

黄土高原水蚀风蚀交错区植被地上生物量及其影响因素

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Vegetation above-ground biomass and its affecting factors in water/wind erosion crisscross region on Loess Plateau.

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摘要

采用野外调查的方法,于2009年9月下旬测定了六道沟小流域不同土地利用方式下的地上生物量以及土壤水分含量和养分含量,研究了水蚀风蚀交错区典型小流域植被地上生物量水平及其影响因素.结果表明:六道沟小流域主要植被地上干生物量在177~2207 g·m⁻²;其中,玉米、谷子、弃耕地、人工草地、天然草地和灌木地的地上干生物量分别为2097~2207、518~775、248~578、280~545、177~396和372~680 g·m⁻².农田平均土壤含水量(0~100 cm土层)最高,达14.2%,灌木地最低,为10.9%;弃耕地土壤水分含量的变异系数最大,为26.7%,说明弃耕地土壤水分有很强的空间异质性.土壤平均储水量大小顺序为:农田>人工草地>弃耕地>天然草地>灌木地,苜蓿地和柠条地出现土壤干化现象.植被地上干生物量与0~100 cm土层土壤储水量存在显著正相关关系($r=0.639$, $P<0.05$),地上鲜生物量与植被的株高呈极显著正相关,较高植被的地上生物量可以间接控制水蚀风蚀交错区土壤侵蚀.植被地上生物量与土壤水分、养分具有很高的相关性,但与海拔、坡度、坡向、容重等的相关性不显著.

关键词: 地上生物量 盖度 土壤水分 群落特征 土壤侵蚀

Abstract:

Field investigations were conducted in Liudaogou small watershed in late September 2009 to study the differences of vegetation above-ground biomass, soil moisture content, and soil nutrient contents under different land use patterns, aimed to approach the vegetation above-ground biomass level and related affecting factors in typical small watershed in water/wind erosion crisscross region on Loess Plateau. The above-ground dry biomass of the main vegetations in Liudaogou was 177-2207 g·m⁻², and that in corn field, millet field, abandoned farmland, artificial grassland, natural grassland, and shrub land was 2097-2207, 518-775, 248-578, 280-545, 177-396, and 372-680 g·m⁻², respectively. The mean soil moisture content in 0-100 layer was the highest (14.2%) in farmlands and the lowest (10.9%) in shrub land. The coefficient of variation of soil moisture content was the greatest (26.7%) in abandoned farmland, indicating the strong spatial heterogeneity of soil moisture in this kind of farmland. The mean soil water storage was in the order of farmland > artificial grassland > natural grassland > shrub land. Soil dry layer was observed in alfalfa and caragana lands. There was a significant positive correlation ($r=0.639$, $P<0.05$) between above-ground dry biomass and 0-100 cm soil water storage, and also, a very significant positive correlation between above-ground fresh biomass and vegetation height. The above-ground biomass of the higher vegetations could potentially better control the wind and water erosion in the water/wind erosion crisscross region. Vegetation above-ground biomass was highly correlated with soil moisture and nutrient contents, but had no significant correlations with elevation, slope gradient, slope aspect, and soil bulk density.

Key words: above-ground biomass coverage soil moisture community characteristics soil erosion

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