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专论与综述

放牧对草地的作用

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摘要 从牧草生长、种群、群落、土壤和生态系统5个方面分析了放牧的作用、机理与途径。放牧改变牧草的物质与能量分配格局，多途径地诱导牧草的补偿性生长，取决于放牧制度等因素。放牧还改变种间竞争格局、调控种群更新，以及群落结构和功能。介绍了草地健康管理的阈限双因子法，讨论了稳定态-过渡态假说和草地灌丛化。家畜对土壤有直接和间接两种作用途径，作用效果与放牧强度、季节、地形有密切关系，重点分析了放牧对土壤C贮量的作用机制。阐述了提高放牧系统生产力的系统耦合机制，以及放牧对生态系统物质循环的影响。根据放牧生态学的发展趋势和我国放牧管理现状，提出7项值得深入研究的问题。

关键词 放牧；草地；牧草；土壤；放牧生态系统；放牧生态学

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Effects of grazing of livestock on grassland

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Abstract The effects of grazing on herbage growth, population, community, soil and ecosystem were analyzed on the mechanisms and approaches in this paper.Grazing changed the allocation of mass and energy in aboveground and underground parts of herbage. The effects of grazing on the herbage growth depended on the grazing system, grazing animal, grazing intensity, grazing season, grazing cycle and vegetation component. Grazing also resulted in the compensatory growth of herbage by changing external factors and internal factors including improvement of canopy microclimate and soil properties, increase in photosynthetic ability and a decrease in respiration rate.

Grazing livestock changes the interspecies competition through the direct action of ingestion and indirect action such as the change of soil properties. The regeneration of herbage was impacted by the ingestion, excrement and trampling of livestock. The factors affecting the structures and function of the herbage community consisted of biotic components, abiotic components and social components, of which active mechanism were discussed.

The state-and-transition hypothesis of community succession gave a satisfactory explanation for the change in grazing land, while shrub invasion could not account for the degradation resulting from only grazing.

Grazing intensity, grazing period and topography altered the response of soil to grazing, in which the direct actions included intake, trampling and excrement, and indirect action factors included the population structure, community structure, fertile island effect and topography. The response mechanisms of soil carbon to grazing were analyzed for soil respiration, litter C production and microbial biomass C.

The mechanisms of temporal coupling, spatial coupling and interspecific coupling between herbag

e and livestock were discussed in order to improve productivity and health level of the grazing ec
osystem. The effects of grazing on cycle of carbon, nitrogen and other elements and their respons
e to global change were analyzed.
According to development of international scientific research and requirement of pasture-livestoc
k production in China, we suggest that animal selection in grazing management, release of the pro
ductive potential by compensatory growth, improvement of the scientific contents of feeding anim
als according to herbage and grazing intensity, fertilization management of grazing land, counterme
asures of grazing management based on the global change and the health management of grazing e
cosystem should be involved in the further study on grazing management.

Key words grazing land； herbage； soil； grazing ecosystem； grazing ecolog
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