

Mild winter confuses trees

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I prize the October Glory red maple growing in my front yard. I planted it there about 10 years ago and it has grown admirably, providing a shady, cool green canopy every summer and brilliant color every autumn. But this spring, only about half of the tree leafed out followed by straggling, uneven leaf emergence in the top and north side of the canopy.

Scanning local trees as I travel around Napa and the valley, I have been noticing many trees showing a similar condition, mostly in some maple species, elms, Raywood ash, Chinese Pistache, flowering cherries, and in fruit and nut trees including apples, peaches, and walnuts. In some instances, it is uneven leafing-out on one tree. In others, it is in a group of the same species with some trees still bare while others are in full leaf.

In contrast, I have noted London plane sycamores leafing out about two weeks ahead compared to last year. And everywhere I look, olive trees are approaching full bloom about a month early, compared to previous years.

It would be easy to jump to a conclusion that the drought is causing this, but I suspect the cause is the lack of “chill hours.” Many trees, most famously, fruit and nut trees but also many shade trees, shrubs and smaller plants need a certain accumulation of hours in winter within a chilly, but not freezing, temperature range to prepare them to start growth in spring. It is usually stated in references as above 32 and below 45 degrees Fahrenheit.

The chill hours do not need to be continuous. Even a few spring nights below 45 degrees will gradually add to the chill hours. Evaporative cooling might help as well. Buds that are wet overnight, when the air is in the upper 40s might be cooled below the critical 45 degrees.

The dynamics are complicated. “Physiology of Woody Plants” (Kramer & Kozlowski) says, “If plants are exposed to low temperatures for a short time and then returned to high temperatures the effects of chilling are lost.”

Further complicating things, chilling requirements vary among cultivated varieties, location of buds on a tree, and bud type. Flower buds may have a lower chill requirement than leaf buds. Perhaps that explains why a peach tree I looked at last week had fruit expanding far ahead of leaf expansion.

Referring back to the London planes that leafed out early, these are trees that have less need for chilling. According to a report from the UC College of Agriculture (Bulletin #611, 1937) sycamores have a very short chilling requirement.

Reviewing reference books and online sources turned up limited, and sometimes conflicting, statements on the subject. Most of the research I found relates to fruit and nut trees, with good detail from growers. They provide information on chilling requirements to help gardeners and farmers select fruit and nut trees appropriate for their local climate.

One online reference I found, by the California Climate and Agricultural Network, June 2011: "Climate Change Affects Winter Chill for Temperate Fruit and Nut Trees," describes the impacts that climate change will have on the temperate fruit and nut industry. In an interview, one of the authors remarked "...in California... I'd be worried about pistachios, walnuts, plums and peaches."

And I've read in the news that lack of chill hours has been affecting cherry production in California in recent years.

Olive varieties differ in their chilling requirements. Warmer weather may induce earlier blooming and normal shoot growth, but lack of chill hours can lead to reduced flower bud formation. That does not seem to be the case this year.

Reviewing weather data (UC Davis Chill Calculator), I noted that the Oakville Station for Nov. 1 2014 to Feb. 28, 2015, recorded only 612 chill hours, compared to 1,200 for that time period in 2011-12.

There is a lot for us to consider, facing the possibilities of future years without enough chill hours.