

## ***Interactive comment on “Remote sensing of plant trait responses to field-based plant-soil feedback using UAV-based optical sensors” by Bob van der Meij et al.***

### **Anonymous Referee #1**

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The paper is well written and logically structured. A plant-soil feedback experiment inducing variation in the growth of *Avena sativa* (oat) is used for the development of a model predicting plant height biomass, N-content and chlorophyll content. The models (for each plant characteristic) were built using hyperspectral and DSM information derived from a UAV flight. The model was built from a calibration dataset and validated on a validation dataset derived from the same population. Only one UAV flight was executed around the time of maturation of the plants as mentioned by the authors. The model building is well described as is the effect on predicted values and the subsequent statistical analysis (Fig. 6). In the title ‘field-based plant soil feedback’ is mentioned but no real biological interpretation related to the preceding crop is

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given. This experiment was used to assess variability in plant characteristics as such I would omit this in the title and put 'Avena sativa' instead. The model building is well described. Further/Future improvements could be using a different flight, derived from a subsequent day, as a validation data set or use a bootstrapping method to find the best combinations of indexes or even use machine learning techniques based on the wavelengths. It is to be expected that there is a lot of redundancy to be found between the tested NDVI indices. Other combination of indices will perform as good or almost as good this could be discussed. Some minor issues are: - describe the RTK-GPS used: type, company, country - describe how plant height was measured e.g. from soil level to the tallest stretched leaf or. . . - p7136: the sentence is unclear, probably a word is missing - p9130: 'biophysical and biochemical oat plant constituents'. I would replace 'constituents' by 'characteristics' - p9134: F-values are reported except for N content, why? - p9135: the authors report that 'similar results' were found related to the F-values. If you compare the F-values, differences can be found resulting in a better post-hoc differentiation of the treatments. This is the case e.g. for fresh biomass: 4.93 vs. 24.58 or for Chl content: 11.10 versus 26.91. This should be more discussed. - p10127: '2008; ' - ' ; ' can be removed - Fig. 3: a colour legend of plant height should be added

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