

# Transcriptional activity of genes involved in the metabolism of abscisic acid in *Quercus robur* L. under drought conditions

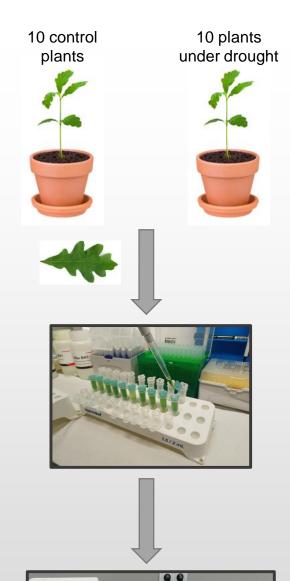
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#### The aim of the study:

Evaluation of the transcriptional activity of genes involved in the abscisic acid metabolism in *Quercus robur* L. under soil drought conditions



 Q. robur seedlings were divided into two groups of 10 plants each: control (75-80% moisture-holding capacity – MHC) and drought (8-12% MHC)

(2) Sampling of leaf blades after 2 weeks

3 RNA extraction with DNase treatment

Evaluation of the quantity and quality of RNA

(4) Preparation of the sequencing library

5 Nanopore RNA-sequencing on a MinION device

> Base calling and read mapping with the Dorado software

#### **Results:**

the **ZEP** (zeaxanthin epoxidase) gene family exhibited high transcriptional activity in control group, particularly ZEP\_LOC126725331 and ZEP\_LOC126732772, with notable decrease under drought stress

- NCED1 and NCED2 (9-cis-epoxycarotenoid dioxygenase) showed low transcriptional activity in both groups
- the oxidation-stage enzymes **SDR** (short-chain dehydrogenase/reductase) and AAO (abscisicaldehyde oxidase) demonstrated generally low expression levels, though **AAO** activity was nearly two-fold higher under drought conditions
- **ABA-GT** (abscisate beta-glucosyltransferase) genes displayed enhanced activity during drought
- CYP707A1/2 (abscisic acid 8'-hydroxylase) remained weakly expressed in both conditions
- among ABA receptors, only PYL2\_LOC126725188 showed increased transcriptional activity under drought

			7ED LOC126725221
	0.78	0.53	ZEP_L0C120/25551
	0.72	0.29	ZEP_LOC126732772
-0.6	0.05	0.03	ZEP_LOC126724113 AFPOS
	0.01	0.00	ZEP_LOC126706033
-0.4	0.00	0.04	NCED1_LOC126720850
	0.02	0.01	NCED2_LOC126726468
-0.2	0.00	0.00	SDR2a_LOC126692492
-0.2	0.00	0.00	SDR3b_LOC126710080
	0.00	0.00	SDR-ATA1_LOC126719540
-0	0.08	0.03	SDR2b_LOC126725185
	0.20	0.11	MCSU_LOC126720689
	0.06	0.11	AAO_LOC126724408
	0.00	0.08	ABA-GT_LOC126705854
	0.08	0.08	ABA-GT_LOC126705735
	0.01	0.02	ABA-GT_LOC126706495
	0.03	0.03	CYP707A1_LOC126710634
	0.02	0.10	CYP707A2_LOC126709100
	0.00	0.00	PYL12_LOC126729098
	0.00	0.00	PYL2_LOC126708526
	0.00	0.00	PYL2_LOC126725188
	0.02	0.25	PYL4_LOC126692465
	0.05	0.04	PYL4_LOC126697785
	0.38	0.30	PYL8_LOC126698532
	0.42	0.28	PYL9_LOC126721248
	0.08	0.09	PYR1_LOC126709271
	Control	Orought	
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Transcriptional activity of genes involved in the metabolism of abscisic acid in Q. robur under drought conditions, which were identified using ONT long-read RNA-Seg technology





### **Conclusions:**

The study revealed drought-induced changes in ABA metabolism-related gene expression in *Q. robur*, including decrease of **ZEP genes** activity and increase of **AAO** and certain **ABA inactivation genes** activity. These results demonstrate complex regulation of ABA biosynthesis and catabolism under drought conditions, though further research is needed to fully understand drought adaptation mechanisms, particularly through investigating ABA dynamics at different stress stages.





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## Thank you for your attention!