

The ThermoChron iButton - Miniaturized Temperature Recorders

Imagine a computer, clock and thermometer condensed into the size of a small battery, no larger than several nickels stuck together (Figure 1). Then, imagine that this object can record temperatures between -40°C to $+85^{\circ}\text{C}$ (-40°F to $+185^{\circ}\text{F}$) for more than 10 years or up to 1 million temperature measurements, whichever comes first. Set the price at around \$10 and you have the new DS 1921 ThermoChron iButton. Since this single-chip recording device is submersible, and resistant to dirt and impact it can be used to monitor most temperatures encountered in the nursery.

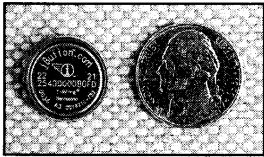


Figure 1

Placing an iButton into the Blue Dot receptor (a \$25 attachment to a PC) will instantly call up its history and allow it to be reprogrammed for future missions. Data is displayed in a temperature over time chart and in a histogram (figure 2) showing how many minutes the temperatures were out of the target temperature range that you define. The data can also be downloaded into a spreadsheet or right onto its own website (each button is web addressable).

One time period where reliable temperature data is critical for assessing stock quality is from harvesting to outplanting. For many seedlings this can be as long as 6 months. For example, an iButton could be placed into a tub of seedlings during lifting, remain with the seedlings through packing and then into long-term storage. Months later, after the seedlings have been moved from storage, transported to the outplanting site, a forester could remove the iButton. The temperature information could be downloaded on the spot or taken back to the office to print out a graph. The forester could immediately see how many total hours the seedlings were outside of a critical temperature range such as above 3°C (38°F) or below -3°C (27°F) and determine when this happened.

Another great aspect of this technology is that sensors can be quickly and easily downloaded at any point in time and then placed back into position for further recording. Any tampering with an iButton is recorded into its memory and detected electronically. The ThermoChron iButton is priced at \$10.00 each in quantities of 1,000. You might want to start with the ThermoChron iButton Evaluation Kit, which is available for \$25 from <www.iButton.com>. This kit includes an iButton, Blue Dot receptor, and mounting accessories. Downloadable evaluation software is available at no charge at that website.

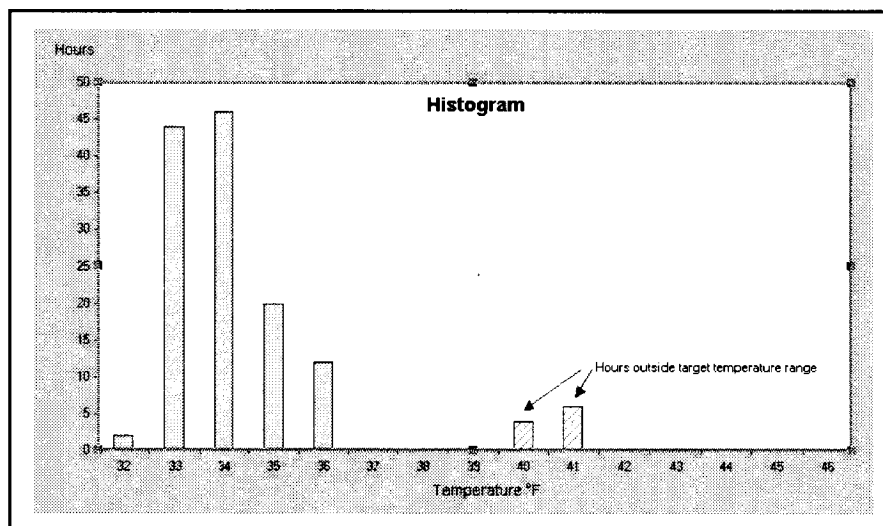


Figure 2