



Impacts of soil moisture content on visual soil evaluation

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Visual Soil Examination and Evaluation (VSE) techniques offer tools for soil quality assessment. They involve the visual and tactile assessment of soil properties such as aggregate size and shape, porosity, redox morphology, soil colour and smell. An increasing body of research has demonstrated the reliability and utility of VSE techniques. However a number of limitations have been identified, including the potential impact of soil moisture variation during sampling. As part of a national survey of grassland soil quality in Ireland, an evaluation of the impact of soil moisture on two widely used VSE techniques was conducted. The techniques were Visual Evaluation of Soil Structure (VESS) (Guimarães et al., 2011) and Visual Soil Assessment (VSA) (Shepherd, 2009). Both generate summarising numeric scores that indicate soil structural quality, though employ different scoring mechanisms. The former requires the assessment of properties concurrently and the latter separately. Both methods were deployed on 20 sites across Ireland representing a range of soils. Additional samples were taken for soil volumetric water (θ) determination at 5-10 and 10-20 cm depth. No significant correlation was observed between θ 5-10 cm and either VSE technique. However, VESS scores were significantly related to θ 10-20 cm ($r_s = 0.40$, $\text{sig} = 0.02$) while VSA scores were not ($r_s = -0.33$, $\text{sig} = 0.06$). VESS and VSA scores can be grouped into quality classifications (good, moderate and poor). No significant mean difference was observed between θ 5-10 cm or θ 10-20 cm according to quality classification by either method. It was concluded that VESS scores may be affected by soil moisture variation while VSA appear unaffected. The different scoring mechanisms, where the separate assessment and scoring of individual properties employed by VSA, may limit soil moisture effects. However, moisture content appears not to affect overall structural quality classification by either method.

References

- Guimarães, R.M.C., Ball, B.C. & Tormena, C.A. 2011. Improvements in the visual evaluation of soil structure, *Soil Use and Management*, 27, 3: 395-403
- Shepherd, G.T. 2009. *Visual Soil Assessment. Field guide for pastoral grazing and cropping on flat to rolling country*. 2nd edn. Horizons regional council, New Zealand.