

## **Supporting Information for**

The potential of mapping grassland plant diversity with the causal links among spectral diversity, functional trait diversity, and species diversity

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### **Introduction**

This supporting information provides one supplementary table as well as three supplementary figures for further illustrating our method and results.

**Table S1.** Plant species in the grassland monoculture platform.

Species	Species ID	Genus	Family	Plant Groups	Functional
<i>Leymus chinensis</i>	G	Leymus	Poaceae	Perennial rhizome grass	
<i>Stipa grandis</i>	N	Stipa	Poaceae	Perennial bunch grass	
<i>Agropyron cristatum</i>	R	Agropyron	Poaceae	Perennial bunch grass	
<i>Achnatherum sibiricum</i>	H	Achnatherum	Poaceae	Perennial bunch grass	
<i>Cleistogenes squarrosa</i>	S	Cleistogenes	Poaceae	Perennial bunch grass	
<i>Koeleria cristata</i>	P	Koeleria	Poaceae	Perennial bunch grass	
<i>Carex korshinskyi</i>	L	Carex	Cyperaceae	Perennial forbs	
<i>Allium ramosum</i>	A	Allium	Amaryllidaceae	Perennial forbs	
<i>Artemisia sieversiana</i>	Q	Artemisia	Asteraceae	Annual forbs	
<i>Artemisia scoparia</i>	O	Artemisia	Asteraceae	Annual forbs	

<i>Axyris amaranthoides</i>	B	Axyris	Amaranthaceae	Annual forbs
<i>Chenopodium acuminatum</i>	E	Chenopodium	Amaranthaceae	Annual forbs
<i>Chenopodium aristatum</i>	I	Chenopodium	Amaranthaceae	Annual forbs
<i>Silene aprica</i>	U	Silene	Caryophyllaceae	Annual forbs
<i>Salsola collina</i>	C	Salsola	Amaranthaceae	Annual forbs
<i>Lappula myosotis</i>	M	Lappula	Boraginaceae	Annual forbs
<i>Allium chysanthum</i>	D	Allium	Amaryllidaceae	Perennial forbs
<i>Dontostemon dentatus</i>	F	Dontostemon	Brassicaceae	Annual forbs
<i>Thalictrum petaloideum</i>	T	Thalictrum	Ranunculaceae	Biennial forbs
<i>Allium tenuissimum</i>	J	Allium	Amaryllidaceae	Perennial forbs

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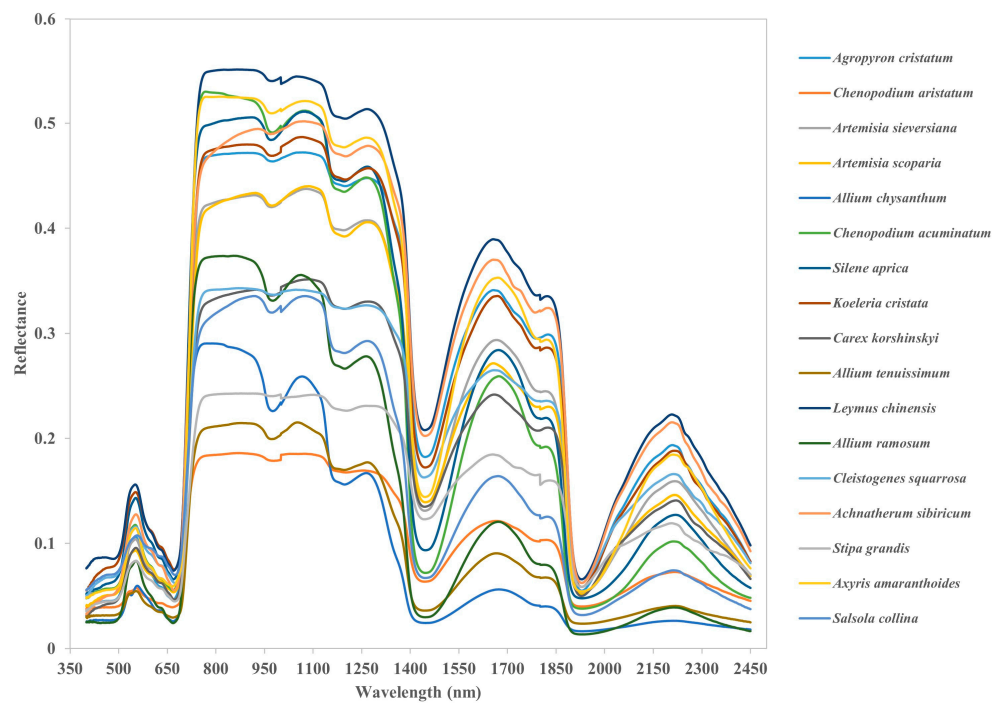


Figure S1. The average leaf reflectance of 17 species included in the study.

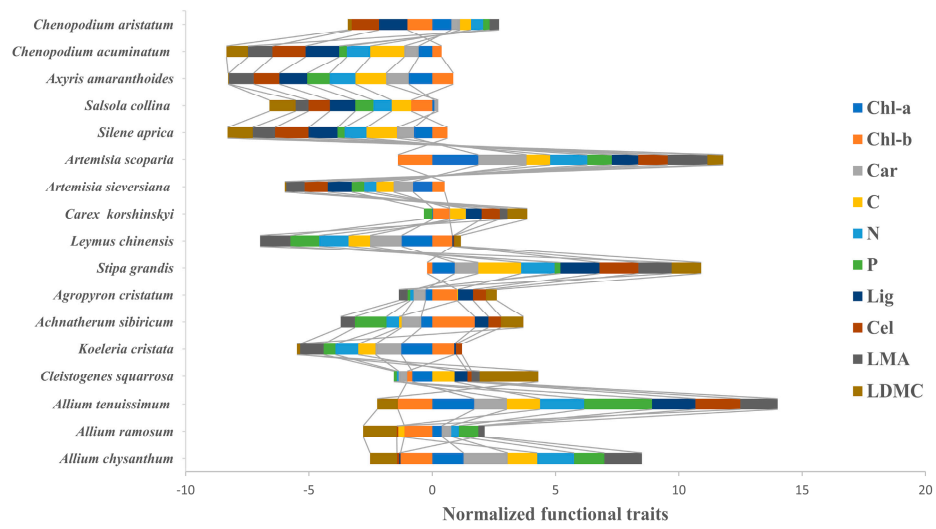


Figure S2. The normalized 10 function traits of 17 species included in the study.

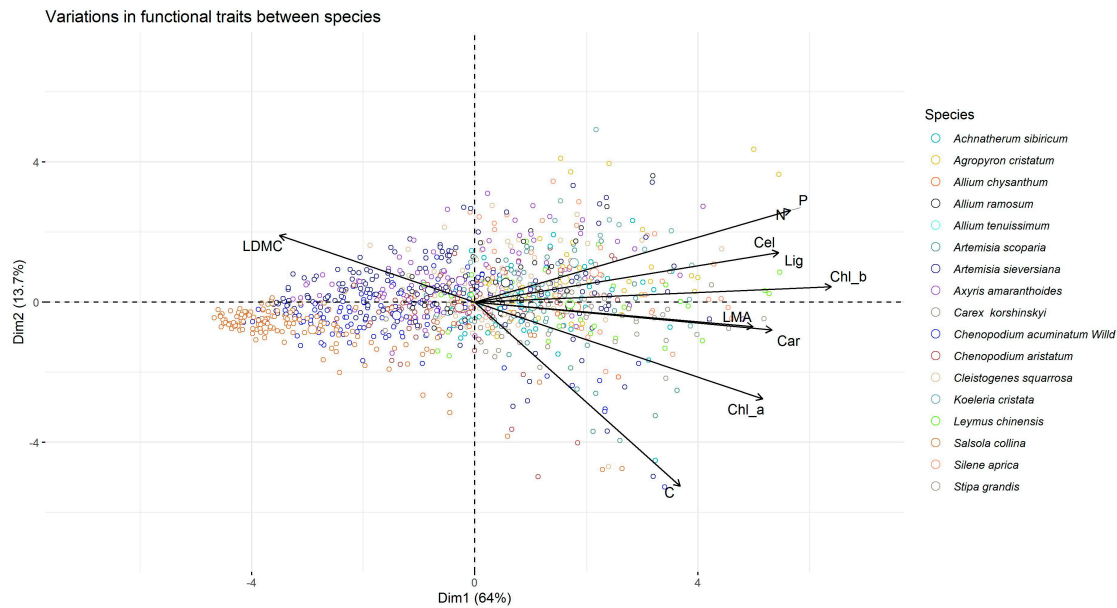


Figure S3. Multivariate leaf functional trait covariation of 17 different species based on 0.3 m × 0.3 m pixel. Arrows represent principal components loadings associated with 10 leaf functional traits (Chl\_a : Chlorophyll a, Chl\_b : Chlorophyll b, Car : Carotenoids, C : Carbon, N : Nitrogen, P : Phosphorus, Lig : Lignin, Cel : Cellulose, Water : Leaf water content, LMA : Leaf mass per area).