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DRONE-BASED ASSESSMENT OF AUTUMNAL WINTER OILSEED RAPE GROWTH

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Winter oilseed rape (WOSR) is one of the major crops in Germany but proven to be a major contributor to N surpluses in cropping systems. The correlation between N uptake and the optimal N fertilization in WOSR (Henke et al., 2009) and the approach to characterize WOSR canopies via multispectral measurements (Müller et al., 2008) offer the possibility to enhance N management via multispectral-driven site-specific N fertilization (Pahlmann et al., 2017).

But it is specifically in the time period of interest (mid-November until early December) that data acquisition is difficult, if not impossible. The issues of area performance and risk of soil compaction due to high soil moisture limit the applicability of tractor-borne methods to collect multispectral data while satellite approaches depend on the cloud coverage. Recently advancing unmanned aerial vehicle (UAV) technology might close this gap. However, first of all it has to be tested if the currently available technology can reliably provide appropriate data.

In the autumn of 2017 and 2018 it was tested if UAV-based multispectral data (Sequoia camera by Parrot) from trials at the experimental station of Hohenschulen of the University of Kiel can be calibrated to fresh matter (FM) and shoot nitrogen (Nshoot) of WOSR and whether these calibrations are transferrable to predict autumnal WOSR growth on commercial farms in Northern Germany.

The advantages of drone-based data acquisition compared to the satellite-based (Sentinel-2) were further investigated by analysing the weather related time slots for data acquisition and by comparing the informative value of the existing UAV and satellite data.

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