

So what are degree days and why do we care about them anyway?

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We list the degree days we've accumulated at The Arboretum, The Chicago Botanic Garden, and other sites at the beginning of each report. Just what are degree days and why do we care about them?

Accumulated degree days are very important tools used for scouting insect pests. Many living organisms, including plants, insects, and fungi are dependent on heat energy from their environment to develop. They develop faster as temperatures increase and slower as temperatures decrease. You know from your own experience that plants bloom earlier when we have warm springs compared to cool springs. Insects and many diseases develop earlier when the weather is warmer, too. In fact, many plants and pests have evolved together. So, a tool for measuring this environmental heat can be helpful for determining when to scout for pests. That's why we use accumulated degree days to determine the appearance and growth of insect pests.

It is much more accurate to use degree days than the calendar for predicting pest outbreaks. For example, here at The Morton Arboretum in 1997, we found European pine sawfly larvae hatching around May 12. In 1998 we discovered them hatching on April 16, nearly four weeks earlier. Why? Spring 1997 was much cooler than spring 1998. On May 12, 1997 we were at **159.5** degree days base 50, whereas on April 16, 1998 we were at **165** degree days base 50. Essentially, insects don't care what day or month it is.

Unfortunately, there is much less data on predicting the appearance of diseases based on degree days than insect pests, but we intend to collect this information and, over time, identify links between diseases and degree days.

How are degree days calculated? The easiest way to determine daily degree days base 50 is to add the maximum temperature to the minimum temperature for a day, divide by two, and subtract 50. If the resulting number is greater than 0, then that is the number of degree days for that day. Otherwise the number of degree days for that day is zero. For example if the high of the day is 62 and the low is 42, we add 62 to 42 and divide by 2. The result is 52, the average temperature for the day. If we subtract 50 from 52, we end up with 2 degree days. If the result was below 50, we would assign 0 degree days to that day. We add up the total of the daily degree days since January 1, although usually we have very few base 50 degree days until April. That is the number we use to look for many insect pests. 50 degrees F. is used as a base because many plants, most insects that feed above the ground, and pathogens begin to grow and develop when the temperature is above 50 degrees F. (or 10 degrees C.)

Don Orton's book *Coincide* is a great reference for use in northern Illinois to determine what pests to look for at various degree days. In his book, Don also lists indicator plants, which relate pest life cycles to life cycles of common ornamental trees and shrubs. For example, when wild black cherry (*Prunus serotina*) is blooming, hawthorn leafminers, juniper tip midges, lilac borers, and oystershell scale (brown race) are susceptible to control.

Coincide is published by Labor of Love Conservatory at 468 S. President, Suite 103, Carol Stream, IL 60188-2894. Their phone number is (630) 668-8597.