“What is a soil series,” with information on the five soil-forming factors, the State Soil of Vermont, and a link to the NRCS Official Series Descriptions website. A brief description of U.S. Soil Taxonomy is also included.

The Soils and Natural Communities report is considered a work-in-progress, with comments and suggestions for refinements being solicited and welcomed. It provides contact information for the State Soil Scientist and the Soil Resource Specialist to facilitate feedback.

The entire report is posted on the NRCS web-based Field Office Technical Guide. To access, go to the Vermont county locator map, http://efotg.nrcs.usda.gov/efotg_locator.aspx?map=VT, and select any county. Then select Section II. > A. Soils Information > 1. Statewide Soils Information in this folder where the Folder for the Soils of Vermont and Natural Communities report is located. An Adobe Acrobat report can also be requested from the author.

References

Soil Survey Staff. 1999. Soil taxonomy: A basic system for making and interpreting soil surveys. USDA-NRCS, Washington, DC.


Design of an Inexpensive Thermocouple-Based Soil Thermometer

Richard P. Faucett, Eric C. Brevik, and Stewart Crow

Soil temperature influences processes such as microbial activity, rates of organic material decay, soil chemical reactions, root activity, seed germination, and plant growth. Soil temperature is important in soil genesis as well and is often measured (Harrison, 1977; Mohanty et al., 1995; Jenkinson et al., 2002; Abu-Hamdeh, 2003; Reuter and Bell, 2003). Because of the importance of temperature in a number of soil processes, reliable means of ascertaining accurate soil temperatures are needed. Various companies such as Campbell Scientific (Logan, UT), Spectrum Technologies (Plainfield, IL), and Onset (Pocasset, MA) market soil temperature monitoring equipment, but the total cost of equipping a research site with these instruments can be beyond the reach of scientists working on modest budgets. An accurate, inexpensive and reliable soil thermometer would be useful for individuals with limited research funding.

Thermocouples are frequently used to measure soil temperature. Thermocouples consist of two wires of different metals that are joined at two ends. This results in a thermoelectric voltage that is generated by the difference in temperature between the ends and the reference junction. The thermocouple readings are recorded by a handheld instrument that reads the thermoelectric voltage and the temperature at the reference junction, and provides a temperature reading for the measuring junction. The relationship between voltage and temperature varies depending on the type of thermocouple (i.e., the two types of metal wires used).

The overall purpose of this project was to develop an inexpensive soil thermometer that would meet the basic needs of affordability, accuracy, and reliability. Eight prototype thermometers were designed and built using thermocouple wires and material available at a local hardware store. The thermometers

Fig. 1. The thermocouple

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