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退耕还果对黄土高原沟壑区坡地土壤和植被碳、氮储量的影响

李泽[1]，郭胜利[1,2*]，张芳[1]，邹俊亮[1]

1 西北农林科技大学资源环境学院，陕西杨凌，712100；

2 黄土高原土壤侵蚀与旱地农业国家重点实验室，中国科学院水利部水土保持研究所，陕西杨凌712100

Effects of apple orchard converted from cropland on C and N storages in terrestrial system of slopping cultivated land in the Loess Gully Regions

LI Ze[1]，GUO Sheng-li[1,2*]，ZHANG Fang[1]，ZOU Jun-liang[1*]

2 State Key Laboratory of Soil Erosion and Dryland Farming on Loess Plateau, Institute of Soil and Water Conservation , Chinese Academy of Sciences and Ministry of Water Resource , Yangling Shaanxi 712100 , China

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摘要 土地利用方式变化是影响陆地生态系统碳储量的重要因素。试验以黄土高原沟壑区王东沟小流域杜家坪坡地果园和邻近农田为对象，分析了坡地退耕还果20年后，地上植被生物量、地下根系生物量以及0—100 cm土层有机碳氮储量的变化及其影响因素。结果表明，坡地果园0—100 cm土层有机碳（SOC）储量为C 50.7 Mg/hm2 低于农田（C 57.3 Mg/hm2），但0—20cm土层，果园SOC储量为C 16.7 Mg/hm2高于农田（C 15.3 Mg/hm2），增幅为9.2%；而在20—100cm土层，SOC含量基本呈现出农田>果园的趋势。果园土壤1m剖面各层次全氮（TN）含量都低于农田，但未达到显著水平。农田退耕为果园20年后，坡地果园植株和根系碳储量（C 19.7Mg/hm2）、氮储量（N 165.9 kg/hm2）约为农田作物（C 3.4 Mg/hm2、N96.8kg/hm2）的5.8和1.7倍。果树主干、枝条和根部的新增生物量是导致果园生态系统碳、氮储量积累的主要因素。

关键词： 果园土壤 土壤有机碳氮 植被碳氮储量 黄土高原沟壑区

Abstract： Land use change plays an important role in organic carbon and total nitrogen storage in a terrestrial system. To better understanding the mechanism of organic carbon in the terrestrial system, soil organic carbon (SOC), total nitrogen (TN) in 0－100cm soil layer, aboveground and belowground biomasses of apple trees were studied in a 20- year of apple orchard converted from croplands, and the effects of converting cropland to apple orchard on carbon and total N storage were evaluated in a terrestrial system in slopping cultivated land of the Loess Gully region. The results show that the SOC storage in 0－100 cm soil in the apple orchard is C 50.7 Mg/ha, which is lower than that in the cropland. For topsoil (0－20cm), SOC storage in the apple orchard is increased by 9.2% compared to the cropland, while for subsoil (20－100cm), SOC storage in the cropland is more than that in the apple orchard. Total N in 0－100cm soil layer of the apple orchard is lower than that in the cropland ($p > 0.05$). Carbon and nitrogen storages in aboveground and root of apple trees are 5.8 and 1.7 times of the crop plants after the 20 year conversion of cropland to apple orchard in the sloping cultivated land. The apple tree stem, branch and root contribute much to the changes in C and N storages in the terrestrial system

Keywords： converting cropland to apple orchard soil organic C and N C and N storages in plant

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Corresponding Authors: 李泽 Email: 294405506@qq.com

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