Data Papers

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Linking above- and belowground traits to soil and climate variables: an integrated database on China's grassland species

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Abstract. Knowledge of plant functional traits and trait–environment interactions is important for characterizing species strategies and understanding ecological processes. However, comprehensive field data on both above- and belowground traits, together with their environmental variables are scarce. Biome-scale studies are particularly lacking. Here we present two large-scale data sets that include functional traits of leaves and fine roots and their corresponding soil and climatic variables in China's grasslands. Leaf, fine root, and soil samples were collected in three biogeographic regions: temperate grassland on the Inner Mongolia Plateau, alpine grassland on the Tibetan Plateau, and mountain grassland in the Xinjiang mountain areas. Field data were collected over two periods. The first data set collected between 2003 and 2004 includes 13 foliar traits (leaf mass per area, LMA; photosynthetic nitrogen use efficiency, PNUE; water use efficiency, WUE; stomatal conductance for water vapor, Gs; transpiration rate, TR; mass- and area-based photosynthetic capacity, Amass and Aarea; mass- and area-based carbon concentrations, Cmass and Carea; nitrogen concentrations, Nmass and Narea; and phosphorus concentrations, Pmass and Parea) for 170 species at 173 sites. The second data set collected between 2006 and 2007 includes six sets of analogous traits for both leaves and fine roots (C, N, and P concentrations; leaf thickness/root diameter; specific leaf area, SLA; specific root length, SRL; and tissue density) for 139 species at 82 sites, along with soil attributes (soil total and organic carbon, STC and SOC; total and available N, STN and SAN; total and available P, STP and SAP; pH, bulk density, and moisture). Moreover, associated information was also gathered, including geographical location (latitude, longitude, and altitude), climate (mean annual temperature, MAT; mean annual precipitation, MAP; growing season temperature, GST; growing season precipitation, GSP; potential evapotranspiration, PET; and actual evapotranspiration, AET) and site descriptions (vegetation and soil types). The data sets are unique because they integrate plant above- and belowground traits, climate, and soil factors over broad regional, elevational, and taxonomic ranges in understudied regions (e.g., the Tibetan Plateau). This is the only database on China's grassland species for unrestricted global access. These data sets will make a valuable contribution to future large-scale trait-based ecological studies.

Key words: *China; climate; fine root; functional traits; grasslands; leaf; soil.*

The complete data sets corresponding to abstracts published in the Data Papers section in the journal are published electronically as Supporting Information in the online version of this article at http://onlinelibrary.wiley.com/doi/10.1002/ecy.1780/suppinfo

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