scaffolds Update on Pest Management and Crop Development

FRUIT JOURNAL

May 29, 2001 VOLUME 10, No. 11 Geneva, NY

INSIDE TRACK

LONG-TERM WORMS: MANAGEMENT OF INTERNAL LEPIDOPTERA IN NY APPLE ORCHARDS

(Harvey Reissig, Entomology, Geneva)

❖❖ Apple growers in N.Y. have not traditionally applied insecticide sprays specifically targeted against internal Lepidoptera. Early season control sprays directed against the plum curculio have provided adequate control of the first generation of internal Lepidoptera, and later sprays applied during July and August to control apple maggot have controlled later season generations. Most growers have used broad-spectrum organophosphate insecticides to control all of these pests that directly injure fruit and have usually obtained almost perfect control at a reasonable cost. However, in the future, it appears that changing pesticide regulations may affect the availability and use patterns of organophosphates. Also, as growers attempt to implement more sophisticated IPM programs using more selective "reduced risk" insecticides, which usually have a narrower activity range, for control of plum curculio and apple maggot, it may become necessary to apply specific treatments to control internal Lepidoptera throughout the growing season.

Biology

Three species of lepidopterous larvae can infest apple fruit in New York State: the codling moth (CM) *Cydia pomonella* (Linnaeus); the oriental fruit moth (OFM) *Grapholita molesta* (Busck), and the lesser appleworm (LAW) *Grapholita prunivora* (Walsh). This species complex of apple pests is commonly referred to as internal Lepidoptera. Seasonal development differs slightly for all three species. However, since codling moth is the most common pest found in fruit in commercial orchards, this entire complex of pests can be managed by directing control measures on a schedule designed to control CM. Since these pests can be found commonly infesting apples in unsprayed orchards and wild apple trees, natural enemies, predators and parasites will not provide adequate control in commercial apple orchards. Therefore, for the foreseeable future, it is likely that specific control tactics will have to be used in order to obtain acceptable control of CM in commercial N.Y. apple orchards.

The seasonal life cycle of CM is discussed in detail in Cornell's Tree Fruit IPM Insect Identification Sheet No. 2. The spring flight of CM begins about the time that 'Delicious' apples

continued...

IN THIS ISSUE...

bloom in N.Y., and a second peak of adult activity, which may include a second and partial third generation of the pest, begins in July and continues throughout the remainder of August. The second generation of CM usually causes more damage to fruit than the first generation of this pest. Even though CM biology and behavior is somewhat similar in the eastern and western apple growing regions, it is much more difficult to control CM in the western part of the United States. The reasons for this differential severity of CM in different apple production regions is unknown, but as a general rule, CM control is more difficult and fruit damage is usually more severe in apple production regions with hot, dry summer weather.

Mating Disruption

Studies conducted in Europe and the western U.S. have shown that it is possible to control CM by deploying large amounts of pheromones in commercial apple orchards to disrupt mating. Several types of pheromone-dispensing systems — including "twist ties", sprayable microencapsulated formulations that can be applied with normal airblast sprayers, paraffinic emulsions, and automated microsprayers — have been used to successfully dispense pheromones for disruption of CM mating in apple orchards. Pheromone disruption has generally provided adequate protection of fruit when large areas of orchards are treated to mitigate the effects of immigration of gravid females from unsprayed areas of outside infestation sources, and indigenous populations of CM in treated orchards are reduced to very low levels.

Usually, pheromone-disrupted orchards or areas under pheromone treatment are carefully monitored, using pheromone traps baited with high rates of pheromone to act as "super lures" to monitor CM males, and fruit samples to estimate damage from different CM generations. If pheromone trap catches or fruit monitoring indicate that CM populations and/or fruit infestation is reaching potentially damaging levels in pheromone-disrupted orchards, insecticide sprays are applied to supplement the pheromones. It is not uncommon to apply an average of at least one general insecticide spray in orchards under pheromone disruption treatments in the western U.S.

Very little work has been done to test the effectiveness of pheromone disruption against CM in N.Y. because of the effectiveness of insecticide control sprays for the plum curculio and apple maggot against this pest. However, if programs are developed to control these pests using more selective insecticides or some other control tactic, pheromone disruption would appear to be a potential, IPM-compatible control tactic for CM in N.Y. apple orchards. It might even be possible to deploy pheromone blends that would disrupt mating of both CM and the obliquebanded leafroller.

Chemical Control

It should not be necessary to apply additional special sprays for CM control in apple orchards that continue to be treated with even minimal schedules (2–3 sprays during the season) of organophosphate or other broad spectrum insecticides for control of the plum curculio and apple maggot. During the past few years, however, with the advent of trapping-based spray deci-

continued...

scaffolds
is published weekly from March to September by Cornell University—NYS Agricultural Experiment Station (Geneva) and Ithaca—with the assistance of Cornell Cooperative Extension. New York field reports welcomed. Send submissions by 3 pm Monday to:
scaffolds FRUIT JOURNAL
Dept. of Entomology
NYSAES, Barton Laboratory
Geneva, NY 14456-0462
Phone: 315-787-2341 FAX: 315-787-2326
E-mail: ama4@nysaes.cornell.edu
Editors: A. Agnello, D. Kain
This newsletter available on CENET at: news://newsstand.cce.cornell.edu/cce.ag.tree-fruit
and on the World Wide Web at:
http://www.nysaes.cornell.edu/ent/scaffolds/
For fruit information on the web see:
http://www.cornellfruit.com

sions for apple maggot, and a resulting decrease in cover sprays in some cases, there have been more opportunities for an unwelcome return of low-level CM infestations. In such cases, if it becomes necessary to apply special sprays for CM control in orchards that are not being treated with standard insecticides, timing control sprays by using CM developmental models based on heat unit accumulation is a very effective management strategy.

The Michigan model for predicting CM development gives fairly accurate predictions of codling moth activity in N.Y. As many as two insecticide applications may be made for each of the two generations per year, depending on the severity of pressure. Degree days are accumulated from the date of first sustained moth catch, and the first spray is applied at 250 DD (base 50°F), which corresponds with predicted 3% egg hatch. A second spray may be applied 10–14 days later. If pressure is not too severe, one spray will suffice, applied instead at 360 DD after the biofix date. To control the second generation, the timing is 1260 DD after this same biofix date.

We will again publicize suggested codling moth treatment windows this season, for those growers who don't necessarily spray certain blocks for maggot each year, and who have evidence (or suspicion) that codling moth is starting to pose a significant threat. We're calling the biofix May 21 in Geneva and May 14 in Highland; we will be providing regular updates to identify imminent spray dates.

Insecticide trials conducted in N.Y. over a number of years in research orchards heavily infested with CM and other species of internal Lepidoptera have shown that most currently available IPM-compatible, "reduced risk" insecticides (Comply, Dipel, Confirm, and SpinTor) are slightly less effective in preventing fruit injury than are standard organophosphate insecticides, such as Guthion and Imidan. However, it is likely that these selective materials applied on a schedule of 2–3 sprays/generation of CM, based on predictions from a CM developmental model, will provide adequate control in normal commercial apple orchards that are not located adjacent to abandoned orchards or extensive acreages of feral, unsprayed apple trees.

continued...

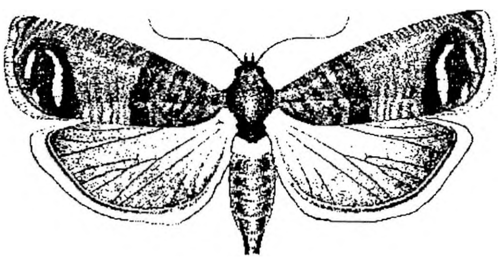
Table 1. Evaluation of insecticides for the control of internal lepidoptera on apples.

		AVERAGE % FRUIT DAMAGED BY			
		Internal Lepidoptera			
Treatment	Spray timing	gen 1	harvest	OBLR	Plum curculio
Trial 1					
Calypso 4F	PK thru 7C	2.3 ab	1.0 ab	1.7 ab	13.7 a
Guthion 50W	PF thru 7C	0.0 a	0.0 a	0.3 a	4.0 a
Danitol 2.4EC	2C, 6C	0.3 a	0.0 a	0.0 a	8.0 a
Guthion 50W	PF, 2C, 5C				
Spintor 2SC	3C				
Imidan 70WP	PF, 2C, 5C	0.3 a	0.0 a	0.0 a	5.7 a
Confirm 2F	3C, 4C				
Actara 25WG	PK thru 7C	13.0 d	2.7 ab	2.7 ab	6.3 a
Check	—	22.0 e	4.7 bc	4.7 bc	49.7 b

Means within a column followed by the same letter are significantly different (Fisher's Protected LSD Test), P<0.05).

However, since some of these materials have limited contact activity against young CM larvae, and are only effective when ingested, they may be more effective if they are applied 5–7 days earlier than the estimated first hatching date predicted by the developmental model for each generation of CM. This type of scheduling ensures that eggs are deposited on residues of the material so that hatching larvae are more likely to ingest a lethal dosage of the compounds before entering the fruit.

Some of the newer selective contact insecticides being developed show promise as potential replacements or rotational complements to the standard OP programs currently used for internal lep management. The results of a recent test in heavily infested research orchards at the NYSAES are shown in Table 1. The seasonal program of Calypso was significantly more effective against STLM than the Guthion standard, but control of other major pests was statistically comparable to Guthion although damage levels of PC and internal lepidoptera were slightly higher at harvest. Actara provided a similar level of pest control, and this material was very effective against STLM and PC. Actara did not adequately control internal lepidoptera. The seasonal programs combining different types of insecticides all controlled direct pests of fruit (int lep, PC, and OBLR) as well as the organophosphate standard treatments.❖❖



THIS DOES NOT COMPUTE

A DIFFERENT PC/MAC CONFRONTATION
(Art Agnello, Entomology, Geneva)

❖❖ Just a reminder that plum curculio egg-laying, which is a very temperature-dependent activity, has been significantly curtailed during the recent period of cold and wet weather we have been experiencing. Whatever protective residues of insecticides that were applied at petal fall will almost certainly have dissipated in effectiveness and probably the actual amount by the time conditions start to moderate again, and it's a sure bet that the curcs haven't finished their cutting or laying. Therefore, most growers will want to be prudent and follow up in most blocks with a second application of a suitable material such as an OP by 10–14 days after their petal fall spray, to protect the fruits during this year's prolonged curc season.❖❖

ERRATUM

SIN OF OMISSION

ERRATUM: SPINTOR NOTE

❖❖ Sorry we indadvertently omitted mention of SpinTor, one of the other main options for OBLR control at petal fall in the 5/14 issue of Scaffolds. Its record of effectiveness against this pest is well known to many growers, and even if the actual petal fall spray has been applied, it also has activity on STLM and Codling Moth, which can additionally be addressed during this PF to 1C period.❖❖

PEST FOCUS

Highland: 2nd generation **pear psylla** adults laying eggs. **Plum curculio** oviposition damage is low in later varieties. Developmental model is at 223 DD_{50}.

Hudson:

Trap catches (#/trap/day)	American plum borer	0.8
	Oriental fruit moth	0.0

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–5/29):	693	407
(Geneva 1/1-5/29/2000):	711	377
(Geneva 1/1–5/29 "Normal"):	652	352
(Highland 1/1–5/29):	831	500
(Hudson 1/1–5/29):	747	443

Coming Events:	**Ranges:**	
San Jose scale 1st flight peak	457–761	229–449
American plum borer 1st flight peak	360–962	134–601
Spotted tentiform leafminer 1st flight subsides	489–978	270–636
Codling moth 1st flight peak	547–1326	307–824
Pandemis leafroller 1st catch	749–873	423–488
Obliquebanded leafroller 1st catch	686–1104	392–681
Redbanded leafroller 1st flight subsides	518–1104	255–658
Peachtree borer 1st catch	565–1557	299–988
Rose leafhopper adults on multiflora rose	668–916	336–519

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva, NY

	5/17	5/21	5/29
Redbanded leafroller	1.8	1.1	0.6
Spotted tentiform leafminer	181	45	23.8
Oriental fruit moth	69	22	9.9
Lesser appleworm	76	34	12.2
Codling moth	–	31.3*	5.6
San Jose scale	–	1.1*	0.1
American plum borer	1.0	1.3	–
Lesser peachtree borer	–	3.6*	–

Highland, NY

	5/21	5/29
Redbanded leafroller	3.6	2.4
Spotted tentiform leafminer	3.4	1.1
Oriental fruit moth	2.9	0.7
Codling moth	1.4	0.9
Lesser appleworm	6.4*	2.9
Variegated leafroller	0.4*	0.7
Obliquebanded leafroller	0	0
Tufted apple bud moth	0	0

* *first catch*

scaffolds
Dept. of Entomology
NYS Agricultural Exp. Sta.
Barton Laboratory
Geneva, NY 14456-0462

NOTE: Every effort has been made to provide correct, complete and up-to-date pesticide recommendations. Nevertheless, changes in pesticide regulations occur constantly, and human errors are possible. These recommendations are not a substitute for pesticide labelling. Please read the label before applying any pesticide.

This material is based upon work supported by Smith Lever funds from the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.