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不同封育年限草地土壤有机质组分及其碳库管理指数

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Soil organic matter fractions and soil carbon management index in grasslands with different fencing ages

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摘要 土壤有机质对草地封育的生态效应具有重要指示作用，本文结合野外调查和室内分析，研究了半干旱区不同封育年限草地土壤有机质组分及其碳库管理指数变化，以分析土壤有机质对草地封育的响应特征，从而为该区土壤质量的改善和植被建设的生态效应评价提供依据。研究结果表明，土壤有机质及不同活性有机质含量均随土层加深而降低，且在各土层基本表现出封育18年、封育23年>封育13年>未封育>封育3年的趋势。除封育3年土壤的3种活性有机质碳库管理指数在0—90cm土壤剖面均低于100外，封育13年草地0—60cm土层、封育18和23年草地0—90cm土层的3种活性有机质碳库管理指数均高于100，表明随年限的延长，封育对土壤有机质的改善深度也在加深。土壤3种活性有机质与有机质及多数土壤性质呈极显著正相关，能更为灵敏和直观地表征土壤管理的长期效应和土壤质量变化。

关键词： 有机质 活性有机质 碳库管理指数 草地封育 不同年限

Abstract: Soil organic matter is an important index to indicate ecological effects of grassland fencing. In this paper, soil organic matter fractions and carbon management index were studied by applying field investigation and laboratory analysis in semi-arid grasslands receiving different years of fencing. The response of soil organic matter to grassland fencing, which is essential for the improvement of soil quality and ecosystem rehabilitation, was analyzed. The results showed that the contents of soil organic matter and labile organic matter were decreased with soil depth, and were in order of 18 and 23 years fencing > 13 years fencing > unfencing treatment >3 years fencing. The carbon management index (CMI) of the soils received 3 years fencing was less than 100 in 0-90 cm soil profile, while the carbon management indices in 0-60 cm soils of 13 years fencing treatment, 0-90 cm soils of 18 and 23 years fencing were larger than 100, which indicated that the improvement of soil organic matter by fencing are more deeper in soil profiles with the increase of fencing age. The three labile organic matters were significantly related with soil organic matter and most soil properties, suggesting that labile soil organic matters could sensitively and directly indicate long term effects and soil quality changes with land/soil management.

Keywords: organic matter labile organic matter carbon management index grassland fencing fencing age

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