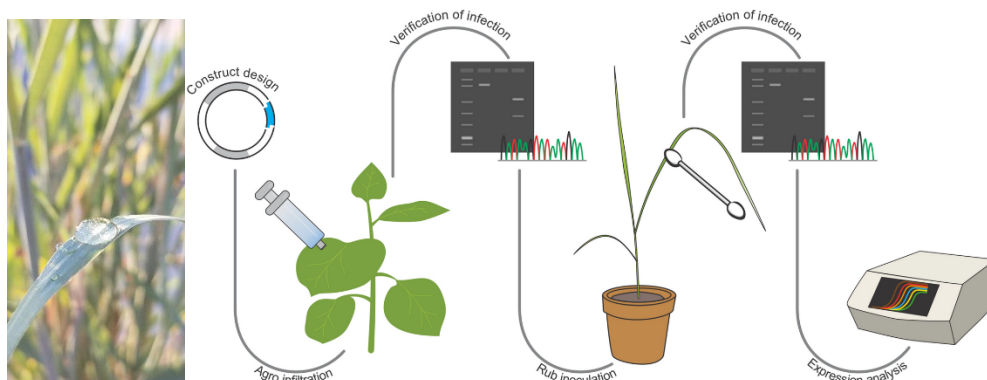# Genetic engineering for future-proof crops

As our climate changes, we need to prepare our crops to survive in a dryer environment. One way to do so is by finding and activating genes that can help the plants to deal with less water. The bioenergy crop switchgrass (*Panicum virgatum*) is an interesting species to study this problem, because it has two contrasting ecotypes of which only one can survive longer periods of drought. We have already found some interesting genes that are activated in the more resistant ecotype during drought and now we are trying to identify the function of those genes.

In this project, you will use Virus-Induced Gene Silencing (VIGS) to knock-down some of those genes in switchgrass and then observe the effects of this gene manipulation.

Methods:

While you grow switchgrass in the greenhouse, you will apply molecular tools to design a viral construct, which you will eventually use to transform your plants. After successful infection with your viral construct, you will monitor the plants to see if they become less drought tolerant. Experience with basic molecular methods (PCR, cloning, etc.) is an advantage.

Further reading:

Tiedge *et al.* (2022). Foxtail mosaic virus-induced gene silencing (VIGS) in switchgrass (*Panicum virgatum* L.). *Plant Methods*, doi: 10.1186/s13007-022-00903-0

Tiedge *et al.* (2022). Comparative transcriptomics and metabolomics reveal specialized metabolite drought stress responses in switchgrass (*Panicum virgatum* L.). *New Phyt*, doi: 10.1111/nph.18443

Staff member:	Kira Tiedge		**Contact:**	k.j.tiedge@rug.nl
Daily supervisor:	Kira Tiedge		**Contact:**	k.j.tiedge@rug.nl
Expertise group:	GREEN			

Type of project:	☐ Bioinformatics	☐ Fieldwork	☒ Laboratory	☐ Theoretical	☒ Data analysis
MSc program:	☒ Biology	☒ Ecology and Evolution		☐ Marine Biology	
	☐ Biomedical Sciences	☐ Behavioural and Cognitive Neurosciences			

ECTS:	☐ 30 ☒ 40	**Language:**	☐ Dutch ☒ English

Start date: Flexible   **Location:** Linnaeusborg