

2 MSc theses at FiBL Plant Breeding Group

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| Title | Analysis of competition and facilitation effects in a mixed crop-plant-community | Biological and physical control of anthracnose disease in lupin |
| Context | Plant teams of two or more crops provide an alternative to mono-crops in terms of yield stability and ecological intensification due to complementarities among the associated crops. Each crop species is not only interacting with its companion species but also with the surrounding weed flora. Especially within the pea gene-pool, a vast morphological diversity exists, which adds another layer of interaction to the setup. | The high protein content and low nutrient requirements of white lupins (<i>Lupinus albus</i>) make them a suitable local alternative to soy imports. However, lupin cultivation is severely impaired by a disease called anthracnose, caused by the seed-borne fungus <i>Colletotrichum lupini</i> . Developing effective and sustainable seed treatments is an important means to re-introduce white lupin into European farming systems. |
| Objectives | <ol style="list-style-type: none"> 1. Describe and analyse the facilitative and competitive interaction in a set of pea and barley genotypes 2. Describe and analyse the interaction of the crop with its accompanying weed flora | <ol style="list-style-type: none"> 1. <i>In vitro</i> screen of potential antagonists for their activity against <i>C. lupini</i> 2. Assess promising biological and physical treatments under controlled and field conditions |
| Methods | <ul style="list-style-type: none"> • Field assessments of competitive and facilitative traits: <ul style="list-style-type: none"> ○ plant biomass and density ○ plant morphology traits ○ yield components • weed species composition • Analysis of interrelatedness of competition/facilitation-traits with yield and their plasticity | <ul style="list-style-type: none"> • Microbial dual-plate assays (culture-based techniques) • Plant inoculation of microbial antagonists • Quantitative real-time PCR (molecular techniques) • Light microscopy • Disease assessments |
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