scaffolds Update on Pest Management and Crop Development

FRUIT JOURNAL

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BIOLOGICAL CONTROL

HOW TO PLANT YOUR PYRI

IMPROVING TRANSFER OF THE MITE PREDATOR *TYPHLODROMUS PYRI* BETWEEN ORCHARDS

Jan Nyrop, Dave Kain, John Minns and Art Agnello

❖❖ The mite predator *Typhlodromus pyri* can provide complete biological control of European red mite (*Panonychus ulmi*) when the predator is conserved in apple orchards. Experiments have shown that once established in an orchard, this predator can completely eliminate the need for miticides. While *T. pyri* is endemic throughout much of western New York, it can take as many as three years in specific orchard blocks for predator numbers to increase to the point where biological control is realized. Moving *T. pyri* from blocks where they are abundant to sites where more predators are desired (seeding) might speed this process.

Instances will occur when it is necessary to use pesticides that are toxic to *T. pyri* in order to control other orchard pests. To combat the attendant disruptions to mite biological control that these pesticide applications cause, it has been suggested that orchardists establish sites to be used as mite "nurseries". These sites would not be treated with pesticides harmful to *T. pyri* and would be used as sources of predators that could be moved to orchard locations where predators are scarce. Thus, moving *T. pyri* from sites where they are abundant to sites where they are less numerous might be an important ingredient of any integrated mite control program.

Transferring *T. pyri* entails removing wood (and foliage when present) from a source orchard to target trees. There are several timing possibilities: 1) Because *T. pyri* overwinter throughout the tree, winter prunings could be used to transfer predators. Moving predators at this time would allow transferred predators the most time for further population development. 2) It has been noted that predators tend to concentrate in flower buds and the flowers themselves during bloom. Therefore, transfer at this time may allow for moving higher numbers of predators than before bloom. 3) *Typhlodromus pyri* is usually most abundant during mid-summer. As result, this is another potential time when predators could be moved.

We recently completed an experiment in which *T. pyri* were transferred from one orchard to another at three tree growth stages; half-inch green, tight cluster, and bloom. Predators were transferred from the source orchard to target trees by attaching five 50-cm-long branches collected from the source orchard to each of twelve recipient Red Delicious trees. Branches were chosen so that they each had approximately seven flower clusters. We found that affixing branches cut from trees that harbored *T. pyri* to recipient trees in another orchard increased phytoseiid densities in the target trees (Fig. 1). Transferring predators at bloom resulted in higher numbers of phytoseiids compared with transferring predators at tight cluster or at half-inch green. There was no difference between predator numbers in trees seeded at half-inch green and tight cluster.

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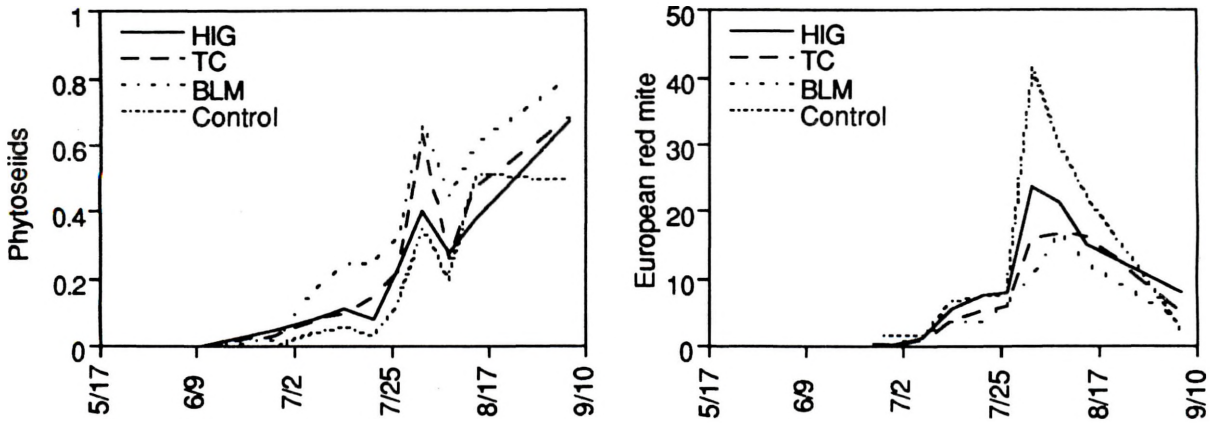

Figure 1. Densities of phytoseiids and European red mites in trees into which branches harboring *T. pyri* were affixed at half-inch green (HIG), tight cluster (TC), or bloom (BLM) or where no predators were transferred (control).

Numbers of European red mite were not statistically different among treatments, probably due to the high variability among density estimates within each treatment. Rank orders of European red mite and phytoseiid densities were identical, suggesting that the time of predator transfer and subsequent predator abundance influenced European red mite dynamics.

Differences in predator numbers among treatments can be related to the number of predators actually transferred. When branches were affixed to the trees, we also extracted phytoseiids from a sample of these branches by placing the branches, foliage and flowers in Berlese funnels. More than thirty times as many predators were transferred per branch at bloom (mean = 8.85), compared with half-inch green (mean = 0.24, SEM = 0.07) ($p < 0.01$), although there was no statistical difference in the number of predators transferred at tight cluster (mean = 4.43) and bloom.

Transferring branch cuttings from one orchard where *T. pyri* is abundant to trees in another orchard is an effective way of increasing numbers of this predator. The best time to make these transfers is at bloom, when predators congregate in flowers to feed on pollen. Moving as few as 40 predators per tree resulted in substantial increases in predator abundance. Orchardists may not be willing to cut branches with flowers to transfer predators. In such cases, terminal branches cut later in the summer could be used; however, more branches will be required. Using winter prunings or branches cut early in the spring to transfer predators is not the most effective way of accomplishing this goal. While *T. pyri* overwinter throughout the tree, there are apparently many predators that overwinter on large branches or the bole

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scaffolds

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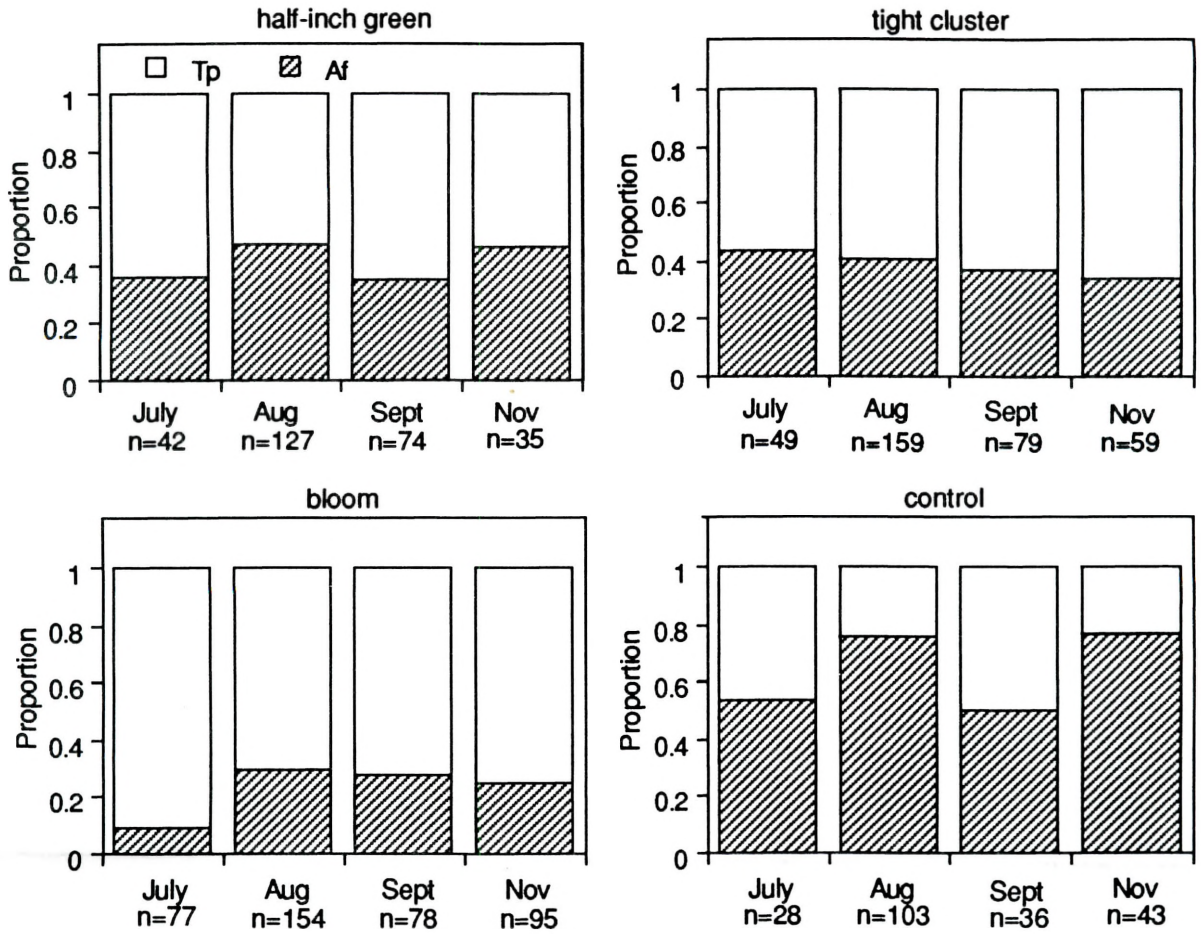

Figure 2. Proportion of *A. fallacis* and *T. pyri* in samples collected from trees into which branches harboring *T. pyri* were affixed at half-inch green, tight cluster, or bloom or where no predators were transferred (control). Numbers (n=*xx*) indicate the number of phytoseiids upon which proportions were based.

itself and that move into the canopy as foliage appears. Use of nurseries in which *T. pyri* are cultivated and transfer of branches harboring *T. pyri* from these nurseries to target sites should allow biological mite control to be more persistent on a farm-wide scale.

Unlike petroleum oils applied early in the growing season, oils applied during the summer can have an adverse effect on phytoseiid numbers. However, this effect is apparently only significant biologically when high volumes of oil suspension are applied. Our opinion is that oil applied using conventional airblast sprayers will have only a minimal negative effect on phytoseiid numbers. As such, summer oil applications can be recommended as a way to help manage European red mite numbers if predator numbers are insufficient to realize biological control.❖❖

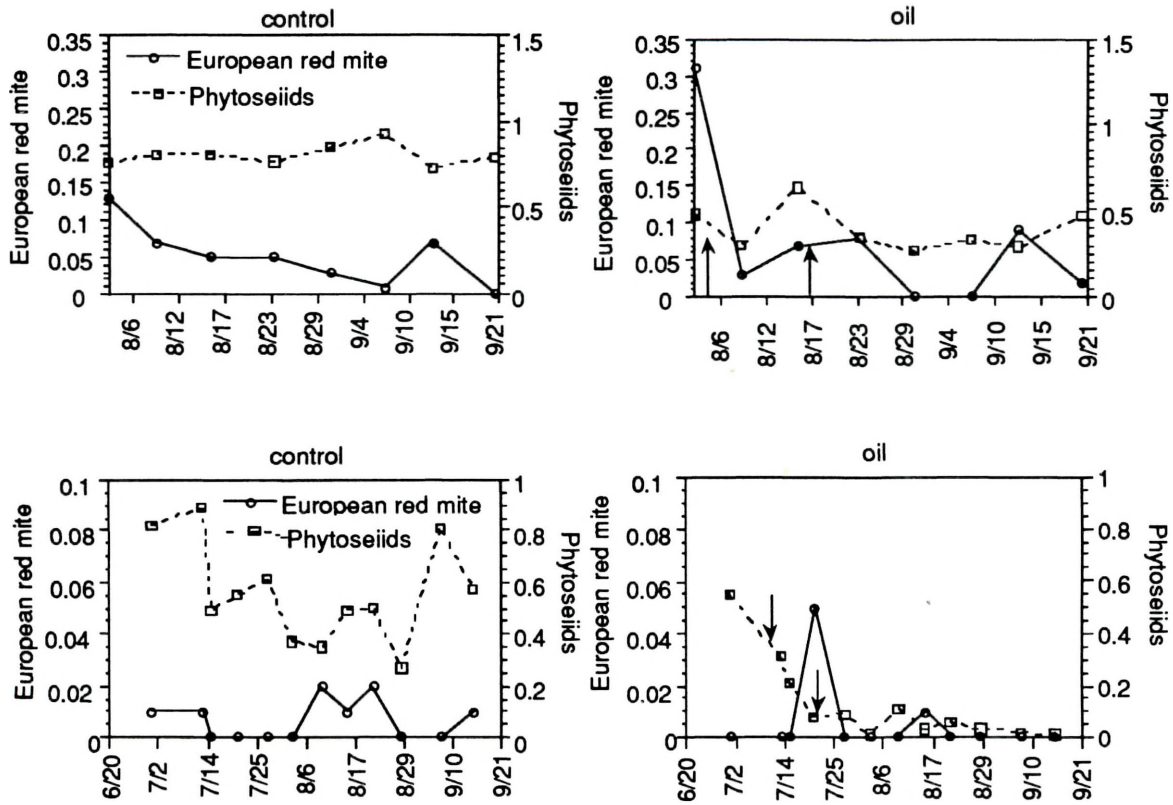

Figure 3. Dynamics of European red mite and phytoseiids (mostly *T. pyri*) in trees treated with 1% ultra fine oil or a water control. The upper figure shows results for the Minns orchard while the lower figure portrays results from the Trickler site. Arrows indicate when the oil applications were made.

SCAB

APPLE SCAB ASCOSPORE MATURITY

(D. Rosenberger)

Highland, NY:

	Immature	Mature	Discharged	Tower shoot
3/21	100%	0%	0%	0 spores
3/31	91%	9%	0%	0 spores

APPLE SCAB UPDATE

❖❖ We have had relatively little snow cover and a dry February and March. Many, but not all, overwintering leaves on the orchard floor have been too dry for ascospore development. As a result, the squash mounts made on March 31 showed high variability in numbers of mature spores. Four of the 20 pseudothecia we examined had large numbers of mature spores (46, 37, 34, and 12%), six pseudothecia had less than 1–5% mature spores, and the other 10 pseudothecia had no mature spores. We expect the most advanced pseudothecia will begin discharging spores with the next rain. Because there are relatively few pseudothecia with large numbers of mature spores, this early discharge is unlikely to be significant in commercial orchards. With the counting method we have traditionally used in Eastern N.Y., we have found that economically important ascospore discharges usually occur only after we have reached an average of 17% mature spores in our counts of 20 pseudothecia. With cold weather predicted for much of this week, we do not anticipate that our spore maturity threshold will be reached until sometime after the beginning of next week (April 10).

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Ascospore maturity is only one factor affecting the risk of scab infection. Another factor (and usually the most important factor early in the season) is the amount of overwintering inoculum present in orchards. This issue was discussed by Wayne Wilcox in last week's issue of "Scaffolds". As in previous years, growers with clean orchards (no scab last year) can delay their first scab spray until at least half-inch green, or until tight cluster if they will be using SI fungicides.❖❖

SOFT-HEARTED

WINTER DAMAGE IN YOUNG TREES

(Dave Rosenberger)

❖❖ Several growers have noted damaged wood in young trees they have been pruning. Trees planted in the dry 1993 season show some of the worst damage. These trees made little growth the year of planting because of the extremely dry conditions. They were then subjected to winter damage during the severely cold winter of 1993–94. These severely damaged trees made little growth during the summer of 1994. When these trees are cut back, the main stem shows discolored wood extending almost to the cambium with very little live (white) wood left to support the tree. In some cases, the wood in the center part of the stem is already turning spongy and soft as a result of fungal invaders. Young trees (2–4 yrs old) with such severely damaged wood are permanently compromised and will never reach their full production potential. They may survive for several more years, or in the worst case, for many more years while they suck up money for pest control, pruning, and overhead costs without ever growing very much. Money will be saved by removing and replacing severely damaged young trees as soon as possible.❖❖

MAY WE SUGGEST

CONSIDERATIONS FOR USE OF PROVADO

(Art Agnello & Harvey Reissig)

INSECTS

❖❖ The sudden availability of a new pest management tool can be a two-edged sword, and the eagerness to try out a newly labeled product should be tempered with the realization that a few seasons' experience will probably be necessary to determine use strategies appropriate to the different pest scenarios present. Provado, Miles' imidacloprid insecticide for leafminers, leafhoppers and aphids, was recently labeled for use on apples in N.Y. This product is a nicotine derivative that mimics acetylcholine and binds irreversibly to the insects' nicotine neural receptor sites, causing paralysis. The federal label contains an Endangered Species notation for Saratoga and Schenectady Counties in New York, stipulating that foliar applications to apples should be avoided during the flowering period, to prevent exposure to the Karner Blue Butterfly.

That aside, what are some of the main considerations for the most effective use of this product? First of all, it should be noted that Provado is potentially detrimental to bees; European data point to a toxicant effect with contact exposure, plus repellency and possible hive disorientation. Probably for these reasons, Miles chose not to pursue a label for a prebloom application timing, so its utility against rosy apple aphid will unfortunately be limited, although some Ida Red plantings may benefit from a petal fall treatment. In field trials at the Geneva research plantings, it performed very well against STLM and WALH in seasonal programs. Depending on the material's cost and your specific pest complex, anywhere from one to three sprays may be considered worth trying during the season.

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Against the first generation of STLM, a petal fall application will be active against the eggs and sapfeeders present, and although there's no guarantee how much help this will be against the second generation, you're also likely to get some leafhopper control with this spray. However, for those orchards where first brood leafminer is not normally a huge problem (i.e., most of them) and where Sevin is normally used at thinning anyway, this strategy is probably not very appropriate. The second brood of STLM would seem to be a better candidate for many orchard situations, and depending on the use and timing of one spray or two, effective control of some other indirect pests might also be obtained.

If you're only going to make one application, it should be made against the first eggs being laid, which means before the peak flight occurs. Since this generation takes off quickly, this translates into virtually right after the beginning of the summer flight, which usually occurs in late June. In the Geneva trials, the flight start date was June 21 and the application was made June 23, with very good results. If you elect a second spray, time it for at least a couple of weeks later. This will serve a few purposes: first, the summer flight is traditionally very extended, so this will give added effectiveness against the late segment of the population, which may effectively shut down the threat from the third brood (remember them?) in August; second, green aphids, leafhoppers, or both species might be building by this time, so this will help with multiple species; and finally, even if the other pests aren't present, it's better ecologically to target primarily one generation of STLM and thereby reduce the selection pressure for resistance. However, with a 7-day PHI, the second spray might be held off until later in August, particularly if leafhoppers are normally worse close to harvest. Regardless, this material represents a valuable option for the control of some of our most problematic summer insects without the side effect of stimulating mite outbreaks.❖❖

AGRI-MEK UPDATE

RULES ON THE RULING
(Art Agnello)

❖❖ For the record, the following are the conditions and restrictions pertaining to the FIFRA Section 18 specific exemption for the use of avermectin Bl formulated as Agri-Mek 0.15 EC (EPA Reg. No. 618-98) to control pear psylla on pears in New York:

- Agri-Mek 0.15 EC, manufactured by Merck and Company, Inc., may be applied at a rate of 10–20 fluid ounces or 0.012–0.024 lb a.i./A. A maximum of one application of Agri-Mek may be made per season by ground based airblast sprayer equipment. Applications will be made with a minimum of 0.25% paraffinic oil in the spray mixture, with not less than 1.0 gallon of paraffinic oil per acre in the finished spray. A 21-day minimum pre-harvest interval will be observed.

- A maximum of 2,400 acres of pears may be treated.

- To reduce the risk to aquatic organisms, a 100-yard buffer zone must be maintained from all water bodies containing aquatic life (streams, ponds, lakes, rivers, springs, irrigation canals containing water year-round swamps, bogs and marshes).

- Livestock may not be grazed in treated orchards.

- This specific exemption expires September 30, 1995.❖❖

INSECT TRAP CATCHES (Number/Trap/Day)

Geneva NY

	3/27	3/30	4/3
Green fruitworm	0.1*	0	0
Redbanded leafroller	0	0	0

HVL, Highland NY

	3/27	3/30	4/3
Green fruitworm	1.0	0.75	0.1
Pear psylla eggs/bud	0.4	-	-
Redbanded Leafroller	0	1.75*	0

* = 1st catch

(Dick Straub, Peter Jentsch)

UPCOMING PEST EVENTS

	43°F	50°F
Current DD accumulations (Geneva 1/1 – 4//3):	118	51
(Highland 1/1– 4/3):	100	36

Coming Events:	**Ranges:**	
Green fruitworm peak	64–221	19–108
Redbanded leafroller 1st catch	32–480	5–251
Spotted tentiform leafminer 1st catch	73–433	17–251
Rosy apple aphid nymphs present	91–291	45–148
McIntosh at green tip	24–161	4–74

Geneva: McIntosh @ **silver tip**
Highland: McIntosh @ **green tip**

PEST FOCUS

Highland: **Redbanded leafroller** 1st catch

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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