Supplementary Materials

Table S1: The results of the two-way ANOVA on the effects of vegetation restoration stages and locations (inside or outside shrubs) on vegetation characteristics. Significant results are indicated by asterisks. (*$P < 0.05$, **$P < 0.01$, *** $P < 0.001$)

Factor	Df	Richness		Shannon-Wiener index		Community height		Biomass	
		F	P	F	P	F	P	F	P
restoration stages	2	172.61	0.00***	58.49	0.00***	159.35	0.00***	277.37	0.00***
locations	1	46.61	0.00***	1.34	0.25	319.62	0.00***	295.08	0.00***
restoration stages×locations	2	41.03	0.00***	2.36	0.10	0.58	0.56	72.48	0.00***

Table S2: Results of three-way ANOVA of vegetation restoration stage, location (inside or outside shrubs) and soil layer on soil physical characteristics. Significant results are indicated by asterisks. (*$P < 0.05$, **$P < 0.01$, *** $P < 0.001$)

Factor	Df	SWC		Clay		Silt		Sand	
		F	P	F	P	F	P	F	P
Restoration stages	2	71.58	0.00***	87.24	0.00***	66.97	0.00***	132.85	0.00***
Locations	1	91.83	0.00***	19.19	0.00***	71.96	0.00***	93.75	0.00***
Soil layer	1	13.91	0.00***	8.39	0.00**	15.17	0.00***	25.77	0.00***
Restoration stages×Locations	2	0.29	0.74	8.02	0.00***	6.27	0.00**	14.12	0.00***
Restoration stages×Soil layer	2	1.40	0.25	1.46	0.24	2.56	0.08	2.46	0.09
Locations×Soil layer	1	0.13	0.72	0.06	0.81	8.39	0.01**	5.24	0.05*
Restoration stages×Locations×Soil layer	2	1.61	0.20	0.64	0.53	3.54	0.05*	2.31	0.10

Table S3: The results of the three-way ANOVA on the effects of vegetation restoration stages, locations(inside or outside shrubs), and soil layers on soil chemical characteristics. Significant results are indicated by asterisks. (*$P < 0.05$, **$P < 0.01$, *** $P < 0.001$)

Factor	Df	SOC		TN		TP		pH	
		F	P	F	P	F	P	F	P
Restoration stages	2	59.029	0.00***	23.535	0.00***	1.89	0.15	48.28	0.00***
Locations	1	15.829	0.00***	133.738	0.00***	0.07	0.79	48.08	0.00***
Soil layer	1	6.135	0.05*	5.503	0.05*	7.83	0.01**	6.465	0.05*
Restoration stages×Locations	2	3.581	0.05*	2.454	0.09	18.53	0.00***	50.64	0.00***
Restoration stages×Soil layer	2	1.090	0.34	7.525	0.00***	3.11	0.05*	2.204	0.11
Locations×Soil layer	1	0.964	0.33	0.009	0.93	1.77	0.19	1.746	0.19
Restoration stages×Locations×Soil layer	2	0.353	0.70	19.987	0.00***	3.077	0.05*	1.898	0.15