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Final

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EVALUATION OF INTEGRATED PEST  
MANAGEMENT AND BIOLOGICAL CONTROLS IN ORCHARDS  
BY  
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The purpose of this project was to evaluate the effectiveness of biological controls in a commercial orchard situation. This report will summarize the findings and will point out additional ideas to enhance the effectiveness of different control measures.

The first part of the project I will discuss is mating disruption in peaches. Mating disruption is simply interfering with the male insects to find the females. When this occurs no eggs are laid and no increase in the population. It is safe and efficient. The major insects I was interested in were Oriental Fruit Moth (OFM) and the Lessor Peach Tree Borer (LPTB). I also added Greater Peach Tree Borer to the project. Availability of LPTB disruptant was very limited, but Penn State supplied me with enough for the project. My goal was to delete insecticides from 5 acres after the risk of catfacing insects had passed. However, green peach aphid was severe and one insecticide spray was applied in May. Traps for OFM were placed April 14th with the first catch the following week. Please note that traps were also placed in the conventionally sprayed block. The disruptant from CONSEP was placed on April 24th. The trap count before the disruptant was placed was 8,2,2,4,0 for 5 traps. The following week the trap count for OFM in the disruption block went to 0 for all the traps and remained there all season. Conventional treatment block traps fluctuated through out the season but were very low. The LPTB and Greater Peach Tree Borer had similar results.

Conclusions: Mating disruption is very effective. One tie per tree floods the air with pheromone and I feel one treatment per season is sufficient. However, weather will play a factor in longevity of the ties. The major drawback is the cost. OFM ties were \$65. per acre, Greater Peach Tree borer was \$15. per acre, and the LPTB ties would be \$15. per ac

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Added up that is \$95. per acre. While conventional treatments for the same time would be about one half that amount. So at this time I do not feel disrupting is the best economically. I suggested to the companies to develop a multiple pest tie to possibly take care of all the major insects for a certain fruit. I do feel very positive, and I think in time these things will work out. Advantages are ease and speed of handling. The ties are nontoxic and 100 can be placed in about 20 minutes. I put a few on some young trees and did not spray all season, and the control was perfect. This technology is very safe to the environment, so it is difficult to put a dollar value on that.

The next part of the project I will discuss is the uses of Pheromone traps for Tufted Apple Bud Moth (TABM), which is the major apple pest we in the apple industry face. The traps and the leafwetness recorder were used to precisely predict when the best time to spray would be. Traps were placed on May 8, 1993, and the first moths were caught on May 10, 1993. At that time accumulation of degree days began. Forty five degrees was the starting point and 550 degree days of accumulation would be the initiation of egg laying. This is the reason for the leafwetness recorder. The formula was from the Fruit Research Lab in Biglerville, PA. I determined we saved one insecticide spray this year which would amount to \$200. for our 20 acres of apples. This is good for the farmer and the environment.

The leafwetness recorder was also used to predict diseases such as apple scab and fireblight. I will briefly discuss diseases. Apple scab is dependent on time, moisture and temperature. You must have the right combination to have an infection. For instance, a long wetting period with cool temperatures would take twice as long for an infection as a period of higher temperatures and moisture. Therefore the recorder precisely told me when we had an infection and how long it lasted. As a result, we saved at least on fungicide spray which amounted to \$100. Fireblight is more difficult to predict. While time, temperature, and moisture are again a factor, different kinds of apples and pears bloom at different times. I accurately predicted an infection but missed the first one that occurred on Summer Rambo apples. As a result I lost 150 bushel of apples. The problem was that the Rambo bloomed earlier and my number was based on a later bloom date.

Conclusion: I feel the leafwetness recorder is an invaluable tool.

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I feel I am just beginning to realize the potential of this machine. Every farm large or small should have one. Another key to good IPM is scouting. I spent 2-3 hours every week looking at the orchard and learning to identify more insects and diseases. A lot more needs to be done to refine and be able to better predict these situations.

The last part of my project that I will discuss is the suppression of nematodes by using rape seed. As with all research there is always something that does not work out. That was the case with this. The thing that I did not realize was that I had very low nematode numbers to begin with. Also little did I know that where I had rotated truck crows that would naturally have brought down the nematode levels. Even in the plot I planned to fumigate I found my rotation of corn and pumpkins for six years naturally did the job of soil fumigation. It took longer, but was so much cheaper and safer to the environment.

On the other hand I had problems with the rape seed. It is very hard to seed. We used a billion seeder and the large boxes. Even then seeding was not good. Rape seed is very susceptible to dry weather and as a result never came into bloom.

Conclusion: I feel more work needs to be done to find a good seeding rate, type of seed, and weather, but I am encouraged that this will replace soil fumigation. While I conducted these projects, I talked to our local fruitgrowers group. In February 1994 I will be speaking at Hershey Fruitgrowers Convention which is the biggest show in the East. That same week I will speak to PA Organization of LISA. Finally I will be speaking at least once at the local winter fruitgrowers meeting.

At this time I would like to close my report with a few comments. I feel IPM is the way of the future. It is safe and easy to work with, it does take time and dedication to learn, scout, calculate and think through the IPM process.

I would like to thank the following people. Mr. William Kleiner who is the regional fruit agent for Franklin, Adams and York counties here in south central Pennsylvania. Dr. Ken Hickey for help in disease prediction. Dr. Larry Hull, and Dr. Ed Rajotte for providing pheromone and advise. Finally I want to thank Dr. George Greene for challenging me to take on a project of this nature.

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Most of all I want to thank LISA for allowing me to try some of these new and exciting ideas on my farm. I hope my work will help others, and will encourage them to experiment. I believe we have no problems in agriculture just CHALLENGES AND OPPORTUNITIES.