

呼伦贝尔草甸草原优势种贝加尔针茅根系组织和地上部分凋落物的分解

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摘要 采用凋落物分解袋法, 研究了呼伦贝尔草甸草原主要优势种贝加尔针茅(*Stipa baicalensis*)根系组织和地上部分凋落物分解的季节动态以及凋落物的放置位置(置于地表和15 cm土壤表层)对分解的影响。结果表明, 置于表层土壤中的根系组织和地上部分凋落物的分解速率比置于地表的快, 但是根系组织在两个放置位置分解的差异不显著。无论置于地表还是置于表层土壤中, 地上部分凋落物的分解均快于根系组织的凋落物分解。在分解过程中, 凋落物碳(C)损失的季节变化模式与重量损失相似; 而氮(N)变化模式明显不同, 地上部分凋落物表现为释放—累积—释放, 根系则表现为释放—累积, 并且地上部分或者根系在不同放置位置中N含量变化的差异较小。地上部分和根系组织凋落物的初始化学组成的差异可能是导致其分解过程差异显著的主要原因, 其次的原因才是土壤含水量。因此, 该地区未来环境温度、湿度因子的变化将会显著影响贝加尔针茅地上部分凋落物的分解过程, 而对根系组织凋落物的分解作用较小。

关键词: 凋落物分解 分解底物的初始化学组成 根系组织 地上部分 贝加尔针茅

Abstract: *Aims* In grassland ecosystems, decomposition of litter is an important process in nutrient cycling and soil organic matter formation. Our objectives are to explore (1) seasonal dynamics of decomposition of root tissues and shoot litter of *Stipa baicalensis*, a dominant species in a typical meadow steppe in Hulun Buir, Inner Mongolia, China, and (2) the effects on decomposition of placing litterbags on the soil surface vs. in the 15-cm soil layer.

Methods We placed litterbags with root tissues and shoot litter of *S. baicalensis* on the soil surface and in the 15-cm soil layer in May 2010. We collected the litterbags after 1, 2, 3, 5, and 12 months and determined mass loss and carbon and nitrogen content in the remaining litter. Microbial carbon and nitrogen contents were determined in the laboratory.

Important findings The mass loss rates of root and shoot litter were smaller on the soil surface than in the 15-cm soil layer, but the mass loss rates of root litter were not significantly different at the two positions. Irrespective of decomposition position, shoot litter decomposed faster than root tissues. Seasonal variation of carbon release showed a similar pattern with mass loss during decomposition. But seasonal variation patterns for nitrogen release were significantly different between shoot litter and root tissues. Nitrogen release of shoot litter exhibited a pattern of release—increase—release and that of root a pattern of release—increase. Nitrogen content difference in shoot or root litter was relatively small at both decomposition positions. Initial chemical compositions and soil moisture played dominant roles in seasonal dynamics of decomposition of root tissues and shoot litter. Findings suggest that future changes of temperature and soil moisture will markedly influence shoot decomposition, but not root decomposition in this meadow steppe.

Keywords: decomposition, initial chemical composition of decomposition substrate, root tissues, shoot, *Stipa baicalensis*

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