

Master thesis BIOVIT 2022/2023

**Title (English): Functional validation of candidate genes involved in stem elongation in red clover (*Trifolium pratensis* L.)**

The timing of stem elongation is an important biological marker for flowering progression in the Leguminosae. A comprehensive genotype by sequencing study has been performed using red clover which uncovered several candidate genes that might be controlling stem elongation and timing of flowering (Ergon 2022, in review). The candidate genes include, among others, homologues of genes involved in the response to vernalization and in the autonomous and photoperiodic regulation of flowering in other species. The same study also revealed a set of genes probably involved in cell wall dynamics and organ elongation that could have high biotechnological potential in plant breeding.

This project proposes to functional validate the candidate genes by analysing their expression at different abiotic conditions (light, temperature and photoperiod) in different organs and stages of development. Some of the more promising genes will be functionally validated *in planta* using *Medicago truncatula*, the legume model species. Technically, the project will involve the use of bioinformatic tools, RNA extraction, expression analysis by qPCR, plant phenotype evaluation, cloning, embryogenic callus culture and plant transformation using *Agrobacterium*.

**Type of thesis work:** laboratory work, literature study

**Subject area:** Plant science, molecular biology

**Language thesis:** English

**Credits:** 60 ETC

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