

Supplementary Material
for

Effects of nitrogen and phosphorus addition on plant diversity and primary productivity in a semiarid grassland

Table S1. Variance analysis of the response of community characteristics to nutrient addition. CWM, community weighted mean; LDMC, leaf dry matter content; LCC, leaf carbon content; LNC, leaf nitrogen content; SLA, specific leaf area; LA, leaf area; LSC, leaf sulfur content. ^, *, ** and *** indicate statistically significant levels at $0.05 < p < 0.1$, $p < 0.05$, $p < 0.01$ and $p < 0.001$, respectively.

Community characteristics	N	NP	P
Abundance	0.296	0.04	0.671
Soil pH	29.773**	26.761**	10.308*
Soil moisture content	0.206	0.774	0.674
Soil carbon content	9.007*	3.736*	2.909
Soil nitrogen content	7.229*	10.244*	7.03*
Soil sulfur content	4.436^	3.106	1.914
Soil phosphorus content	3.725*	46.996***	67.196***
Soil available phosphorus	0.105	14.194**	6.562*
Soil NH ₄ ⁺ -N	5.65*	31.034**	0.864
Soil NO ₃ ⁻ -N	1.188	3.577	16.946**
Height	42.458***	35.552***	10.352*
CWM.LA	13.333**	18.003***	0.503
CWM.SLA	0.245	0.003	4.839^
CWM.LDMC	15.576**	1.536	4.35
CWM.LNC	29.895**	14.06**	10.045
CWM.LCC	0.968	0.678	0.389
CWM.LSC	2.198	0.708	14.921

Table S2. Lists of species losses from 2017 to 2021 and belonging functional groups in each treatment (CK, N, NP, P)

Treat	Plant species loss			
C	Potentilla multifida	F	Agropyron cristatum	F
	Heteropappus altaicus	F	Chamaerhodos erecta	F
	Allium neriniflorum	F	Artemisia frigida	G
	Artemisia scoparia	F	Allium ramosum	G
	Poa subfastigiata	F	Ixeridium graminifolium	L
	Medicago ruthenic	F		
N	Chamaerhodos erecta	F	Artemisia frigida	F
	Heteropappus altaicus	F	Artemisia pubescens	F
	Saposhnikovia divaricata	F	Ixeridium graminifolium	F
	Allium bidentatum	F	Potentilla acaulis	F
	Sibbaldia procumbens	F	Artemisia sieversiana Willd	G
	Dianthus chinensis	F	Medicago ruthenic	L
	Allium tenuissimum	F	Astragalus scaberrimus	L
	Allium neriniflorum	F	Astragalus galactites	L
	Artemisia scoparia	F	Gueldenstaedtia stenophylla	L
NP	Chenopodium aristatum	F	Gentiana squarrosa	F
	Potentilla tanacetifolia	F	Artemisia pubescens	F
	Ixeridium graminifolium	F	Artemisia scoparia	F
	Potentilla acaulis	F	Stipa krylovii	G
	Chamaerhodos erecta	F	Cleistogenes squarrosa	G
	Dontostemon dentatus	F	Poa subfastigiata	G
	Heteropappus altaicus	F	Agropyron cristatum	G
	Saposhnikovia divaricata	F	Medicago ruthenic	L
	Allium bidentatum	F	Astragalus galactites	L
	Allium tenuissimum	F	Gueldenstaedtia stenophylla	L
	Allium neriniflorum	F	Astragalus scaberrimus	L
	Allium ramosum	F	Melilotus officinalis	L
	Artemisia frigida	F		
P	Chamaerhodos erecta	F	Artemisia pubescens	F
	Heteropappus altaicus	F	Sibbaldia procumbens	F
	Allium bidentatum	F	Achnatherum sibiricum	G
	Allium tenuissimum	F	Poa subfastigiata	G
	Artemisia frigida	F	Gueldenstaedtia stenophylla	L
	Allium neriniflorum	F	Melilotus officinalis	L

Note: F: Forb, G: Grass, L: Legume.

Figure S1. Average above-ground net primary productivity (ANPP), plant species richness, and precipitation amount in the control plots (CK) from 2017 to 2021 was shown.

