

研究报告

## 西藏高原退化土壤的生物学肥力及其变化特征

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**摘要** 通过3年田间定位试验, 对施肥条件下退化山地灌丛草原土生物学肥力的变化进行了研究. 结果表明, 不施肥状态下的耕层土壤有机质含量较试前呈微弱下降, 施肥条件下土壤生物学肥力呈现出相对一致的特征, 表现在耕层土壤有机质相对较高的积累速率、腐殖质结构明显改善以及土壤细菌的显著增殖等方面, 但土壤微生物区系仍处于极不协调状态; 随着有机肥或化肥的递增, 0~30和30~60 cm土层有机质含量均有显著提高的趋势, 其年均累积量分别达1.35和0.67 g·kg<sup>-1</sup>; 0~30和30~60 cm土层腐殖质碳占有机碳比重、胡敏酸碳占腐殖质碳比重亦均随有机肥或化肥递增而趋于提高; 不同培肥方式对土壤细菌的繁殖与活动均具有极为显著的促进作用, 2~30和30~60 cm土层细菌数量与有机质含量分别呈极显著和显著正相关 ( $r=0.7194$ 、 $0.6042$ ), 对土壤真菌、放线菌的影响则不甚明显; 多数施肥处理下, 不同土层固氮菌、纤维素分解菌数量低于不施肥处理, 耕层土壤固氮菌与纤维素分解菌数量呈负相关 ( $r=-0.4799$ )

**关键词** [退化土壤](#) [土壤培肥](#) [生物学肥力](#) [西藏高原](#)

分类号

## Biological fertility and its dynamics of degraded soil in Tibet Plateau

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### Abstract

In a three-year field trial, this paper studied the dynamics of biological fertility of degraded cultivated mountain shrubby steppe soil in the lower reaches of Lisa River as affected by fertilization. The results showed that under non fertilized condition, the organic matter (OM) content in soil surface layer declined slightly, but after fertilization, the OM in this layer accumulated with a relatively high rate, humus structure improved obviously, soil bacteria had a significant multiplication, while soil microbial community was still in unharmonious state. With the increasing application rate of organic manure or chemical fertilizers, the OM content in 0~30 cm and 30~60 cm soil layers showed a significant increasing trend, with an annual increment being 1.35 and 0.67 g·kg<sup>-1</sup>, respectively, and the ratio of humus carbon (C) to organic C and of humic acid C to humus C was also increased. Fertilization had a significant promotion effect on the multiplication and activity of soil bacteria. There was a significant positive correlation between the numbers of bacteria and OM content in 2~30 cm ( $r=0.7194^{**}$ ) and 30~60 ( $r=0.6042^{*}$ ) cm soil layers, while soil fungi and actinomycetes were not affected by fertilization. The numbers of azotobacter and cellulose decomposing bacteria in different soil layers were lower in most fertilization treatments than in the control, and azotobacter in soil surface layer had a negative correlation with cellulose decomposing bacteria ( $r = -0.4799$ ).

**Key words** [Degraded soil](#) [Soil fertilization](#) [Biological fertility](#) [Tibet Plateau](#)

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