

Effects of different management on soil organic carbon dynamics in Chinese grassland systems

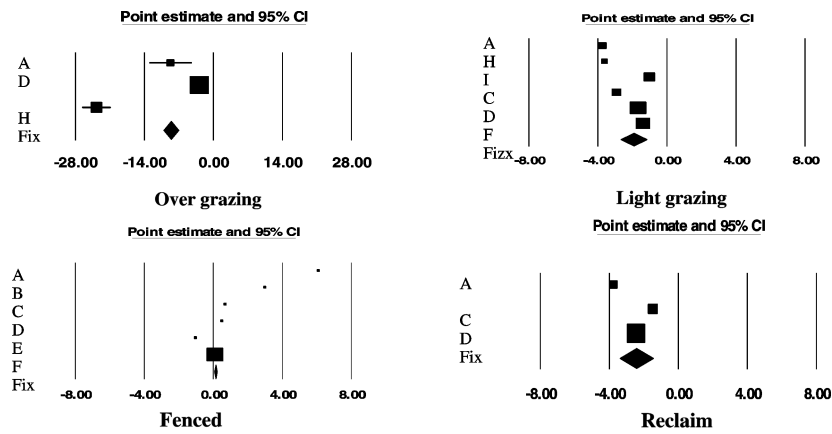
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Introduction The grassland ecosystem is one of the most important land ecosystems in the world . In China grassland area is nearly 400million ha , occupies 41.7% of the national territory area . Meanwhile it is a large global carbon storage (Cheng et al . , 2000) . Therefore , it is a vital significance to study the effects of the human management on soil organic carbon dynamics in grassland ecosystems .

Materials and methods By reviewing one hundred references and analyzing the change of soil organic carbon under grassland management in long-term experiment , we built the SOC&MANAGEMENT database . Finally , we used meta-analysis to estimate carbon annual change with grassland management in China .



A :alpine meadow B :mountain meadow C :temperate meadow D :temperate steppe E :temperate desert F :temperate desert steppe H :alpine steppe I :shubby grassland

Figure 1 The annual increase (t C · hm⁻² · yr⁻¹) of SOC and grassland for types of management in China .

Results In the Figure 1 , the diamond position and the size have represented the fixed estimate effect and 95% confidence interval . There is a large SOC losses under the over-grazing condition : -8.677tC · hm⁻² · yr⁻¹ while the light grazing and reclamation makes the SOC decreased respectively : -1.95tC · hm⁻² · yr⁻¹ and -2.455tC · hm⁻² · yr⁻¹ . The enclosure management increased the soil organic carbon : 0.096tC · hm⁻² · yr⁻¹ .

Conclusions The soil structure in grassland aggravates unceasingly with the grazing intensity increasing . In addition , massive organic matter expose in the air , which accelerates the decomposition of SOC and reduces the carbon accumulation . But the conversion of grassland into farmland leads the aboveground biomass to move away and reduce the biological carbon transportation into underground . However , the fenced grassland can increase the SOC as it was not affected by the domestic animal or human management .

References

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