

## Publication

Effects of leaf water evaporative 2H-enrichment and biosynthetic fractionation on leaf wax n-alkane  $\delta^2\text{H}$  values in C3 and C4 grasses**JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 3676028**Author(s)** Gamarra, Bruno; Sachse, D.; Kahmen, Ansgar**Author(s) at UniBasel** [Kahmen, Ansgar](#) ;**Year** 2016**Title** Effects of leaf water evaporative 2H-enrichment and biosynthetic fractionation on leaf wax n-alkane  $\delta^2\text{H}$  values in C3 and C4 grasses**Journal** Plant, Cell and Environment**Volume** 39**Number** 11**Pages / Article-Number** 2390-2403

Leaf wax n -alkane  $\delta^2\text{H}$  values carry important information about environmental and ecophysiological processes in plants. However, the physiological and biochemical drivers that shape leaf wax n -alkane  $\delta^2\text{H}$  values are not completely understood. It is particularly unclear why n -alkanes in grasses are typically 2 H-depleted compared with plants from other taxonomic groups such as dicotyledonous plants and why C3 grasses are 2 H-depleted compared with C4 grasses. To resolve these uncertainties, we quantified the effects of leaf water evaporative 2 H-enrichment and biosynthetic hydrogen isotope fractionation on n -alkane  $\delta^2\text{H}$  values for a range of C3 and C4 grasses grown in climate-controlled chambers. We found that only a fraction of leaf water evaporative 2 H-enrichment is imprinted on the leaf wax n -alkane  $\delta^2\text{H}$  values in grasses. This is interesting, as previous studies have shown in dicotyledonous plants a nearly complete transfer of this 2 H-enrichment to the n -alkane  $\delta^2\text{H}$  values. We thus infer that the typically observed 2 H-depletion of n -alkanes in grasses (as opposed to dicots) is because only a fraction of the leaf water evaporative 2 H-enrichment is imprinted on the  $\delta^2\text{H}$  values. Our experiments also show that differences in n -alkane  $\delta^2\text{H}$  values between C3 and C4 grasses are largely the result of systematic differences in biosynthetic fractionation between these two plant groups, which was on average  $-198\text{‰}$  and  $-159\text{‰}$  for C3 and C4 grasses, respectively.

**Publisher** Wiley**ISSN/ISBN** 0140-7791 ; 1365-3040**edoc-URL** <http://edoc.unibas.ch/45179/>**Full Text on edoc** No;**Digital Object Identifier DOI** 10.1111/pce.12789**PubMed ID** <http://www.ncbi.nlm.nih.gov/pubmed/27392279>**ISI-Number** WOS:000385842400005**Document type (ISI)** Article