

DOKTORSKÝ STUDIJNÍ PROGRAM/*DOCTORAL STUDY PROGRAM*

VYPSÁNÍ TÉMATU/*LISTING OF TOPIC*

Studijní program/*Study Program*: **Agricultural Specialization**

Studijní obor/*Branch of Study*: **Exploitation and Protection of Natural Resources**

Katedra/*Department of*: **Soil Science and Soil Protection**

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Forma studia/*Form of Study*: **Full_time**

Typ tématu/*Type of Theme*: Disposable

Téma/Topic: Prediction of soil properties using soil spectral libraries and spectra measured in the field

Hypotézy/*Hypotheses*:

- 1) It is possible to acquire field soil spectra in a way that as much as possible limits the effects of moisture and structure. Mathematical pre-processing of the spectra can further reduce the remaining disturbance effects.
- 2) Laboratory based soil spectral libraries can be used to build calibration models that are able to cost efficiently and accurately predict soil properties from spectra acquired in the field.

Anotace/Summary: Soil spectroscopy in the visible and near-infrared range (vis-NIR) has become a useful tool for fast estimation of soil properties. However, the spectra are usually measured in laboratory on collected, disturbed and dried soil samples under standard conditions. Direct field measurement of soil spectra could substantially increase the number of measurements compared to procedures when a laboratory is involved. Nevertheless, the field spectra measurement is influenced by solar radiation, soil moisture, soil structure, surface roughness and other disturbing factors. The objective of this thesis is to search a methodology for in-field point estimates of soil properties. Procedures to reduce the effect of soil moisture and other factors, including both technical and mathematical approaches, will be analysed. Transformation functions that would allow to use or adapt laboratory based soil spectral libraries for soil property prediction from field spectra will be tested. Major attention will be paid to soil organic carbon content. The results can be exploited on farm level in precision agriculture, in regional digital soil mapping, as well as in national soil monitoring networks.

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V/In Prague

dne/*Date*: 18.10.2018

Podpis/*Signature*: