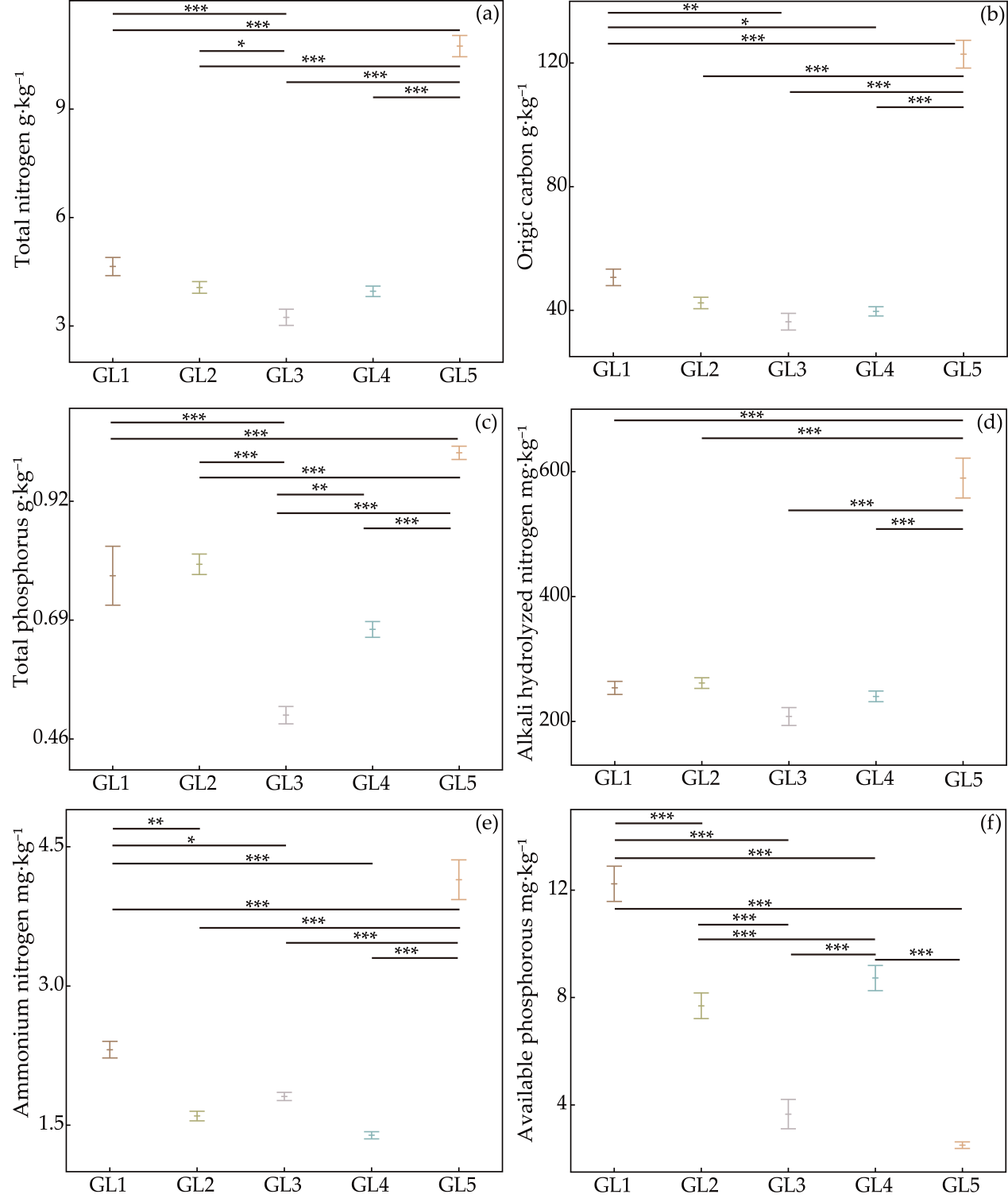
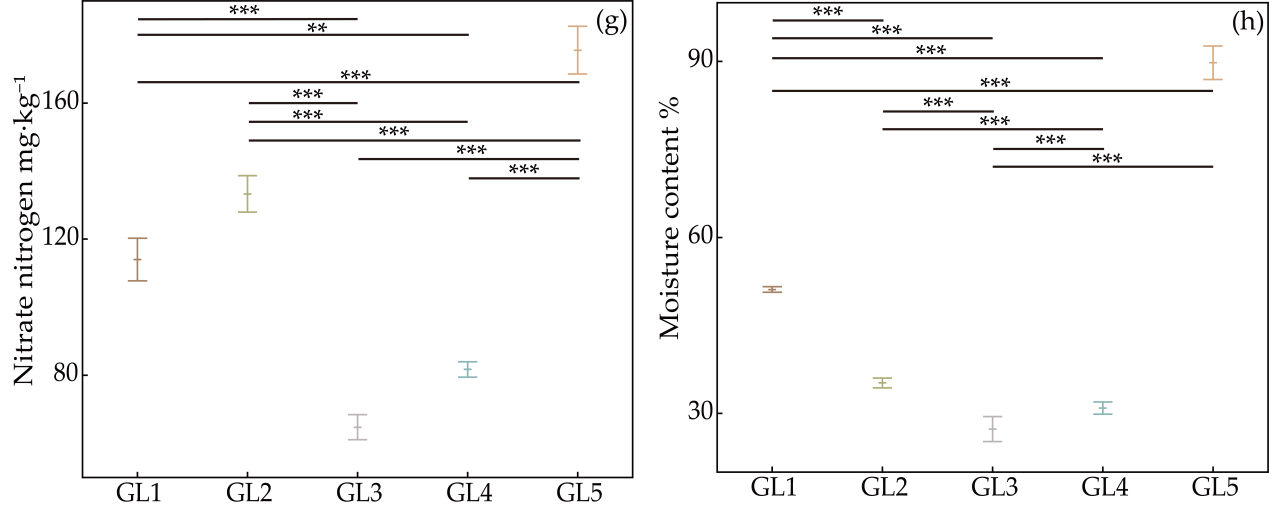
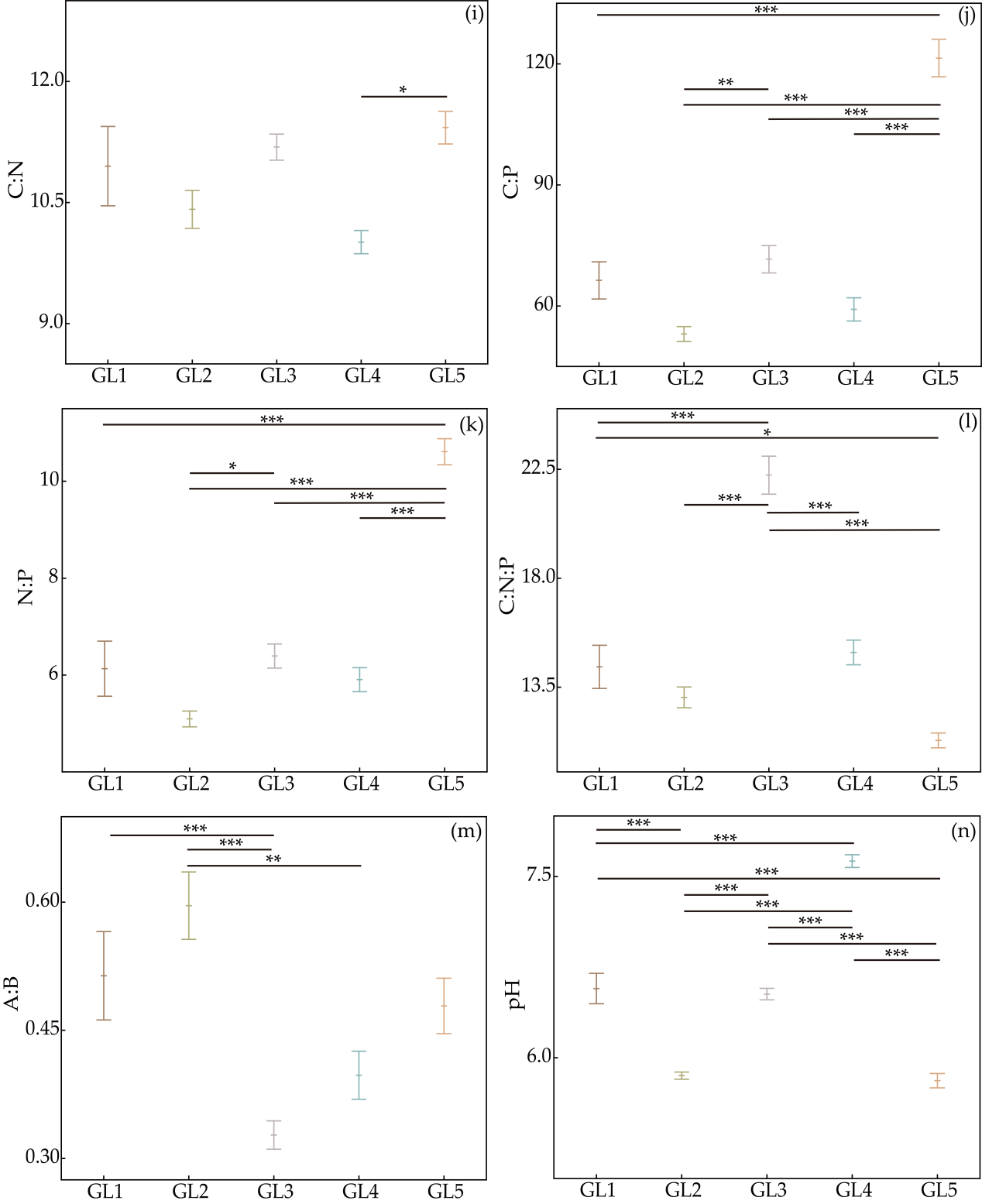


Figure S7 Above- and below- ground biomass in different grassland types. \*, \*\*, and \*\*\* indicate a significant relationship with Pearson test at *P* < 0.05, *P* < 0.01, *P* < 0.001 level respectively.





Figure S8 Ecosystem functions in different grassland types (a. Total nitrogen, b.Organic carbon, c. Total phosphorus, d. Alkali hydrolyzed nitrogen, e. Available phosphorous, f. Ammonium nitrogen, g. Nitrate nitrogen, h. Moisture content, i. Ratio of organic carbon to total nitrogen,gl. Ratio of organic carbon to total phosphorus, k. Ratio of total nitrogen to total phosphorus, l. Ratio of organic carbon to total nitrogen to total phosphorus, m. Ratio of plant aboveground biomass to belowground biomass, n. pH). \*, \*\*, and \*\*\* indicate a significant relationship with Pearson test at *P* < 0.05, *P* < 0.01, *P* < 0.001 level respectively.

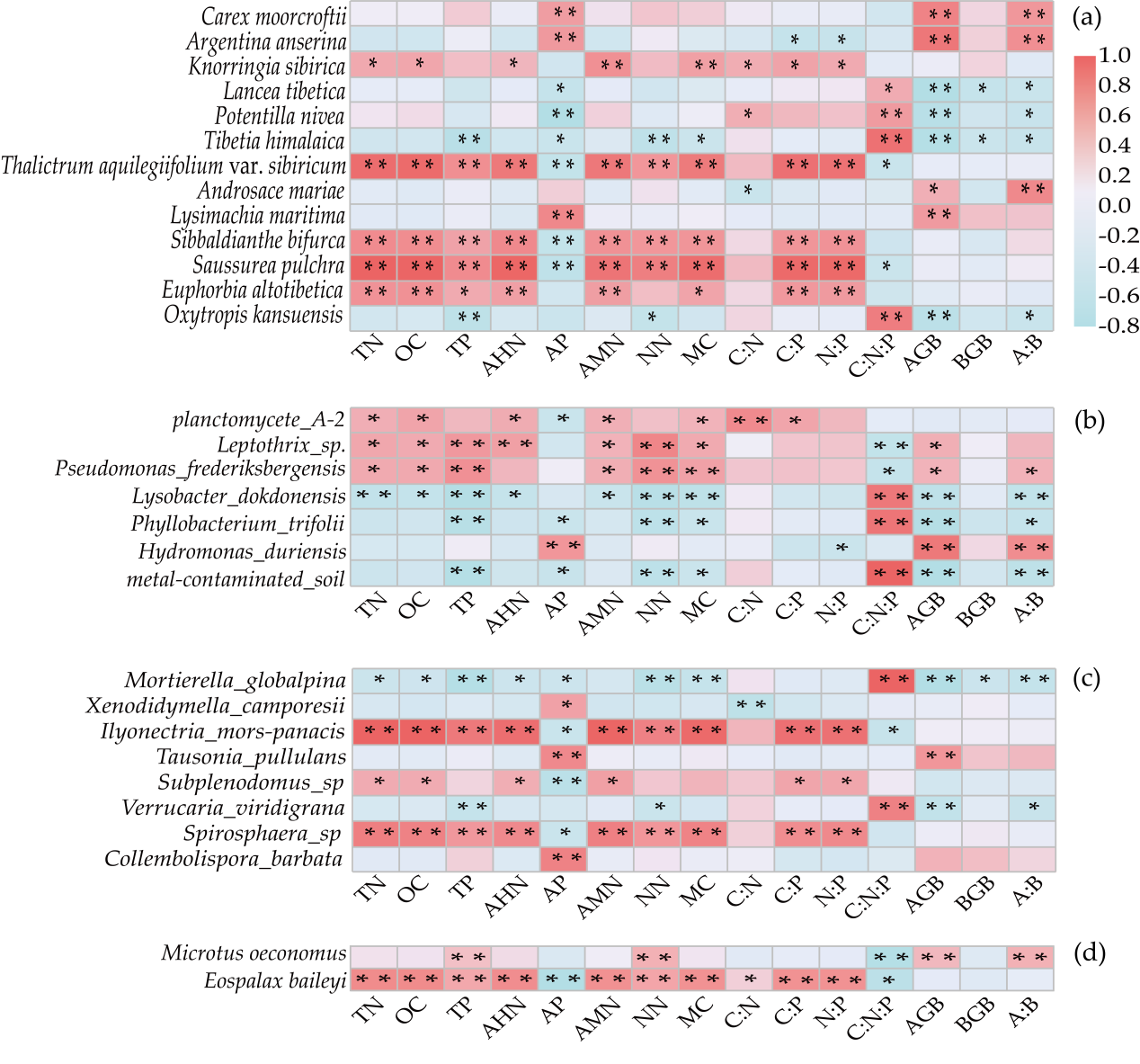


Figure S9 Pearson correlation between keystone species and ecosystem functions (a. keystone species of plant, b. keystone species of bacteria, c. keystone species of fungi, d. keystone species of rodent) and soil functions. \*, \*\*, indicate a significant relationship with Pearson test at *P* < 0.05, *P* < 0.001 level respectively. Red and blue color indicate a positive and negative relationship. “TN”, “OC”, “TP” “AHN”, “AP”, “AMN”, “NN”, “MC”, “C:N”, “C:P”, “N:P”, “C:N:P”, “AGB”, “BGB”, “A:B” represent “Total nitrogen g·kg-1”, “Organic carbon g·kg-1”, “Total phosphorus g·kg-1”, “Alkali hydrolyzed nitrogen mg·kg-1”, “Available phosphorous mg·kg-1”, “Ammonium nitrogen mg·kg-1”, “Nitrate nitrogen mg·kg-1”, “Moisture content %”, “Ratio of organic carbon to total nitrogen”, “Ratio of organic carbon to total phosphorus”, “Ratio of total nitrogen to total phosphorus”, “Ratio of organic carbon to total nitrogen to total phosphorus”, “plant aboveground biomass g·m-2”, “plant belowground biomass g·m-2” and “Ratio of plant aboveground biomass to belowground biomass ”respectively.

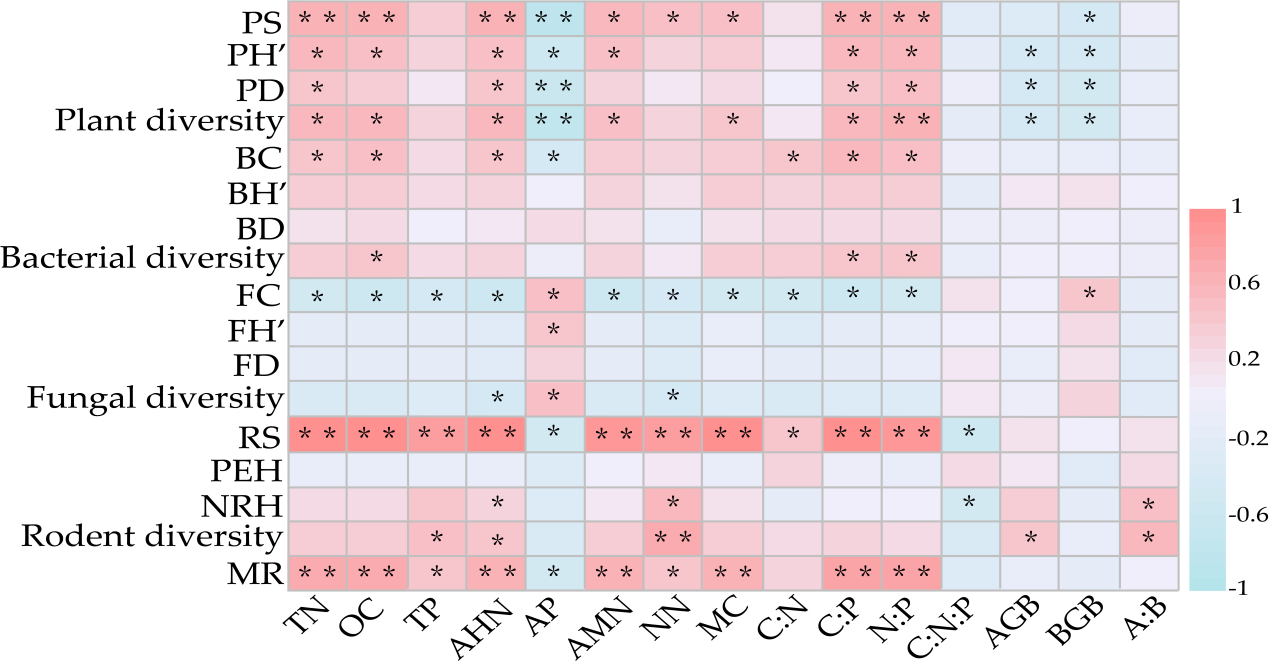


Figure S10 A visualization of a Pearson correlation matrix of different trophic diversity and ecosystem functions. \*, \*\*, indicate a significant relationship with Pearson test at *P* < 0.05, *P* < 0.001 level respectively. ”PS”, “PH”, ”PD”, ”BC”, ”BH’”, ”BD”, ”FC”, ”FH’”, ”FD”, ”RS”, ”PEH”, ”NRH”, and “MR” represent “Plant number of species”, “plant Shannon-Wiener index”, “plant Simpson”, “bacteria Chao1 index”, “bacteria Shannon-Wiener index”, “bacteria Simpson index”, “fungi Chao1 index”, “fungi Shannon-Wiener index”, “fungi Simpson index”, “rodent number of species”, ”Proportion of effective holes %”, “multitrophic diversity” and “Number of rodent holes pcs·ha-1” respectively. “TN”, “OC”, “TP”, “AHN”, “AP”, “AMN”, “NN”, “MC”, “C:N”, “C:P”, “N:P”, “C:N:P”, “AGB”, “BGB” and “A:B” represent “Total nitrogen g·kg-1”, “Organic carbon g·kg-1”, “Total phosphorus g·kg-1”, “Alkali hydrolyzed nitrogen mg·kg-1”, “Available phosphorous mg·kg-1”, “Ammonium nitrogen mg·kg-1”, “Nitrate nitrogen mg·kg-1”, “Moisture content %”, “Ratio of organic carbon to total nitrogen”, “Ratio of organic carbon to total phosphorus”, “Ratio of total nitrogen to total phosphorus”, “Ratio of organic carbon to total nitrogen to total phosphorus”, “plant aboveground biomass g·m-2”, “plant belowground biomass g·m-2” and “Ratio of plant aboveground biomass to belowground biomass” respectively.

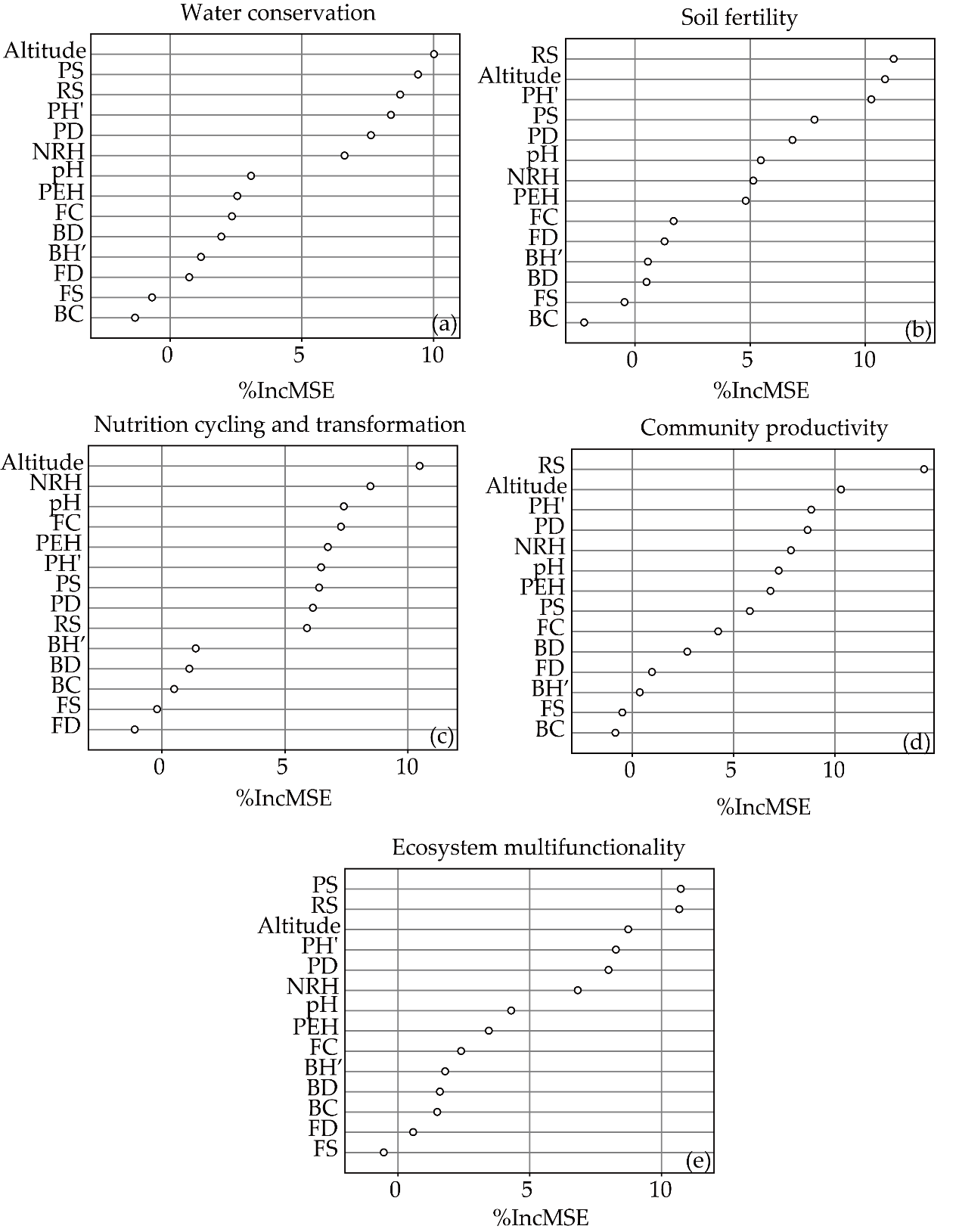


Figure S11 Results of Random Forest analysis of the relative importance of species richness of different trophic community and abiotic variables (altitude and soil pH) to ecosystem functions (a. Water conservation, b. soil fertility, c. nutrition cycling and transformation, d. community productivity, e. ecosystem multifunctionality). ”PS”, “PH”, ”PD”, ”BC”, ”BH’”, ”BD”, ”FC”, ”FH’”, ”FD”, ”RS”, ”PEH”, ”NRH” represent “Plant number of species”, “plant Shannon-Wiener index”, “plant Simpson”, “bacteria Chao1 index”, “bacteria Shannon-Wiener index”, “bacteria Simpson index”, “fungi Chao1 index”, “fungi Shannon-Wiener index”, “fungi Simpson index”, “rodent number of species”, ”Proportion of effective holes %” and “Number of rodent holes pcs·ha-1” respectively.

Notes:

