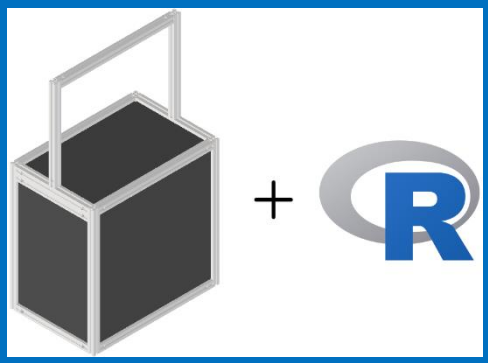
ETH zürich

Molecular Plant Breeding



Bachelor thesis project

Assessing tiller density of intensively managed grassland

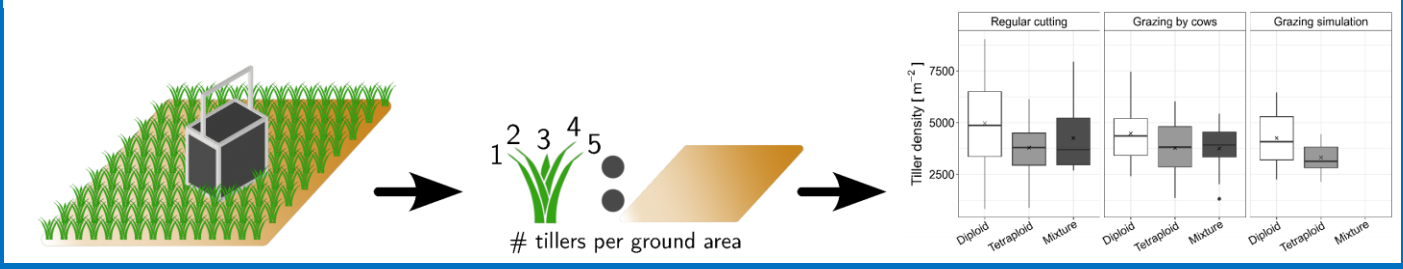
Background

Perennial ryegrass (*Lolium perenne* L.) is an important grass species in temperate regions thanks to its high forage quality and its high productivity. To maintain this productivity over time, high persistence is key. Tiller density is a trait strongly associated with persistence and is traditionally measured by manually counting tillers in swards. Even though this method is still considered state-of-the-art, it is intensive in labour and time. Therefore, a reliable high-throughput method would be highly valuable. We developed such a method by using a self-designed 'Tillerbox'. The 'Tillerbox' is a portable, waist-high box containing a camera, enabling both standardised conditions and measurements independent of weather conditions.

Objective and Research Approach

The main objective of this project is to analyse tiller densities of perennial ryegrass depending on the management type, the ploidy, and the cultivar.

The basis of this project is a field experiment at two farms in Switzerland. At both locations, diploid and tetraploid perennial ryegrass cultivars were sown in single-cultivar swards and in mixtures of two cultivars. The swards were managed under regular cutting, grazing simulation, and grazing by cows and defoliated five, eight, and seven to nine (according to the practice of the farmers) times per year, respectively. In each of the field plots, images were taken using the 'Tillerbox'. The student will annotate tillers on these images. The generated data of tiller densities will then be statistically analysed using the programming language R. The project will allow the student to get familiar with R and statistical analyses, profiting from strong support.



You will learn

You will learn skills in **image annotation, experimental design, and statistical analysis**. You will increase your **understanding of agronomical traits of grasses**. Additionally, you will also learn to **work in a group** of researchers.

We are looking for

This project is suitable for a Bachelor's student with an interest in plant breeding and statistical analysis. The work will take place at **ETH Zurich Zentrum** and **remotely**.

Contact

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