Society Science

Soil Content Accurately Modeled Using Spectroscopy

Soil is the foundation of food production on the planet. Clay and organic carbon content of the soil are among the most influential factors in soil functions, productivity, and management. Current laboratory methods for studying clay and organic carbon are slow, highly uncertain, and expensive. Visible near-infrared spectroscopy has shown to be a powerful tool to detect and quantify molecules of interest in a sample.

In an article recently published in the *Soil Science Society of America Journal*, researchers report on a novel method of combinatory on-the-go spectroscopy and soil electrical conductivity measurements in agricultural fields as a substitute to soil sample collection and laboratory analysis. The team used multivariate regression methods to predict soil clay and organic carbon in soil using the rapidly obtained data. They found that although the uncontrolled spectral measurement environment in the field introduced a large amount of noise in the dataset, comprehensive spectral preprocessing and redundant variable removal could still lead to accurate models. Furthermore, it was shown that spectroscopy alone could provide the best results without the need for adding electrical conductivity data.

In addition to the practical applications in soil and agricultural studies, the results also have important implications for future sensor design, data processing, and soil modeling.


doi:10.2134/csa2019.64.S013

Stockpiling Warm-Season Forage Grasses

In the Southeastern U.S., extending the grazing season into late fall and early winter can potentially reduce costs associated with feeding beef cattle. Stockpiling warm-season perennial grasses is a management practice that can be implemented during this time period, ultimately generating quality feedstuffs and reducing supplementation or stored feed demand. To determine how this process might benefit producers in the Deep South, forage mass and nutritive value of commonly seeded bermudagrass and bahiagrass cultivars must be defined.

In a study conducted in east-central Mississippi and recently published in *Agronomy Journal*, researchers found that accumulation intervals (length of time forage was allowed to grow prior to the onset of grazing) between 60 and 90 days following a nitrogen application would generate the greatest amount of dry matter before the average frost date. In terms of forage nutritive value, crude protein concentrations are sufficient for most classes of beef cattle. However, energy supplementation may be necessary to meet the demands for specific classes of livestock, such as lactating beef cows.

Developing simple, cost-effective grazing management strategies that reduce the dependency on stored feed is key for beef cattle producers in the Southeast. This study shows that with favorable environmental conditions, the practice of stockpiling warm-season perennial grasses can provide adequate amounts of quality standing forage for extending the grazing season.

Adapted from Rushing, J.B., R.W. Lemus, and J.C. Lyles. 2019. Nitrogen fertilization and moderate accumulation intervals can maximize stockpiled warm-season forage grasses. *Agron. J.* 111. View the full article online at http://dx.doi.org/doi:10.2134/agronj2018.07.0461

Field trial location at the Coastal Plain Branch Experiment Station in Newton, MS. *Photo by Brett Rushing.*

doi:10.2134/csa2019.64.S003