



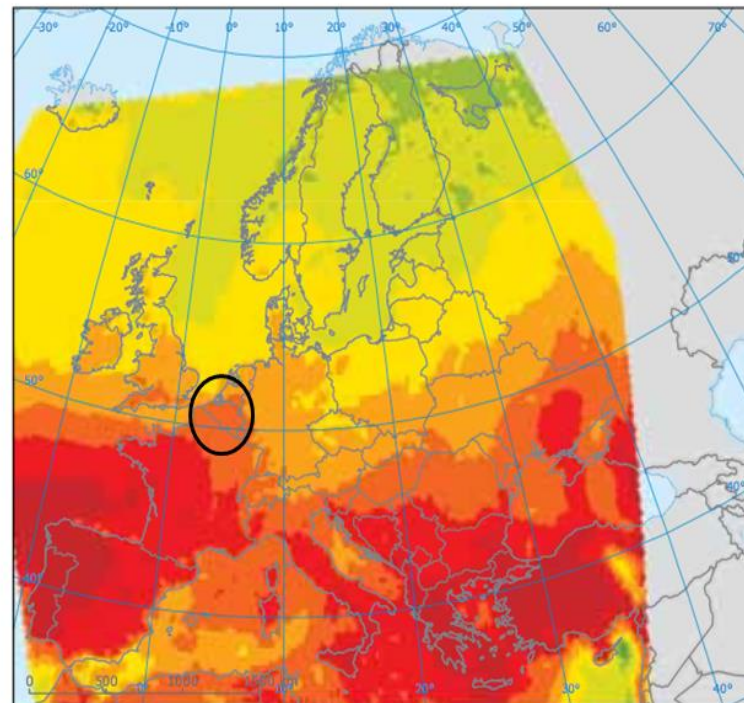
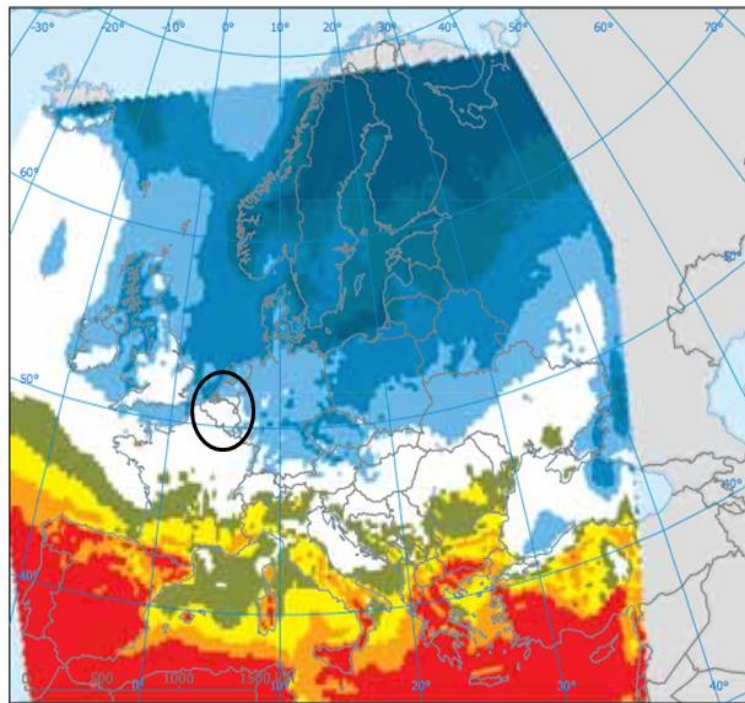
Root system responses of *D. glomerata* and *M. sativa* to water stress in pure or mixed stands

04 February 2019

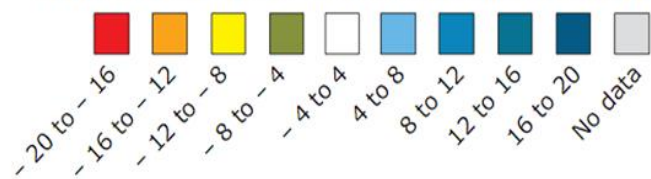
Benoît Destrée

Supervisors: Xavier Draye and Mathieu Javaux

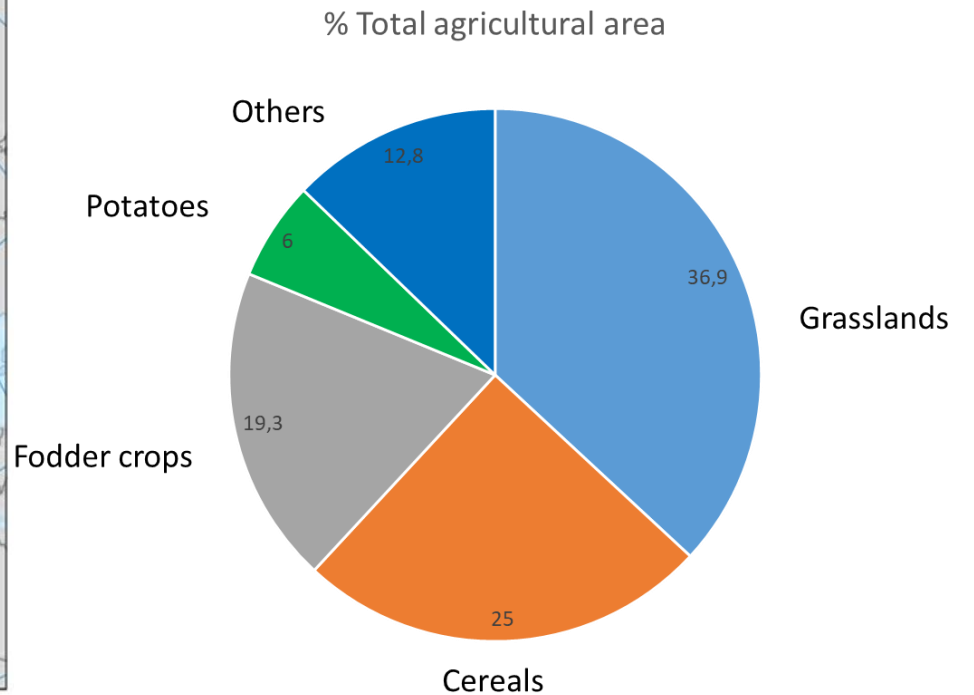
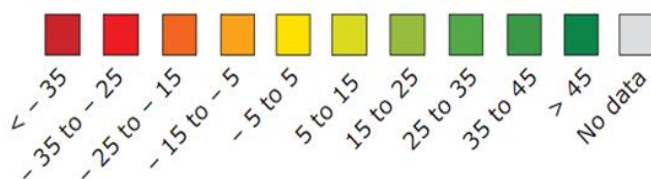
Map 2.6 Projected changes in annual (left) and summer (right) precipitation (%) between 1961–1990 and 2071–2100



Projected changes in in annual precipitation (%)



Projected changes in in summer precipitation (%)

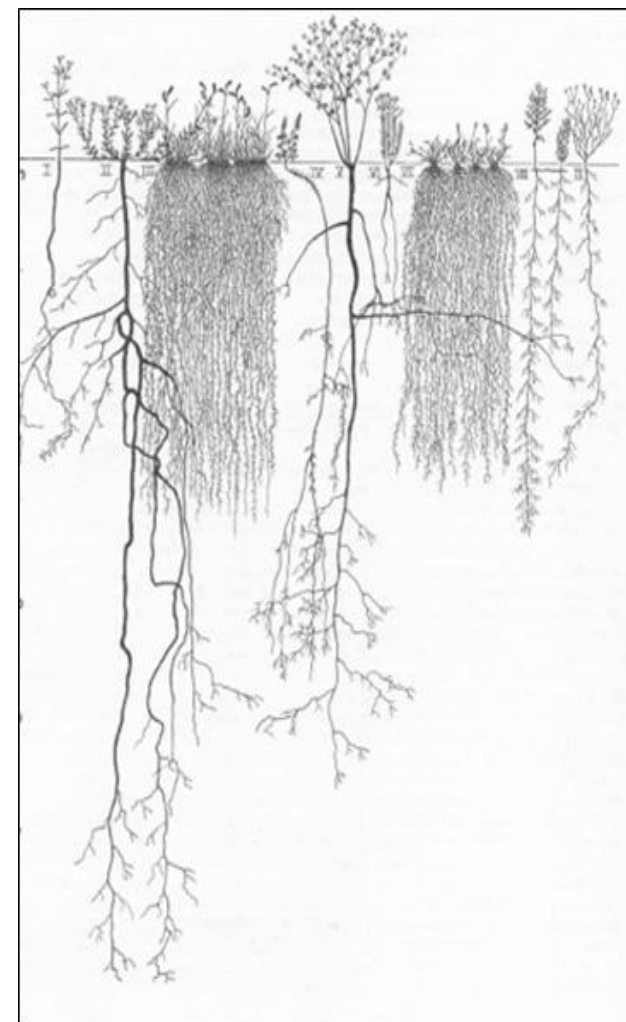




ForDrought Project

- Since 2012
- Improving forage cropping systems to face climate warming

- Observe the root systems of dactylis and alfalfa in pure and mixed stands
- Analyse the root response of the plants when facing a water deficit
- Assess impacts on the yield



Stressed plots

Dactylis

Alfalfa

Mix:
Dactylis +
Alfalfa

Control plots

Dactylis

Alfalfa

Mix:
Dactylis +
Alfalfa





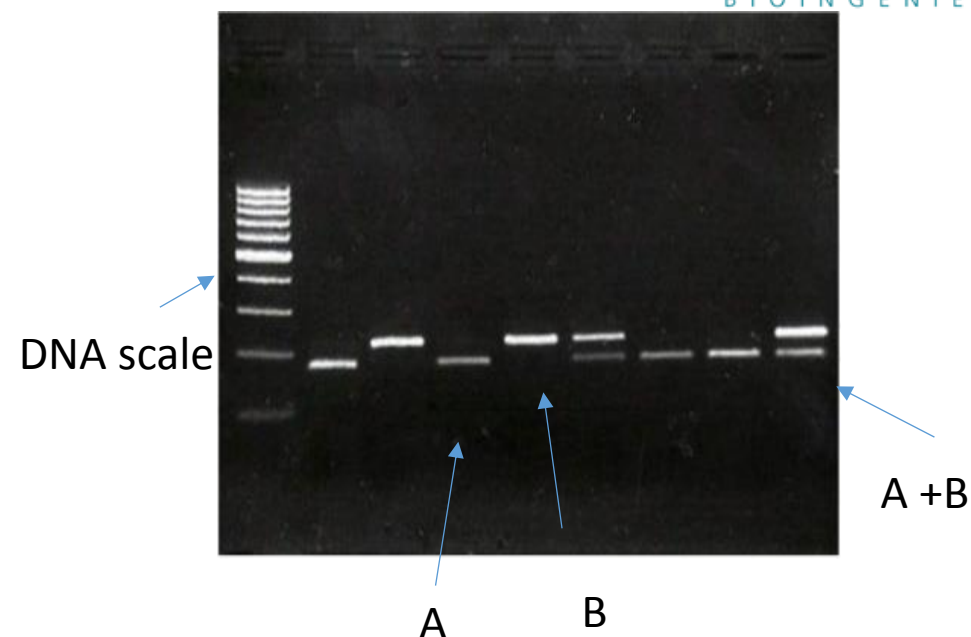
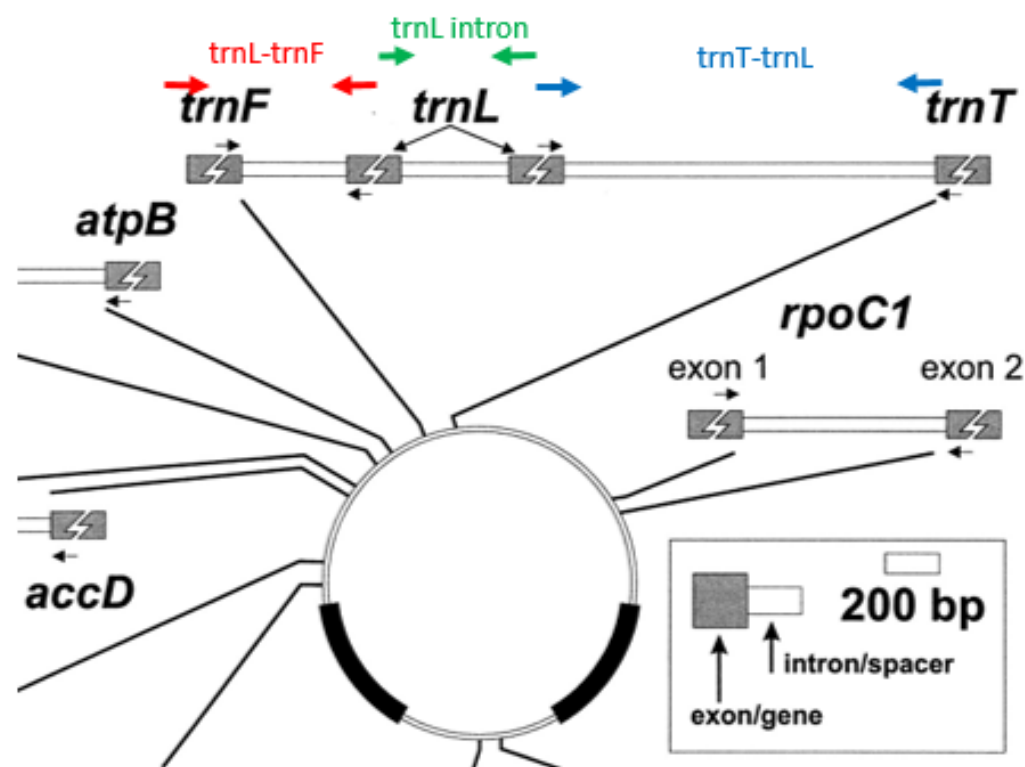
Horizontal sampling



Vertical sampling



Genetic analysis



	<i>trnT-trnL</i>	<i>trnL-intron</i>	<i>trnL-trnF</i>
<i>M. sativa</i>	-	422,9	221,0
<i>D. glomerata</i>	865,0	613,3	432,7



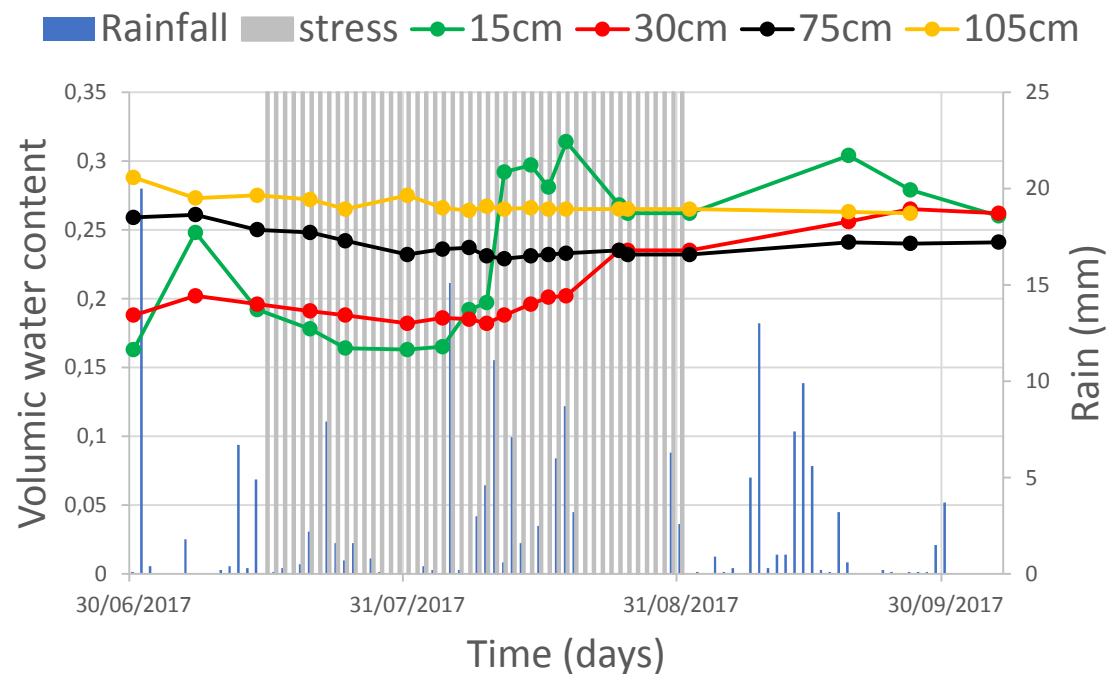
Important compaction > 30cm
Ploughpan

Border between the ploughpan and loess

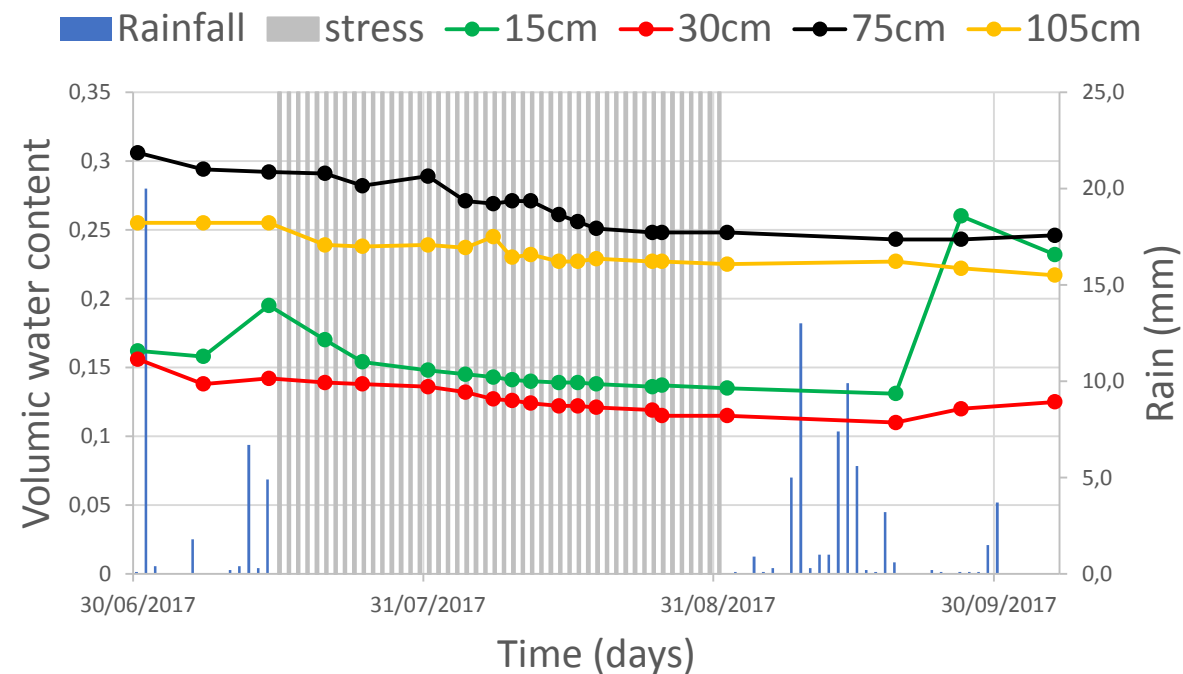
Loess horizon between 35 and 75cm

Border between loess and soil parent material

Parent material



Control plots



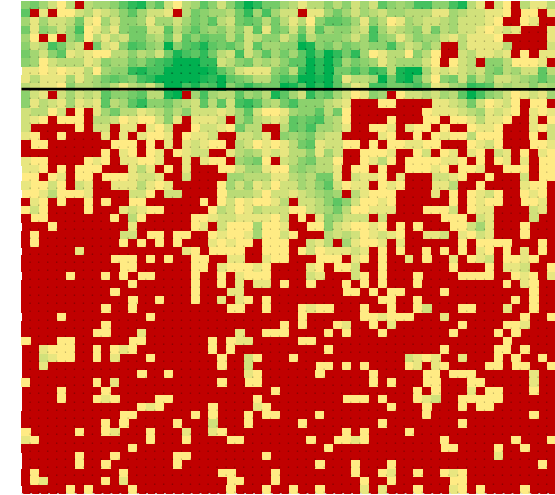
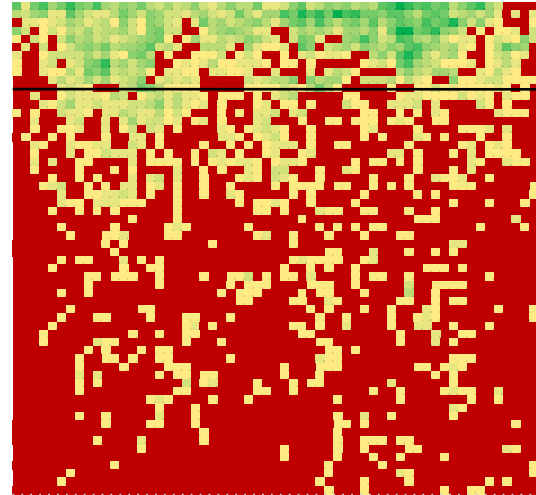
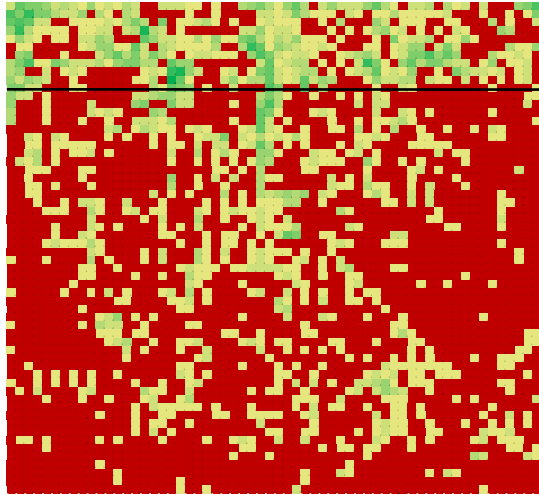
Stressed plots

Alfalfa

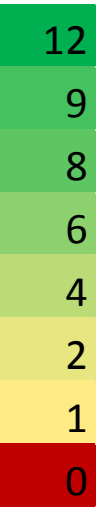
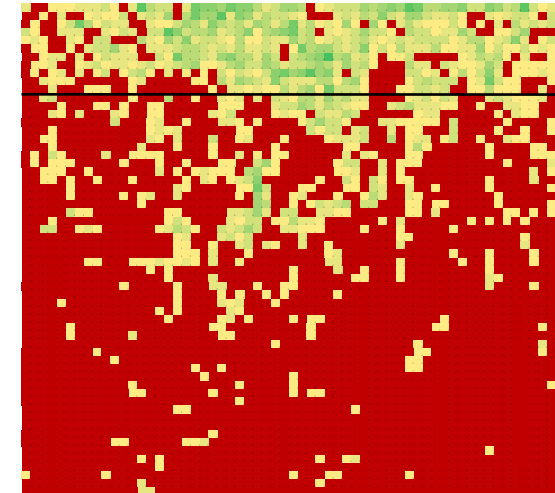
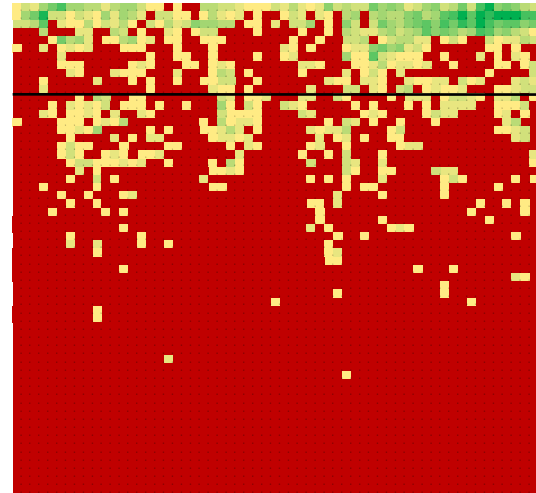
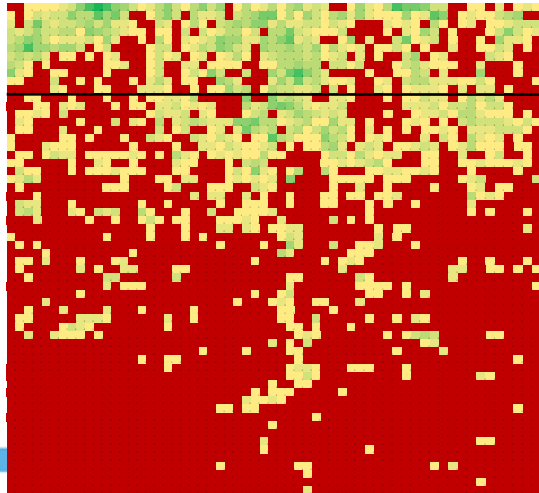
Dactylis

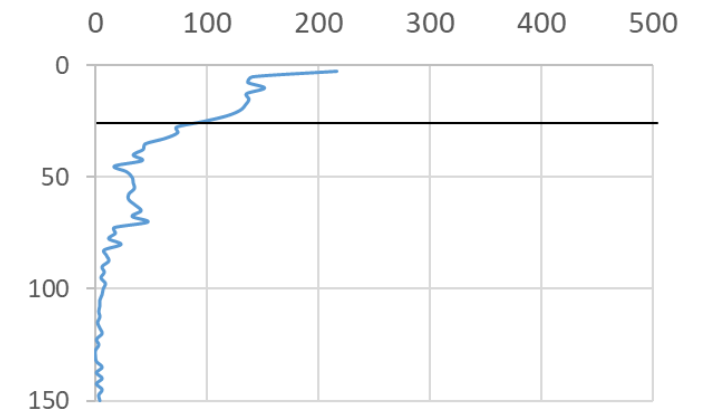
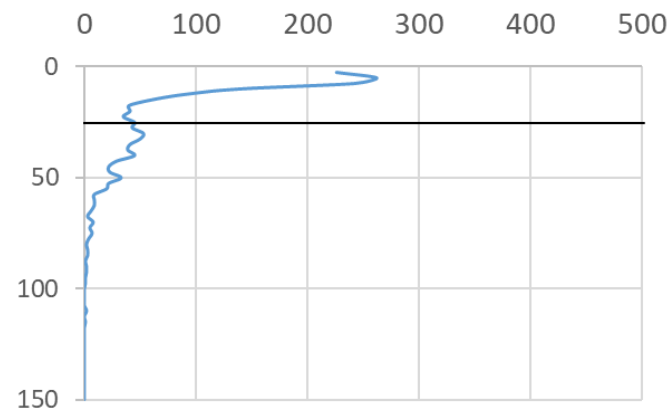
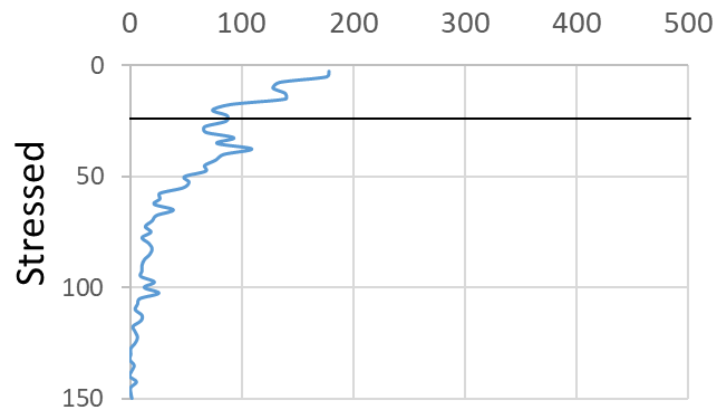
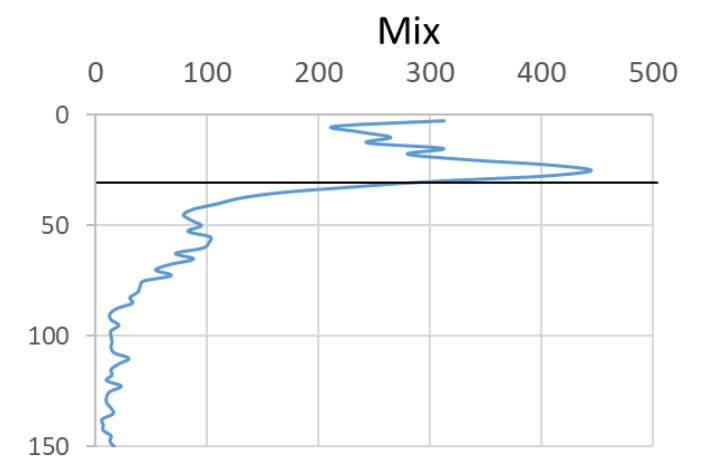
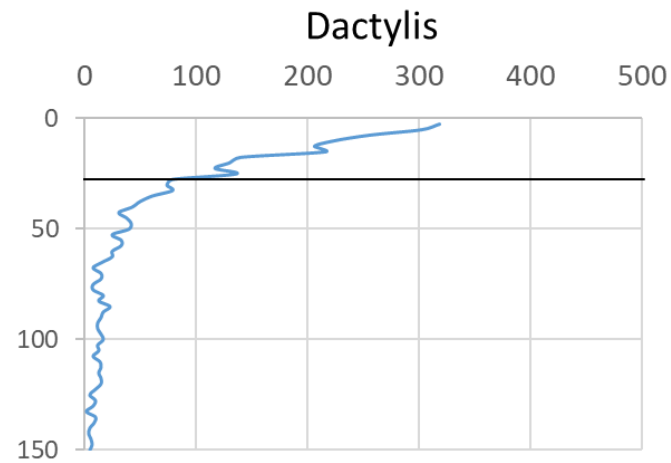
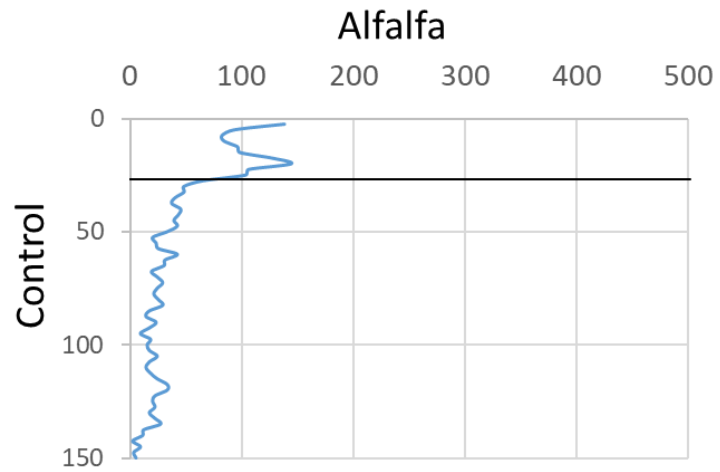
Mix

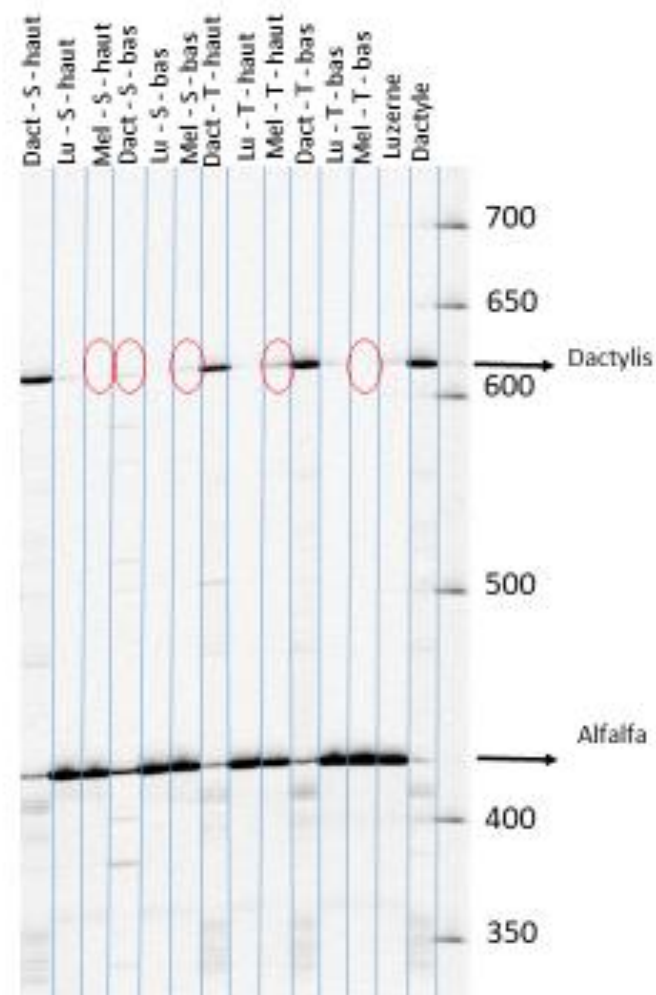
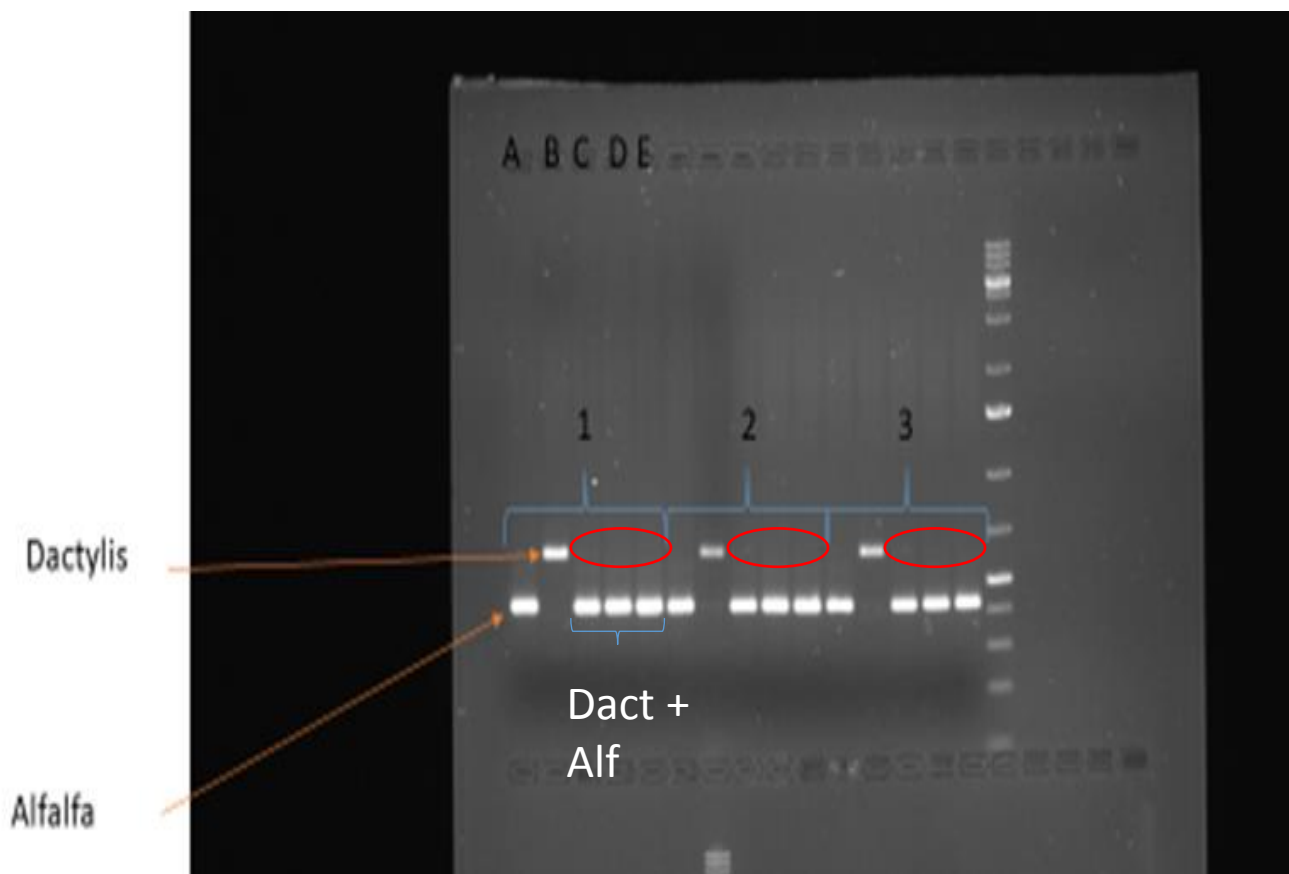
Control

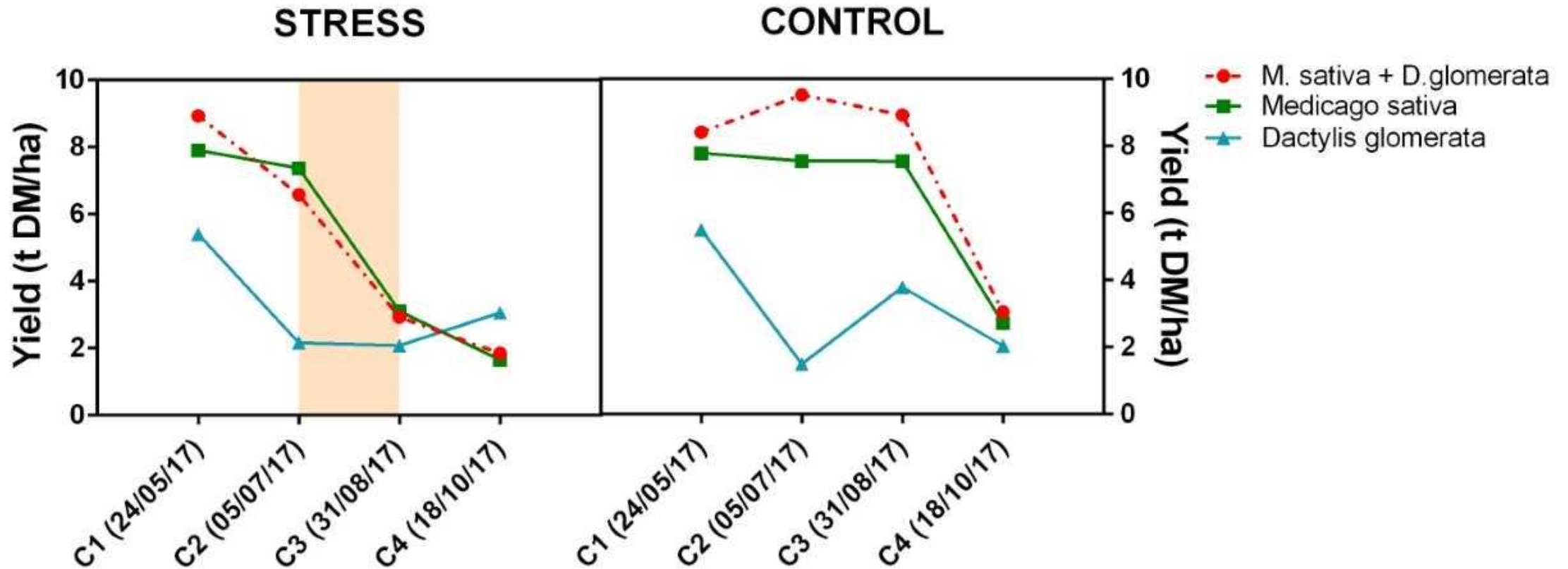


Stressed









Root counts

- Stress → dactylis and mix show decrease but alfalfa shows increase
- Association → more roots than pure stands

Genetic analysis

- Dactylis undetectable in association samples
- Alfalfa present at all depths in both treatments

Yields

- Stress → yield decreases
- Association → less clear effect

Enhance methods of genetic analysis

Use models to determine the distribution of roots
(in fact anything that could avoid having to dig pits)

Correlate the data with the TDR in order to better
understand the boundaries of the stress



