

Soil Oriented Roughness Measurement Protocol

This document describes the method for measuring soil oriented roughness at National Wind Erosion Research Network sites.

Equipment needed in field:

- Magnetic compass
- Measuring tape (metric)
- Graduated 100 cm ruler
- Soil oriented roughness data collection sheet

In the field:

1. Soil oriented roughness measurements should be made at 27 locations across a network site. Sampling should be stratified by the site virtual grid cells (A through I; also used to stratify the MWAC samplers and soil survey). Three (3) soil oriented roughness measurements should be taken at random locations in each grid cell, producing a total of 27 samples.
2. Random locations for the soil oriented roughness measurements should be pre-determined using GIS software and uploaded to a GPS for finding the sample locations in the field. This will ensure true randomness in sampling, and that a record is kept of which locations have been sampled.
3. At exactly each sample location, measurements should be taken of: (i) the orientation (azimuth) of the soil ridges from the observer, (ii) the spacing (width) of the soil ridges, and (iii) the height of the soil ridges. If soil ridges have flattened tops, and/or if dykes are present between ridges, then the ridge top width and dyke spacing may also be measured.

Soil ridge azimuth:

1. Mark the sample location with a pin flag and lay the 100 cm height ruler (with 50 cm mark at the pin flag) perpendicular to the adjacent soil ridges to provide a reference/guide for the measurement area. Soil ridge azimuth will be considered only within this area.
2. Move three paces back from the sample location in a direction following the soil ridges.
3. Hold the magnetic compass horizontally in front of you and parallel with the soil ridges at the sample location, within the area defined by the width of the height ruler (i.e. 50 cm radius from the pin flag).
4. Read off the magnetic compass bearing and record on the data collection sheet next to the appropriate sample ID. Whole degree accuracy is adequate.

5. Note: sample IDs follow the convention of grid letter (A through I), O (designating an oriented roughness measurement), and sample number (1, 2, or 3). i.e. AO1, AO2, AO3, BO1...IO3.

Soil ridge spacing and height:

1. With the graduated 100 cm ruler placed at the sample point and perpendicular to the soil ridges, measure the spacing (length) between the visual centers of adjacent soil ridges to the nearest cm.
2. Record the soil ridge spacing on the data collection sheet next to the appropriate sample ID.
3. Measure the height from the visual center of the furrow between the soil ridges to the 100 cm ruler laying perpendicular across the ridge tops.
4. Record the ridge height measurement on the data collection sheet next to the appropriate sample ID.
5. If ridge tops are bedded (i.e. have a flatted seedbed), record the width of the bed top.
6. If furrow dykes are present, measure the distance between the centers of the closest adjacent dykes, parallel to the ridges.
7. Record ridge top width and distance between furrow dykes on the data collection sheet next to the appropriate sample ID.