Transcriptome and ecophysiological data of Populus nigra genotypes during drought stress

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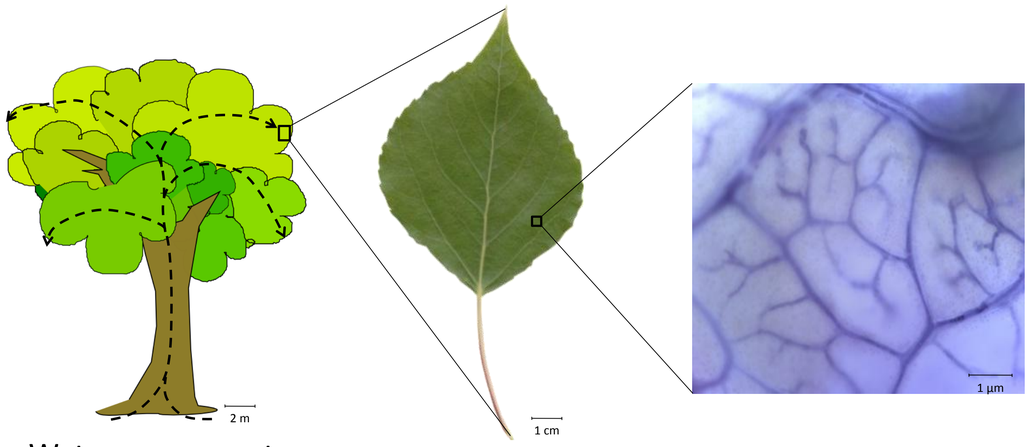
Issue

Global warming

Increase of drought in progress…



Water movement in well-watered *Populus nigra*

Leaf

Vascular tissues

Questions

Do poplars responses to drought stress depend on plasticity?

Is the leaf transcriptome modified by drought treatment?

Experimental design

Explained variables					
Phenotypes			**Transcriptome**		
V1	…	V133	V1	…	V73013

Explanatory variables		
2 levels	6 levels	4 levels
Treatment	**Genotype**	**Biological repetition**
WD	SPM-28	R1
WD	SPM-28	R2
WD	SPM-28	R3
WD	SPM-28	R4
WD	SPM-40	R1
WD	SPM-40	R2
WD	SPM-40	R3
WD	SPM-40	R4
WD	STR-10	R1
WD	STR-10	R2
WD	STR-10	R3
WD	STR-10	R4
WD	ERS-05	R1
WD	ERS-05	R2
WD	ERS-05	R3
WD	ERS-05	R4
WD	SPM-12	R1
WD	SPM-12	R2
WD	SPM-12	R3
WD	SPM-12	R4
WD	ALL-29	R1
WD	ALL-29	R2
WD	ALL-29	R3
WD	ALL-29	R4
WW	SPM-28	R1
WW	SPM-28	R2
WW	SPM-28	R3
WW	SPM-28	R4
WW	SPM-40	R1
WW	SPM-40	R2
WW	SPM-40	R3
WW	SPM-40	R4
WW	STR-10	R1
WW	STR-10	R2
WW	STR-10	R3
WW	STR-10	R4
WW	ERS-05	R1
WW	ERS-05	R2
WW	ERS-05	R3
WW	ERS-05	R4
WW	SPM-12	R1
WW	SPM-12	R2
WW	SPM-12	R3
WW	SPM-12	R4
WW	ALL-29	R1
WW	ALL-29	R2
WW	ALL-29	R3
WW	ALL-29	R4
		n = 48

WD Water Deficit

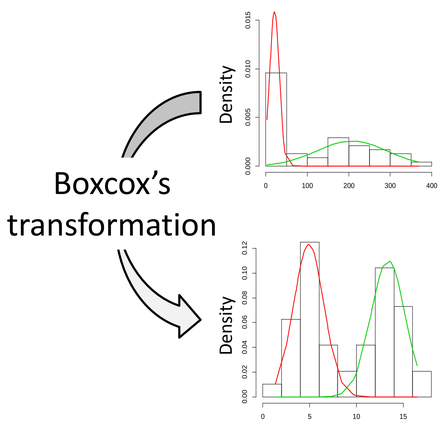
WW Well-Watered

Statistical analysis

Placticity response to drought

Phenotypic data

Normalisation



Boxcox's transformation

Shapiro-Wilk's test

Homoscedasticity

Levene's test

Selection of variables

Genotype effect
ANOVA 2

Statistic choice

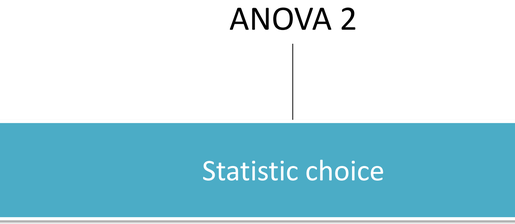
$$CV = \frac{\mu}{\sigma}$$

	SPM-28	SPM-40	STR-10	ERS-05	SPM-12	ALL-29
V1						
…						
Vx						

CV matrix

Clustering

Ascendant Hierarchical Clustering
Distance: euclidian
Contrast: Ward



Leaf transcriptome in drought

Transcriptional data

RNAseq paired-end

47 samples
30 M sequences/sample
1,5 MM sequences

Cleaning

Filtered reads 7%

N
AAAA
< 60 pb
> 30% redundancy
contaminants

PIAFdb

geno toul bioinfo

Mapping

Reference transcriptome
Populus trichocarpa
73013

Populus nigra
leaf
47739

Treatment impact on transcription

```
> library("DESeq2")
```

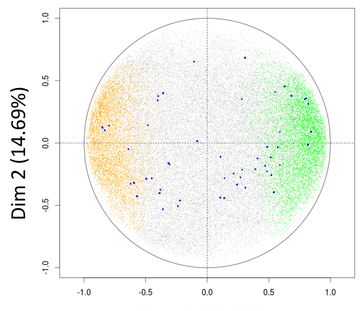
Wald's statistic
False Discovery Rate 0.1‰

Multivariate analysis

Principal Component Analysis

29214 non-differential

8836 down

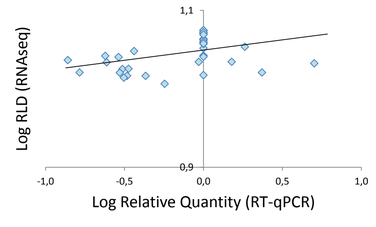


9689 up

Target transcripts = aquaporins

Validation of aquaporins expression

Pearson's correlation



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