

EGU2020-20261

<https://doi.org/10.5194/egusphere-egu2020-20261>

EGU General Assembly 2020

© Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.



Root traits as key proxies to unravel plant and ecosystem functioning: entities, trait selection and outlook

Boris Rewald¹, Grégoire T. Freschet^{2,3}, Catherine Roumet², Alexia Stokes², Monique Weemstra², Richard D. Bardgett⁴, A. Glyn Bengough^{5,6}, Louise H. Comas⁷, Gerlinde B. De Deyn⁸, David Johnson⁴, Jitka Klimešová⁹, Martin Lukac¹⁰, M. Luke McCormack¹¹, Ina C. Meier¹², Loïc Pagès¹³, Hendrik Poorter^{14,15}, Ivan Prieto¹⁶, Nina Wurzburger¹⁷, and Marcin Zadworny¹⁸

¹Forest and Soil Sciences, University of Natural Resources and Life Sciences, Vienna, Austria (boris.rewald@boku.ac.at)

²Centre d'Ecologie Fonctionnelle et Evolutive, UMR 5175 (CNRS - Université de Montpellier - Université Paul-Valéry Montpellier - EPHE - IRD), Montpellier, France

³Station d'Ecologie Théorique et Expérimentale, CNRS, Moulis, France

⁴School of Earth and Environmental Sciences, University of Manchester, Manchester, UK

⁵James Hutton Institute, Invergowrie Dundee, UK

⁶School of Engineering, Mathematics and Physics, University of Dundee, Dundee, UK

⁷Water Management Research Unit, USDA-ARS, Fort Collins, USA

⁸Soil Biology and Biological Soil Quality Group, Wageningen University, Wageningen, The Netherlands

⁹Institute of Botany, Czech Academy of Sciences, Třeboň, Czech Republic

¹⁰School of Agriculture, Policy & Development, University of Reading, Reading, UK

¹¹Center for Tree Science, Morton Arboretum, Lisle, USA

¹²Plant Ecology, University of Goettingen, Göttingen, Germany

¹³Plantes et Systèmes de culture Horticoles, INRA UR 1115, Avignon, France

¹⁴Plant Sciences (IBG-2), Forschungszentrum Jülich GmbH, Jülich, Germany

¹⁵Department of Biological Sciences, Macquarie University, North Ryde, Australia

¹⁶Centro de Edafología y Biología Aplicada del Segura (CSIC), Campus Universitario de Espinardo, Murcia, Spain

¹⁷Odum School of Ecology, University of Georgia, Athens, USA

¹⁸Institute of Dendrology, Polish Academy of Sciences, Kórnik, Poland

Root systems show a tremendous diversity both between and within species, suggesting a large variability in plant functioning and effects on ecosystem properties and processes. In recent decades, developments in many areas of root research have brought considerable advances in our understanding of root traits and their contribution to plant and ecosystem functioning. However, despite major progress, a comprehensive overview—bridging research fields—is lacking. Furthermore, considerable uncertainties exist in the identification of root entities, and the selection and standardized measurement of traits. Here, we provide a comprehensive overview on root entities, exemplify recent advances in our understanding of both theoretical and demonstrated relationships between root traits and plant or ecosystem functioning, discuss trait-trait relationships and hierarchies among traits, and critically assess current strengths and gaps in our knowledge.

