

DEBBIE SPARKES, JENNIFER BUSSELL, SACHA MOONEY, MARTIN BROADLEY
University of Nottingham, School of Biosciences, UK – Loughborough, Leics LE12 5RD

UNDERSTANDING SOIL-PLANT INTERACTIONS TO IMPROVE SUGAR BEET PRODUCTIVITY

ABSTRACT

The British Beet Research Organisation (BBRO) has funded a five year programme of research at the University of Nottingham entitled 'Understanding soil-plant interactions to improve sugar beet productivity'. The programme comprises three inter-related work packages: 1) Evaluating and mitigating limitations to water uptake; 2) Identifying rooting traits for optimal nutrient uptake; 3) Improving establishment and early growth.

The first work package aims to understand how much water the crop can take up in non-limiting conditions and to explore the main limitations to water uptake from depth. Once these are established, we will explore how the limitations to water uptake can be mitigated.

The second work package aims to identify the optimum root structure of young sugar beet plants to facilitate nutrient uptake. We are working with a number of breeders to extend the range of genetic material examined and the eventual aim is to provide a screening tool, or genetic markers, that breeders can use to select for varieties with more efficient nutrient uptake.

The final work package aims to use soil physical properties at sowing to predict crop establishment. We have achieved this previously in winter wheat and are testing to see if the approach can be extended to sugar beet. In the first year we have measured a wide range of physical properties across a range of soil textures including: penetration resistance, shear vane, bulk density, temperature, moisture content and aggregate size. The aim is, over a number of years, to build, test and refine a model to predict establishment from soil properties at sowing. In the longer term, we hope to use this model to support grower decision making.

Recent results from the project will be outlined in the oral presentation.
