NOAA Product Highlight: Growing Degree Days

Growing degree days have been used widely for both agriculture and horticulture purposes since the 1950s to track temperature accumulation. Without the stress of drought or other unusual weather conditions, plants typically grow in a stepwise fashion that is influenced strongly by air temperature. Growing degree days measure the daily accumulation of that temperature, which then allows us to predict not only plant growth and maturation but also pest activity.

Growing degree days are defined as the difference between the average daily temperature and a base temperature, which is 50°F in most cases. The average daily temperature is calculated by subtracting the minimum observed temperature from the maximum observed temperature for the day and dividing that value by two. For those who prefer formulas, it looks like this:

(Max Temp Observerd+Min Temp Observed)/2-50°F=Growing Degree Day Value

Growing degree days for specific dates can then be added together to determine the cumulative growing degree day value for a certain period.

Growing degree day information can be useful for predicting when to plant or when to harvest certain crops. For example, if an abnormally warm spring caused plants to bloom early, growers could use growing degree day values to calculate how much earlier in the season the crop would be expected to be ready for harvest. Growing degree day information can also help predict the arrival of pests allowing crops and plants to be seeded when they are less likely to be around. For example, it is known that female Fletcher scales lay eggs beginning at growing degree day 171, and that their eggs hatch and crawlers are produced starting at growing degree day 310. By

calculating the growing degree day values as the year progresses, planters can manage the detrimental effects of the Fletcher scales and other pests.

There are many ways to obtain growing degree day information, and NOAA provides several avenues to access this information. Growing degree day Normals, or the average values over the past 30 years, are available through the National Climatic Data Center's 1981–2010 Normals Data Access page as well as through their Climate Data Online System. NOAA's Climate Prediction Center provides weekly growing degree day statistics specifically for corn crops, and seasonal growing degree day maps are available from NOAA's regional partner, the Midwestern Regional Climate Center. You can also obtain the daily temperatures for your location from Weather.gov to manually calculate the growing degree value for that day using the formula above.

Photo tip: Fletcher scale adult crawlers can cause black sooty mold growth on yew, arborvitae, and junpier trees and shrubs.

Photo Credit: Kansas Department of Agriculture

More Growing Degree Day Resources

The Ohio State University (OSU) has provided the following Growing Degree Day Phenology Calendar, listing common ornamental plants and pests. While the calendar is Ohio-specific (by zip code), the sequence holds across the region and might be of interest to neighboring states. **View the calendar here.** (Developed by Dr. Dan Herms of the OSU Department of Entomology).