Roll-out of online application for N sidedress recommendations in potato.

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Abstract: In the Netherlands the soil nitrogen supply and the crop nitrogen requirement varies widely from year to year and from field to field. For potato farmers sidedress systems based on physical measurements are available, however these systems neglect the spatial variation within fields. Based on 20 years of research [1,2] we developed a crop reflectance based N sidedress system for potatoes which overcomes this problem. Recently we implemented this system online as an application on a web-based portal called Akkerweb (http://www.akkerweb.nl), which allows for safe and easy storage of spatial and temporal soil, crop, climate and management data.

The N sidedress system consists of three parts. In the first part the farmer registers his potato fields, variety and planting date in a cropping scheme. The application uses the geographic location of the field to download temperature data of the nearest public weather station. The farmer enters the expected yield for the particular field. Then a logarithmic model calculates a target nitrogen content based on the expected yield and the temperature sum between planting date and crop sensing date.

The second part consists of uploading the spectral crop data in a sensor data application. The spectral data is measured with a tractor mounted sensor (Yara-N-sensor), satellite images (Sentinal-2) or UAV-images (Multispec4C). The spectral data contains a calculated Weighted Difference Vegetation Index (WDVI) [3]. The N sidedress system translates the WDVI into an aboveground N-uptake using a broken-stick model [1]. It then calculates the total N-uptake.

In the last part the system calculates for each spot within the field a recommendation, based on the derived target nitrogen content and N-uptake. Then the farmer can download a task map for his variable-rate application (VRA) of nitrogen.

Since 2014 we made a small group of farmers acquainted with this application. In participative projects we organized an entire workflow from measuring with tractor mounted sensors (a Yara-N-Sensor) to a N sidedress recommendation. The experiences from the farmers were divers, mainly due to two seasons of irregular weather patterns. Overall the application is appreciated by the farmers as an easy-to-use tool which provides good indications of the N-uptake and guidelines to deal with the natural variation in nitrogen uptake.

In 2016 field experiments were done to fine-tune the recommendation system, to enable recommendations on the basis of UAV-images [4] and to estimate the usefulness of several other near-by sensors. Recommendations by the user group enabled us to improve the user interface of the app.

In the oral presentation we elaborate more on the operation principles of the N sidedress system and the used models. We show our web-based portal, the background of the online N-sidedress application and the user-interface. Furthermore we present and evaluate some results from the farmers in terms of N-target (expected and realized targets), N-uptake and applied N-recommendations. We also show some results of the experiments in 2016.

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