The Importance of Chilling

By Sheri Hunter
April 8, 2016

Keep plants thriving when temperatures drop

No one I know would jump for joy at the prospect of a chilly winter day, but in fact many gardeners should. Just as important as heat is to some plants during the warm season, particularly those we depend on to flower and ripen fruit, is cold during the winter months. Some plants need chilling for a prolonged period of time in order to produce buds the following spring.

Cold acts as a sort of reset switch that enables some plants to enter dormancy, to rest and recharge before producing next year's harvest. This demand for cold in order to flower, is called *vernalization*. It is best explained by the fact that survival in the wild often depends on precise timing of flowering, which must be coordinated with pollinator activity and general weather conditions. The level of cold necessary has yet to be clearly defined in all cases. Some sources define a *chill hour*, or *chill unit*, as exposure to temperature ranging from 32-45°F, others, including WSU Mount Vernon weather station, simply say an hour below 45°F. Skagit Valley averages 1468 hours of chilling annually, varying from 968-1950 hours (AWN, 2007-15).

Knowing the typical chill hour accumulation of your geographic region should be one of the primary criteria to use in choosing cultivars that are suitable to grow there. Insufficient chilling hours can adversely affect many types of plants. Fruit trees may leaf out and flower late, set less fruit and become weak and vulnerable to pest infestation. Many trees, in fact—trees that do not produce fruit—fail to produce seed when dormant for too short a time. Early spring perennials like phlox, iberis, *Anemone pulsatilla* (Pasque flower) may flower spottily and then remain vegetative the rest of the summer, rarely if ever producing another flower. Biennial vegetables in their reproductive season, including cabbage, celery and carrot may fail to produce seed. Many peony varieties fail to put on a proper show, which is why they are not recommended in warm winter climates.

The problem of chilling is anything but straightforward, however, as there is no consistent relationship between hardiness designation and a need for cold exposure. Moreover, selecting a low chill variety in a cold area will result in early flowering and possible damage by late frosts. Selecting a high chill variety in warm areas will result in little or no fruit production. Fruit tree growers publish significantly varying chilling hour requirements for the same variety. In truth, it can be difficult to know exact requirements, so experiment and ask around for promising local cultivars. When all else fails, select varieties that have a chilling requirement at least 20% less than local averages. Here are other general guidelines regarding chilling:

- Select early-flowering varieties in warm climates, late flowering varieties in cooler areas.
- Early ripening varieties are best in areas with intense summers. Late ripening varieties are best where cooler summers prevail.

- Climate extremes may eliminate certain varieties that would otherwise meet the chilling requirements. For example, the very dry air and intense summer heat found in eastern Washington may stress a fruit tree beyond its ability to produce quality fruit.

Your garden microclimate may influence not only how much heat plants gather in summer, but also cold exposure. If it contains “frost pockets” where the sun is obscured in winter, where it is exposed to a clear sky when temperatures dip in winter, or where cold air from higher elevation is banked or cached in a basin, you may have higher chilling hours. Open sloped areas are more exposed to cold than areas close to buildings that act as thermal sinks. Low-lying areas with surrounding high ground collect heavy cold air, and therefore, are more frost-prone. Avoid planting frost-tender species here. By recognizing these conditions and measuring your microclimate may help you site a plant with a long chilling requirement.

Some plants need chilling for a prolonged period of time in order to produce buds the following spring. *(Photo courtesy of the Skagit Valley Herald and chicagobotanic.org)*

Learning to select and site plants with special needs such as chilling is the natural outcome of recognizing and measuring garden microclimate. A WSU Know & Grow workshop called “Understanding Your Climate Zones” is scheduled for April 12th at the NWREC lecture hall at 1 p.m. Come learn how to measure and track temperatures and moisture, as well as other important conditions that affect growing everyday backyard plants.

WSU Know & Grow Workshop

What:	**"Understanding Your Climate Zones"** Sheri Hunter, a master gardener and author will speak on micro-climates in western Washington. We are not just Mediterranean climate, but also maritime zone.
When:	Tuesday, April 12
Time:	1:00 P.M - 2:30 P.M
Where:	WSU Mount Vernon Northwestern Research and Extension Center, 16650 State Route 536 (Memorial Highway)
Cost:	Free
Questions	Call the WSU Skagit County Extension at 360-428-4270, ext. 0.

RESOURCES:

- Chilling hours calculator. WSU Agricultural Weather Network (AWN), 2009-16. http://weather.wsu.edu/?p=94750
- Byrne. D. H. and Bacon, T. *Chilling Accumulation: Its Importance and Estimation.* Dept. of Horticultural Sciences, Texas A&M University, College Station, TX, 1992. http://aggie-horticulture.tamu.edu/stonefruit/chillacc.html
- Caplan,L. *Effects of Cold Weather on Horticultural Plants in Indiana.* Department of Horticulture Publication, Purdue University Cooperative Extension Service, Pub. HO-203, 1988. https://www.extension.purdue.edu/extmedia/ho/ho-203.html
- Cameron, A; Fausey, B.; Padhye, S.;and Runkle, E. *Some Perennials Like it Cold.* Greenhouse Grower, October 2005. https://www.canr.msu.edu/resources/vernalization-part-1

Note: some hyperlinks in this article have been updated since its initial publication.