

黄土塬面果园土壤养分特征及演变

Characteristics and evolution of soil nutrients in apple orchards at the gully region of Loess Plateau

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摘要 为了探明黄土高原沟壑区长期种植果树对果园土壤肥力的影响,应用空间代时间的方法,对不同种植年限果园的土壤肥力状况进行多元统计分析。结果表明,果园土壤全磷、速效磷和速效钾含量丰富,有机质、全氮、碱解氮含量属中等偏下水平。不同果园中各养分变异较大的是土壤速效磷、速效钾,土壤有机质和全氮的变异系数最小。与当地农田土壤养分相比,果园土壤养分除有机质含量差异不显著,全氮含量显著低于农田外,其余养分含量均显著高于农田。总体上看,不同种植年限间果园土壤养分含量差异显著。果园土壤肥力综合指数与种植年限二者之间有显著的相关性,其变化趋势符合 $y = -0.0011x^2 + 0.0419x + 0.2078$ 模型。在黄土高原沟壑区种植果树能够提高土壤肥力,但当果树种植年限超过19年时果园土壤肥力开始衰退,果园生态系统质量下降。

关键词: 果园 种植年限 土壤养分 多元统计分析 土壤肥力指数

Abstract: In order to know the soil nutrient condition and its evolution in apple orchards at the gully region of Loess Plateau, the soil characteristics and their temporal variations in apple orchards with different ages were studied systematically through the approach of substituting the temporal serial with spatial serial. The results show that contents of soil total phosphorus (TP), available phosphorus (AP) and available potassium (AK) are at their high levels, while contents of soil organic matter (OM), total nitrogen (TN) and available nitrogen (AN) are at their low levels. The variation coefficients of soil AP and AK are larger than those of the other soil nutrients in different orchards, and the variation coefficients of soil OM and TN are the lowest. Compared with the farmland ecosystem in the region, soil TN content is lower in the orchard ecosystem, while the other soil nutrients in the orchard are significantly higher than those in the farmland ecosystem. The contents of orchard soil nutrients are significantly different with the increase of land use years. A significant correlation is found between the soil fertility index (SFI) in apple orchards and the land use years, and the correlation could be simulated with: $y = -0.0011x^2 + 0.0419x + 0.2078$. In the apple orchards of the loess gully region, SFI could reach to its highest level after 19 year land using, and then decreased rapidly.

Keywords: orchard planting years soil nutrients multivariate statistical analysis soil fertility index

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