



The Virtual Gardener—Some Like It Cold...Update

I originally wrote this article five years ago (see the original [here](#)) and thought it might be appropriate to look at the subject again since bare root fruit trees will soon begin appearing in the stores. As you look at the displays of these bare root fruit trees—apples, cherries, peaches, pears, *etc.*—you will see their plastic wrappers covered with pictures of sugary sweet, delicious fruits. And, as you read the descriptions on the wrappers, you'll notice one thing about many of them. They will show low chill requirements—200-400 hours. Since we live in an area with relatively mild winters—at least as compared to more northern states—that seems like a good thing...right?

Not necessarily! If you plant those trees, there's a good chance you will never see those luscious fruits pictured on the plastic wrappers. Here's why.

Fruit trees begin to bud in the fall but go into dormancy during the coldest portions of the winter to protect themselves and their buds from cold damage. They resume growing again when the weather warms up in the spring. Cooler temperatures and shorter days in the fall provide the signal it's time to begin the winter nap, and an internal "alarm clock" tells them when it's time to begin waking up.

The tree's internal alarm clock keeps track of the number of hours the tree is exposed to temperatures lying within a certain range. When the requisite number of hours have passed, the alarm "rings" and the tree knows it's getting close to time to start growing again.

When our alarms ring in the morning, many of us don't immediately leap out of bed but prefer to doze a bit longer. We may finally be motivated to actually crawl out by the smell of brewing coffee, sunlight streaming through the bedroom window, or some other stimulus. Trees act the same way.

For a tree, the signal to stop dozing and actually start growing again comes from lengthening daylight hours, warmer temperatures, and perhaps other environmental stimuli. But suppose the tree gets the signal to wake up too early and there is a brief warm spell followed by a cold snap as frequently happens here in Cochise County. The tree will begin to bud out in response to the early warm temperatures, and the buds will die during the subsequent cold snap. The end result: no fruit that year.

The number of hours of chill that need to be accumulated before a tree will wake from dormancy depends on the climate that it's adapted to. Trees that are adapted to colder climates will take a long winter's nap and only wake up when all danger of late spring cold snaps has passed, that is, after accumulating lots of chill hours. Trees adapted to warmer climates can wake up and begin growing earlier after accumulating fewer chill hours.

Of course, it's still a game of chance. Trees don't have the ability to forecast short winters or late spring cold snaps any better than we do, so they must operate on the principle that the past is key to the future. Over time their

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chill-hour requirements evolve to match the average conditions of their environments, but like us, they can still be caught by surprise by an abnormally cold or warm winter.

In order to improve your chances of getting good crops of fruit, you need to balance the number of chill hours required by your fruit trees with the number of chill hours you can expect to accrue in your area. You can find the required number of chill hours for a given type and variety of fruit tree in many places—on the package of a bare root tree, from vendors online, or from reference books. But where can you find the number of chill hours that typically accrue for your location?

If you have access to hourly temperature readings for the four month period from, say November through February at a location near your home, you can compute the chill-hours directly for the previous winter. (Note: every winter will be a little different so whatever you compute for the latest winter will only be an estimate of what can be expected at your location for any given year.)

A rule of thumb is that each hour below 45°F and above 32°F counts as one chill-hour. But each hour above 68°F subtracts a chill-hour from the above total. Since you will have almost 3,000 temperature readings to work with, this represents a lot of calculating. If you are adept at using a spreadsheet, it's not too onerous, but if you have to do the calculations by hand, it would be a lot of work. However, there is a simpler way.

The College of Agriculture and Life Sciences of the University of Arizona operates The Arizona Meteorological Network (AZMET) which provides agriculture-related weather data from 28 stations scattered around the state. Four of those stations are located in southeast Arizona: [Bonita](#), [Bowie](#), and [San Simon](#). The Kansas Settlement station, listed in the original article has since gone offline. The station at Bonita is in southern Graham

county and the other two are in eastern Cochise County. Using the rule stated above, the number of chill-units accumulated for each of these AZMET stations for previous winters are in the table below.

Note how the numbers change over the years. The values peaked in 2015 and declined in 2016 and 2017, but they are all over 400.

Another option to get an estimate of the number of chill-hours for your location is to locate a [Weather Underground weather station](#) near your property, get its ID number, and use that as the station name in the [Get Chill Hours](#) website. There is a lot of calculation to be done by the Get Chill program, so there is a lag of a few seconds before the answer appears, but a progress bar on the website lets you see the progress of the calculation process. You will see three answers.

The first answer shows the number of hours below 45°F; the second answer shows the number of hours between 45°F and 32°F; and the third answer shows the number of hours as calculated by the “Utah model.” Although the Utah model does not simply subtract the hours above 68°F from the total hours between 45°F and 32°F, it does compensate for chill-hours above 60°F in a more complicated way so it gives the best estimate to use. Using data from the Weather Underground station near my home (KAZSIERR59), the Utah model shows 455 chill-hours accumulated for 2016-2017.

So depending upon exactly where you live, buying a tree with a chill-hour requirement of less than about 500-800 hours might not be such a good idea.

If you are interested in learning more about chill requirements for fruit trees and how they are calculated, check out this website:

<http://www.davewilson.com/home-gardens/variety-list/dwn-website-top-40-tree-fruit-varieties-500-and-more-chill-hours>

Until next time, happy surfing!

Gary Gruenhagen, Master Gardener
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Cuttings 'N' Clippings

✿ The High Desert Gardening & Landscaping Conference will be held on **March 14—17** at Cochise College, Sierra Vista. For information or to register, go to: cals.arizona.edu/cochise/mg/conference

The next Cochise County Master Gardener Association meeting will be Thursday, April 12. Watch for details in next month's newsletter.

For CCMGA information contact Valerie at: valeriedavidson@email.arizona.edu or the Cochise County Master Gardeners web site at:

<http://cals.arizona.edu/cochise/mg/>

✿ Water Wise will be holding an Off-the-Grid Tour on **March 17**. Register now to join us at the non-profit Bisbee Royale for videos and breakfast (available for purchase) before visiting homesteaders living sustainably in a rural environment. Location: Bisbee Royale Theater, Bisbee, AZ and McNeil area. For information or to register contact Valerie at: valeriedavidson@email.arizona.edu or 520-8278, Ext 2141.

Check out the Water Wise web site for their 2018 schedule at:

<http://waterwise.arizona.edu/>

✿ AZ Native Plant Society meets, **Friday, March 16, 5:00 PM**, Cochise County Community Development Office, 4001 E. Foothills Drive, (Corner of Highway 92 and E. Foothill Drive) Sierra Vista. The speaker will be Wendy Lotze, Volunteer Coordinator, Arizona Trail Association on *The Arizona Trail in Southern Arizona*. For more information, follow AZ Native Plant Society on their web site: <http://www.aznps.com/chapters/cochise/cochise.htm>

Station	Year 2014	Year 2015	Year 2016	Year 2017
Bonita	969	973	908	619
Bowie	626	726	527	475
San Simon	746	795	644	604

Celebrating our Conference Speakers

We have a most special group of speakers for our High Desert Gardening & Landscaping Conference this year and we'd like to briefly introduce them to you. After all, isn't that why you're coming to the Conference? The Speakers make up the heart and soul of the event.

We have several speakers coming from out of town:

~ **Tony McCammon** spent several years as a horticulturalist and educator with the University of Idaho Extension. He retired in January 2018 to develop his education & consulting business, Bloom Horticulture Specials in Twin Falls, Idaho. Tony will be speaking on the fascinating topic of Neurobotany & plant signaling, an incredibly interesting discussion on "how plants think." Tony will also be conducting a Thursday workshop on creating Ikebana floral arrangements, an art involved with how plants make YOU feel.

~ **James Cassidy** is a senior instructor in Crop & Soil Science with Oregon State University College of Agricultural Science in Corvallis, Oregon. Some of us heard James speak on "the magic of soil science" at the International Master Gardener Conference in Portland last summer and enjoyed him so much we invited him to come speak for us!

~ **John Jackson** represents Grafted Growers, a company which specializes in the production of grafted vegetable plants for home and commercial growers struggling with diseases, low yields, and harsh environmental conditions. While the company is located in Raleigh, North Carolina, it was developed by John and his business partner right at the UA Tucson! John will teach us about the magic benefits of growing grafted vegetables.

~ **Mike Crimmins** has been a professor and Climate Science Extension Specialist with University of Arizona Tucson for many years. Mike will open our Conference with a talk we've wanted to present for a long time ... "What is Weather?"

~ **Greg Starr** is a horticulturalist, educator, and owner since 1985 of the well-known Starr Nursery in Tucson which specializes in cactus and succulents. Greg has also authored a collection of books which will be available at a book signing immediately following his talk on desert succulents, trees, and blooming desert shrubs.

~ **Dr. JoAnne Mowczko** comes to us from Yuma. She is an educator, Master Gardener, and author of the book, *The Achuar of the Pastaza River*. She will also have a book signing following her talk on "Achuar Gardens."

~ **Terry Swartz** is President of the Tucson Rose Society. He is a long-time rosarian and educator, presenting talks throughout Arizona on growing roses successfully in our unique environment.

~ **Bill Cook**, Greenlee County Master Gardener Program Coordinator & Instructor, is a Conference favorite. Coming to us from Duncan, Bill will make two presentations: a talk on the art of caring for and pruning fruit trees, and also conduct a workshop on propagation where all attendees will not only learn the many forms of propagation, but also leave with a grafted fruit tree they have learned to graft themselves.

~ **Toni Moore**, Pima County Master Gardener, multi-talented, always busy educator, is another Conference favorite. She is so diverse in her knowledge and an excellent presenter. Toni will be giving her presentation on "growing delectable herbs."

~ **Deborah North** is another very talented Pima County Master Gardener with tremendous educating skills in a variety of topics. Deborah will be giving a 2-session presentation on "Growing Great Grapes," which she efficiently teaches from a backyard growing perspective

rather than from large scale commercial growing approach. Deborah also represents ARBICO ORGANICS and will have a vendor booth for three days with us. Fascinating products!

~ **Allen Wetherbee** was with us three years ago to teach about "Raising Backyard Chickens" and was another Conference favorite. With all the interest in folks having their own chickens these days, and the ease with which that can be accomplished, we invited Allen back again. He is not only a busy business owner in Sahuarita, but is a member of Tucson Poultry Assn., American Poultry Assn., and a community 4H leader and educator.

~ **Jim Koweek** of Elgin is one of the most knowledgeable fellas around on native plants and grasses throughout our great state. He's been a great supporter of our Conference throughout the 25 years and will be presenting this year on "Landscaping with Native Plants." Jim is also an author of two books and will be having a book signing following his talk.

~ **Homer Hansen** is an environmental scientist and the principal member at Aplomado Environmental LLC in Willcox. Homer has spent several years researching and educating in many topics, but one of his specialties is birds. You'll always find him at Southwest Wings. At this Conference he'll be conducting a workshop on inviting birds into your backyard. Participants will be building their own bird feeders to take home!

~ **Nicholas Garber** is Conservation Program Manager with Native Seeds/SEARCH in Tucson. He'll be closing our Conference with a comprehensive talk on the facts and myths of GMO's. We are all anxious for this one!

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Check out the High Desert Conference!

Don't miss the **High Desert Gardening & Landscaping Conference--The 25th Annual!** **March 15, 16, 17** in Sierra Vista, with a pre-conference **Gardeners' Gathering** on Wednesday evening, **March 14** in the Discovery Gardens Pavilion with drink, cheeses, fruits, meats, and live music. Produced by the Cochise County Master Gardeners in conjunction with UA Cooperative Extension Cochise County, the Conference offers multiple talks and workshops on a wide variety of gardening topics ...

- ~ Herbs
- ~ Roses
- ~ Veggie growing
- ~ Fruit tree care
- ~ Propagation
- ~ Fruit tree grafting
- ~ Ikebana floral arranging
- ~ Container gardening
- ~ What makes weather?
- ~ How Plants Think
- ~ Contagious art of Painting
Mandala Rocks
- ~ Succulents & Blooming Shrubs
- ~ Grape growing
- ~ Backyard Chickens
- ~ Soil science & fertilizing
- ~ Rain gardens and rainwater harvesting
- ~ Inviting birds into your garden
- ~ Building your own bird feeders
- ~ Magic of growing Grafted Veggies
- ~ Mesquite Flour processing and uses
- ~ Landscaping with Native Plants
- ~ Plan veggie garden for home or school
- ~ Facts & Myths of GMO's...confused?

You see? Numerous fun topics for your spring motivation and creativity! Presented by a wonderful cadre of speakers in academia and the horticultural industry from around Arizona, Oregon, and Idaho.

In addition to all the talks to attend, there will be raffles, a silent auction, and a cheery collection of numerous vendors to visit in the Spring Marketplace.

To check out the program agenda and register, visit cals.arizona.edu/cochise/mg/conference or call the UA Cooperative Extension, Sierra Vista, at 520-458-8278, ext. 2141 for info and assistance.

This is 25 years of celebrating life in our High Desert Gardens. There's something for everyone. See you at the Conference!

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We also have a wonderful group of local educators . . .

~ **BJ Searcy**, active with Cochise County Master Gardeners and BASA, will be speaking on the processing of and uses for mesquite flour. She'll also bring lots of yummy samples baked with mesquite flour for you to try.

~ **Sheila DeVoe Heidman**, active Cochise County Master Gardener, will be presenting the many fun aspects of Container Gardening.

~ **Julie Barton & JoAnne Ehasz**, active Cochise County Master Gardeners, will be sharing fun ideas for vegetable gardening hacks, veggie growing tips, and companion planting.

~ **Mary Ann Capehart**, our UA Extension Water Wise Specialist, is giving a talk on the popular topic of Rain Gardens and Rainwater Harvesting.

~ **Cal Kelley**, our Cochise County

Master Gardener Association President, will be conducting a hands-on workshop on the art of pressing & drying flowers from your garden. Participants will then be creating a piece of art using the dried flowers.

~ **Jody Sharp Webb & Mary Jackson** will be repeating our most popular hands-on workshop from last year's Conference ... "the Contagious Art of Mandala Rock Painting."

~ **Jan Groth**, Cochise County Master Gardener Program Coordinator, will be discussing factors for Planning a Veggie Garden for your Home, Community, or School. This could be a good talk for teachers to attend!

Once again, we've tried to give you a diverse, talented group of speakers where everyone should be able to feed their gardening curiosity and enthusiasm.

*Jan Groth, Master Gardener
Program Coordinator*

Save the Date—April 21

The **4th Annual Master Gardener Spring Plant Sale** where all proceeds go to help with sustaining and ongoing development of the Discovery Gardens at UA Sierra Vista takes place on Saturday, April 21.

The **Plant Talk** will begin at 8:45AM in the Public Meeting Room (PMR) of Groth Hall and will offer discussion on the growth and care of each of the plants for sale and other gardening tips.

The **Plant Sale** will be 10:00 AM to 2:00 PM in the Discovery Gardens Pavilion and will feature a nice variety of native and desert adapted perennials, shrubs, trees, vines, cacti, succulents, groundcovers, and fruit trees.

Find inspiration for additions to your landscape gardens or for new potted plants on your deck or patio. Coffee, tea, and cold water will be available for your refreshment throughout the Talk and Sale.

The **Plant Sale** will be held in conjunction with **UA Family Day** on April 21 which is also being held 10:00 AM to 2:00 PM on UA Sierra Vista campus and is free and open to all families and children in our community. More information on Family Day coming in the April edition of this Master Gardener Newsletter, so stay tuned!

*Jan Groth, Master Gardener
Program Coordinator*



Pears—A Pomological Fruit

Pears are delicious and much tastier and more complex than apples, I believe. What is a pomology? “Pomum” is Latin for fruit and “ology” the study of. Thus, pomology is the branch of horticulture which researches, studies, and cultivates trees and shrubs producing food, oil, and landscape plants. These primarily include fruit, nuts, and oil seeds—both temperate and tropical. Pome fruits are members of the *Rosaceae*, sub-family *pomoideae* plant family. These include apple, pear, quince, and related ornamental plants.

There are over 35 pear species worldwide. They originated in the Old World including Europe, Northern Africa, and Asia. Two large classes of commonly consumed pears are Asian pears (*Pyrus pyrifolia*) and European pears (*Pyrus communis*). When tree ripened, Asian pears (also known as Chinese, Japanese, Oriental, sand or “apple pear”) are crisp, juicy, and somewhat sweet with tartness near the core. They have an apple-like texture. In contrast, European pears are ripened off the tree and are soft, juicy, and sweet with a mellow taste. Most need a conditioning period to ripen. More on conditioning later.

There are over 3,000 pear cultivars (cultivated varieties). Readily available Asian pears include: ‘Chojuro’, ‘Hosui’, ‘Shinko’, and ‘20th Century’. Common European pears include: ‘Bartlett’ eaten fresh and used for canning, ‘Anjou’, ‘Bosc’, ‘Comice’, ‘Concorde’, ‘Starkcrimson’, ‘Forelle’, and ‘Seckel’. There are red skinned ‘Anjou’ and ‘Bartlett’ pear selections. ‘Bosc’ have a natural brown russetting skin color.



‘Chojuro’ Asian Pear

The Chinese consume more pears per capita than any other country in the world, having cultivated them for more than 3,000 years. China grows 70% of all pears produced, albeit mostly Asian pears. Annually, European Union citizens eat many more pears than Americans. Italians eat the most European pears per capita. Major producing countries are Argentina, Italy, and the United States, primarily in California, Oregon, and Washington.

Pears are eaten fresh and are delicious when paired (pun intended!) with cheese. They are also canned, dried, juiced, and candied. Pears are used in salads, cooked foods, and desserts. Fermented pear juice is called “Perry.” Many commercial prepared fruit juices and cheap jug wines have pear juice as a major component. I particularly enjoy dried Asian pears because sugars are concentrated and are very chewy. I dried over a bushel last fall. Ten

12 medium cored and sliced dried fruit fill a plastic sandwich bag.

Pears are usually grafted onto rootstocks. Sometimes the scion wood (a bud or shoot joined to a rootstock) is incompatible with the rootstock. In this case an interstem is grafted between the rootstock and scion as an intermediary. At Bear Creek Orchards, ‘Comice’ is budded or grafted directly onto a selected Quince rootstock to control vigor and ultimately tree height.

After planting it takes three to four years to begin production. A pear tree can be productive for 40 to 80 years, the longest of any temperate tree fruit. Trees and fruit are susceptible to many of the same insects and diseases as apples. Insect pests include codling moth (*Cydia pomonella*), San Jose scale (*Quadraspidiotus perniciosus*), and the aphid-like pear psylla (*Cacopsylla pyricola* (Förster)). The most severe disease is called fire blight, caused by a bacterium (*Erwinia amylovora*) which can kill a tree over several years if left untreated. Another disease is pear scab (*Venturia pirina*) which causes corky spots and cracking on fruit.

Asian pears are left on the tree to ripen, whereas European pears are picked when immature. European pears are further classified by their ripening window. ‘Bartlett’ for example is a late

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summer pear, where 'Comice' is a winter pear. 'Anjou' and 'Bosc' are late winter or early spring pears. 'Comice' pears are known for their sweet, juicy, and buttery taste and are used as a holiday gift fruit eaten from Halloween through Valentine's Day.

After harvest, European pears are stored in a cool place for several weeks to initiate ripening. The plant ripening hormone Ethylene is produced by fruit and causes maturation. This is known as conditioning. It's best to place recently harvested fruit in covered boxes or plastic bags to contain the ethylene gas. Place them in a cool location or refrigerator. If purchasing fruit from the market they will already be conditioned. If a large quantity is purchased, place a few on the kitchen counter and the remainder in a refrigerator, removing them as needed. To check for ripeness "check the neck" by gently pressing on the fruit neck with a thumb or finger. If the fruit yields a little it is ripe and ready to eat. Skin color isn't a good way to judge pear ripeness.

Eating tasty and nutritious pears is a very healthy choice. A cup of pears has 80 calories, 206 mg of potassium, 4 grams of fiber, plus many other phytonutrients. Finding ways to include them in your diet will enhance your well-being. Again, pairing pears with cheese is a delicious dessert or snack. If you have not tried it I think you might like it!

*Robert E. Call, Guest Author
Certified Professional Horticulturist
Bear Creek Orchards; Harry and David, Inc.*



'Comice' European Pear

March Reminders

- ◆ Prune roses
- ◆ Start seeds indoors
- ◆ Check cactus for fungus
- ◆ Plant cool-season veggies
- ◆ Reconsider your water usage
- ◆ Call Water Wise for a free audit—

The U of A Water Wise Program
(520) 458-8278, Ext. 2141

- ◆ Remove and replace winter mulches

Did You Know . . .

you can get an electronic notification when a new Cochise County Master Gardener Newsletter is posted on-line? Send an email to Valerie at: valeriedvidson@email.arizona.edu or give her a call at: (520) 458-8278 Ext 2141 with your request.

*A house without a garden or orchard is
unfurnished and incomplete.*

~A. Bronson Alcott (1799–1888)

Cochise County Master
Gardener Newsletter Editor
Carolyn Gruenhagen