International Grassland Congress Proceedings

21st International Grassland Congress / 8th International Rangeland Congress

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The 21st International Grassland Congress / 8th International Rangeland Congress took place in Hohhot, China from June 29 through July 5, 2008.

Proceedings edited by Organizing Committee of 2008 IGC/IRC Conference

Published by Guangdong People's Publishing House

Presenter Information

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Key words : Loess plateau , Different land use , Soil organic carbon , Soil microbial biomass C

Introduction The soil organic carbon (SOC) and microbial biomass C (MB-C) play key roles in soil conservation , agriculture production , and global environmental changes . Land use and management practices have great influence on SOC and MB-C . Pool size and activity changes in components of soil organic can be influenced by many factors , including climate and land use . The objective of this study was to investigate changes in SOC and MB-C after conversion to different land use .

Materials and methods The study was conducted at Semi-Arid Climate and Environment Observatory of Lanzhou University (35°57′ N , 104°09′ E) . Soil type is Sierozem , elevation is 1966 m , mean air temperature is 6 .7℃ , mean annual rainfall is about 382 mm . Four sites [fenced grassland (FG) ,grazing grassland (GG) , millet field (MF) and fallow cropland (FC)] , each 1 hm2 and adjacent to each other , were selected for the study . FG and GG : dominant grass was Stipa . Bungeana , fenced in Oct . 2005 . MF : planted S . italica (L .) Beauv . FC : fallowed in 2006 and 2007 . Both organic manure and chemical fertilizer were applied to croplands except in the fallowing year . Three sample plots (50×50 m^2) were randomly located within each site . In May 2007 , ten soil samples at five soil depths (0-60cm) were taken in each plot using soil cores and each five soil samples from same depth were mixed together . Soil samples were analyzed organic carbon and microbial biomass C . Data were analyzed using General ANOVA .

Results The data was shown in Table 1 , SOC and MB-C in the 0-10 cm layer decreased in the order : FG>GG>MF>FC . But in the 10-20 cm and 20-30 cm layers , SOC in FG and GG were almost at the same level . In MF and FC soil , the maximum SOC was in the 20-30 cm . SOC and MB-C of FG and GG were decreased with increased soil depth . MB-C of FC in the 20-30 cm layer was higher by 51% than those in the 10-20 cm . MB-C of MF in 10-30 cm layers was higher than in FG , GG and FC (Table1) .

Table 1 *Change of SOC and MB-C under different land use regimes*
The data in the table are means (SE) , different capital letters in the same row mean significant difference at $P<0.05$;the different lower cases in the same column mean significant difference at $P<0.05$.

Soil depth	SOC (g/kg)			
	FG	GG	MF	FC
0—10 cm	9 .1(0 .5)aA	8 .9(0 .6)aA	7 .5(0 .1)bB	7 .2(0 .2)bB
10—20 cm	6 .7(0 .3)bAB	6 .4(0 .2)bB	7 .9(0 .3)abA	7 .4(0 .3)bA
20—30 cm	5 .9(0 .6)bB	5 .6(0 .6)bB	8 .2(0 .4)aA	9 .3(0 .5)aA
	MB-C (mg/kg)			
	FG	GG	MF	FC
0—10 cm	141 .4(4 .7)Aa	107 .6(8 .1)Ba	105 .7(2 .8)Ba	40 .0(1 .6)Ca
10—20 cm	27 .35(2 .9)Cb	46 .15(6 .0)Bb	99 .60(2 .1)Aa	16 .9(0 .9)Cc
20—30 cm	26 .63(3 .1)Bb	25 .50(0 .5)Bc	80 .99(1 .3)Ab	25 .7(0 .8)Bb

Conclusions The SOC and MB-C in 0-10 cm layer decreased in the order : fenced grassland>grazing grassland>millet field>fallow cropland . The SOC in the 10-20cm soil layers were shown millet field>fallow cropland>fenced grassland>grazing grassland . Fertilization and human activities were found to have major impacts on SOC . The MB-C of MF was higher in the 10-20 cm and 20-30 cm than FG , GG and FC . After land use change , soil microbial biomass was affected , fallowed cropland is more sensitve than others , two grasslands also have small change . Different land use has been shown to have profound influence on MB-C and SOC .

Acknowledgment This study was sponsored by the China National Key Projects for Basic Scientific Research (2006CB400501) .