

Ohio Fruit ICM News

Volume 16, Issue 2

April 15, 2012

The Ohio State University

Greetings from Gary

What a year it has been so far!

These warmer-than-average temperatures, though good for utility bills, make plenty of people nervous. It is hard to know what the weather will be like for the rest of the season. We will just have to find out.

At OSU South Centers, our recent Blackberry, Blueberry and Grape Pruning Workshop was a big hit! We had 51 attendees. My sincere appreciation goes to Dr. Imed Dami (Department of Horticulture and Crops, OARDC), Mark McCann (McCann Blueberry Farm in Chillicothe), and Dave Scurlock

(Department of Horticulture and Crop Science) for their excellent demonstration of pruning techniques. I also enjoyed showing attendees how to prune blackberries.



Dr. Gary Gao, Editor

If you have any fruit-related events that you would like to us to publicize, please email them to Julie Moose moose.14@osu.edu. If you have any suggested topics, please let Julie or I know too. We will try to address them for you.

Frost damage to fruit crops

By Dr. Gary Gao

Many areas of Ohio have experienced spring frosts during the first two weeks of April. These frosts have caused damage of varying severity to fruit crops, such as apple, cherries, blueberries, grapevines, and strawberries.

I examined a few apple blossoms in central Ohio. A small percentage of apple blossoms were killed. I noticed that the ovaries in a few apple blooms turned brown. These flowers will not develop into

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Frost damage to fruit crops

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apples. The healthy ovaries in apple blooms are green.

As of April 10, there were still many flowers in full bloom. I ran into Mark Schmittgen of Heartland Orchard. Mark jokingly said that "As of April 10, I am still optimistic!" Unfortunately, additional frosts hit many parts of Ohio on April 12. I checked out Dr. Celeste Welty's apple orchard on April 13. There were still many apple flowers in full bloom. I noticed that many "King blooms" were damaged. In addition, early blooms and the blooms on the lower branches were affected more than those on the higher branches. It is hard to know how much of a crop loss we will suffer.



Frost damaged apple ovary

Erik Draper, Extension Educator with OSU Extension Geauga County, reported that frost damage in northeastern Ohio was more severe. He has been very busy assessing frost damage during the last two weeks.

Blueberries have been blooming in southern and central Ohio for several

weeks. I did not see any frost damage to blueberry flowers on April 10. However, I did notice many dead blooms on the blueberry bushes at OSU South Centers in Piketon on April 12. Some pistils on the flowers turned brown.



*Frost damaged blueberry flowers.
Please note the brown pistil.*

Pollination process will not be completed on those flowers with damaged pistils. Some of the corollas, the bell shaped structures on the flowers, on blueberry flowers turned brown. This is normal in some cases where flower petals fall off. However, some of those brown corollas could have been attributed to frost injuries as well.

Several of those "green caps" turned reddish to black. I have a feeling that those purple to black ones will not develop into blueberries. I will keep watching them and keep you posted

I also checked out the unprotected strawberry flowers under plasticulture at OSU South Centers in Piketon. This is one extra row that was not covered. It appears that 25% of the blooms on those

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Frost damage to fruit crops

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plants were damaged. The strawberry plants that were covered with floating row covers look good though.

With strawberry flowers, it is quite easy to see the frost damage. The center of the flowers “zapped” by frosts just turned black. The center of a healthy strawberry at bloom is light green.



Frost damaged strawberry flower

There was also freeze damage to our wine grapes. Many of the young shoots on both French-American hybrids and *Vinifera* grapevines simply turned black! Both leaves and flower clusters were damaged. Fortunately, those shoots that came out later were not affected or not as much.

We have a few blackberry plants left from a previous project at OSU South Centers in Piketon. The cultivars are Chester and Triple Crown. Their shoots were about 3" long and flower buds were still pretty tight yet.

Hopefully, there were not affected.



Frost damaged young grape shoots

If you would like to share your experience with other growers, please email Julie Moose at moose.14@osu.edu. Please include a short write up and a photo or two. We will try to include one or two articles from you, our growers.

Additional Resource:

“Evaluating Tree Fruit Bud & Fruit Damage from Cold” by H.J. Larsen of Colorado State University: <http://www.ext.colostate.edu/pubs/garden/07426.html>

The effect of the mild winter of 2011/2012 on fruit trees

By Terence Robinson, Cornell University
Reprinted from Scaffolds Fruit Journal

The mild winter weather of 2011/12 has led to questions about what effect will this have on tree bud development this spring. The physiology of trees during dormancy is a highly complex phenomenon. A simplified explanation of what we understand is as follows.

1. In late summer, growth inhibitors (natural chemicals) build up in fruit buds which prevent them from growing even though temperatures are favorable. This is to prepare the tree for winter and is called summer dormancy. This type of dormancy is the reason we can summer prune in the month of August and not cause regrowth of the shoots, whereas such summer pruning in June will cause shoot regrowth.
2. As trees experience cold but non-freezing temperatures in the fall and winter, the level of inhibitors in the buds gradually declines. When inhibitor levels are high, buds will not begin to grow even if warm temperatures are experienced. This is termed "rest". At some point in the winter, when enough cold temperatures have been experienced, the level of inhibitors is lowered enough in the buds that they will begin to grow if warm temperatures are experienced. This point is called "rest completion".
3. The internal physiological events associated with rest completion are still unclear, but the progression from summer dormancy to rest completion has been modeled using accumulated cold temperatures. A temperature accumulation unit termed a "chill unit" was developed, which is defined as 1 hour at the optimum temperature for chilling (45°F). Experimental data has shown that temperatures in a 15-degree band above and below 45 have a positive effect on chilling and contribute a partial chill unit for each hour of such temperatures. In contrast, temperatures above 65°F have a negative effect on chilling and subtract a partial or whole chill unit from the total. Experimental data has also shown that many apple varieties require 1000 to 1200 chill units to reach rest completion. To predict when enough chill units have been accumulated for rest completion, chill units are summed beginning at the onset of summer dormancy in late July. Hourly temperatures are assigned either a positive, negative or fraction of a chill unit. Usually the warm temperatures in August and early September result in a negative chill unit accumulation, which does not help end rest. However, with the arrival of cool temperatures in late September and early October, positive chill units are usually

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The effect of the mild winter of 2011/2012 on fruit trees

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accumulated. Once positive chill units begin to accumulate a running total is calculated from that point forward and the end of rest is predicted when 1200 chill units have been accumulated. In New York this usually occurs in December.

4. Once rest is completed, buds can respond to temperatures greater than 40°F. However, a significant accumulation of warm temperatures (above 40°F) is required before visible bud development can be seen. This process is termed heat unit accumulation and the units used to measure it are growing degree hours. Experimental data has shown that about 2500 growing degree hours (base 40°F) are required from the end of rest completion until green tip. In most winters in NY, the cold temperatures of Jan., Feb. and early March limit heat unit accumulation so that, even though rest has been completed in early to late December, buds do not begin to develop until warmer temperatures arrive in late March and April.

For the remainder of the article, please follow this link online <http://www.scaffolds.entomology.cornell.edu/2012/SCAFFOLDS%203-19-12.pdf>

2012 OPGMA Summer Tour & Field Day

June 27, 2012
8 a.m. - 3 p.m.

Locations:

Eshleman Fruit Farm, Clyde, OH
Buurma Farms Inc., Willard, OH

The OPGMA Summer Tour & Field Day brings together fresh produce growers and marketers for a day of networking and education.

Learn effective growing and retailing practices to help your business succeed.

Allied industry vendors will be sharing their newest equipment, packaging, chemicals, seeds, and services.

Join your peers for this educational and networking activity.

Log on to OPGMA's website for more information:

<http://www.opgma.org/>

Controlling Apple Mildew

By Dave Rosenberger, Cornell University
Reprinted from Scaffolds Fruit Journal

In the northeastern United States, controlling apple powdery mildew may be more challenging in 2012 than in previous seasons because the mild winter of 2011–12 favored survival of mildew in buds and because DMI fungicides are losing effectiveness against mil-dew in many orchards.

Powdery mildew overwinters in infected buds, but mildew-infected buds are more sensitive to winterkill than are healthy buds. When infected buds are killed during winter, the overwintering mildew also dies. Winterkill of mildew-infected buds begins as winter temperatures drop below 10°F, but suppression of mildew by winter cold is more noticeable after temperatures drop below 0 or –5°F. If temperatures drop to –11°F, then 95 percent of infected buds may be killed, although the timing and duration of the cold periods probably impact the degree of mildew suppression. The bottom line is that the mild winter we just experienced will have allowed excellent survival of mildew throughout most of the northeastern United States.

The DMI fungicides, a class that now includes Vintage, Rally, Procure, Indar, Inspire Super, and Topguard, were exceptionally effective for controlling powdery mildew when the first products in this class were introduced more than 25 years ago. However, observations from both commercial orchards and research plots indicate that many populations of mildew have gradually become less sensitive to these fungicides. As noted in a previous

Scaffolds article (see Scaffolds 20[3]:5–7. <http://www.scaffolds.entomology.cornell.edu/2011/110404.pdf>), notable problems developed in some orchards in 2010 when growers switched from Rally or Vintage to Inspire Super. Although Inspire Super has better activity against apple scab than older DMIs like Rally and Vintage, it is somewhat less effective against mildew. That difference allows mildew to explode when Inspire Super is applied in orchards where the mildew population has already shifted toward DMI resistance.

In the absence of resistance, DMI fungicides control mildew not only by protecting new foliage, but also by eradicating incubating infections before they can appear on leaves and by suppressing sporulation of older infections. Because of their post-infection and anti-sporulant activity, DMI fungicides provided effective control of powdery mildew even when the first mildewicide spray was delayed until petal fall. None of the other mildew fungicides provide an equivalent level of



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Controlling Apple Mildew

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post-infection activity against mildew. Therefore, they must be applied earlier in the season, beginning at tight cluster or pink, so as to protect new leaves against secondary infections. Primary infections are infections that develop from infected buds, and these infections usually begin producing spores by the time trees are at tight cluster.

Because DMI-resistant mildew is emerging in many orchards, a non-DMI mildewcide should now be included in sprays applied at tight cluster and pink. This is true even where DMI fungicides are still working against mildew because including a non-DMI mildewcide at tight cluster and pink will reduce further selection pressure for DMI-resistance. Except for orchards where oil is being applied at tight cluster or pink, the best approach for controlling mildew before bloom might be to include 3 to 5 lb of sulfur per acre with prebloom scab fungicides. This low rate of sulfur will suppress mildew and provide some assistance with scab control, but higher rates of sulfur (e.g., 15 to 20 lb/A) are required if sulfur alone is being used to control scab.

Sulfur can be especially useful in programs where captan or captan-mancozeb mixtures are being used for scab control. Neither captan nor mancozeb will control mildew. Sulfur fungicides that are formulated with bentonite clay generally provide better residual activity than other sulfur products. One advantage of sulfur is that mildew will not develop resistance to it. A second advantage of using sulfur in

prebloom sprays is that, at this application timing, temperatures are usually low enough to eliminate concerns about sulfur phytotoxicity. Sulfur will sometimes burn leaves and even fruit if temperatures exceed 80°F during the three to five days after sulfur has been applied. Sulfur can also be used for mildew control in petal fall and cover sprays, but the high temperatures that contribute to sulfur burn are more likely to occur after bloom.

The strobilurins (Flint, Sovran, Cabrio) provide very effective protection against powdery mildew so long as mildewcide programs are initiated before bloom. The strobilurin fungicides can be used for both prebloom and post-bloom control of mildew, but they may provide suboptimal mildew control if they are applied at petal fall in orchards where no mildewcides were applied prior to the petal fall spray. Unlike DMI fungicides, the strobilurins cannot eradicate pre-existing infections, so they must be used in programs that include pre-bloom applications of mildewcides.

Label restrictions allow only four applications per year for any combination of strobilurin fungicides. Those wishing to use Flint or Pristine in late summer to control summer diseases will need to preserve one or two of those four applications for the late-summer timing.

Luna Sensation is an excellent option for pre-bloom mildew control in states where it is registered and available.

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Controlling Apple Mildew

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(This new fungicide is NOT yet registered in New York.). Luna Sensation is a packaged mixture of Flint plus the new SDHI fungicide fluopyram. This mixture provides two modes of action against both scab and mildew, and it therefore provides excellent protection against both of these diseases. However, both components of Luna Sensation can be compromised by fungicide resistance, so Luna Sensation should still be tank-mixed with either captan or mancozeb to slow selection for fungicide-resistant apple scab. As noted, one component of Luna Sensation is a strobilurin fungicide. Thus, any applications of Luna Sensation will also count against the four permitted applications of strobilurin fungicides within any given year.

Where DMI fungicides are still working, they are especially useful during the period immediately after bloom because they will provide both post-infection and protectant activity, not only against mildew, but also against rust diseases. Among the DMI fungicides, Rally and Topguard are the best choices for mildew control. If Inspire Super will be used for scab control after bloom, then it should probably be supplemented with sulfur at 3 to 5 lb/A to ensure that mildew will be controlled during this critical period.

Protection against powdery mildew is especially important from petal fall through the second cover spray because the rapid growth of terminal leaves during this period provides a constant supply of new mildew-susceptible

tissue. Failure to control mildew during this critical period can result in devastating levels of mildew by late June and an abundance of inoculum for infecting the buds that will carry mildew through winter into the next growing season. By the time mildew appears on terminal leaves in mid- to late June, it will be too late to implement effective control measures. Thus, mildew control must be integrated into scab sprays during the entire period from tight cluster through second cover. Mildew protection may be required all the way through midsummer on non-bearing trees where terminal growth continues long after bearing trees have set terminal buds. The mildew season ends when trees stop producing new leaves (i.e., when terminal shoots stop growing).

Most fungal spores require water for germination, but powdery mildew spores can germinate and infect tissue anytime that relative humidity is between 70 and 100 percent with temperatures between 50 and 80°F. Optimum infection conditions are 96 to 100 percent relative humidity and 68 to 72°F. Rain actually deters mildew by washing spores off of primary infections and by slowing spore germination. Because mildew thrives in dry weather, mildew problems are often more severe in years that have extended periods with little or no rain between tight cluster and second cover. Thus, mildew sprays may still be required during dry periods when there is little risk from apple scab.

Doubling the blueberry acreage in Ohio in the next 3-5 years?

By Dr. Gary Gao

Some of you might have already heard that OSU South Centers received a specialty crop block grant to work on "Revitalization, Expansion and Season Extension of Blueberries in Ohio." I am privileged to be the principle investigator of this project.

This two-year project is funded through a specialty crop block grant program from United States Department of Agriculture (USDA) and is administered by the Ohio Department of Agriculture. We are very grateful for their financial support.

One of the main objectives of the grant is to provide technical support to both new and existing blueberry growers so that new growers can start a blueberry planting and existing growers can expand their blueberry acreage. My lofty goal is to help Ohio blueberry growers double the blueberry acreage in the next 3-5 years.

Ohio has about 380 acres of blueberries based on the 2007 USDA Agricultural census. It might sound quite ambitious to double this amount in 3-5 years. However, many growers have already expanded their blueberry acreage since 2007. There is a worldwide surge in demand for blueberry so my lofty goal might not be that lofty after all.

We will plant one half of an acre of blueberries at OSU South Centers in Piketon this year. This new planting will serve as a research and demonstration plot of new cultivars and production techniques.

We also have five rows of mature "Blueray" bushes. They were pruned pretty hard this year since they are 15 years old and definitely could have used a little tough love! In addition, we placed two high tunnels over half of the planting to see if high tunnels can boost blueberry yields.

If you are thinking about planting blueberries, please email me at gao.2@osu.edu and let me know how many acres you will plant. Hopefully, I can help you avoid some of the common pitfalls that can be costly to new growers.

Look for workshops to help both new and existing growers coming soon and as always, let me know if you have any suggestions.

New blackberry cultivar trial at OSU South Centers

By Dr. Gary Gao

One of the main challenges with blackberry production in Ohio is low temperature injuries to buds and canes.

A new blackberry cultivar will be carried out at OSU South Centers in Piketon during the next three years to test four Polish blackberry cultivars for their winter hardiness, yield and quality. They will be planted with three common blackberry cultivars in Ohio.

Our sincere appreciation goes to Tim Nourse at Nourse Farms for donating the plants for this trial.

<http://www.noursefarms.com/>

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David Scurlock Viticulture Outreach Specialist 118 Gourley Hall – OARDC 1680 Madison Avenue Wooster, OH 44691	Phone: 330-263-3825 Email: scurlock.2@osu.edu Website: oardc.osu.edu/grapeweb/	Evaluation of site suitability for vineyard establishment and all aspects of grape production practices in northern Ohio. David is the primary extension contact of the viticulture program.
Dr. Celeste Welty, Associate Professor and Extension Entomologist Extension Entomology Rothenbuhler Labs 2501 Carmack Rd. Columbus, Ohio 43210	Phone: 614-292-2803 Email: welty.1@osu.edu http://bugs.osu.edu/welty/index.html	Tree fruit insect and mite control.
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Ohio Fruit ICM News

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ICMNews](http://go.osu.edu/ICMNews)**

If you have articles or events for possible inclusion in upcoming issues of this newsletter, submit them to:

**Dr. Gary Gao
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Midwest Tree Fruit Spray Guide, 2012 (Price: \$12.00) - This bulletin provides formulations, application schedules, and procedures for the listed fruits and special problems and pests that can occur. Included in the back are the requirements for pesticide recordkeeping, as well as suggested recordkeeping forms for restricted-use pesticides.

Midwest Commercial Small Fruit and Grape Spray Guide, 2012 (Price: \$12.00) - Growers who plan to use restricted pesticides must be certified as private applicators. The pest management recommendations in this guide have been formulated to provide up-to-date information on pesticides and their applicability to the pest problem. Accurate records of pesticide use should be kept, and this publication provides sample record sheets.

Purchase from Ohio State University Extension Offices in Ohio or the OSU Extension eStore <http://estore.osu-extension.org/>

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<http://www.oardc.ohio-state.edu/grapeweb/>

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NOTE: Disclaimer - This publication may contain pesticide recommendations that are subject to change at any time. These recommendations are provided only as a guide. It is always the pesticide applicator's responsibility, by law, to read and follow all current label directions for the specific pesticide being used.

Due to constantly changing labels and product registrations, some of the recommendations given in this writing may no longer be legal by the time you read them. If any information in these recommendations disagrees with the label, the recommendation must be disregarded. No endorsement is intended for products mentioned, nor is

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