Onset®

Growing Degree Days Assistant

For HOBOware® Pro Software

User's Guide

License Agreement

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About Data Assistants

Data assistants are plug-in utilities for HOBOware Pro. They let you create new data series by combining data recorded by the logger with additional data that you enter before you display the plot.

If your logger or datafile contains data that supports a data assistant, you will see a Data Assistants section at the bottom of the Plot Setup dialog. Select an assistant and click **Process** to continue.

For information about installing and managing data assistants, refer to the following page at the Onset web site:

http://www.onsetcomp.com/dataAssistants

Using the Growing Degree Days Assistant

The Growing Degree Days Assistant calculates growing degree days based on temperature data spanning at least one full calendar day (midnight to midnight). Growing degree days are used for agricultural and turf management applications, such as estimating harvest time or pest growth.

One growing degree day (GDD) is equivalent to a one degree increase above a minimum threshold temperature for a period of one day. For example, assuming no horizontal cutoff, if the minimum threshold temperature is 70°F and the temperature was a constant 85°F for the day, the GDD for that day is 15 GDD.

A single GDD value is calculated for each full calendar day of temperature data, and plotted at noon for that day. GDD values are cumulative; that is, the GDD for each day adds to the previous days' GDD value.

Important: Time of day is a factor in the GDD computation. When you launch a logger, be sure that your computer's clock is set to the proper time zone for the area where the logger will be deployed. If you try to correct it later by entering a different offset in the Plot Setup dialog, you may get confusing or misleading results.

Steps

To calculate GDD:

1. Read out a logger or open a datafile that contains data from a temperature sensor.
2. From the Plot Setup dialog, select **Growing Degree Days Assistant** and click **Process**.

The Growing Degree Days Assistant dialog will appear.

3. If your datafile includes multiple temperature series, choose the series you want to use from the drop-down list. (If your logger supports sensor locations, the location you entered will be displayed here.)

4. From the **Calculation Method** box, click to indicate the calculation method you want to use. See Calculation Methods below for more details
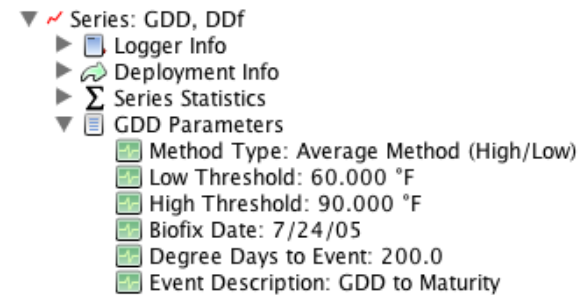
5. Select lower and upper **Development Thresholds**.
   These are the minimum and maximum thresholds that will be used in the GDD calculation. Use the sliders to set these thresholds, or enter the values manually. If the calculation method you chose does not use an upper threshold, the upper threshold option will be disabled.

   Temperatures are in degrees Fahrenheit if your default unit preference is US, and in degrees Celsius if your default unit preference is SI.

6. From the **Select Biofix Date** list, choose a date that marks the beginning of the development phase. The dates in this list are the full days contained in the datafile.

7. In **Degree Days to Event**, enter the number of degree days needed to reach an event of interest (harvest time, pest emergence, etc.). This will create an alarm line on the graph to indicate when the event took place. Degree days are in Fahrenheit (DDf) if your default unit preference is US, and in Celsius (DDc) if your default unit preference is SI.

8. Enter an optional **Event Description** to identify the event.

9. Keep the default **Resultant Series Name**, or enter a new one. You may also enter **User Notes** concerning the series you are creating.

   NOTE: Your settings are retained, so you do not need to re-enter these parameters each time you use the Growing Degree Days Assistant.

10. Click **Create New Series**. The new series is listed and selected in the Plot Setup dialog.

11. You can click **Process** on the Plot Setup dialog again to create another series using a different methods or parameters.

12. Click the **Plot** button. The settings you entered will be displayed in the Details pane of the plot.

▼ ~ Series: GDD, DDf
  ▶ 🗐 Logger Info
  ▶ 🔗 Deployment Info
  ▶ Σ Series Statistics
  ▼ 🗐 GDD Parameters
      🔲 Method Type: Average Method (High/Low)
      🔲 Low Threshold: 60.000 °F
      🔲 High Threshold: 90.000 °F
      🔲 Biofix Date: 7/24/05
      🔲 Degree Days to Event: 200.0
      🔲 Event Description: GDD to Maturity

Calculation Method

Average Method

Calculates the average of the high and low temperatures for the day (adjusted to the lower and upper thresholds, if necessary), then subtracts the low threshold to compute the GDD.

Single Triangle (no cutoff)

Uses the low and high daily temperatures to compute a set of two linear equations to generate a triangle. The area between the curve and the low threshold is then used to compute the GDD.

Single Triangle (horizontal cutoff)

Uses the low and high daily temperatures to compute a set of two linear equations to generate a triangle. Then it adjusts any temperatures above the upper threshold to the upper threshold. The remaining area between the curve and the low threshold is then used to compute the GDD.

Single Sine (no cutoff)

Uses the low and high daily temperatures to compute a sine wave that assumes the low temperature occurred at midnight and the high temperature occurred at noon. The area between the curve and the low threshold is then used to compute the GDD.

Single Sine (horizontal cutoff)

Uses the low and high daily temperatures to compute a sine wave that assumes the low temperature occurred at midnight and the high temperature occurred at noon. Then it adjusts any temperatures above the upper threshold to the upper threshold. The remaining area between the curve and the low threshold is then used to compute the

GDD.

Actual Temperature (no cutoff)

Uses the logging interval of the temperature data to perform a numerical integration. The area between the curve and the low threshold is used to compute the GDD.

Actual Temperature (horizontal cutoff)

Adjusts any temperatures above the upper threshold to the upper threshold. Then it uses the logging interval of the temperature data to perform a numerical integration. The area between the curve and the low threshold is then used to compute the GDD.

Actual Temperature (vertical cutoff)

Uses the logging interval of the temperature data to perform a numerical integration. Any interval in which the temperature exceeds the upper threshold is excluded from the calculation. The remaining area between the actual curve and the low threshold is then used to compute the GDD.