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Update on Pest Management and Crop Development

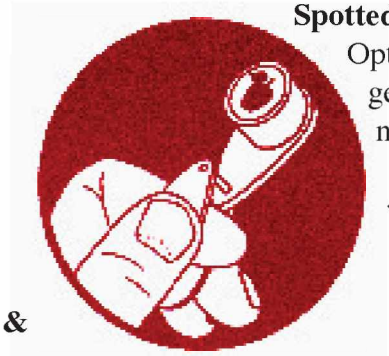
FRUIT JOURNAL

July 7, 2008 VOLUME 17, No. 16 Geneva, NY

INSECTS

ETA

ORCHARD RADAR DIGEST



Geneva Predictions:

Roundheaded Appletree Borer & Dogwood Borer

RAB peak egglaying period roughly: June 24 to July 8.

Peak RAB eggs hatch roughly: July 9 to July 28.

Codling Moth

Codling moth development as of July 7: 1st generation adult emergence at 100% and 1st generation egg hatch at 91%.

Lesser Appleworm

2nd LAW flight begins around: July 7.

Obliquebanded Leafroller

Where waiting to sample late instar OBLR larvae to determine need for treatment is an option, or to check on results from earlier sprays: If first OBLR late instar larvae sample is below threshold, date for confirmation follow-up: July 7.

Oriental Fruit Moth

2nd generation – first treatment date, if needed: July 6.

2nd generation – second treatment date, if needed: July 16.

Redbanded Leafroller

Peak catch and approximate start of egg hatch: July 9.

Spotted Tentiform Leafminer

Optimum first sample date for 2nd generation STLM sap-feeding mines: July 10.

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MODEL BUILDING

Oriental Fruit Moth (First treatment targeting earliest egg hatch of 2nd generation larvae between 175–200 DD base 45°F after biofix):

Location	Biofix	DD (as of 7/7)
Albion	July 1	160
Geneva	June 30	176
Sodus (South)	June 30	153
Waterport	July 1	164
Williamson	June 30	175

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IN THIS ISSUE...

Obliquebanded Leafroller (% estimated egg hatch in DD base 43°F after biofix: 50% hatch - 630 DD; "halfway point" in development of earliest emerging larvae – 720 DD):

Location	Biofix	DD (as of 6/30)
Albion	June 7	833
Appleton-S	June 10	697
Clifton Park	June 11	641
Geneva	June 9	735
Knowlesville	June 8	775
Sodus	June 10	647
Waterport	June 10	743
Williamson	June 10	678

[NOTE: Consult our mini expert system for arthropod pest management, the Apple Pest Degree Day Calculator:
http://www.nysaes.cornell.edu/ipm/specware/newa/appledd.php
Find accumulated degree days between dates with the Degree Day Calculator:
http://www.nysaes.cornell.edu/ipm/specware/newa/
Powered by the NYS IPM Program's NEWA weather data and the Baskerville-Emin formula]

PEST ASIDES

PERFORMANCE-ENHANCING BUGS

(Art Agnello, Entomology, Geneva)

❖❖ There are many insects present in apple orchards that provide a benefit to growers by feeding on pest species. It is important that growers and orchard managers be able to recognize these natural enemies, so that they are not mistaken for pests. The best way to conserve beneficial insects is to spray only when necessary, and to use materials that are less toxic to them (see Tables 5 & 12, pp. 58 and 64 of the Recommends). This brief review, taken from IPM Tree-Fruit Fact Sheet No. 18 (available online at: http://www.nysipm.cornell.edu/factsheets/treefruit/pests/ben/ben.asp), covers the major beneficial insects that are likely to be seen in N.Y. orchards, concentrating on the most commonly seen life stages. Factsheet No. 23, "Predatory Mites" (online: http://www.nysipm.cornell.edu/factsheets/treefruit/pests/pm/pm.asp), reviews mites that are important predators of leaf-feeding mites.

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CECIDOMYIID LARVAE (*Aphidoletes aphidimyza*)

These gall midge flies (Family Cecidomyiidae) are aphid predators, and overwinter as larvae or pupae in a cocoon. Adults emerge from this cocoon, mate, and females lay eggs among aphid colonies. The adults are delicate, resembling mosquitoes, and are not likely to be seen. The eggs are very small (about 0.3 mm or 1/85 in. long) and orange. They hatch into small, brightly colored, orange larvae that can be found eating aphids on the leaf surface. These predacious larvae are present from mid-June throughout the summer. There are 3–6 generations per year. In addition to aphids, they also feed on soft-bodied scales and mealybugs.

SYRPHID FLY LARVAE (Family Syrphidae)

The Family Syrphidae contains the "hover flies", so named because of the adults' flying behavior. They are brightly colored with yellow and black stripes, resembling bees. Syrphids overwinter as pupae in the soil. In the spring, the adults emerge, mate, and lay single, long whitish eggs on foliage or bark, from early spring through midsummer, usually among aphid colonies. One female lays several eggs. After hatching, the larvae feed on aphids by piercing their bodies and sucking the fluids, leaving shriveled, blackened aphid cadavers. These predacious larvae are shaped cylindrically and taper toward the head. There are 5–7 generations per year. Syrphid larvae feed on aphids, and may also feed on scales and caterpillars.

LADYBIRD BEETLES (Family Coccinellidae)

• Stethorus punctum: This ladybird beetle is an important predator of European red mite in parts of the northeast, particularly in Pennsylvania, and has been observed intermittently in the Hudson Valley of N.Y., and occasionally in western N.Y. Stethorus overwinters as an adult in the "litter" and ground cover under trees, or in nearby protected places. The adults are rounded, oval, uniformly shiny black, and are about 1.3–1.5 mm (1/16 in.) long. Eggs are laid mostly on the undersides of the leaves, near the primary veins, at a density of 1–10 per leaf. They are small and pale white, and about 0.3–0.4 mm (1/85 in.) long. Eggs turn black just prior to hatching. The larva is gray to blackish with numerous hairs, but becomes reddish as it matures, starting on the edges and completing the change just prior to pupation. There are 3 generations per year in south-central Pennsylvania, with peak periods of larval activity in mid-May, mid-June and mid-August. The pupa is uniformly black, small and flattened, and is attached to the leaf.

• Other Ladybird Beetles: Ladybird beetles are very efficient predators of aphids, scales and mites. Adults are generally hemisphere-shaped, and brightly colored or black, ranging in size from 0.8 to over 8 mm (0.03–0.3 in.). They overwinter in sheltered places and become active in the spring. Eggs are laid on the undersides of leaves, usually near aphid colonies, and are typically yellow, spindle-shaped, and stand on end. Females may lay hundreds of eggs. The larvae have well-developed legs and resemble miniature alligators, and are brightly colored, usually black with yellow. The pupal case can often be seen attached to a leaf or branch. There are usually 1–2 generations per year. One notable species that is evident now is Coccinella septempunctata, the sevenspotted lady beetle, often referred to as C-7. This insect, which is large and reddish-orange with seven distinct black spots, was intentionally released into N.Y. state beginning in 1977, and has become established as an efficient predator in most parts of the state.

LACEWINGS (Family Chrysopidae)

Adult lacewings are green or brown insects with net-like, delicate wings, long antennae, and prominent eyes. The larvae are narrowly oval with two sickle-shaped mouthparts, which are used to pierce the prey and extract fluids. Often the larvae are covered with "trash", which is actually the bodies of their prey and other debris. Lacewings overwinter as larvae in cocoons, inside bark cracks or in leaves on the ground. In the spring, adults become active and lay eggs on the trunks and branches. These whitish eggs are laid singly and can be

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seen connected to the leaf by a long, threadlike "stem". Lacewings feed on aphids, leafhoppers, scales, mites, and eggs of Lepidoptera (butterflies and moths).

TRUE BUGS (Order Hemiptera)

There are many species of "true bugs" (Order Hemiptera) such as tarnished plant bug, that feed on plants, but a number of them are also predators of pest species. The ones most likely to be seen are "assassin bugs" or reduviids (Family Reduviidae), and "damsel bugs" or nabids (Family Nabidae). These types of predators typically have front legs that are efficient at grasping and holding their prey.

PARASITOIDS

Parasitoids are insects that feed on or in the tissue of other insects, consuming all or most of their host and eventually killing it. They are typically small wasps (Order Hymenoptera; e.g., families Ichneumonidae, Braconidae, Chalcididae), or flies (Order Diptera; e.g., family Tachinidae). Although the adult flies or wasps may be seen occasionally in an orchard, it is much more common to observe the eggs, larvae, or pupae in or on the parasitized pest insect. Eggs may be laid directly on a host such as the obliquebanded leafroller, or near the host, such as in the mine of a spotted tentiform leafminer. After the parasitoid consumes the pest, it is not unusual to find the parasitized larvae or eggs of a moth host, or aphids that have been parastized ("mummies"). Exit holes can be seen where the parasitoid adult has emerged from the aphid mummy.

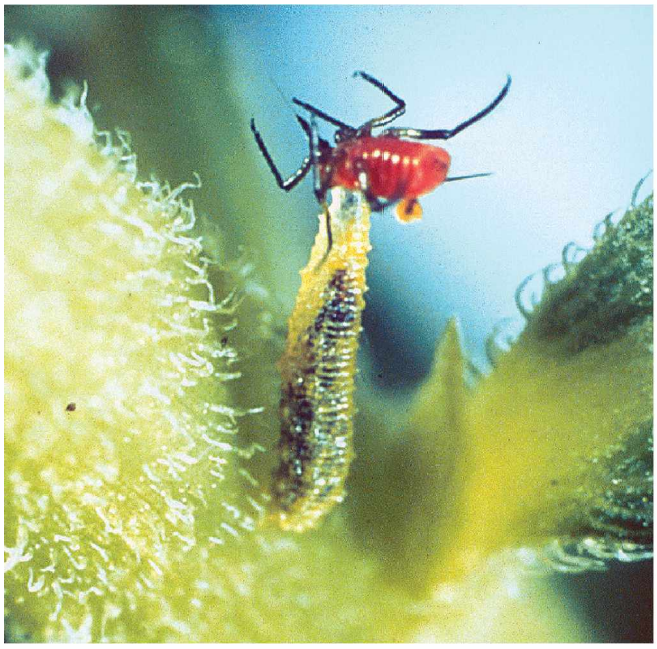
GENERALIST PREDATORS

There is a diversity of other beneficial species to be found in apple orchards, most of which are rarely seen, but whose feeding habits make them valuable additions to any crop system. The use of more selective pesticides helps to maintain their numbers and contributes to the level of natural control attainable in commercial fruit plantings. Among these beneficials are:

• Spiders (Order Araneida): All spiders are predaceous and feed mainly on insects. The prey is usually killed by the poison injected into it by the spider's bite. Different spiders capture their prey in different ways; crab spiders (Thomisidae and Philodromidae) and jumping spiders (Salticidae) forage for and pounce on their prey -- the crab spiders lie in wait for their prey on flowers -- and web-building spiders (e.g., Araneidae, Theridiidae, and Dictynidae) capture their prey in nets or webs.

• Ants (Family Formicidae): The feeding habits of ants are rather varied. Some are carnivorous, feeding on other animals or insects (living or dead), some feed on plants, some on fungi, and many feed on sap, nectar, honeydew, and similar substances. Research done in Washington has shown certain species (Formica spp.) of ants to be effective predators of pear psylla.

• Earwigs (Family Forficulidae): Although these insects may sometimes attack fruit and vegetable crops, those found in apple orchards are probably more likely to be scavengers that feed on a variety of small insects. ❖❖



Syrphid fly larva attacking aphid

INSECT TRAP CATCHES
(Number/Trap/Day)

Geneva, NY

	6/30	7/3	7/7
Redbanded leafroller	2.5*	3.2	1.5
Spotted tentiform leafminer	12.6	11.2	18.0
Oriental fruit moth	1.1*	2.5	1.8
American plum borer	0.0	0.0	0.0
Lesser peachtree borer	0.3	0.3	0.3
Lesser appleworm	0.0	0.3	0.0
San Jose scale	0.0	0.1	0.0
Codling moth	0.0	0.0	0.0
Pandemis leafroller	0.3	0.0	0.0
Obliquebanded leafroller	0.0	0.3	0.0
Peachtree borer	0.1	0.0	0.4
Apple maggot	0.3*	1.2	0.6

* first catch

Highland, NY

	6/21	6/30
Redbanded leafroller	0.6	0.6
Spotted tentiform leafminer	38.1	41.4
Oriental fruit moth	0.0	0.9
Codling moth	1.1	0.3
Lesser appleworm	6.3	2.2
Obliquebanded leafroller	7.4	0.9
Tufted apple budmoth	0.6	0.3
Fruittree leafroller	0.3	0.1
Apple maggot	0.0	0.1
Lesser peachtree borer	0.5	1.1
Dogwood borer	0.3	0.1

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1–7/7/08):	1582	1005
(Geneva 1/1–7/7/2007):	1572	1015
(Geneva "Normal"):	1604	1020
(Geneva 1/1–7/14 Predicted):	1817	1191

Coming Events:	Ranges (Normal ±StDev):	
Oriental fruit moth 2nd flight peak	1387–2137	874–1452
American plum borer 2nd flight begins	1409–1967	1006–1294
Lesser appleworm 2nd flight begins	1405–2023	917–1337
Apple maggot 1st oviposition punctures	1528–2078	1021–1495
Codling moth 2nd flight begins	1555–2283	999–1529
Pandemis leafroller flight subsides	1390–1636	866–1046
Spotted tentiform leafminer 2nd flight peak	1388–1838	869–1215
STLM 2nd gen tissue feeders present	1378–2035	913–1182
Obliquebanded leafroller 1st flight subsides	1621–2121	1040–1426
Redbanded leafroller 2nd flight peak	1545–2069	983–1389
San Jose scale 2nd flight begins	1575–1933	1020–1302

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.

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