ohio State University Extension, Fayette County or the Ohio IPM Office.

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