Supplementary Materials

Table S1.

Changes of soil bulk density (BD), soil pH and soil water content (SWC) under different grazing densities. Values of a parameter labeled with different letters differ significantly between control (CK), light grazing (LG), and moderate grazing (MG).

Time	Soil properties	Grazing intensities	Soil depth		
			0-10 cm	10-20 cm	20-30 cm
2016	BD	CK	1.390±0.051a	1.460±0.014a	1.398±0.015a
		LG	1.359±0.030a	1.400±0.020ab	1.397±0.031a
		MG	1.362±0.018a	1.372±0.030b	1.415±0.024a
	pH	CK	6.788±0.084a	6.914±0.124a	7.057±0.302a
		LG	6.891±0.109a	6.999±0.083a	7.336±0.154a
		MG	6.979±0.215a	7.561±0.287a	7.612±0.238a
	SWC	CK	4.345±0.126a	4.783±0.207a	6.316±0.736a
		LG	4.507±0.131a	4.662±0.216a	4.930±0.203a
		MG	5.303±0.536a	6.020±0.730a	5.585±0.481a
2019	BD	CK	1.552±0.018a	1.682±0.013a	1.756±0.024a
		LG	1.522±0.047a	1.666±0.017a	1.681±0.052a
		MG	1.486±0.026a	1.723±0.025a	1.787±0.019a
	pH	CK	6.989±0.122a	7.249±0.173a	7.169±0.071ab
		LG	6.916±0.101a	7.076±0.151a	7.077±0.089a
		MG	7.104±0.077a	7.408±0.096a	7.518±0.100b
	SWC	CK	11.283±0.519a	5.995±0.167a	5.506±0.584a
		LG	8.857±0.920a	6.655±0.701a	6.500±0.665a
		MG	8.089±0.960a	9.080±1.048a	6.408±0.526a
2020	BD	CK	1.553±0.024a	1.719±0.026a	1.727±0.023a
		LG	1.558±0.026a	1.709±0.024a	1.733±0.020a
		MG	1.548±0.028a	1.698±0.018a	1.731±0.022a
	pH	CK	7.483±0.084a	7.531±0.124a	7.648±0.302a
		LG	7.548±0.109a	7.471±0.083a	7.646±0.154a
		MG	7.537±0.215a	7.738±0.287a	8.163±0.238b
	SWC	CK	14.349±0.801a	11.206±0.364a	8.745±0.293a
		LG	13.594±1.116ab	10.973±0.655a	9.845±0.570a
		MG	9.782±1.332b	8.964±0.788a	8.415±0.462a

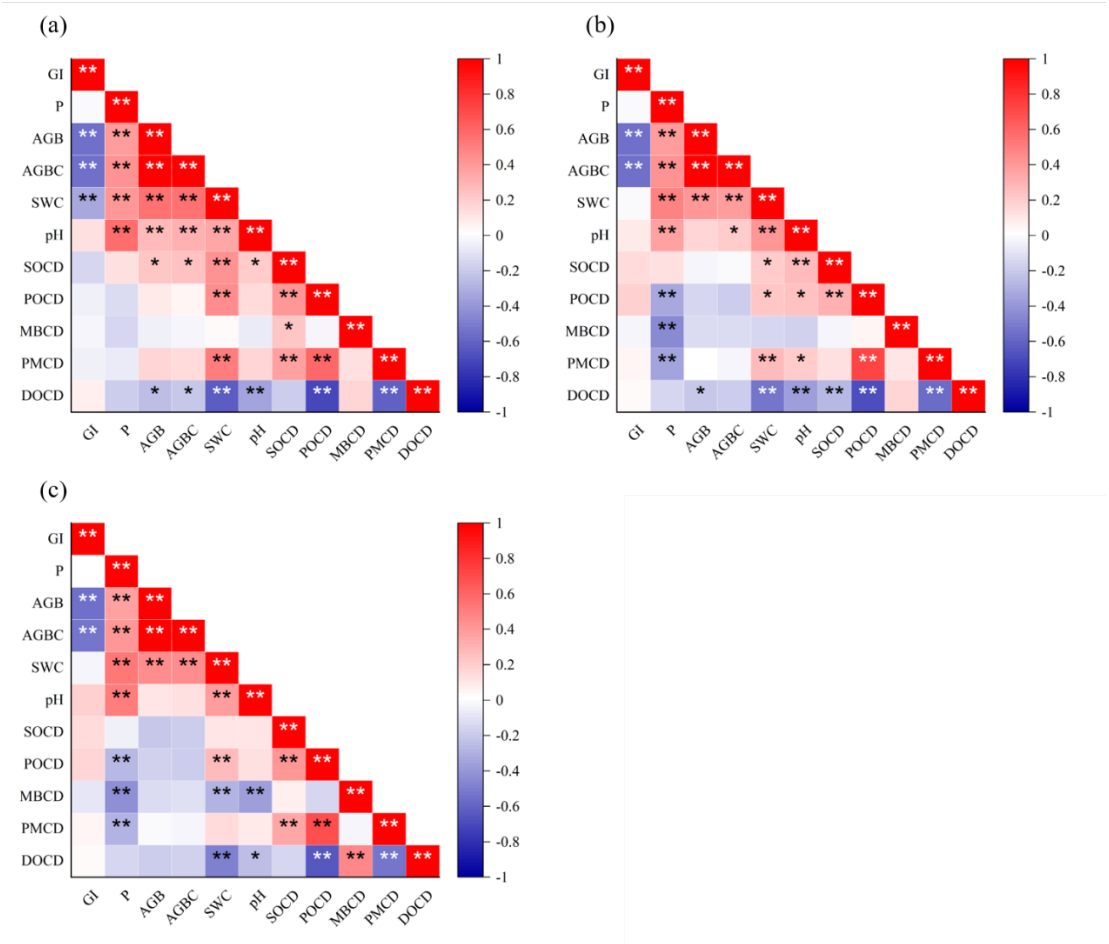


Fig. S1. Relationships between variables including GI, P, AGB, AGBC, SWC, pH, SOCD, POCD, MBCD, PMCD and DOCD. Panels (a), (b) and (c) represent the 0–10 cm, 10–20 cm and 20–30 cm soil layers, respectively. GI: grazing intensity; P: precipitation; AGB: aboveground biomass; AGBC: aboveground biomass carbon density; SWC: soil water content; pH: soil pH; SOCD: soil organic carbon density; POCD: soil particulate organic carbon density; MBCD: soil microbial biomass carbon density; PMCD: soil potentially mineralizable carbon density; DOCD: soil dissolved organic carbon density. *, $p< 0.05$; **, $p < 0.01$.

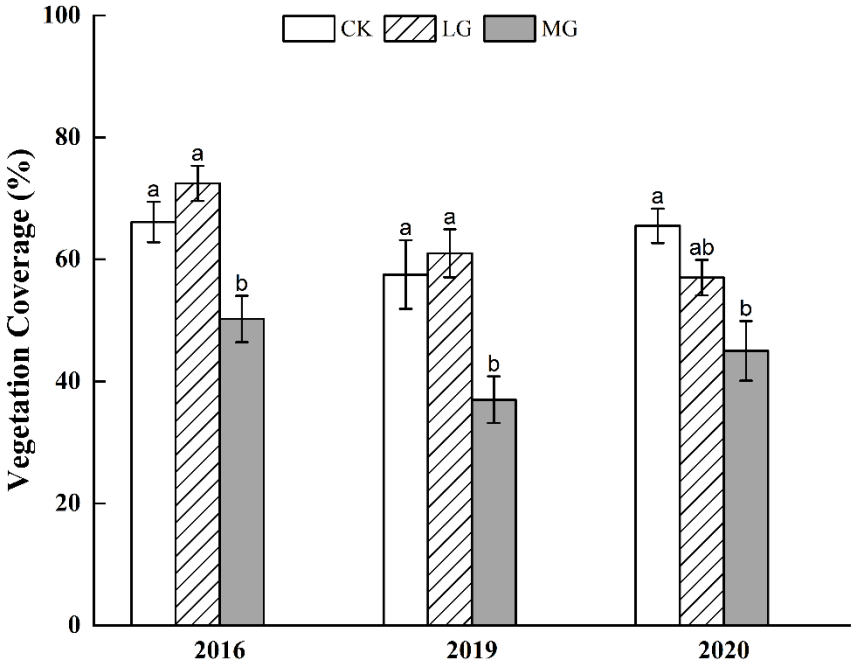


Fig. S2. Effects of different grazing intensities on vegetation coverage in 2016, 2019 and 2020. Values are means ± standard error (SE) (n = 9). Values of a parameter labeled with different letters differ significantly between control (CK), light grazing (LG), and moderate grazing (MG).

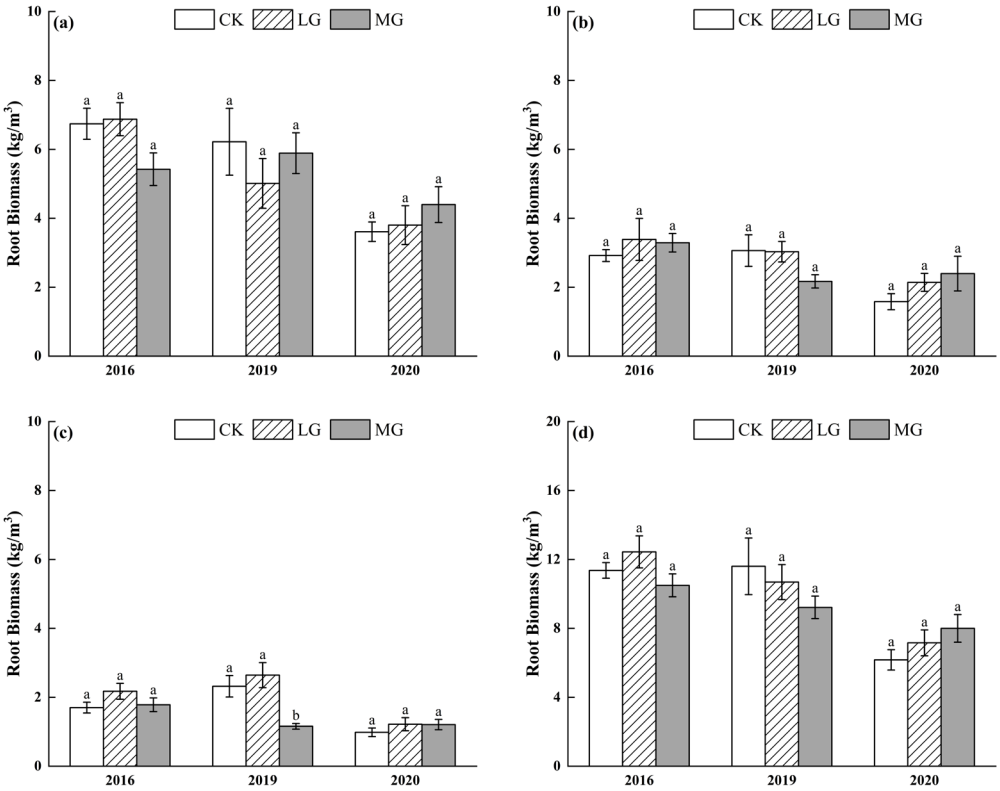


Fig. S3. Effects of different grazing intensities on root biomass in 2016, 2019 and 2020 for the (a) 0–10 cm layer; (b) 10–20 cm layer; (c) 20–30 cm layer; (d) 0-30cm layer. Values are means ± standard error (SE) (n = 9). Values of a parameter labeled with different letters differ significantly between control (CK), light grazing (LG), and moderate grazing (MG).

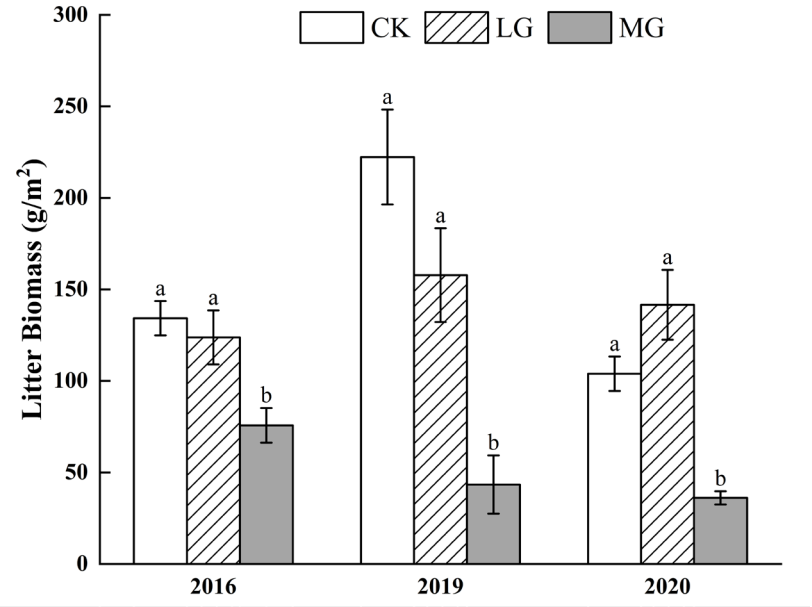


Fig. S4. Effects of different grazing intensities on litter biomass in 2016, 2019 and 2020. Values are means ± standard error (SE) (n = 9). Values of a parameter labeled with different letters differ significantly between control (CK), light grazing (LG), and moderate grazing (MG).