

# Yavapai Gardens

Master Gardener Newsletter

August-September 2019



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## Powdery Mildew

By Nora Graf



One of the more common problems on a variety of plants this time of year is powdery mildew. The hot humid weather seems to bring it on very quickly. It appears as a white powder covering the leaves, tender stem tissues, and flower buds. It can damage, even kill plants. It is most commonly seen on apples, grapes, roses, squash, melons, cucumber, some flowers

(like zinnias), and even grass. The surprising part is that it is not the same fungus. Each is caused by a different species, but they look the same and fortunately can be treated the same.

Powdery mildew is a fungus, it produces spores. These spores do not need water to germinate—just high humidity and temperatures. This is monsoon time in Arizona.

On most plants you will see a fine powdery growth forming on the leaves. It can spread and eventually cover the entire leaf and then the plant. The leaves shrivel, dry and die. This exposes fruit to sunburn. Loss of the leaves can cause small fruit and poor fruit texture along with reduced flavor.

On cucurbits (squash, cucumbers and melons) two species are the problem: *Erysiphe cichoracearum* and *Sphaerotheca fulginea*. To grow, the fungus needs a living plant but the spores can survive mild winters. Once in the garden it persists from year to year. The spores are very tiny and fine and are easily dispersed by the wind. Even if you don't have it in your garden one year, it doesn't take much for it to suddenly appear. These two species don't even need as high a humidity as others. They can germinate in humidity as low as 46%. *Erysiphe cichoracearum* also affects some flowers such as zinnias, dahlias, chrysanthemum, phlox, and sunflowers. A closely related species causes mildew on peas.

All members of the rose family, including the garden rose, and most fruit trees are affected. The mildew first shows up on young stems then spreads to the leaves and flower buds. While it doesn't usually kill the plant directly, it reduces photosynthesis, causing poor health in the plant. The look of the plant is damaged along with any fruit.

On roses, the spores overwinter in bud scales and other protected places on canes. It starts growing again in the spring when temperature and humidity go up. The spores produced can be blown by the wind or splashed on other plants when there is overhead watering.

Grapes are affected by the fungus *Uncinla necator*. In our warmer climate, spores survive in bark cracks where they germinate when the temperature rises. Temperatures can range from 68°F to 77°F for germination, although they can develop in a wide range of conditions. The spores of this variety are damaged by water. It also prefers shaded areas. The infection occurs only on new tissue and fruit but only when the sugar content of these reach a level of about 8%. Some native varieties that have been crossed with native types are resistant to the mildew.

Once started, powdery mildew is difficult to control as the spores are resistant and very mobile. Since most require a high humidity to germinate, avoid wetting the leaves. Providing good air circulation is important also. Don't crowd your plants. Water in the mornings so vegetation has time to dry out quickly. Drip irrigation of some sort is a good way to help prevent infestations of powdery mildew. If, in spite of your best efforts you have a problem you can try some of the fungicides on the market. Remember to read the label carefully and follow the directions completely.

There are plant varieties that are resistant to mildew. Some cucumbers and muskmelons in particular while there has been less success with pumpkins and squash. The seed label or description should list if it is resistant.

Sulfur has been used to control mildew but it can damage leaves, so be careful with it. A less toxic remedy may be made at home with baking soda and water. Mix 1 tablespoon of baking soda with one quart of water and spray on the infected plant. Another version includes horticulture oil. Mix 1 Tablespoon baking soda, 2-1/2 tablespoons of a fine horticultural oil and 1 gallon of water. Spray on foliage. This is a case of more is not better. Stronger solutions may damage the plant.

## Science News



### *Improving Tomato Flavor, Genetically.*

*: A sequencing blitz on the tomato genome reveals the genes that contribute most to tastiness. Jan 26, 2017 BOB GRANT*

Anyone who grows their own tomatoes in backyard gardens can attest to the borderline criminality of the lifeless, flavorless facsimiles found in the supermarket bin. But now scientists have cracked part of the tomato's genetic flavor code and the findings may help commercial-scale growers breathe life back into the fruit. They reported their results in [Science](#) today (January 26).

"You can almost assemble a molecular toolkit," University of Florida horticulture professor and study coauthor Harry Klee told [The Verge](#). "We have identified a pathway to really significantly improve the flavor of tomatoes."

Klee and his colleagues sequenced the genomes of tomato varieties from grocery store disappointers, from heirloom strains to wild tomato ancestors. Then the researcher had multiple consumer panels taste the tomatoey cornucopia. The team created a chemical profile for each tomato strain, cross-referenced the tasting panel's preferences with concentrations of compounds known to influence flavor. The result was 13 chemicals that were likely exerting the most influence over the tastiness of the tomatoes. Zeroing in on specific tomato genome sequences, Klee and his coauthors identified the genes that were responsible for the flavorful compounds and specified which heirloom varieties contained the most of them.

The authors suggest that crossbreeding tasty heirloom strains with mass produced tomato varieties might introduce some of these flavorful genes back into the supermarket fruits without losing traits selectively bred into commercial varieties, such as long shelf-life, higher yields and disease resistance.



# Monsoon Madness 2019









# *Meet a Master Gardener: Karen O'Donnell*

*By Laurie Cameron*

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Karen O'Donnell has been a master gardener since completing her training in 2016. Karen moved to Sedona three years earlier from her native town of Phoenix. Most of the gardening she did in Phoenix consisted of growing tomatoes as seasons allowed and raising hummingbird friendly plants, which drew hummingbirds year-round.

When she moved to Sedona, she had trouble finding resources for gardening, as most publications cater to desert gardening. She learned about the Master Gardener program at a farmer's market master gardener's table. The major strength of the MG training, she found was that it covered a wide range of topics and provided many useful resources.

At her home in Sedona her focus is mainly on fruit trees. The property already had several fruit trees when they moved in: an apricot tree, a pear tree, and a grafted apple tree that produces both Fuji and Granny Smith apples. She has since planted a peach and a plum tree, and another apricot and pear tree. In addition, she and her husband grow strawberries, tomatoes, cucumbers, zucchinis, and grapes. Needless to say, the entire enterprise is enclosed in fencing to keep the wild critters away.

They rely entirely on rain water collected in cisterns for all of their watering needs. To that end they have six tanks holding 420 gallons each for a total of 2,520 gallons of water. The cisterns are positioned near the house, which is a good fifteen feet

above their garden so that the system is completely gravity fed.

In terms of volunteering, Karen has been the secretary of the Master Gardeners Association for the past three years. In addition, she takes the lead role of hosting the master gardener's table at the farmer's market. When I asked what some of the typical questions she got at the farmer's market were, she said she often met newcomers to the area who, like her, had trouble getting information about gardening here.

What Karen values most about the program is the opportunity to interact with the public, saying "You get back as much as you give."

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## *More Science News*

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Scientists are always doing interesting research that we never hear about so I spent a little time looking for strange, amazing, and just good stuff to bring to your attention. Enjoy and thank scientists for their imagination, creativity, and hard work. The following articles are summaries which have been edited (by me) for length.



### **Wheat myth debunked**

Pervasive myth that intensive breeding has made modern wheat cultivars weaker debunked June 17, 2019 Source: University of Queensland

Common opinion has it that modern wheat is so reliant on fertilizer and crop protection agrochemicals that the plants now lack the hardiness needed to remain productive under harsher environmental conditions. But comprehensive new research shows that modern wheat varieties out-perform older varieties even when grown under unfavorable conditions.

The myth that modern wheat varieties are more heavily reliant on pesticides and fertilizers is



debunked by new research published in *Nature Plants* today. Lead author on the paper, Dr. Kai Voss-Fels, a research fellow at The University of Queensland, said that modern wheat cropping varieties actually out-perform older varieties in both optimum and harsh growing conditions.

"There is a view that intensive selection and breeding which has produced the high-yielding wheat cultivars used in modern cropping systems has also made modern wheat less resilient and more dependent on chemicals to thrive," said Dr. Voss-Fels. "However, the data unequivocally shows that modern wheat varieties out-perform older varieties, even under conditions of reduced amounts of fertilizers, fungicides and water," he said. "We also found that genetic diversity within the often-criticized modern wheat gene pool is rich enough to generate a further 23 per cent increase in yields."

Dr. Voss-Fels said the findings could have potentially important implications for raising the productivity of organic cropping systems: "It's been widely assumed that the older wheat cultivars are more robust and resilient but it's actually the modern cultivars that perform best in optimum and sub-optimum conditions."

Wheat is the world's most important food crop.

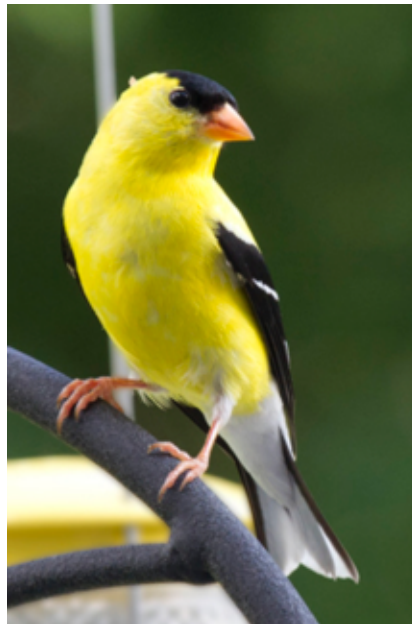


### **The case of the poisoned songbirds**

**June 26, 2019 Source:** Society of Environmental Toxicology and Chemistry

Researchers from the California Department of Fish and Wildlife's Wildlife Investigations Laboratory present their results from a toxicological investigation into a mortality event involving songbirds in a new publication in *Environmental Toxicology and Chemistry*.

On 17 March 2017, residents in Modesto, California, reported finding dead birds along the street and in front yards in a section of the town. The day prior to the incident, the city had made a drench application of imidacloprid, a pesticide synthetically



derived from nicotine, to the base of trees that lined the street. The pesticide was reportedly mixed and applied according to package directions. Researchers at the Wildlife Investigation Laboratory were notified of the incident and conducted a post mortem investigation on the dead songbirds, which were identified as American goldfinches. The

cause of death was determined to be imidacloprid poisoning likely due to the ingestion of fallen elm tree seeds contaminated during the drench application.

Lead author, Krysta Rogers, and her colleagues noted that, "The mortality event investigated in the present study highlights a previously unidentified risk of drench application for imidacloprid. The pesticide label states that the product be applied to the base of the tree and directly to the root zone. [However] Seeds, insects, or other invertebrates consumed by birds and other animals may be present within that zone. If these food items were contaminated during the drench application, they would be highly toxic to animals when ingested."

The authors recommend, that "drench applications not occur during seed drop to minimize the risk of exposure to animals that consume fallen seeds and that mitigation measures could be taken to prevent small animals from accessing areas treated with the pesticide, at a minimum." Finally, the authors encourage integrated pest management over the prophylactic use of pesticides as the ideal.

**Story Source:** Materials provided by [Society of Environmental Toxicology and Chemistry](#).

### **Journal Reference:**

Krysta H. Rogers, Stella McMillin, Katie J. Olstad, Robert H. Poppenga. **Imidacloprid poisoning of songbirds following a drench application of trees in a residential neighborhood in California, USA.** *Environmental Toxicology and Chemistry*, 2019; DOI: [10.1002/etc.4473](https://doi.org/10.1002/etc.4473)





***Congratulations***  
*for completing your first 50 hours*

*Cindy Tirotta — mentor: Diane Thornbrugh*  
*John Davis — mentor: Karen Austermiller*  
*Mike Sheedy — mentor: Bob Reynolds*  
*Pam Edwards — mentor: Betty Loos*  
*Emily Lane — mentor: Jan Gradle*

## **Recognition Picnic**

**Hold the date!!! Our annual MGA Recognition Picnic will be held on Saturday, Sept. 21<sup>st</sup> in Prescott. Watch for e-mail messages with details.**

### ***From the Editor:***

I sometimes struggle to come up with new ideas for newsletter articles. If you have something you would like me to write about, something that's a problem in your garden, just want to learn something new, feel free to let me know and I will look into it and write about it.



### **2018 Newsletter Deadline Schedule**

The newsletter comes out every two months. Please note the deadlines.

Publish	Date	Deadline
Feb-Mar	Feb 1	Articles Jan 5, announcements Jan 25
April-May	April 1	Articles March 5, announcements Mar 25
June-July	June 1	Articles May 5, announcements May 25
Aug-Sept	Aug 1	Articles July 5, announcements July 25
Oct-Nov	Oct 1	Articles Sept 5, announcements Sept 25
Dec-Jan	Dec 1	Articles Nov 5, announcements Nov 25

From the Editor: Send or email articles to the address below. Email is preferred. Please see schedule for deadlines.

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## MG NEWSLETTER



## *Next Meetings*

August 21, Prescott MGA Meeting

September 21, Prescott MGA  
Recognition Picnic