Geophysical Research Abstracts
Vol. 19, EGU2017-18991, 2017
EGU General Assembly 2017


# Do root traits affect a plant's ability to influence soil erosion?

Emma Burak, John Quinton, and Ian Dodd
United Kingdom (b.burak@lancaster.ac.uk)

With the ever increasing global population the agricultural sector is put under increasing pressure. This pressure is imposed on the soil and results in wide spread degradation that ultimately decreases productivity. Soil erosion is one of the main features of this degradation. Much focus has been put on the ability of plant canopies to mitigate soil erosion but little research has assessed the impact of below ground biomass. It is understood that woody roots reinforce slopes and lateral roots are believed to support the soil surface but the impact of root hairs is completely unknown.
This study used two root hairless mutants one of barley (brb) and one of maize (rth3) along with their wild types (WT) to assess the capacity of different root traits to bind soil particles to the root system, creating a physical coating called a rhizosheath. The two genotypes were grown in a clay loam and periodically harvested during vegetative development. Rhizosheath weight was used to measure the ability of the root system to effectively bind soil particles, while root length was measured to standardise the results between genotypes.
Overall, rhizosheath weight increased linearly with root length. When compared to WT plants of the same age, the root length of brb was, on average, 37% greater, suggesting that they compensated for the absence of root hairs by proliferating lateral roots. However, WT plants were far superior at binding soil particles as the rhizosheath weights were 5 fold greater, when expressed per unit root length. Thus root hairs are more important in binding soil particles than lateral roots. Whether these genotypic differences in root traits affect soil erosion will be assessed using mesocosm and field trials.
Keywords: Soil erosion, Roots, Barley, Rhizosheath