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► To cite this version:

Boris Rewald, Gregoire T. Freschet, Catherine Roumet, Alexia Stokes, Monique Weemstra, et al.. Root traits as key proxies to unravel plant and ecosystem functioning: entities, trait selection and outlook. 2020. hal-03028581

HAL Id: hal-03028581

<https://hal.science/hal-03028581>

Preprint submitted on 27 Nov 2020

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EGU2020-20261

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

EGU General Assembly 2020

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

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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.

