

Investigation Teams

Form three teams, each with two to six members. Each team will be responsible for measuring the soil temperature of one agroecosystem or subsystem. If there are more than about 18 students, a fourth group can be formed to study a fourth system.

Procedure

Data Collection

Choose a time in the middle of a sunny day for measuring soil temperatures, if possible. The measurements in the three systems should be done simultaneously. It is interesting and instructive to take two sets of measurements about 2 h apart to see how soil temperature varies with time—see “Variations and Further Study” section.

The following steps describe the procedure for sampling one system:

1. Randomly select 40 locations within the system at which to measure soil temperature. The method for choosing the locations can vary depending on the size of the system, the time available, and the desired degree of randomness. Two basic methods are outlined here:

Method A. Extend 10 m of a meter tape and lay it down diagonally through the system. Take temperature measurements every 25 cm along the tape.

Method B. Establish a baseline along one edge of the plot or bed. Randomly select five points along the baseline (i.e., by generating five random numbers in the 0–100 range, each of which corresponds to the number of decimeters from one end of a 10 m baseline). From each of the five points, run a transect some distance (e.g., 8 m) into the bed or plot, perpendicular to the baseline. Along each transect, take eight temperature measurements, at each of eight evenly spaced intervals (e.g., every meter along 8 m transects).

2. At each of the locations established in step 1, use a temperature probe to measure the temperature at the soil surface, 5 cm below the surface and 15 cm below the surface. In mulched systems, the soil surface is defined as the surface of the soil proper, not the surface of the mulch or the soil covering. Thus, the mulch or covering must be carefully removed or pushed aside to measure the temperature. Follow these guidelines for measuring temperatures:
 - a. To take surface readings, make sure the probe is in full contact with the soil, but not buried. A good way of ensuring this is to hold the probe nearly horizontal, with the tip touching the soil.
 - b. To measure below the surface, mark the correct depth of insertion on the probe with a piece of tape or a permanent marker.