



## **Roles of nitrogen and non-structural carbohydrate (NSC) storage for the recovery of oak after drought release**

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Nitrogen and water are critical for maintaining tree function. Carbon reserves play a major role in trees' survival during and after drought events. Increasing frequency, intensity and duration of droughts call for intensified research on the mechanisms of how plants respond to drought and especially to react after drought release. Three-year-old saplings of oak (*Quercus petraea*) were exposed to four intensities of drought for three years in macrocosm systems. Two fertilization treatments (control and addition of 5g/m<sup>2</sup> N per year) were set up from the start of the experiment. A rewetting (drought release) was performed after three years of drought exposure. Testing the nutrient and non-structural carbohydrate (soluble sugar, starch) content in different organs, combined with the monitoring of gas exchange over time after rewetting, allowed to unravel the role of nitrogen in oak for surviving drought and for the subsequent recovery process. After serious drought, *Q. petraea* did recover photosynthetic activity within one month whereas only one week was needed when drought stress was more moderate. The results also showed that nitrogen plays only a minor role for the drought recovery process in *Q. petraea*. The changes of non-structural carbohydrate with drought release will give us more detailed information on the role of storage compounds and the tradeoff between tree growth and carbon storage with drought intensity and nutrient supply and for the recovery process after drought.