Carbon sequestration potential of legume based cropping systems

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Introduction

Cropping systems that have the potential to increase soil organic carbon and provide a range of ecosystem services (e.g., N inputs through biological nitrogen fixation) play an important role in ensuring sustainable food and feed production. However, there is a lack of comprehensive studies on legume-based cropping systems and intercropping effect on legume-cereal C inputs via phyllo- and rhizodeposition (ClvPR).

Materials and methods

A field experiment with $^{13}CO_2$ enriched atmosphere labeling-cylinders was conducted with faba bean, pea, spring barley and intercropped pea and spring barley to investigate how plant C inputs into the soil in deep layers (1 m) are affected in relation to the selected species monocrop x intercropping.

Preliminary conclusions

Faba bean shows promising potential for increased biomass production and deeper rooting in the soil profile, when compared to intercropped, as well as spring barley monocrop.

Preliminary results and discussion

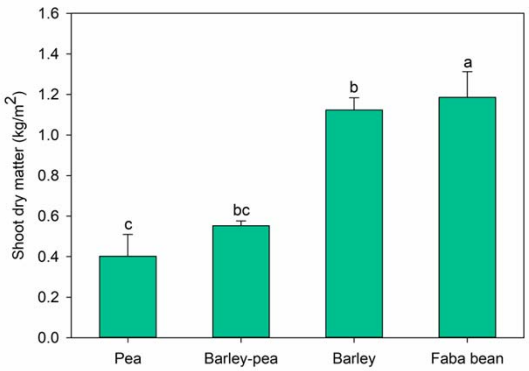

Figure 1. Average shoot dry matter (kg/m^2).

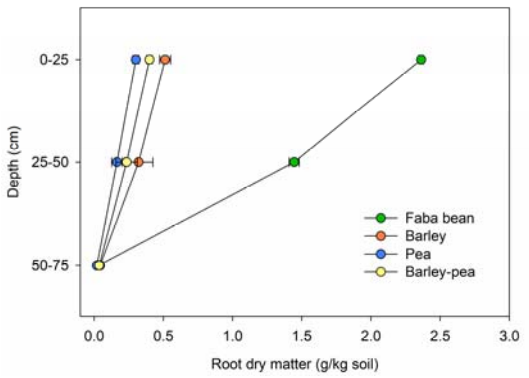

Figure 2. Average root dry matter (g/kg soil) in 0-75 cm soil depth.

Preliminary findings have demonstrated a significant higher biomass production in both aboveground and belowground of faba bean compared to the other crops and intercropping. However, comprehensive data on C allocation and how grain legumes contribute to the quantity of C input into the soil through phyllo- and rhizodeposition (qClvPR) are still lacking.