

PERFORMANCE OF THE VERIS NIR SPECTROPHOTOMETER FOR MAPPING SOIL C IN THE PALOUSE SOILS OF EASTERN WASHINGTON

Francis Pierce, Paul Carter

Washington State University

Eileen Perry

Dept. of Primary Industries, VIC, Australia

Stephen Young

University of Nebraska

Harold Collins

USDA-ARS, Prosser, WA

ABSTRACT

Recent advances in sensing technology have made measuring and mapping the dynamics of important soil properties that regulate carbon and nutrient budgets possible. The Veris Technologies (Salinas, KS) Near Infrared (NIR) Spectrometer is one of the first sensors available for collecting geo-referenced NIR soil spectra on-the-go. Field studies were conducted to evaluate the performance of the Veris NIR in wheat grown under both conventional and no-till management in the Palouse region of eastern Washington. Soil samples and reflectance spectra were collected at sites with a range of soil C from < 0.5% to 4%. Maps of soil C were constructed using predictive equations of estimated versus measured soil C with r^2 ranging from 0.79 to 0.97. The range of C values at each site was insufficient to produce an accurate prediction according to the cross validation results from partial least squares regression (PLS). Pooling the data across sites increased the range of C values and improved model validation. However, calibration based on a limited number of sites may not accurately translate to other areas in a region. Our results indicate that the Veris NIR is useful for spatial estimates of soil carbon, but additional research is needed to refine the methodology for field data collection.