



Vermont Apple Newsletter

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Horticultural News

M. Elena Garcia, Horticulturist

Ecological Weed Management Part 1: Knowing your weeds

Weed control is an important component of horticultural and pest management practices in an orchard. Weeds compete with trees for nutrient and water resources and provide a habitat for pests. In the US, the use of herbicides has dominated weed management practices because this method of weed control has resulted in improvement in crop productivity and has increased farm efficiency. Approximately 60% of all apple acreage receives herbicide treatments to limit weed growth in orchards.

Although the use of herbicides is the preferred method for weed control, several factors such as ground water contamination, unintentional pesticide poisoning, and weed resistance, have led to re-evaluate the dependency on this technology and to examine alternative management strategies for weed control.

Ecological weed management involves a variety of control tactics which impose multiple, temporally variable stresses on the weeds which: (1) reduce the density of weed propagules and seedlings; (2) decrease the rate of weed emergence; (3) decrease the rate of weed dispersal and; (4) decrease the proportion of available resources consumed by weeds. Table 1 summarizes the advantages and disadvantages for the various weed management practices growers can use in order to minimize weed competition in their orchard.

In order to maximize the effectiveness of any management practice, basic information about problem weeds is necessary. You need to be able to identify the weed and determine where and when does it occur. Knowing your weeds should help determine the most effective method of control and when during the life cycle of the weed is this method most effective. For example, the use of systemic herbicides such as glyphosate in perennial weeds is most effective during the late vegetative stage of the plant or during early bud stage. Following is a list of some resources that should make this task easier for you:

(This list was provided by Sid Bosworth UVM Extension Specialist in Agronomy during his Weed Management workshop at the HRC).

Books:

Weeds of the Northeast

by Richard H. Uva, Joseph C. Neal (Contributor), Joseph M. Ditomaso (Contributor).
A Cornell Publication.

(This is probably one of the best weed identification books in the market).

Book review from Amazon. Com:

Here, at last, is a lavishly illustrated manual for ready identification of 299 common and economically important weeds in the region south to Virginia, north to Maine and southern Canada, and west to Wisconsin. Based on vegetative rather than floral characteristics, this practical guide gives anyone who works with plants the ability to identify weeds before they flower. A dichotomous key to all the species described in the book is designed to narrow the choices to a few possible species. Identification can then be confirmed by reading the descriptions of the species and comparing a specimen with the drawings and photographs. A fold-out grass identification table provides diagnostic information for weedy grasses in an easy-to-use tabular key. Specimens with unusual vegetative characteristics, such as thorns, square stems, whorled leaves, or milky sap, can be rapidly identified using the shortcut identification table. The first comprehensive weed identification manual available for the Northeast, this book will facilitate appropriate weed management strategy in any horticultural or agronomic cropping system and will also serve home gardeners and landscape managers, as well as pest management specialists and allergists.

Websites:

Virginia Tech Weed Identification Guide

http://www.ppws.vt.edu/scott/weed_id/rightsid.htm

At this web site, by answering a series of questions about your unknown grass sample, this identification key will narrow down your choices and provide you with the identity of your unknown grass sample.

Weed identification from the University of Illinois

<http://web.aces.uiuc.edu/weedid/>

Weed identification Page (Oregon State University)

<http://www.css.orst.edu/weeds/id.html>

Table 1. Comparison of various weed management practices

TOOL	ADVANTAGES	DISADVANTAGES
Cultivation	Effective Non-selective Equipment readily available Considered "Green" Increase availability of soil nutrients and water for about a month after cultivation	May damage soil structure Spreads perennial weeds May damage tree /roots Short term control Repeated cultivation depletes OM Compaction
Mulching	Effective Non-selective Holds moisture Considered "Green" Long-term control Beneficial soil amendments	Availability of mulch Cost of mulch/application Attractive to rodents Must be free of seeds Expense and durability varies depending on type
Mowing	Rescue treatment Quick suppression Equipment available Reduce seed spread	Weeds may still compete Quick regrowth Several mowing required May damage young trees
Herbicides	Effective Easy to apply Can be selective Timely Short-term benefits include conserving soil nutrients and moisture; optimal growth and early cropping	Requires at least 2% OM Directed spray equipment Effects on pest complex Cost varies Prolonged use depletes soil OM Some residue may persist in the soil

Factors affecting apple thinning

What, when, and how much thinner to use has to be one of the most crucial and difficult decisions apple growers make concerning their orchard management practices. It has been estimated that 90% of apple growers in the United States use some form of chemical thinning to improve fruit size and to promote annual cropping. However, no single thinning program applies to all cultivars. Each cultivar requires a slightly different thinning program, and the thinning response varies depending on climate and cultural conditions. The past history of the orchard, the grower's experiences with particular blocks, the cultivar, and the weather conditions should be used to determine the best time of application and the rates of the individual or combinations of thinners.

Factors influencing chemical thinning

Temperature

Temperatures during a thinner application and temperatures after the application are critical to successful thinning. All thinners have a greater response as the application temperatures increase because in order for thinners to work, they have to be absorbed, and absorption increases as the temperatures increase. Also, high temperatures increase the waxy cuticle of the foliage, thus decreasing the absorption of the thinner.

Light

Factors that decrease photosynthesis such as cloud cover or within tree shade increase the effectiveness of thinners. Conversely, sunny weather, which increases photosynthesis, decreases the sensitivity of the fruitlets to the thinners. The amount of sunlight 3 to 5 days before thinner application is important in the uptake of the chemical thinner. Heavy cloudy weather can result in greater uptake of the thinner due to a thinner leaf cuticle and reduced carbohydrate supply for fruit growth

Fruit size

Fruit size is very important in determining the efficacy of thinners. Most chemical thinners are most effective at fruit diameter's of 4 to 14 mm. At about 50 days after bloom, fruits begin to accumulate starch, and for approximately 6 weeks, the fruit can not be induced to drop by the use of chemical thinners.

In spur Delicious, fruit diameter and temperature interact to determine the efficacy of the thinner. For example, when the fruit was less than 8 mm in diameter, thinning results with carbaryl were similar regardless of the temperature. However, for larger fruit thinning (14 to 16 mm) was better when the temperature was at 70 or 80 than at 50 to 60.

Drying conditions

Poor drying conditions such as high humidity increase the amount of time the thinning chemical stays on the leaf surface, thus increasing the amount of chemical that is absorbed.

Cultivar

Cultivars vary in their thinning response. The insert in this letter is from Table 34b from the *Pest Management Guide for Commercial Tree-Fruit Production 2001. A Cornell Cooperative Extension Publication* and are general thinning recommendations for some apple cultivars. This information is located on the web at:

http://www.nysaes.cornell.edu/ent/treefruit/Consider_Apples.pdf

Orchard Replanting at the Justin Smith Morrill Homestead

Terence Bradshaw

Last summer Elena and myself were approached by representatives from the Friends of the Morrill Homestead in Strafford, VT who were interested in re-establishing an orchard on the site. Being an Orange County native myself with an interest in older cultivars, I looked forward to working on this project.

Justin Smith Morrill was a congressman from Vermont in the mid-nineteenth century, serving as both a Whig and a Republican in the House from 1865 to 1867 before becoming a Senator associated with the latter of the two parties where he served until 1868. Morrill was an early champion of education, helping establish the Library of Congress, but will always be better known for his staunch support of what became known as the Morrill Land Grant Colleges Act. It was this legislation that set the groundwork for our Agricultural University system from which eventually came our Extension Service.

While he had a strong interest in architecture, a fact evident when viewing his Gothic home in Strafford village, Morrill was especially an accomplished horticulturalist. Spread throughout the grounds of the homestead were gardens full of exotic plants, complete with a gravity fed irrigation system. Amongst the plantings on the property, there was an orchard which held up to forty trees at any time, but it appears as though they were often replaced as his journals list over eighty varieties which he grew on the site. Much of this replanting was obviously done to replace trees that were not suited for the climate (he even tried his hand at growing peaches well before the Reliance Series was developed), but he also appears to have been performing his own variety trials to determine what he could best grow in his climate.

My job was a bit easier because we have had 150 years of variety testing since then to help me choose what to plant. Friends of the Morrill Homestead members Lorenz Rutz and Kay Campbell presented me with a site plan pulled together in the early 1990's which summarized maps and photos of the site along with Morrill's journals and local's remembrances to come up with an approximation of what the place looked like during its time.

Armed with my list of apple varieties planted by Morrill, I chose, with Lorenz, to include some newer varieties in the planting that would be suited to the area and fit in with Morrill's vision of always trying new cultivars. Together with Jim Cummins at Cummins Nursery in Geneva, NY, we planted one tree each of the following twelve varieties; Newtown Pippin, Esopus Spitzenburg, Hubbardston Nonesuch, Chenango Strawberry, Keepsake, Enterprise, Fortune, NY 75414, NY 30, and NY 35. The latter two trees were graciously donated to us by Cummins who felt that we may wish to test them on the site. In the true nature of Morrill himself we will do just that and graft over to other

cultivars else if we do not like the results! All of the trees were planted on semi-dwarfing rootstock.

The Friends held an open house on planting day, May 13 which was attended by some seventy five people. Most helped in the planting (even Lorraine and Elena!) giving them a sense of ownership in the project. In addition to Morrill, the orchard is dedicated to the memory of Floyd Campbell who was a founding member of the Friends who died last year. Floyd was instrumental in the revitalization of the site and his generosity lives on with his passing, as donations made in his memory currently fund the orchard project.

This planting is certainly not over yet, as we have room for at least another twenty trees, possibly more if a wet spot can be drained by unplugging Morrill's 150-year-old tiling drains. Future plantings will include varieties unique to Vermont such as Bethel, Northfield Falls, and Malinda, a variety that lives on today as a major foundation of the University of Minnesota's breeding program. I am also planning on including Wealthy, Red Astrakan, Pound Sweet, and a russeted variety, either Roxbury or Hunt. Any growers that have ideas for inclusions or experience with success of these cultivars in Zone 4 should contact me. For now, the planting can be visited at the homestead in the village of Strafford. Visitors should call ahead to check on hours at (802) 828-3226.



View of the Morrill Homestead from the orchard site



Terry speaking to the crowd during the tree planting ceremony



Planting trees

Thanks to the VTFGA for their Fund Contribution

The UVM Apple Team wants to thank the Vermont Tree Fruit Grower Association (VTFGA) for their monetary contribution to our research fund. These funds will be used to help support necessary labor, equipment, and supplies required for performing research activities occurring primarily at the Horticultural Research Center in So. Burlington. Without such assistance, our research and subsequent Extension programs could be seriously compromised.

In addition, their support demonstrates to outside parties that the apple industry in the state is committed to success even in difficult times.

Projects: Examples of individual research projects at the UVM Horticultural Research Center for which we are requesting VTFGA funding assistance include:

NC-140 Cornell/Geneva Regional Rootstock Planting: Investigation of the adaptability and productivity of new dwarfing, fire-blight resistant rootstocks to develop feasible alternatives to the current selection of rootstocks. A new planting containing 21 rootstock of the CG and Supporter Series and McIntosh as the scion, was added to this project in 1999. Results from data collected are reported annually to the NC-140 Technical Committee and incorporated into our Extension program. The 1992 Liberty planting was terminated in 2000 and a report will be compiled by the national committee. This report will be available to the public.

NE-183 Regional Cultivar Evaluation Planting: Although McIntosh will remain important, horticultural and pest susceptibility evaluations of the newest named and numbered apple cultivars will be of considerable interest to Vermont growers. Planted in 1995, this 125 tree research block has to yield valuable fruit and growth data, which has been reported annually to the NE-183 Technical Committee and incorporated into our Extension program. A three year summary evaluation on the performance of these cultivars has been placed on the web at:

<http://orchard.uvm.edu/uvmapple/hort/95NE183CultivarEvaluationSummary.pdf>

This information is also available to growers as a hard copy upon request. A new planting consisting of 21 new cultivars was added to this project in 1999. This will be the first year we harvest fruit from this planting.

Cultivar evaluation for winter hardiness: Determining the winter hardiness of newer cultivars provides critical information to apple growers in Vermont, where apple production is marginal due to winter temperatures. This project will provide information on what cultivars are better adapted to the climatic conditions in Vermont. We will be testing the degree of bud winter hardiness in some of the cultivars of the NE-183 project.

Apple scab research will continue: The second year of a study to validate a new sequential sampling technique to determine 'scab risk' of an orchard will be conducted in

2001

Research will be initiated to study the efficacy of a new 'reduced risk' IPM alternative on arthropod pests and explore non-target impacts on disease and bird management, and on tree vigor, productivity, and fruit quality. This new alternative is a kaolin-based particle film with the trade name Surround.

We will also continue to maintain several acres of research orchard that are not directly involved in any of the above projects, however, they are either unique (i.e., containing selections of promising varieties for demonstration and observational purposes) or must be preserved for future studies. These plantings must still be maintained, pruned, sprayed, monitored, and harvested for such future and current needs.

How Will We Report to Growers the Results of these Projects? We will continue to disseminate research-generated information via traditional channels, including horticulture and IPM News mailings, Extension bulletins, orchard visits, and telephone conversations. We will present results of our findings at the annual meeting of VTFGA as appropriate. We also propose to continue to advance and expand our dissemination efforts via the Internet/WWW through the UVM Apple Orchard and AIM (Apple Information Manager) websites.

Congratulations and Farewell to Linda

Linda Boccuzzo, a member of the Apple Team, received her Master's degree this May and is now working at Severn Trent Laboratories in Colchester. These laboratories test water, soil, fish, and other materials for organic contaminants. Linda's Master thesis involved the study of winter hardiness of apple cultivars. Her research provides information to growers as to the adaptability to Vermont's winters of newer cultivars. For the past six months, she had been working as an Apple Team technician. Linda was the recipient of the C. Lyman Calahan Award in 2000. Linda is a highly valued member of the Apple Team and her contributions and friendship will be deeply missed.

Congratulations on your accomplishments and good luck in the future!



Linda at her farewell party



IPM News

May 25, 2001

Lorraine P. Berkett, IPM Specialist

2001 C. Lyman Calahan Award Recipient - - Jessica Reardon

This award is presented by the **Vermont Tree Fruit Growers Association** in honor of C. Lyman Calahan, a long time Extension Horticulturist who helped the Vermont apple growers for many years. This \$500 award is presented to a student showing promise and interest in commercial horticulture.

This year's recipient of the C. Lyman Calahan Award is Jessica Reardon who is currently a graduate student in the Department of Plant and Soil Science at UVM where she is studying for a Master of Science degree. Her thesis research is entitled: "Orchard Validation of a New Sequential Sampling Technique for determining 'Scab Risk' in Apple Orchards." She has been a member of the UVM Apple Team for three years and has contributed to many apple research and extension projects. Jessica received her Bachelor of Arts degree from UVM in Environmental Studies and obtained experience working in apple orchards and vegetable farms in Vermont before joining the UVM Apple Team.

Congratulations, Jessica !!



Dr. Alan Gotlieb, Chair of the Dept. of Plant & Soil Science, presenting the C. Lyman Calahan Award to Jessica Reardon

Disease Management Update

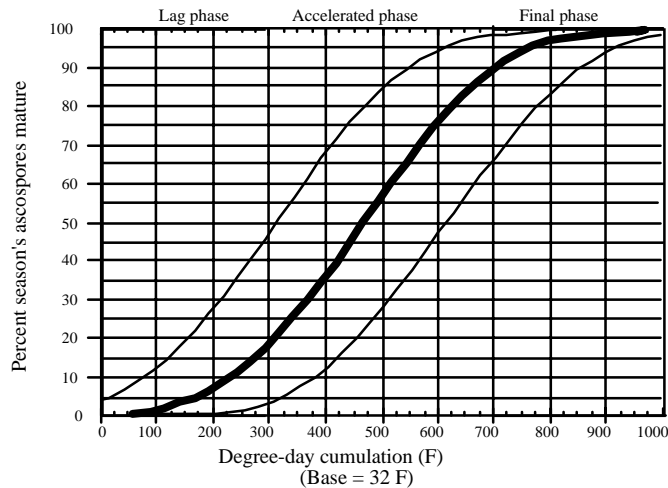
Apple Scab -- Critical Time for Management

You can see from the table and graph below, we have entered the “Final Phase” of the primary stage of ascospore maturation and discharge in all but two of the sites that we are monitoring with estimated degree days. The rains that many parts of the state received this week and the wet weather predicted over the Memorial Day weekend probably have/will release the majority of the ascospores for the season. *It is a critical time for apple scab management.* Trees should be protected during this wet weather. Next week I plan to look at a sample of pseudothecia to gain some insight on the remaining ascospores - - I will send out an *IPM Alert* with the results.

Scab lesions from the May 12 infection period should be showing up any day now. It is important to go out and check your orchard over the next few days to make sure that your fungicide program was effective. Examine all leaves on a minimum of 10 vegetative shoots and 10 fruit clusters on at least 10 trees per block. Check areas of the canopy most likely to have inadequate spray coverage. Please see pages 17-18 of the 2000-2001 New England Apple Pest Management Guide for information on conidia suppression.

2001 <i>Estimated Degree-Day Accumulation (Base 32F, from McIntosh Green Tip) and Cumulative % Ascospore Maturity for Selected Vermont Sites</i> ¹						
Date 5/22	South Burlington (GT=4/23)	Shoreham (GT=4/23)	South Hero (GT=4/23)	East Dorset (GT=4/30)	Dummerston (GT=4/21)	Franklin (GT= 4/28)
DD	711	711	717	540	778	601
Maturity	90-95%	90-95%	90-95%	50-75%	95-97%	75-90%

¹Degree Days received from Skybit E-Weather Service: <http://www.skybit.com/>



- Curve describing the relationship between the percentage of the season's ascospores that have matured and accumulated degree-days.
- —** The two curves that identify the upper and lower boundaries between which the model is accurate 90% of the time. The two curves show the variation in predicted maturity that can be expected at different times during the primary scab season.
- ▭** Accelerated phase of ascospore maturation.

Fire Blight - - Will Blossom Blight Symptoms Appear ?

Based on the Maryblyt™ computer model and Skybit weather estimates, the four criteria for fire blight infection were met during bloom in one of the locations in the state that we were monitoring. Those criteria were: 1) flowers were open; (2) at least 198 degree hours greater than 65F had accumulated after first bloom; (3) at least 0.01" rain or dew occurred that day or at least 0.10" of rain fell the day before; and (4) an aver. daily temp. equal to or greater than 60F. All of those conditions were met on May 12th in Dummerston. [Note: The Maryblyt™ model assumes the fire blight pathogen is present.] At two other sites (South Burlington and Shoreham), three of the four criteria were met over May 11-13, which put orchards at a "high" risk for infection. At the other three sites (East Dorset, So. Hero, and Franklin) only 1-2 of the conditions were met during bloom. We are continuing to track degree days for Dummerston, So. Burlington, and Shoreham from May 11-12 to give an indication when blossom blight symptoms should appear if infection did indeed take place. It is predicted that blight symptoms should be evident in the fruit cluster clusters when 103 DD (base 55 F) accumulate. Using the current 7-day weather forecast, we should not reach that threshold for at least another week.



'Water-soaked' appearance
of infected fruit

Phytophthora Crown and Root Rot

If your apple trees have been showing reduced vigor and growth, you should check the base of the trunks at and below the soil line for crown (upper portion of the rootstock) and root rot. We recently visited an orchard planted with M26 rootstocks on well drained soil and found many trees with crown and root rot symptoms indicating infection by *Phytophthora spp.* This was surprising because usually these fungi cause problems in poorly drained, wet sites. However, looking back over the weather starting with the deluge of rain in September 1999 from Hurricane Floyd and then the cool, very wet conditions we had in 2000, one can see that conditions were favorable for infection even on well, drained sites. It apparently takes only 24 hours of water saturation of soil to initiate infection. Infections usually occur under cool, wet conditions in the fall and spring.

The primary fungicides used for managing this disease are “fungistatic” - - they do not kill the fungi but stop fungal growth for a time. The 2000-2001 New England Apple Pest Management Guide contains information on two materials labeled for use for *Phytophthora* rot: Ridomil®, which is applied as a soil drench after harvest and before growth in the spring, and Aliette®, which is sprayed on the foliage during the growing season. People have had varying results with both materials.

Note: Other causes of reduced vigor and growth include vole damage and borer damage, both of which can be detected by examining the lower part of the trunk.



Symptoms of *Phytophthora* rot include soft, spongy, thickened bark that looks orange when cut.

Arthropod Management Update

**2001 Estimated Degree-Day Accumulation (Base 50F, from Jan. 1)
for Selected Vermont Sites¹**

Date	So.Burlington	Shoreham	South Hero	East Dorset	Dummerston	Franklin
5/22	267	275	269	231	295	249

¹Degree Days received from Skybit E-Weather Service: <http://www.skybit.com/>

Predicted Degree Days for Arthropod Pest “Events”

- ◆ STLM—1st sap-feeding mines observed 187-323 DD
- ◆ CM—1st adult catch 182-322 DD
- ◆ PC—1st oviposition scars observed 249-323 DD

Insects of Importance following Petal Fall

European Apple Sawfly - From May 14 to May 21, the average cumulative trap capture for this insect jumped from 6 to 26 per trap at the UVM Hort. Res. Center (threshold = 9/trap in blocks that had received a pre-bloom insecticide). With the return of more warmer temperatures, ovipositing damage on the developing fruit might become more prevalent. This appears as a small hole near the calyx end of the fruit. The larva will tunnel just under the surface of the fruit, producing a scar. The larva can exit the fruit and tunnel into another fruit - this EAS damage often is confused as codling moth damage because the larvae are pink like codling moth larvae and frass collects on the surface of the fruit. Infested fruit may drop to the ground and the mature larva enters the soil where it overwinters. Petal fall is a key time to manage this insect. Insecticides such as Imidan® and Guthion® applied for Plum Curculio are also effective against EAS.



Oviposition scar in young fruit.



EAS winding surface scars and frass at holes where larvae have tunneled into the apples. A few Plum Curculio scars are also present on fruit.

Plum Curculio - Beware of a potential increase in PC migration into the orchard with a return of sunny, warm (70 F) weather. Once they are in the orchard, wet/humid conditions coupled with 60 F or higher temperatures (particularly at night) will trigger egg-laying.

How long will PC be active in your orchard? As the 2000-2001 New England Apple Pest Management Guide states, research in New York has found that degree day (DD) accumulation is a useful predictor of how long protection is needed against plum curculio (PC). The model is based on the assumption that insecticide residues for the control of PC after Petal Fall (PF) are maintained until 40% of the egg-laying activity is completed, which is predicted to occur at 340 DD (Base 50F) after PF. A strategy of how to use this information is: apply an insecticide effective against PC to the entire orchard at PF; start calculating DD at 95% PF; maintain insecticide residue by additional applications until 340 DD have accumulated; no additional sprays are necessary if the date on which 340 DD was reached is less than 10-14 days from the last spray. The following chart gives an estimate of the DD accumulated so far and an estimate, based on a 7-day weather prediction, where we will be by June 1. Note that we will not be halfway to 340 DD accumulation until sometime after June 1.

2001 <u>Estimated</u> Degree-Day Accumulation (Base 50F, from 95% McIntosh Petal Fall) for Selected Sites¹						
	UVM Hort. Res. Center	Shoreham	South Hero	East Dorset	Dummerston	Franklin
Petal Fall Date	21-May	18-May	18-May	25-May	14-May	23-May
DD May 22	12	40	41	na	50	na
Forecast DD Jun 1	121	147	154	79	139	100

¹Degree Days received from Skybit E-Weather Service: <http://www.skybit.com/>

Leafminers - Leafminer sap-feeding mines should be visible on the undersurface of cluster leaves. In Massachusetts, it has been reported that some orchards have observed 2-3 mines per fruit cluster. However, Dr. Ron Prokopy of UMass is recommending not to treat against first-generation miners but instead to monitor the second-generation sap-feeding mines very carefully in late June and early July and determine whether the treatment threshold has been reached. Nevertheless, it is important to monitor your orchard over the next week to get an idea of the level of infestation. Sample 5 mid-cluster leaves per tree on 20 trees per block, for a total of 100 leaves. Sampled leaves should be taken within 1 meter of the trunk, no higher than chest level, and from different quadrants of the canopy. Infestation levels exceeding 7 mines/100 leaves will likely result in damaging second and third generation populations.



Sap-feeding mines (lightened areas) visible only on underside of leaves.

Codling Moths - We have started to capture CM adults in pheromone traps at the UVM Hort. Res. Center. Please see pages 31– 32 of the 2000-2001 New England Apple Pest Management Guide for information on a degree day model to optimally time insecticide applications in your orchard if CM are a problem.

Pear Thrips - - Cause of Blossom Damage

Pear thrips were very numerous in one of the orchards visited last week and blossom damage was evident. Petals were brown and flower parts were damaged by thrips feeding. Fortunately, pear thrips are susceptible to most insecticides, however, this orchard did not receive any insecticides prebloom.



Blossom damaged by Pear Thrips



Small brown "streaks" on petals caused by thrips feeding

Contact Information

A Commitment to Excellence and Service:

If you have any questions or want to arrange for an orchard visit regarding your concerns, please call or write.

For horticulture questions contact:

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