

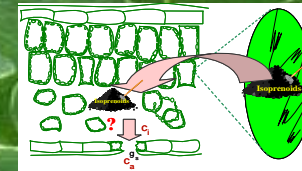
# A Study on Isoprene Emission of three European Deciduous Oak Tree Species with two Provenances each as Impacted by Drought, Elevated Temperature and in Combination

***Rainer Steinbrecher<sup>1</sup>,  
Nicla Contran<sup>2</sup>, Ewelina Utrata<sup>1</sup>, Madeleine  
Günthardt-Goerg<sup>3</sup>***

<sup>1</sup>Research Centre  
of Karlsruhe,  
IMK-IFU  
Garmisch-  
Partenkirchen  
Germany

<sup>2</sup>University of  
Milan-Bicocca  
Milan  
Italy

<sup>3</sup>Swiss Federal  
Research Institute  
WSL  
Birmensdorf  
Switzerland



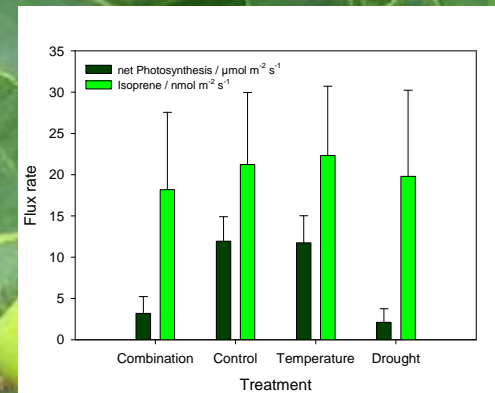
## Methods

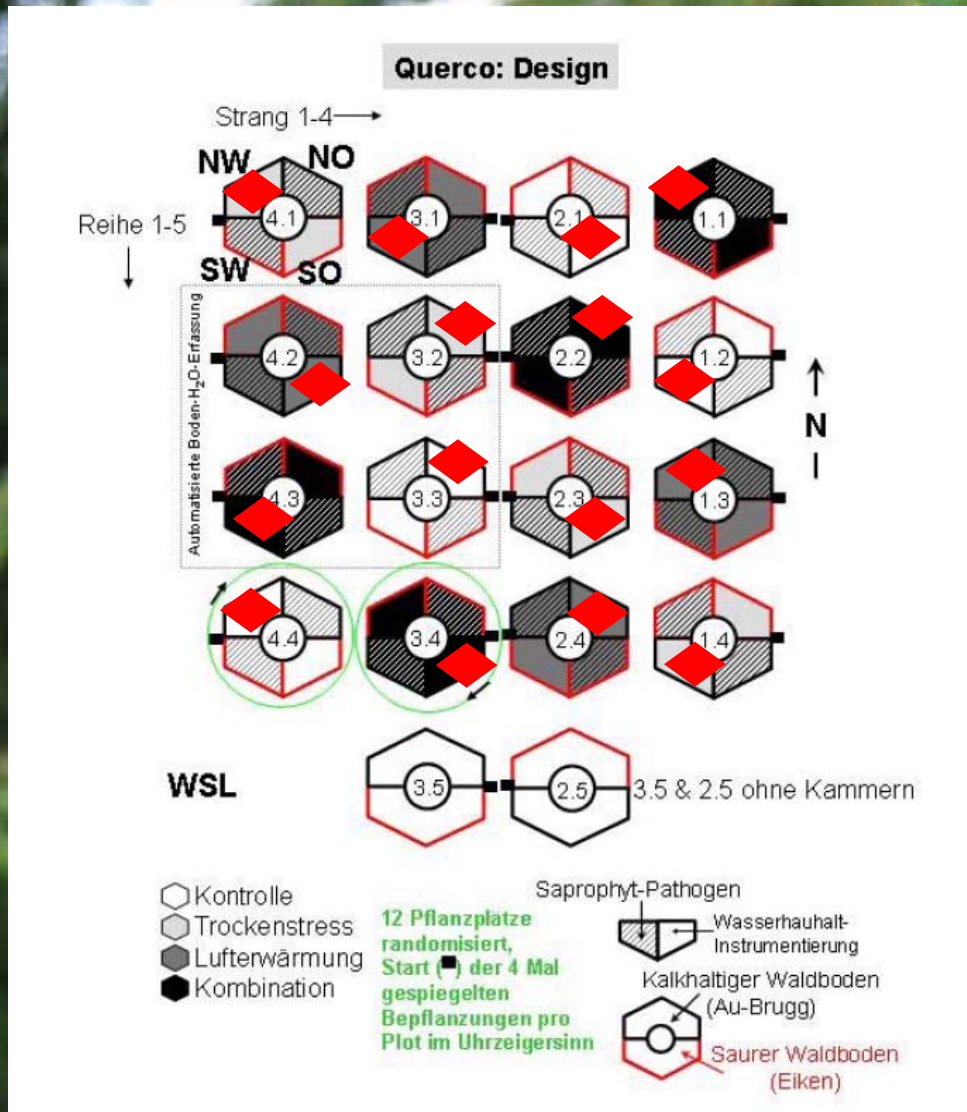


## Results



## Conclusions



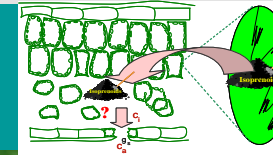


## Measurements:

- All treatments
- Calcerous soil
- *Quercus petraea*, provenance Corcelles-P. Concise
- *Q. robur*, provenances Bonfol and Tagerwilen
- *Q. pubescens*, provenances Arrezo and Leuk



# Methods



## Gas exchange:

Isoprene, CO<sub>2</sub>, Water Vapor

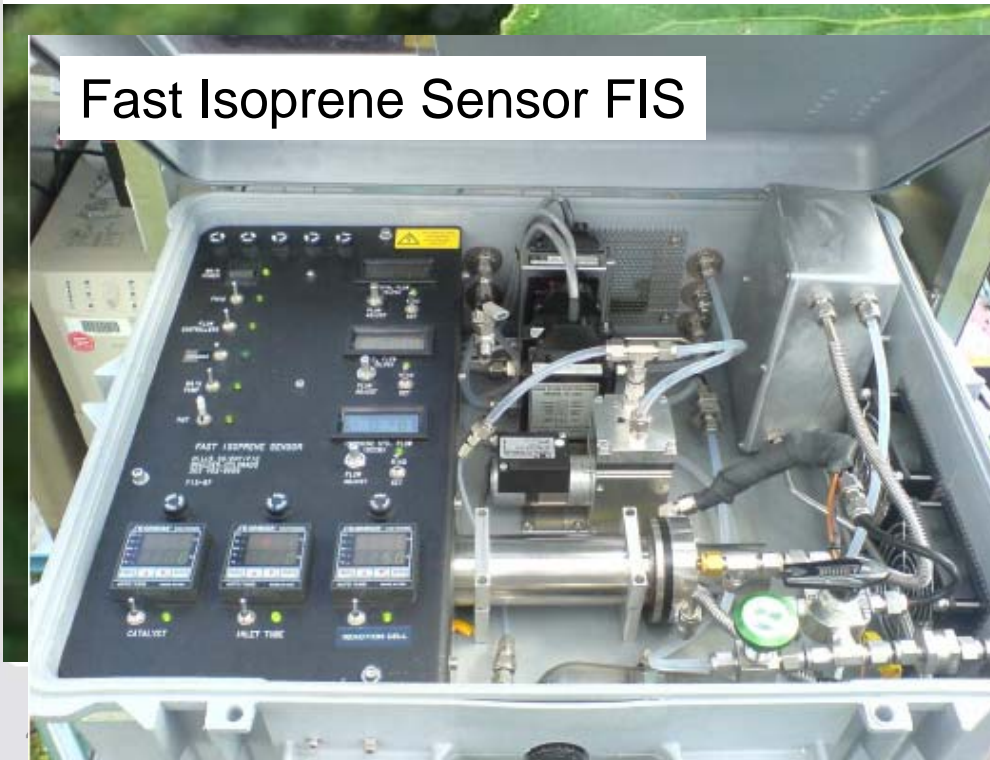
Standardised conditions:

28 °C leaf temperature; 1500 μE PAR;  
rel. Hum. 45%; CO<sub>2</sub> 380 ppm



LI6400 Gas Exchange System

Fast Isoprene Sensor FIS





## Data Evaluation

- The data set was statistically analysed using a multivariate model (SPSS 8.0).
- Tree effects, effects of provenance and treatment effects on isoprene emission, net photosynthesis and leaf to air water vapour conductance were tested.
- The measurements were performed during sunny as well as overcast days with some rain.

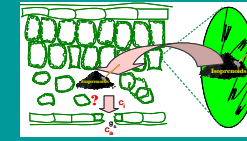




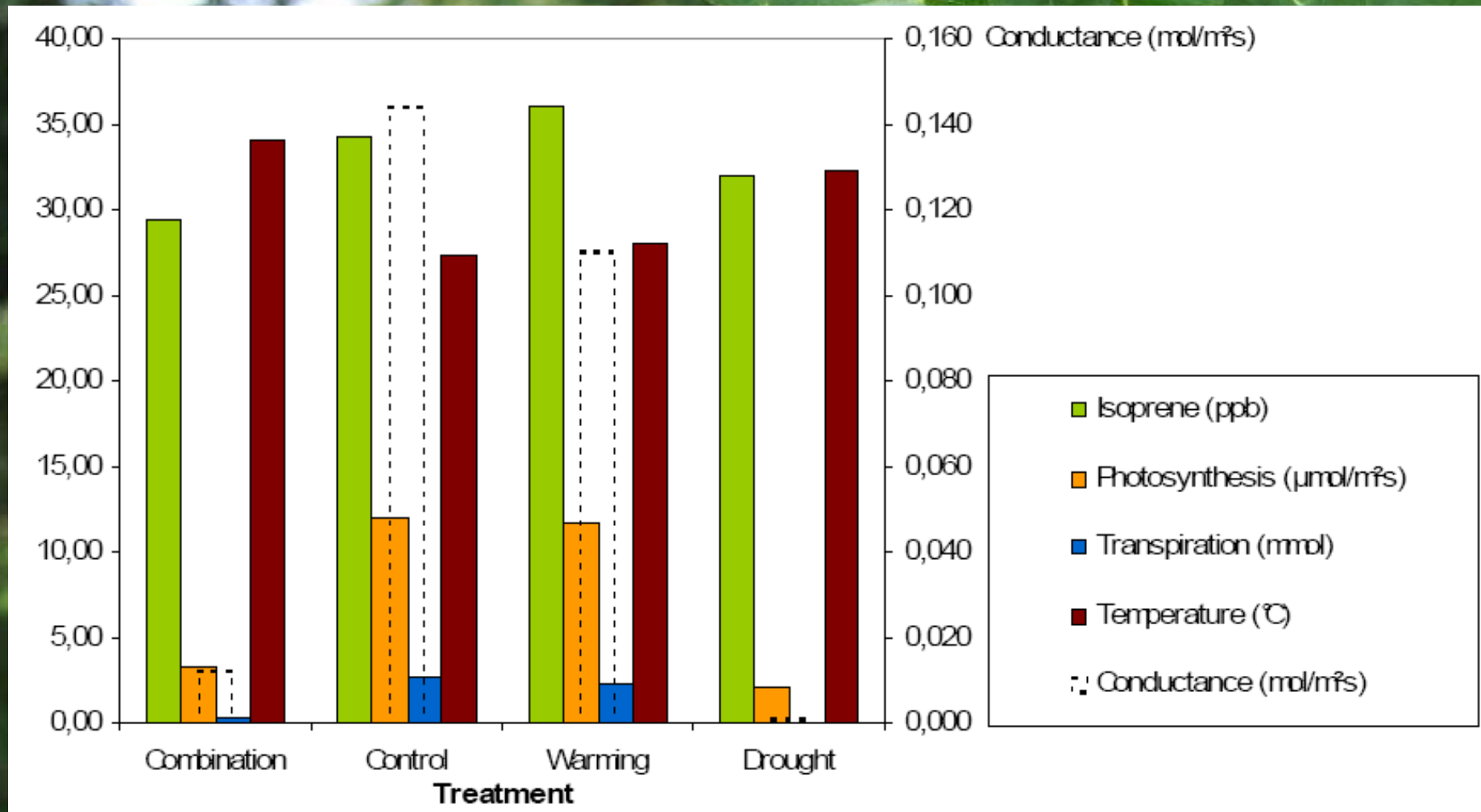
## Statistical Analysis

- A multivariate analysis of the data set showed no significant ( $P=0.05$ ) effect of tree species and provenance on isoprene emission in the different treatments. Statistical results of the other parameters are not shown.
- Isoprene emission potential, net photosynthesis and leaf-to-air water vapor conductance values were pooled between the three oak species and provenances and analysed in relation to treatment effects under standardized measurement conditions in July/August 2008.

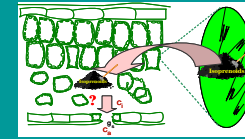
# Results



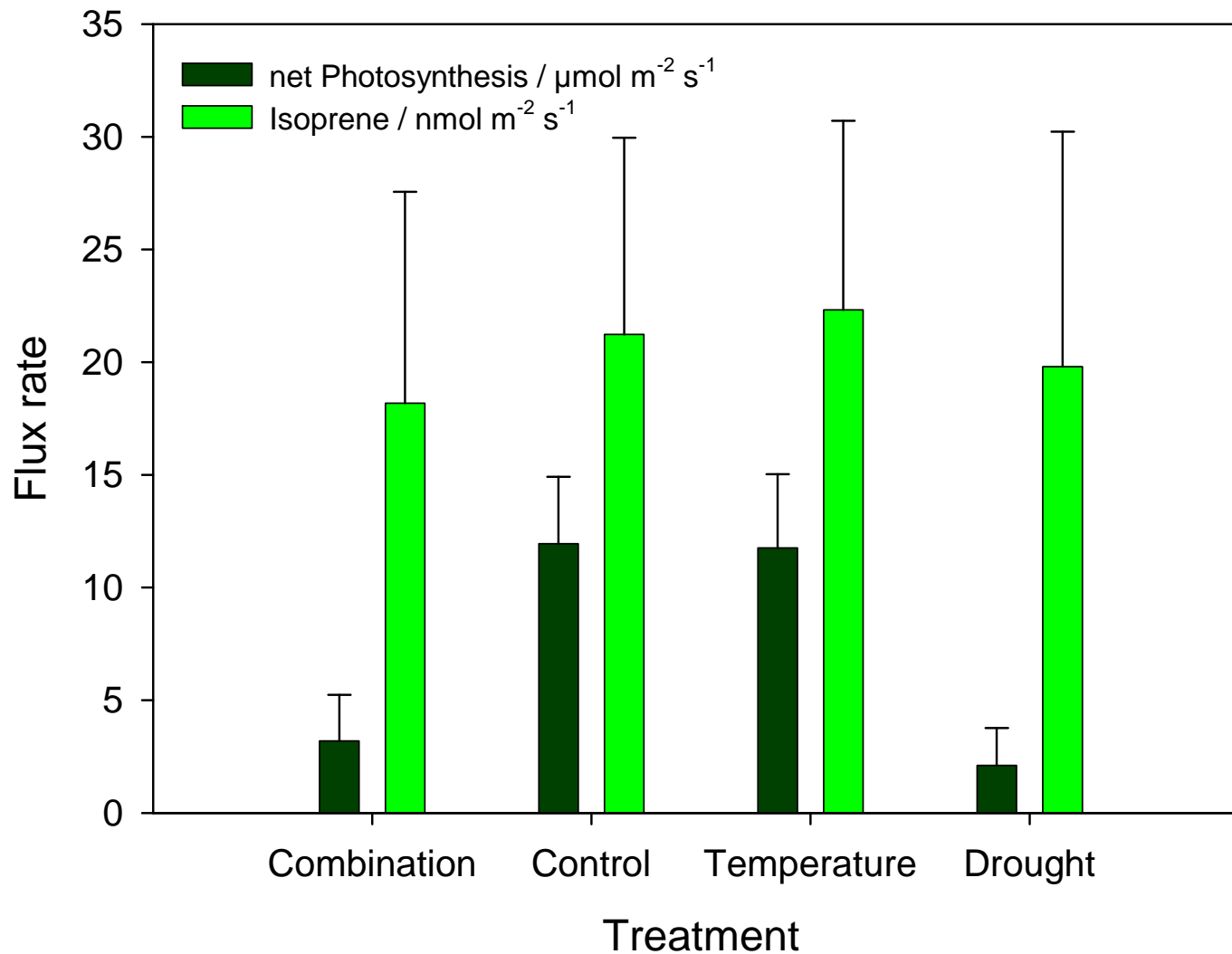
## Gas Exchange and Treatments



# Results

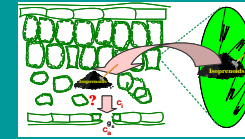


## Isoprene Emission and Photosynthesis



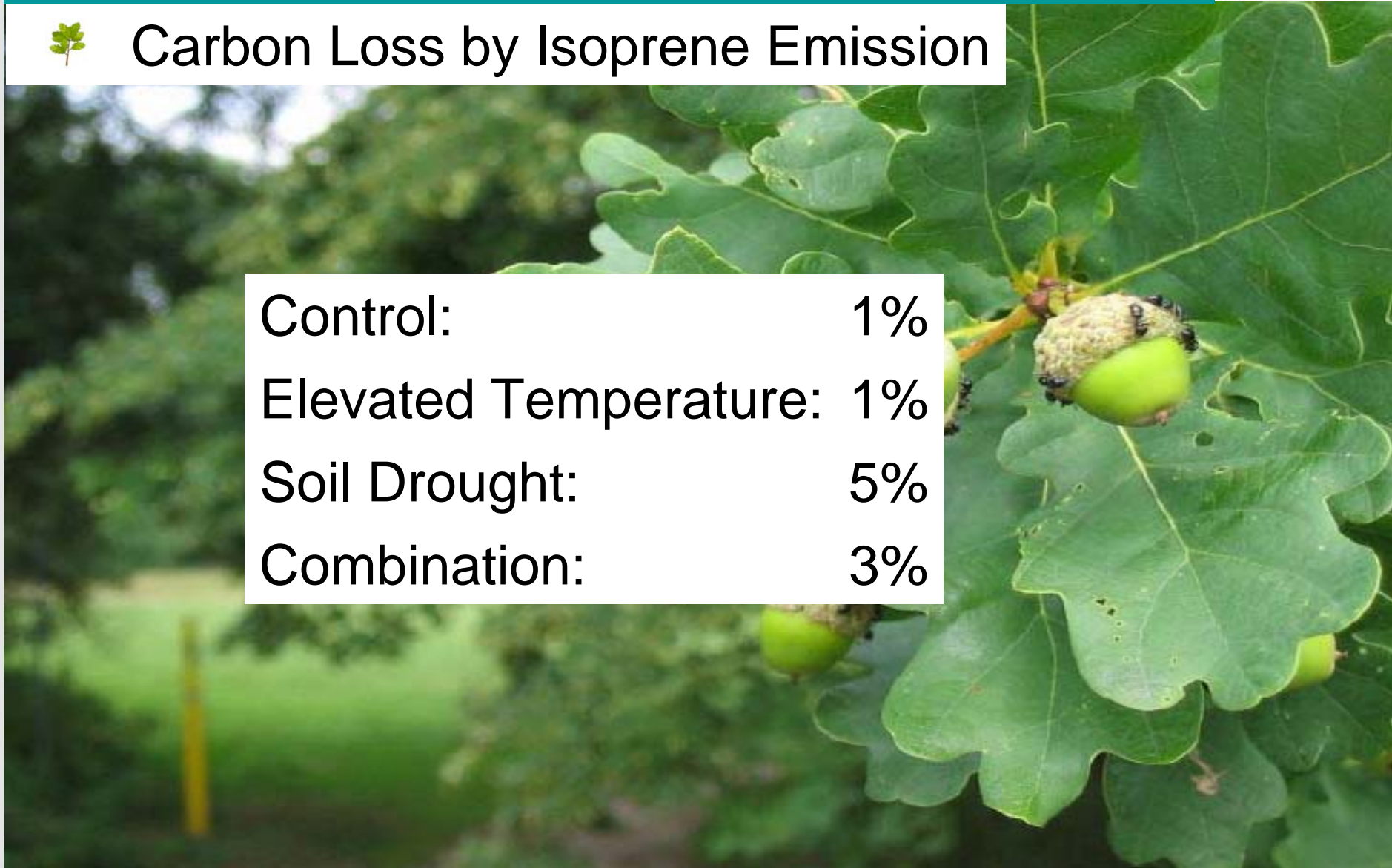


# Results



## Carbon Loss by Isoprene Emission

Control:	1%
Elevated Temperature:	1%
Soil Drought:	5%
Combination:	3%





## Isoprene emission

- **Isoprene emission** of *Q. robur*, *Q. petraea*, and *Q. pubescens* including a maximum of 2 provenances is not different from each other.
- **Standardised isoprene emission** is not statistically significant ( $P=0.05$ ) impacted by the elevated temperature, soil drought or by both parameter combined.
- **BVOC emission modelling**: The results indicate that at least in Europe a specific adaptation of isoprene emission factors for oaks in response to projected elevated temperature and soil drought seems not to be necessary.

# Thank You!!

for your kind support  
and for giving us the  
opportunity being part of  
this great integrated and  
interdisciplinary project

