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藏北高寒草甸植物群落对土壤线虫群落的影响

Effect of plant community on soil nematode community in alpine meadows in North Tibet

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中文摘要:

2011年5月—11月,对西藏北部高寒草甸3种典型植物群落下0~30 cm范围内不同深度土层的土壤线虫群落进行调查,浅盆法收集土壤线虫,应用个体密度、多样性指数等特征值来分析高寒环境下土壤线虫群落的组成、分布特征与多样性。调查共分离得到33 038条土壤线虫,隶属于2纲6目51科93属;线虫个体密度平均为847条 100 g^{-1} 干土;表聚性明显。研究表明,不同植物群落间的土壤线虫群落组成存在一定差异,土壤线虫数量的大小顺序为委陵菜植物群落<藏北高草植物群落<高山高草植物群落,土壤线虫数量差异显著($p<0.05$);土壤线虫数量随生长季变化发生明显波动,返青期最多,盛长期次之,枯草期最低;不同植物群落的优势属种类不同。生物多样性为委陵菜植物群落>高山高草植物群落>藏北高草植物群落,这可能是放牧干扰强度不同,以及植物群落影响下的土壤性质分异所导致的结果。总之,不同植物群落下土壤线虫群落特征的分异初步显示出线虫指示环境因子影响土壤生态系统的潜力。

Abstract:

During the period from May to November, 2011, a survey was carried out to investigate variation of soil nematode communities in different soil layers varying from 0~30 cm as affected by plant community in alpine meadows in North Tibet. The shallow dish method was adopted for nematode extraction. In order to analyze composition, distribution and diversity of nematode communities in an extremely cold condition, indices, such as individual density, genus number and diversity, were applied in the research. A total of 33 038 nematodes were extracted and sorted into 93 genus, 51 families, 6 orders and 2 phylums. The average individual density of the nematodes was 847 idv 100 g^{-1} dry soil. They were found mainly in the top soil. Differences in nematode community were found existing between meadows different in plant community. In terms of population of nematodes, the three alpine meadows followed an increasing order of *Potentilla* < *Kobresia littledalei* < *K. pygmaea*, and the differences are distinctive ($p<0.05$); while in terms of genus number, an reverse order went like *Potentilla* > *Kobresia littledalei* > *K. pygmaea*. Quantity and genus number of nematodes were fluctuated sharply during the period. The plant reviving period was the highest and followed by the flourishing period and the withering period. Dominant species varied with plant community. In terms of biodiversity, the three meadows follow an order of *Potentilla* > *K. pygmaea* > *Kobresia littledalei*. This might be explained by disturbance of grazing, as well as soil properties as affected by different plant communities. Therefore, nematodes can be used as a potential indicator for analyzing impacts of environmental factors on soil ecosystems.

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