

1 **Table**

2 **Table 1** Basic chemical properties of the experimental soil (Mean $\pm$ SE, n = 6). TC: total carbon; TN:
3 total nitrogen; TP: total phosphorus; OM: organic matter; AN: alkali-hydrolysable nitrogen; AP:
4 available phosphorus; AK: available potassium.

	TC	TN	TP	OM	AN	AP	AK
pH	(mg/g)	(mg/g)	(mg/g)	(mg/g)	(mg/kg)	(mg/kg)	(mg/g)
8.08 $\pm$	3.82 $\pm$	0.78 $\pm$	0.25 $\pm$	0.82 $\pm$	63.00 $\pm$	6.04 $\pm$	0.16 $\pm$
0.05	0.03	0.02	0.02	0.05	13.20	1.67	0.01

6 **Table 2** Species richness, species combinations, and sowing amounts of each species for each plant
7 community.

Species richness	Species or species combination	Total sowing	Sowing amount
		amount	of each species
1	<i>Xanthium sibiricum</i> (XS)	60	60
1	<i>Bidens pilosa</i> (BP)	60	60
1	<i>Setaria viridis</i> (SV)	60	60
1	<i>Arthraxon hispidus</i> (AH)	60	60
2	<i>X. sibiricum</i> + <i>S. viridis</i>	60	30
2	<i>X. sibiricum</i> + <i>B. pilosa</i>	60	30
2	<i>B. pilosa</i> + <i>S. viridis</i>	60	30
3	<i>X. sibiricum</i> + <i>S. viridis</i> + <i>A. hispidus</i>	60	20
3	<i>X. sibiricum</i> + <i>B. pilosa</i> + <i>A. hispidus</i>	60	20
3	<i>B. pilosa</i> + <i>S. viridis</i> + <i>A. hispidus</i>	60	20
4	<i>X. sibiricum</i> + <i>S. viridis</i> + <i>A. hispidus</i> + <i>B. pilosa</i>	60	15

9 **Table 3** Statistical results from linear mixed effects models testing for the (interactive) effects of soil depth and plant species richness on community productivity. Soil depth
10 and plant species richness were included as fixed factors, and species combination and abundance were included as random factors. The performance of the model was assessed
11 based on the conditional and marginal R squares, which indicate the proportion of variance explained by the whole model (R_c^2) and the proportion of variance explained by the
12 fixed effects alone (R_m^2), respectively. df, degrees of freedom; *, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$

Random effects		<i>logLik</i>	AIC	<i>Chi.df</i>	<i>p</i>	Fixed effects	<i>Sum.sq</i>	<i>df</i>	<i>F</i> value	<i>p</i>
Productivity	Species combination	-105.78	227.56	1	<0.000***	Soil depth	0.88	2	11.97	<0.000***
$R_m^2 = 0.507$	Abundance	-12.90	41.80	1	0.092	Species diversity	0.21	1	5.83	0.039*
$R_c^2 = 0.967$						Soil depth; Species diversity	1.94	2	26.46	<0.000***