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论文

黄土高原草地植被与土壤固碳量研究

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摘要:

在黄土高原自东南向西北,采用样带多点调查与定位监测相结合的研究方法,系统分析了不同草地类型封禁初期和封禁11 a草地生物量与固碳量变化特征。结果表明:4种草地类型地上活体植物、凋落物/地下活体根系和土壤中碳密度与碳储量分布规律均为森林草原＞梁塬典型草原＞丘陵典型草原＞荒漠草原;草地封禁11 a,地上活体植物、凋落物、0~100 cm活体根系和土壤中碳密度总量,森林草原类型为63.38~97.65 $t \cdot hm^{-2}$,梁塬典型草原类型为49.04~68.80 $t \cdot hm^{-2}$,丘陵典型草原类型为52.33~62.11 $t \cdot hm^{-2}$,荒漠草原类型为11.93~19.62 $t \cdot hm^{-2}$;碳储量4种草地类型分别为230.287 7 Tg C、332.306 7 Tg C、484.055 5 Tg C和113.856 3 Tg C;黄土高原草地总固碳量为573.10 Tg C,其中:活体植物为42.89 Tg C,占总固碳量的7.48%;凋落物为80.40 Tg C,占14.03%;活体根系为108.66 Tg C,占18.96%;土壤为341.15 Tg C,占59.53%。这充分表明,封禁不仅能使草地植被快速恢复和生物量增加,而且也是提高草地固碳潜力的一条重要途径。

关键词: 黄土高原 天然草地 固碳量 碳密度

Grassland Vegetation and Soil Carbon Sequestration in the Loess Plateau

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Abstract:

The features of biomass and carbon sequestration were studied based on multi-point transect survey and combined with positioning monitoring methods for different type of grasslands from southeast to northwest in the Loess Plateau. The data were obtained for the pre- and post- 11-year fencing. Results showed that carbon density and storage were decreased from southeast to northwest with an exponentially trend among four-type grasslands. In each type of grassland (aboveground living plants, litter/underground of soil root and soil), the characteristics of distribution of carbon density and storage presented a tendency: forest steppe>plateau steppe>hilly steppe>desert steppe. Grassland carbon density and storage, which included living plants, litter, 0—100cm depth of soil root and soil, were 63.38—97.65 $t \cdot hm^{-2}$ and 230.2877 Tg C for forest steppe, 49.04—68.80 $t \cdot hm^{-2}$ and 332.3067 Tg C for plateau steppe, 52.33—62.11 $t \cdot hm^{-2}$ and 484.0555 Tg C for hilly steppe and 11.93—19.62 $t \cdot hm^{-2}$ and 113.8563 Tg C for desert steppe respectively, after 11-year fencing. The total carbon sequestration of grasslands was 573.10 Tg C after 11-year fencing on the Loess Plateau. Among which, living plant was 42.89 Tg C (7.48% of the total carbon sequestration), litter was 80.40 Tg C (14.03%), living root was 108.66 Tg C (18.96%), and soil was 341.15 Tg C (59.53%). In conclusion, our results demonstrated that grassland fencing can not only restore vegetation and increase biomass, but can also significantly improve grassland carbon sequestration potential.

Keywords: Loess Plateau natural grassland carbon sequestration carbon density

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