

Data that can be collected with equipment/supplies available for Plant ecology Labs

Abiotic parameters

Soil bulk density and moisture content

soil corers

collection bags

drying oven

digital balances

Soil pH, nitrogen, phosphorus, potassium, particle composition

soil test kits

Soil and air temperature and humidity

thermometers, handheld weather station

Light availability

digital light meters

Biotic parameters

Tree and Shrub stem basal area

diameter tapes

50-m tapes and flag markers for delineating plot boundaries

Tree canopy density

densimeters

Herbaceous data - percent cover or biomass per m² or pre linear meter

50-m tapes

sampling quadrat frames

drying oven

collection bags

Plot/transect layout

Flag markers, flagging

Tapes

Compasses

Abiotic Data Collection Labs

Abiotic data that you will collect in this lab will consist largely of soil data, with some temperature and light data.

Temperature data should be fairly straightforward. Simply use a thermometer (there should be three digital soil thermometers available) to measure the temperature of the air and soil – in representative locations in your designated plots.

Light data also will be easy to collect. I have two very expensive light meters in my lab. You may use one of these for this lab – it measures light at a single point and in the portion of the spectrum used by plants for photosynthesis. This meter consists of a Li-Cor 190SA “quantum sensor” attached to a Li-Cor 250A meter. This instrument costs about \$650, so be careful. You should be able to record one or more light readings in your plots and then in the nearest opening that receives full sunlight, as a reference measurement to determine the degree of shading in your plot.

In addition to temperature, soil data will consist of bulk density and moisture content, pH, nitrogen, phosphorus, potassium, and particle composition. You also may measure organic matter content if you're really motivated.

To collect soil samples:

1. Push the sample collector (soil corer) into the soil to near the top of the elongated cut-out.
2. Measure the depth of the soil sample removed.
3. Record depth/length and diameter of sample.
4. Remove soil and place into tared (pre-weighed) paper bag.

Place this bag into a plastic ziploc or a second paper bag and seal.

BE SURE TO RECORD THE SAMPLE ID ON THE BAG, WITH A SHARPIE.

The bags should be weighed upon return to Harned to determine wet soil mass. They then should be placed into the drying oven to be re-weighed at least 24 hours later. These will be dried at approx. 105°C. The mass of the dried soil will be used to determine soil moisture, using the wet soil mass, and to determine soil bulk density, using the volume of soil collected.

Use the same collection procedure for collecting a soil sample for pH and nutrient analyses.

Those will be analyzed in the lab, using a LaMotte soil analysis kit (which should not leave the lab).

Misc. Soil Data

Plot	Sample Dimensions depth, dia: cm	Bag, tare g	Bag+ Wet Soil g	Wet Soil g	Bag+ Dry Soil g	Dry Soil g	% Water %	Bulk Density g/cm ³
_____	_____, _____	_____	_____	_____	_____	_____	_____	_____
_____	_____, _____	_____	_____	_____	_____	_____	_____	_____
_____	_____, _____	_____	_____	_____	_____	_____	_____	_____
_____	_____, _____	_____	_____	_____	_____	_____	_____	_____

Wet soil (g) = [Bag + Wet Soil] – Bag

Dry soil (g) = [Bag + Dry Soil] – Bag

% Water = [Wet Soil – Dry Soil] ÷ Wet Soil

Bulk Density = Dry Soil ÷ Soil volume ($\pi r^2 \times \text{depth}$)

Notes:

Soil pH, Nutrients, and particle composition

Specific instructions for the tests are included with the kit, which should not leave the lab.

Plot	pH	N	P	K	% sand	% silt	% clay
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____

Notes:

Temperature & Light

Plot	Soil Temp °C	Air Temp °C	Light, plot $\mu\text{mol m}^{-2} \text{s}^{-1}$	Light, reference $\mu\text{mol m}^{-2} \text{s}^{-1}$
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Notes: