Encouraging Biological Control in Vermont: The *T. pyri* Project, 1996-1997*

Lorraine P. Berkett, Gwendolyn Neff, Terence Bradshaw, and Roger Brouillette -University of Vermont

---

*Vermont was part of a collaborative, New England-wide project led by Dr. Jan Nyrop of Cornell University entitled: "Biological mite control in Northeast apple orchards by distributing the predator Typhlodromus pyri." This report is a summary of a presentation given at the Vermont Tree Fruit Growers Association Annual Meeting, February 12, 1998, Rutland, VT. The authors gratefully acknowledge Dr. Jan Nyrop for providing data and an overall summary of the project which were used both in the presentation and in this Vermont report.

The phytoseiid mite, *Typhlodromus pyri*, is an effective predator of the European red mite (ERM). Cornell researchers have shown that it can completely eliminate the need for miticides once they are established. Over the past two years, Vermont's Apple IPM Team has participated in a project led by Dr. Jan Nyrop of Cornell University to establish populations of this predacious mite throughout New England. In Vermont, three orchards participated in the project: Larrabee Point Orchard in Shoreham, Allenholm Farm in So. Hero, and the UVM Horticultural Research Center in So. Burlington. In all three orchards, pesticides known to be harmful to *T. pyri* were not used for the duration of the study in the area where the predacious mites were released and in a separate area where naturally occurring mites were monitored (i.e., control trees). The following is a brief overview of the methods used to release the predacious mite, to monitor the populations of both ERM and *T. pyri*, and a summary of the results from each orchard.

Release and Monitoring Methods:

In May of 1996, apple blossoms containing *T. pyri* were collected at the New York State Agriculture Exp. Station in Geneva (Fig. 1) and shipped in cooled containers to Vermont for distribution. In each of the three Vermont orchards, 50 blossoms were secured in each of 6 trees (i.e., the release trees) (Fig. 2). In August of 1996, an additional shipment of *T. pyri* on leaves were sent from Cornell for release in the Vermont orchards. Fifty leaves were stapled on each of the original 6 release trees in each orchard (Fig. 3). Over the 1996 and 1997 growing seasons, leaf samples, consisting of 25 leaves per tree, were periodically collected from the release trees and 6 'control' trees (i.e., trees in which *T. pyri* were not released) in each orchard and sent to Cornell University where all the predacious and pest mites were identified and counted.

1996 Results:

The following are the graphed results (#of mites/leaf) from each orchard. Note that the designation "Phyto/leaf" stands for the number of phytoseiids per leaf. In general, ERM populations were low both in the control trees and the release trees. This may have been due, in part, to the weather. Both the spring and summer were relatively cool and very wet.

In the Allenholm Farm orchard, the ERM population was continuing to increase at the end of the 1996 season in the control trees whereas in the trees where *T. pyri* were released, ERM were lower (Fig. 4a, 4b). Species composition of predacious mites differed on the control and release trees; on the former, 100% of the population was A. fallacis; on the latter, the predominant species was *T. pyri*, although 5-18% of the population was A.fallacis.

Fig. 4a.

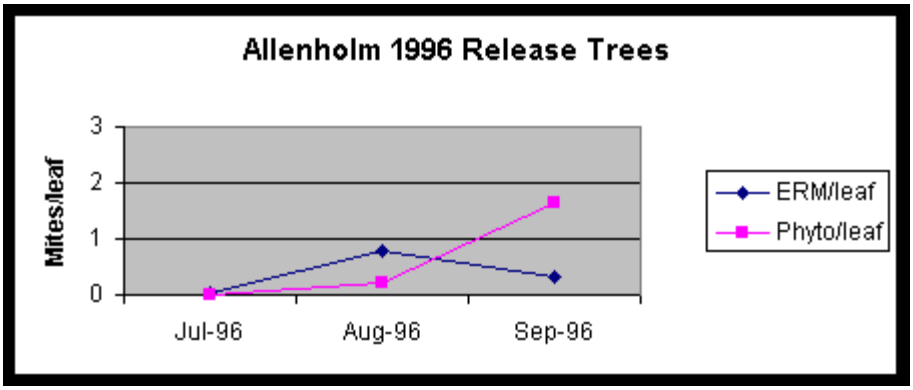
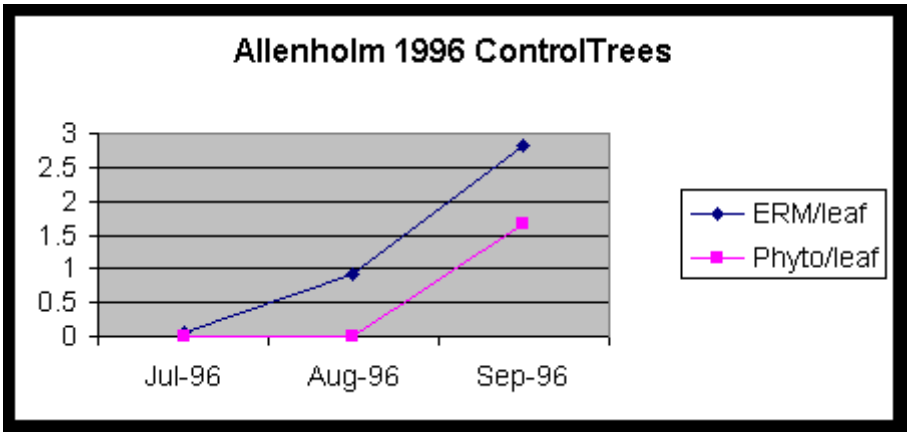


Fig. 4b.



Larrabee Point Orchard had very low populations of ERM in both the control and the release trees (Fig. 5a, 5b). This orchard had a naturally occurring complex of phytoseiid mites in the trees, which included A.fallacis, T.longipilus, and *T. pyri*. A.fallacis was the predominant predator in the control trees; *T. pyri* was the predominant predator in the release trees.

Fig. 5a.

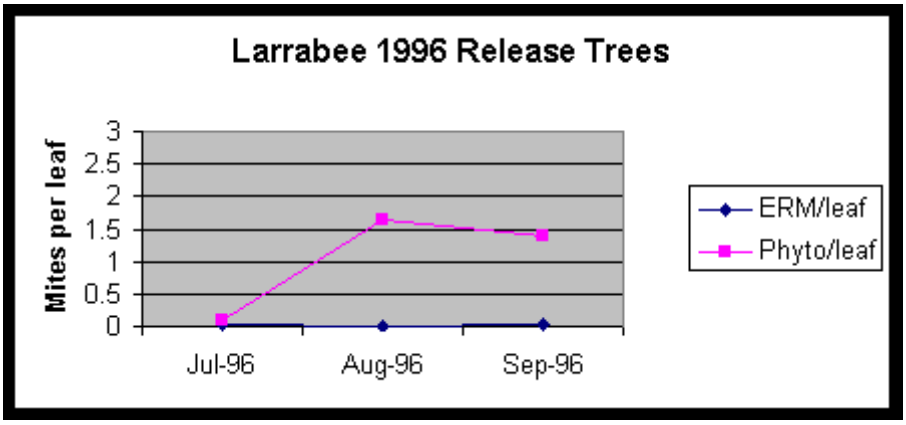
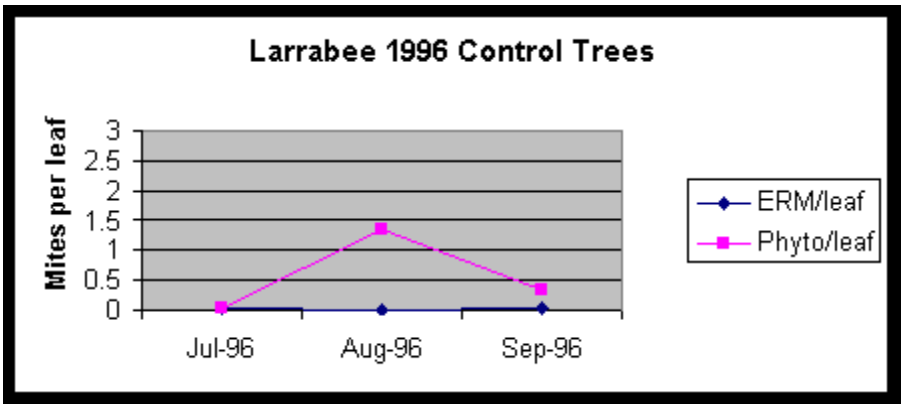


Fig. 5b.



By the end of the 1996 growing season, phytoseiid mites outnumbered ERM in the release trees at the UVM Horticulture Research Center (Fig. 6a). In this orchard there was also a naturally occurring complex of predacious mites which included *A.fallacis*, *T.longipilus*, and *T. pyri* (Fig. 6a, 6b).

Fig. 6a.

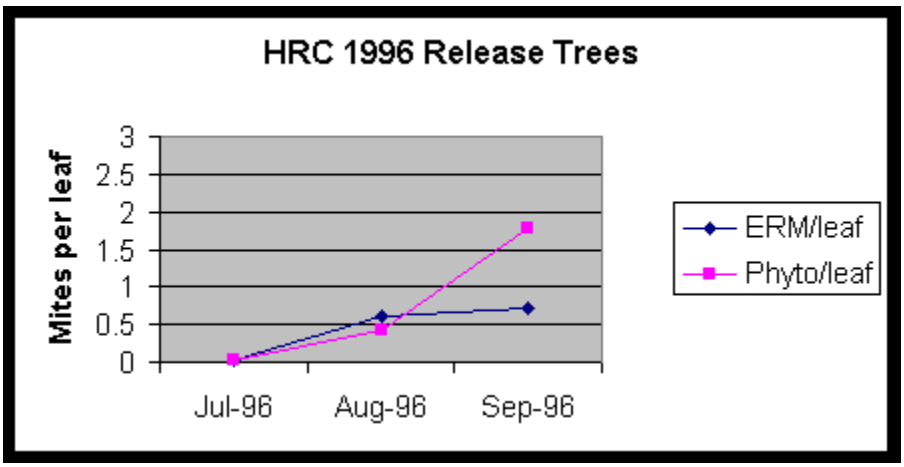
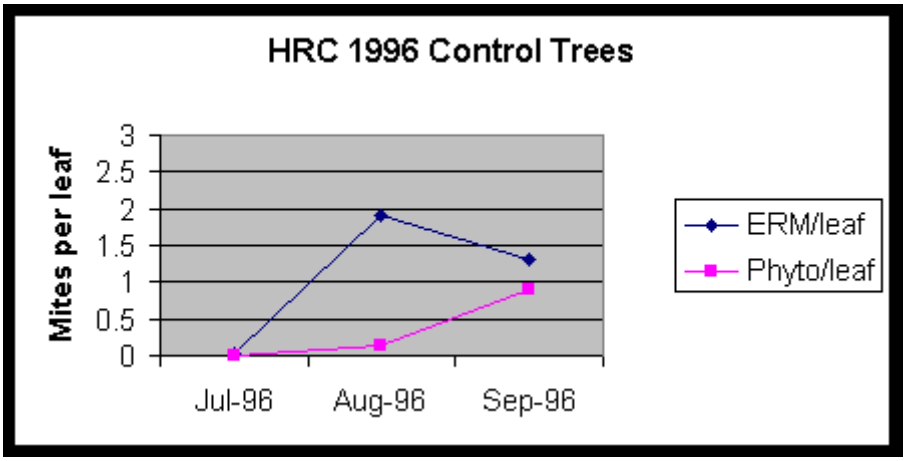


Fig. 6b.



1997 Results:

The population of ERM reached the highest level of any orchards in the control trees of Allenholm Farm orchard (Fig. 7b). These trees did have phytoseiid mites present, but the predominant species was *A.fallacis*. It is interesting to note that although no *T. pyri* were observed in the first year of the study in the control trees, they did make up a small percentage of the population in 1997 (i.e., 10%). In contrast, in the release trees, *T. pyri* was the predominant species and ERM populations remained low (Fig. 7a).

Fig. 7a.

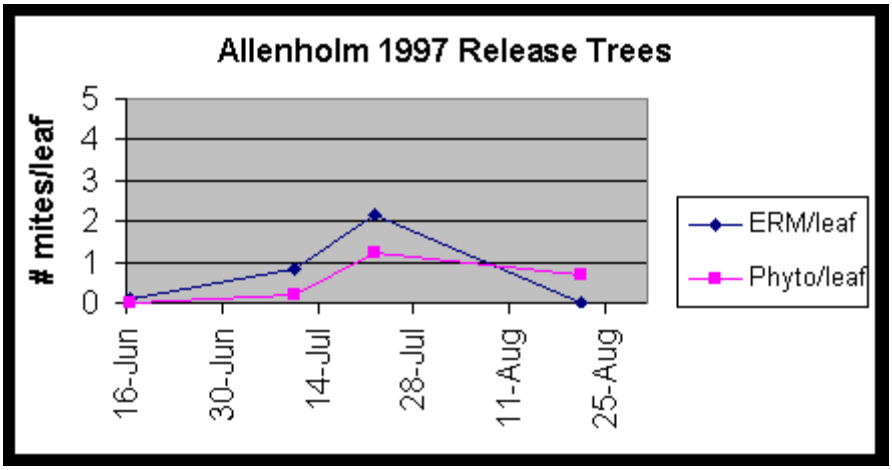
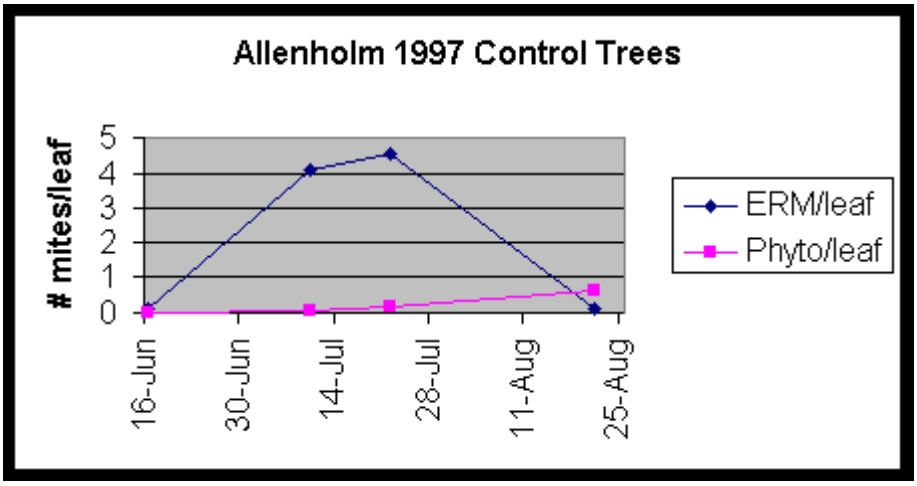


Fig. 7b.



Larrabee Point Orchard had the distinction of having the highest density of *T. pyri* that Dr.Jan Nyrop had ever observed (7.5/leaf on the release trees) (Fig. 8a) !! ERM in both the release and the control trees were very few in number (Fig. 8a, 8b). In both the control and release trees, the percentage of *T. pyri* in the phytoseiid complex increased. On average, *T. pyri* made up 58% of the phytoseiid complex in the control trees in 1997, compared to 7% in 1996; in the release trees the percentages were 99% and 87%, respectively.

Fig. 8a.

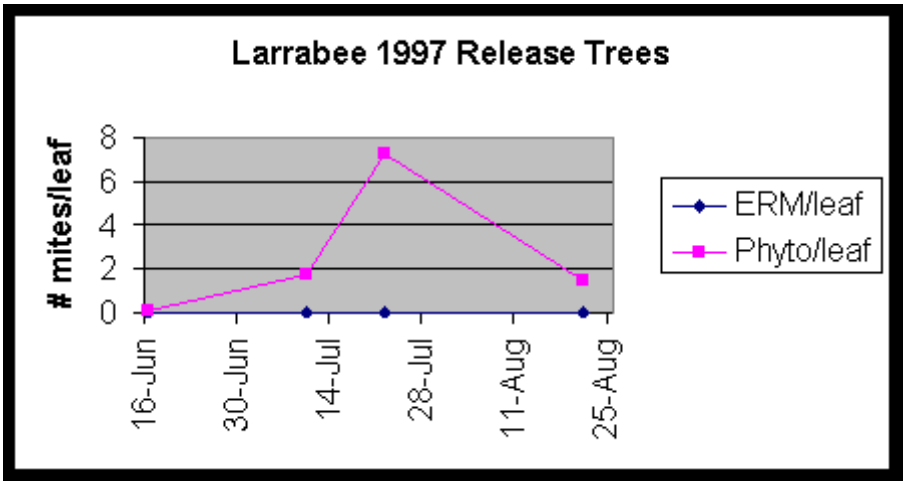
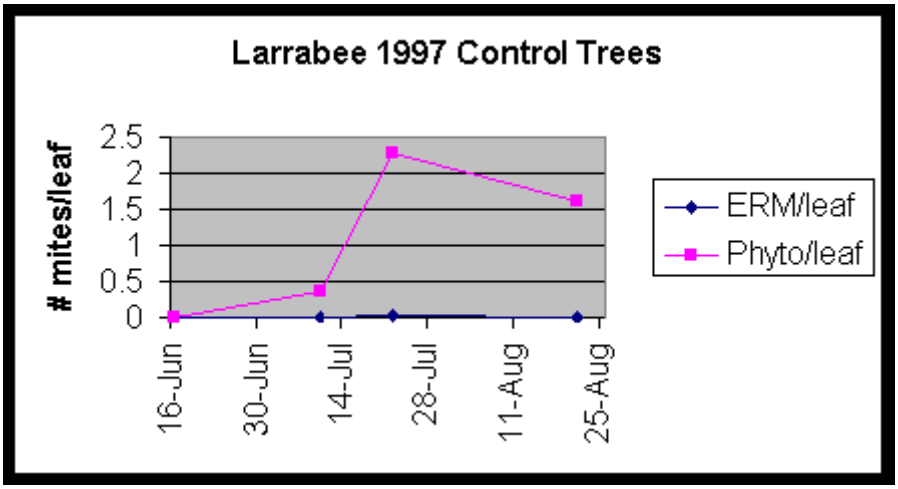


Fig. 8b.



At the Hort.Res.Center, there was also an increase in the percentage of *T. pyri* in the predator complex. However, on average, they only increased to 38% of the phytoseiid population in the control trees in 1997 and this may be a factor in why ERM started to increase at the end of the growing season (Fig. 9b), although the ERM population was still way below threshold levels. In the release trees, *T. pyri* made up 100% of the phytoseiid population (Fig. 9a).

Fig. 9a.

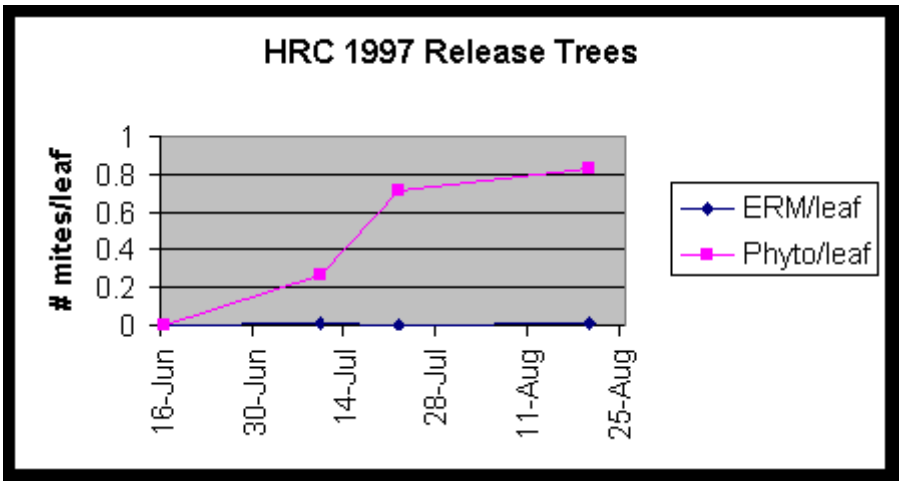
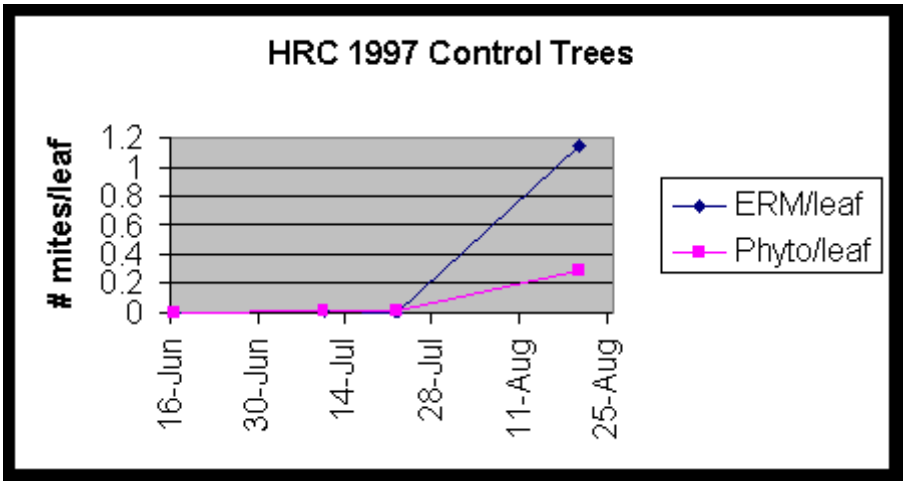


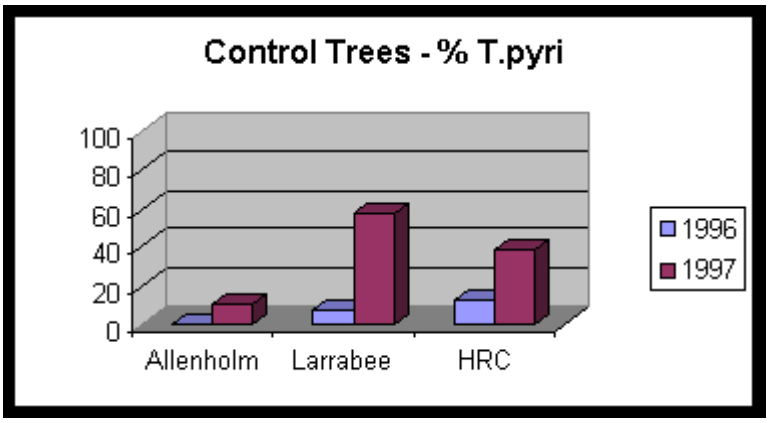
Fig. 9b.



In Conclusion...

Not only did *T. pyri* become established in the release trees in each orchard, it was found naturally occurring in other trees as well (i.e., the control trees). One of the stipulations of participating in the project was that pesticides known to be harmful to *T. pyri* would not be used and it appears that this allowed not only the released predators to survive but also allowed naturally occurring populations to increase in number. The following graph (Fig. 10) illustrates how the percentage of *T. pyri* in the predator mite complex increased in the control trees in each orchard over the two years of the project.

Fig. 10.



As an orchardist, what can you do to encourage biological control in your orchard? Choose your pesticide carefully. Avoid using materials known to be toxic to *T. pyri* such as pyrethroids, Lannate, Vydate, and Carzol. Also, limit the use of EBDC fungicides and use them only prebloom to try to minimize their impact. These would be the first steps in conserving any naturally occurring populations of *T. pyri* in your orchard.

Thanks....

We sincerely thank the orchardists who participated in this project: Ms. Judy Pomainville of Larrabee Point Orchard (Fig. 11). and Mr. Ray W. Allen (Fig. 12) of Allenholm Farm. We also acknowledge and thank Dr. Jan Nyrop and his team at Cornell University for inviting us to be part of this project.