



May 2000

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Chilling and Tree Response – Revisiting 1999-2000

Kevin R. Day

It is now obvious that tree response to this winter's chilling was less than ideal. There have been many instances of long drawn out and erratic bloom, poor set, and in some apricot orchards severe bud drop. The official chilling hour totals of 874 (Exeter/Visalia) and 897 (Kearney Ag Center) – considered adequate in most years – would not suggest such a poor tree response.

However, there were several contributing factors that complicate this:

- 1) **Occurrence of Chilling Accumulation** – There were 445 chilling hours (Exeter) in December and only 224 hours in January. The figures for Kearney were virtually identical, 446 hours in December and 223 hours in January. Furthermore, in the second half of January only 31 chilling hours occurred at Exeter and 29 at Kearney. In effect, we accumulated virtually no chilling after mid-January. In years when both these numbers do not approach or exceed 400 hours it is common to have chilling problems.

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- 2) **Temperature at which chilling is accumulated** – Chilling hours are commonly expressed as the number of hours below 45° F during a specific time period. However, there are most certainly differences between varieties with respect to this critical temperature. For instance, one variety may accumulate chilling beginning at 47° F and another not until 43° F. It is these types of differences that are responsible for such things as changes in bloom sequence from year to year. Perhaps the best example of this is Friar Plum, which can bloom early, mid or late in certain years. It would be exceedingly difficult to determine all the critical temperatures, and so a generalized figure such as 45° F is used because it works more than adequately in most years.
- 3) **Light and Moisture** – There were very few if any foggy days this past season. Not only does fog help keep down the overall temperature of the atmosphere, it reduces bud temperatures through a combination of shading and evaporative cooling. There are famous photographs that show trees shaded during the winter growing normally after sub-chilling years, while trees growing in the open sun are suffering from the symptoms described above.

The following quote from the late UC Professors William Chandler and Dillon Brown illustrates this. "When the sky is hazy or foggy, even though many more of the hours may be above the basic 45°F, ... they still may be rather more effective for rest breaking than if the sunlight were more intense." In essence, the chilling we did have was not as effective as would normally be expected due to the greater than normal influence of solar radiation incurred by lack of fog.

- 4) **High Winter Temperatures** – There is no doubt that there were many warm days this past winter. It is an established fact that excessive temperatures may be able to negate already accumulated chilling hours. There are several sophisticated models that try to take this into

consideration, with varying degrees of success. We have rarely used these types of models in California, but if employed for the 1999-2000 season, such models would indicate that there were only approximately 500 hours of accumulated chilling.

In summary, there were several factors that contributed to poorer chilling than would be expected this past season. It is difficult, if not impossible, to ascribe greater importance to any one of the explanations outlined above. Furthermore, tree dormancy and chilling response is one of the most complex subjects in practical horticulture, and, unfortunately, it remains a factor over which the grower has very little control.

Nitrogen Content of Irrigation Water

Kevin R. Day

Nitrogen which is present in irrigation water is an important nutritional source and should not be forgotten. The usual source of such additional nitrogen is in pump water. Typical nitrogen content of pump water in Tulare County ranges from 5 to 30 pounds per acre foot of water. Average orchard water use is from 3 to 4 acre feet of water annually. It is possible then (if pump water is the only water source) to be applying 15 to 120 pounds of nitrogen per acre in the irrigation water. This may be more than sufficient in some orchards.

To determine the nitrogen content of water, collect a sample after allowing the pump to run at least 30 minutes. Collect 1-2 pints of water in a clean container. Seal it tightly and deliver to a lab as soon as possible. The lab results will be expressed as either "ppm NO₃" (parts per million nitrate) or as "ppm NO₃-N" (parts per million nitrate nitrogen).

To determine the amount of actual nitrogen per acre foot of irrigation water, multiply ppm NO₃ by 0.61. If expressed as ppm NO₃-N, multiply by 2.7.



For example:

- A. 45 ppm NO_3 in the sample.
 $45 \times 0.61 = 27$ pounds of nitrogen per
acre foot of water.
- B. 10 ppm NO_3N in the sample. $10 \times 2.7 =$
27 pounds of nitrogen per acre foot of
water.

To calculate pump output in terms of acre feet per day remember that a pump output of 226 gallons per minute (gpm) is one acre foot per day. Simply divide pump output in gpm by 226 to get acre feet per day.

For example:

Pump output is 750 gpm.
The $750 \div 226 = 3.31$ acre feet per day.

Don't forget that pumping may be supplying much of your orchard's nitrogen requirement. A simple, inexpensive pump test may go a long way toward improving fruit quality and orchard performance.

Guidelines for Gypsum Use in Orchards

Kevin R. Day

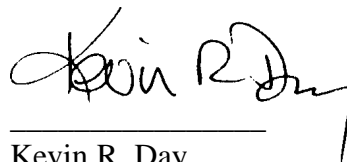
In orchards where water infiltration is limited, gypsum applications can be helpful. Gypsum is especially effective in increasing water penetration in instances where the primary water source is low in salts, e.g., canal or ditch water.

1. Apply 1-2 tons per acre in late spring to early summer. This is generally the time period when soils "tighten up," and gypsum applications can help alleviate this problem.
2. Do not incorporate the gypsum. Incorporation will only dilute the gypsum in the upper 6-8" of soil. In order to be most effective the gypsum should remain at the surface where it can be most active.
3. When adding gypsum to irrigation water apply at a rate of 500 to 1000 pounds per acre foot of water.

Gypsum applications may need to be made annually in order to be most effective. **Remember also, that gypsum is not a cure-all. It will not increase water penetration in soils that are compacted or otherwise damaged.**

Orchard Notes E-mail Version Available

A shorter and more frequent version of Orchard Notes is available by e-mail. For those of you interested in receiving this please send e-mail to krday@ucdavis.edu requesting being added to the list.



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***University of California Cooperative Extension
and the
Kearney Agricultural Center***

Present

**VARIETY DISPLAY AND RESEARCH UPDATE
SEMINARS**

Featuring

- 8:00 – 9:00 a.m. Variety display by stone fruit nurseries, breeders and the USDA.
- 9:00 – 10:00 a.m. Research update & discussion in the field.

Mark your calendars for these dates:

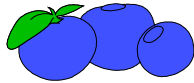
- May 23 - Research Update – Pest Management
June 20 - Research Update – Nectarine Training Systems
July 25 - Research Update – Chemical Thinning of Plums
August 22 - Research Update – Pest Management/Tree Nutrition

All meetings will be at the:

**Kearney Agricultural Center
9240 S. Riverbend Avenue
Parlier, CA 93648**

These meetings are free and all interested people are invited to attend. For more information call Kevin Day, (559) 733-6485.





Blueberry Field Day
May 23, 2000
10:00 AM - 12:00 PM

Kearney Agricultural Center
9240 S. Riverbend Avenue, Parlier

The University of California Cooperative Extension invites growers and other interested persons to attend the **Blueberry Field Day** at the Kearney Agricultural Center in Parlier, May 23, 2000. Twenty -one highbush blueberry varieties will be shown from 10:00 a.m. to 12:00 noon. Participants will be taken by tram to the blueberry field. Participants must plan on arriving 15 to 20 minutes early to board the tram.

The blueberry trial includes northern and southern cultivars which ripen mid-May through late June. Tulare County Farm Advisors Kevin Day, Bill Peacock and Manuel Jimenez will speak on field establishment, soil pH management strategies and blueberry chilling requirements and how to calculate chilling hours. Additionally, Dave Brazleton of Fall Creek Farm and Nursery, Inc. will speak on each of the varieties.

The field day is free and no pre-registration is required.

The Kearney Agricultural Center is located at 9240 S. Riverbend Avenue, off Manning Avenue, just east of Parlier.

If you wish more information, please contact Manuel Jimenez, Farm Advisor, University of California Cooperative Extension, 559-733-6791.

