

## Publication

## Effects of phenotypic variability on the oxygen and hydrogen isotope compositions of grains in different winter wheat varieties

**Journal Article (Originalarbeit in einer wissenschaftlichen Zeitschrift)**

ID 4638100

**Author(s)** Cueni, Florian; Nelson, Daniel B.; Kahmen, Ansgar**Author(s) at UniBasel** [Kahmen, Ansgar](#) ; [Nelson, Daniel](#) ; [Cueni, Florian](#) ;**Year** 2021**Title** Effects of phenotypic variability on the oxygen and hydrogen isotope compositions of grains in different winter wheat varieties**Journal** Isotopes in environmental and health studies**Pages / Article-Number** 1-21**Keywords** Food; dried grain; grains; hydrogen-2; leaf water; leaves; oxygen-18; winter wheat

Stable isotope analyses are the leading method for geographic origin determination, especially of plant-based agricultural products. Origin analysis is typically done by comparing a suspicious sample to reference materials with known geographic origin. Reference materials are usually collected at the species level, assuming different varieties of a species to have comparable isotope compositions within a given location. We evaluated whether different phenotypes that are expressed in different varieties of winter wheat (*Triticum aestivum* L.) influence the oxygen ( $\delta$  O-18) and hydrogen ( $\delta$  H-2) isotope composition of plant tissue water and organic compounds. We found that mean  $\delta$  O-18 and  $\delta$  H-2 values among winter wheat varieties did not differ significantly in leaf water, however, differed significantly in bulk dried grain tissue. The differences in bulk dried grain  $\delta$  O-18 and  $\delta$  H-2 values among varieties can be related to differences in phenotypic trait expression among varieties. Despite this substantial phenotypic variability, the overall variability of bulk dried grain  $\delta$  O-18 and  $\delta$  H-2 values among varieties was small (SD 0.54 parts per thousand for oxygen, 3.60 parts per thousand for hydrogen). We thus conclude that reference materials collected at the species level should be sufficient for geographic origin analysis of winter wheat and possibly other cereals using  $\delta$  O-18 and  $\delta$  H-2 values.

**ISSN/ISBN** 1477-2639**edoc-URL** <https://edoc.unibas.ch/86774/>**Full Text on edoc** No;**Digital Object Identifier DOI** 10.1080/10256016.2021.2002855**PubMed ID** <http://www.ncbi.nlm.nih.gov/pubmed/34846959>**ISI-Number** 000723965000001**Document type (ISI)** Journal Article