



Redwood Barn Nursery

1607 Fifth Street Davis, California

April Showers Bring ... Fungus

I noticed with sadness the passing of Dr. Robert N. Campbell and Lynn L. Campbell in the Enterprise obituaries, Sept. 20. But it also brought a smile as I remembered what a joyfully ebullient professor Dr. Campbell was.

I took his class in plant pathology (the science of plant diseases) in the 1970's. I recall him bounding in to the classroom after a rainy spring day, cheerfully exclaiming "what *wonderful* fungus weather we're having!" And then he would proceed to instruct us as to which fungi were inoculating outside *right now* thanks to the moisture and the temperature range we were experiencing. He was able to make plant diseases fascinating, which is no small feat in itself, and had great enthusiasm for his subject. With many hundreds of students over the years, he leaves quite a legacy.

His teaching was perhaps my clearest introduction to the principle that *what happens today creates symptoms next week*. When we get rain showers in spring, we can expect leaves to drop from sycamore and ash trees about a week later due to anthracnose blight. A few days after above-average temperatures in late July of this year, we saw many samples of burnt and withered foliage from maples, birches, and redwoods. The weather predicts the problems.

Note that some symptoms are not caused by an organism, but simply by environmental stress. Pathologists like to call those 'abiotic disorders'. Those burnt maple leaves had "summer leaf scorch," which simply refers to the drying and scorching of foliage due to a combination of high temperature, low humidity, and insufficient soil moisture. As landscape watering has been reduced to conserve water, many trees are just on the edge of drought stress for much of the summer. In hot weather, water use by plants spikes up above what is available that day. Then the weather cools, the irrigation system runs, and the plant mostly recovers. On a larger leaf I can often show the customer exactly where each water stress occurred over time.

Why don't symptoms appear immediately?

Disease organisms often have to penetrate the leaf or stem, block the flow of moisture, or build up sufficient tissue to cause mayhem. Leaves that wither at first may just appear stressed or slightly wilted, then desiccate inward from the edges. The fine, barely visible root-like mycelia of fungus precede the more visible fruiting bodies. Sometimes the disease stops as the plant marshals its defenses and blocks further spread in the plant, or the roots get watered, or the affected part simply falls off. A trained plant pathologist or sharp-eyed gardener can see the early signs. Most of us don't really notice until the plant part actually starts to die, or, as they like to put it, necrosis sets in.

You can look at pest problems on plants using the model plant pathologists call the Disease Triangle. The symptoms you see occur because of the interaction of the Host (the plant), the Pathogen (fungus, bacteria, or other pest), and the Environment. Post-war agriculture focused heavily on breeding plants (hosts) with disease resistance, and eliminating the pathogens by



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spraying. With the advent of integrated pest management (IPM), more attention was given to the changes the farmer or gardener could make in the environment to reduce the problem.

Should you reach for a fungicide?

Probably not. By the time you see the damage, the disease cycle may actually be done. For every moist day that leads to inoculation, a dry windy day can stop it. We have far fewer problems with plant diseases than people who live in rainier-summer climates. Often just pruning out the affected portion will suffice. And then perhaps you can take a moment to look at the other corners of the disease triangle – the host plant, or especially the environment – and assess what changes you can make to reduce the problem. Perhaps you can look for more disease-resistant varieties, move the plant to a more favorable location, or change your watering practices.

It doesn't take an advanced degree or even a class in plant pathology to tell us that the weather affects how our plants grow. Knowing some key seasonal weather conditions can help you know what to expect. For example, recently we reached the dew point in the morning a couple of times. People who move here from more humid regions may be surprised to know that we don't see much morning dew from late spring until nearly fall, because it is so dry here.

Why does dew matter?

When water droplets condense on leaf surfaces and remain there for several hours, it provides fertile conditions for fungus spores to grow. The first one to show up is powdery mildew. You'll see it is on susceptible host plants that are growing along the ground, such as verbena and scabiosa. Or on the cucumber or pumpkin vines that are running along the ground in your vegetable garden. A bit later it will show up on higher-growing plants such as zinnias or mildew-prone varieties of roses.

To me, some of these infections are simply a natural part of seasonal change. Your cucumbers and zinnias are about done; just pull them out. If you have a properly functioning compost pile that gets hot, go ahead and compost them. If not, put them out in your spiffy new compost trash bins. Perennials that show mildew on the leaves are probably about done blooming for the season. You can trim them back, enjoy another surge of bloom as we have late season warm spells, and then don't worry about it.

But the rose is another story. Here is where I look at the Host part of the disease triangle. Some roses get mildew, others don't. If you have a rose that gets powdery mildew every year, why not just replace it with another variety? Prune it with a shovel, as rosarians like to say. As one plant pathologist said to me wryly, "removing the host plant is a time-tested method of disease control." Or look at the environment it's in: is there more shade than there used to be, causing moisture to stay on the leaves longer? Perhaps pruning a nearby tree or shrub will improve the sunlight and air movement and reduce the disease problem. Planting your rose bushes further apart is a simple way to reduce diseases.



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Some weather-pest connections.

Winter:

- Spikes of high temperatures in mid-winter can disrupt the chilling hours of some fruit trees, yielding poor fruit set. Cherries were hit hard by warm January weather in 2015.

Spring:

- A sunny day in spring after rain showers, with temperatures between 55 and 85 degrees, leads to fireblight infection of apples, pears, and related trees. Around here, April showers bring mostly diseases.
- Those same conditions favor inoculation and spread of downy mildew on roses. With a 4 – 5 day generation cycle, you can expect rapid spread until drier weather prevails.
- North wind is dry and warm, often putting a stop to disease infection. The north wind is our most effective fungicide.
- 62 degrees at sunset means codling moths are starting to fly.
- Cold nights in spring, watering tomatoes daily? Blossom end rot.

Summer:

- Moisture close to the bark of certain woody plants can lead to crown rot, but only when temperatures are high. Ceanothus and lavender are examples. We call it overwatering, but the disease organism is Phytophthora which infects through the stem.
- Temperatures above 90 degrees cause most tomato varieties to drop their flowers without setting fruit.

Fall:

- As we reach the dew point on several mornings in a row, you can expect to start seeing powdery mildew.

This last one is especially timely:

- High temperatures, low humidity, a windy day, insufficient watering? Leaf scorch.

We're seeing a lot of very stressed trees. All of you who have conserved so much water by removing your lawns, could you go ahead and give your trees and shrubs a nice, long drink right now? Our urban forest will thank you.



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Low-growing verbena is a popular ground cover for its summer bloom and heat and drought tolerance. But older forms got mildew during the cooler seasons. The Tapiens series (Blue Violet is shown here) of verbena was touted for ground-hugging habit and better mildew resistance.



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Low-growing verbena is a popular ground cover for its summer bloom and heat and drought tolerance. But older forms got mildew during the cooler seasons. The EnduraScape™ series of verbena varieties grows a little taller than the Tapiens, and features vivid colors and even better mildew resistance. EnduraScape™ Red is shown here.



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Trees are looking pretty dispirited around town right now. With Davis residents achieving 25% reduction in water use in recent years, some trees are showing signs of serious drought stress. A



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deep soaking every month would keep them healthy. Some such as redwoods, maples and birches would like a slow soak every couple of weeks. Please water your trees!



The low-growing, long-blooming pincushion flowers (*Scabiosa caucasica*) came on the market several years ago and quickly became very popular. Their beauty is marred somewhat by late season mildew on the foliage, but it comes along as the bloom season is winding down and doesn't really harm the plant.