

Utilization of Fertilization aimed to Restoration of Degraded Grassland in Inner Mongolia, China

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Keywords: Grassland, Inner Mongolia, Fertilization, Phosphorus

中国内蒙古自治区における退化草原の修復へ向けたリン酸窒素混合施肥の活用に関する研究

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キーワード：草原, 内蒙古自治区, 施肥, リン

Abstract: Grassland degradation is one of the most serious environmental problem in Inner Mongolia, China. However, there is no effective solution ever. Although it has been widely accepted that main cause of this problem is overgrazing, our previous study has pointed out other factor that phosphorus contents in soil and grass have drastically decreased in past 50 years with production in grassland, such as livestock farming or meadow setting, and biogeochemical cycle has been broken. Indeed, our research group had proved that nitrogen and phosphorus mixed fertilization could increase plant biomass only for 80 days.

On the other hand, nutrients had stocked only in plant body, not so much in soil after one time of fertilization. To increase soil nutrition stocks, soil microbes should decompose plant litter into available minerals. Therefore, we started to focus on activities of soil microbes because they decompose soil organic matter and provide available minerals to plant. In addition, we have found that activities of soil microbes have not been affected by fertilization but they have enhanced their activities under much precipitation. Based on these results, we are undergoing collaborative restoration projects aimed to restore biogeochemical cycle of grassland with a local institute and company in Inner Mongolia.

要旨：中国内蒙古草原では草原退化が深刻化しており、修復方法の確立が急がれている。先行研究により、過去 50 年間で土壌および植物中のリンが激減していたことが明らかになり、草原退化の要因として植物-土壌-家畜の間の物質循環の破たんが示唆された。また、このような草原にリン酸および窒素を施肥すると、80 日間で植物の量は約 2 倍に増加した。一方で、養分物質は植物体内に吸収され、草原の土壌中養分のストックは増えていなかった。そこで、物質循環に着目し、有機物の低分子化・再利用を行う微生物の活性について調査した。その結果、土壌微生物の活性は施肥の影響は受けないものの、降水量が多い条件下では高くなることが明らかになった。このデータに基づき、本研究室では現地の研究機関や企業と共に、大規模な新規修復プロジェクトへ向けて準備を進めている。