



Deciduous Fruit Tree Chilling Hours

WHAT ARE CHILL HOURS:

Chill hours are the cumulative number of hours of temperatures lower than 45°F that are required by deciduous fruit and nut trees for fruit production. The hours are tracked during the traditional dormant season, measured from November 1 to February 28/29.

AVAILABLE DATA:

The University of California (UC) provides cumulative chill hours, current year and historical, for more than 100 locations throughout the state. The data is collected from UC's CIMIS (California Irrigation Management Information System) weather stations. There are 4 CIMIS weather stations located in Contra Costa County – Brentwood, Concord, Moraga, and El Cerrito. There is no weather station located in the western part of Contra Costa County (Richmond area), so the chill hours for that area can be approximated by data measured by the former Oakland Hills (Alameda County) CIMIS station. The Pleasanton (Alameda County) CIMIS station data can be used to approximate chill hours for the San Ramon area.

WHY CHILL HOURS ARE IMPORTANT:

During the fall season, shortening day length and cooler temperatures stimulate a tree to produce growth inhibitor hormones that stop it from growing. It is these hormones that keep a tree in dormancy during the winter months. Dormancy is broken when sufficient cold temperatures break down the growth inhibitors within the tree. The simplest model uses a specific number of cumulative hours of chill (temperatures lower than 45°F) required to break dormancy. Once the appropriate number of chill hours has been achieved, and only after trees are exposed to longer daylight hours and warm enough temperatures for natural growth processes to begin, will active growth resume in the spring.

EFFECTS OF INSUFFICIENT CHILL:

With insufficient chill, trees will leaf out late in the season, blossoming can be prolonged, buds may deteriorate and/or drop, and few if any flowers are produced. Without flowers, there is no fruit. Both the absolute number and the distribution of chill hours have an impact. Periods of a few days to a week or more of mild weather may offset or reduce the effectiveness of accompanying periods of good chilling weather. Greater seasonal totals are usually necessary when there is prolonged interruption of cool weather.

CHILL HOUR REQUIREMENTS:

The number of chill hours required varies by the type and variety of fruit or nut. In order to assure the tree you plant is appropriate for your area's environmental conditions, you should know at least the average chill hours in your area as well as the chill hours required for the specific fruit or nut tree you wish to plant. For general information on the chilling requirement for various fruit and nut trees you can go to the following UC website: http://homeorchard.ucanr.edu/The_Big_Picture/Tree_Selection/#chill.



FRUIT TREE SELECTION:

For information on fruit tree varieties for the home garden, including low chill varieties (varieties requiring less than 300 hours of temperatures lower than 45°F to break dormancy), consult the University of California free publication *Growing Temperate Tree Fruit and Nut Crops in the Home Garden* at <http://homeorchard.ucanr.edu/varieties.pdf>.

For Contra Costa-specific variety recommendations, consult our publication *Fruit, Nut & Grape Varieties for the Contra Costa Home Orchard*, located at <http://ccmg.ucanr.edu/files/228958.pdf>.

You may also find more information on fruit tree varieties and required chill hours of interest on the web sites of commercial wholesale and mail-order web nurseries.

CHILL HOURS DATA:

The table below provides average chill hours and the range of chill hours for the last 14 years (as of 2016) from the CIMIS active sites in Contra Costa County. You can obtain the original data at the following UC website: http://fruitsandnuts.ucdavis.edu/Weather_Services/Chill_Calculators/.

Contra Costa County Current CIMIS Weather Stations	Average and (Range) of Seasonal Chill Hours November 1—February 28/29, 2001-2015
Brentwood (#47)	818 (234 to 1066) ⁽¹⁾
Concord (#170)	930 (679 to 1152)
El Cerrito (#213)	191 (132 to 250) ⁽²⁾
Moraga (#178)	1030 (891 to 1226) ⁽³⁾
Oakland Foothills (Alameda County)	560 (560) ⁽⁴⁾
Pleasanton (#191) (Alameda County)	881 (656-1217) ⁽⁵⁾

NOTES:

- ⁽¹⁾ Brentwood: 12 of 14 years reporting
- ⁽²⁾ El Cerrito: 2 of 14 years reporting available (only several years in operation)
- ⁽³⁾ Moraga: 13 of 14 years reporting
- ⁽⁴⁾ Oakland Hills: ~10 years data from previous reports; data now not readily available
- ⁽⁵⁾ Pleasanton: 11 of 14 years reporting