

Describing soils: Calibration tool for teaching soil rupture resistance

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A new calibration tool was recently developed to help students and soil scientists calibrate their thumb and forefinger for the correct amount of pressure.

C.A. Seybold and colleagues, USDA-NRCS, Lincoln, NE, write about this new tool in the 2009 issue of *Journal of Natural Resources and Life Sciences Education*.

Rupture resistance is a measure of the strength of a soil to withstand an applied stress or resist deformation. In soil survey, during routine soil descriptions, rupture resistance is described for each horizon or layer in the soil profile. The current rupture resistance classes were developed from the qualitative consistence classes in the 1951 Soil Survey Manual and from studies that developed quantitative class limits. The lower portion of the rupture resistance classes are assigned based on the rupture force exerted between thumb and forefinger.

"The problem is that the tactile sense of the pressure can vary considerably between individuals," explains Seybold.

Here is how the new calibration tool works, according to Seybold. There are four pressure calibration tool assemblies measuring 8, 20, 40, and 80 N of applied pressure. The assemblies consist of a compression spring between two door-pulls (knobs) where the force exerted is calibrated using a top loading balance. Cap screws inserted into the door-pulls are adjusted so that the desired force is exerted just as the cap screws touch.

The cap screws differ in height for each assembly.

The calibration tools are demonstrated on how the combinations of spring/knobs are put together to get different rupture pressures. Manufactured or substitute fragments for natural soil fragments are described that can be used in the instruction of rupture resistance in the class room.

Seybold has discovered that, in soil survey, this tool has been effective in calibrating the finger-force range for rupture resistance class placement for the last two decades. The calibration tools have become a part of the tool set carried by field soil scientists for use when describing soils.

The full article is available for no charge for 30 days following the date of this summary. View the abstract at www.jnrlse.org/pdf/2009/E08-0011.pdf .

Source: Soil Science Society of America

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