

植物生产层

羊草生物量和养分分配对养分和水分添加的响应

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摘要:

本研究通过3个盆栽控制试验(施氮肥试验, 0、0.5、1、2、4、8、16、32、64和128 g·m<sup>-2</sup> 10个水平;施磷肥试验, 梯度同施氮肥试验;控水试验, 11.5、12.7、14.3、16.4、19.1、22.9、28.7、38.2、57.3和114.6 mL·cm<sup>-2</sup> 10个水平),探讨了养分和水分改变对羊草(*Leymus chinensis*)生物量和养分分配的影响。结果表明,随着氮肥和磷肥施用量的增加,羊草地上、地下生物量和养分库呈先增加后降低的趋势,根冠比呈降低的趋势;随着水分供给增加,羊草地上、地下生物量和养分库亦呈现出先增加后降低的趋势,根冠比无明显变化;生长旺期地上生物量和养分库高于地下部分,生长末期地下生物量和养分库高于地上部分。

关键词: 生物量分配 羊草 氮添加 养分分配 磷添加 盆栽控水

Responses of biomass, nutrient allocation of *Leymus chinensis* along N, P and water gradients

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Abstract:

Three pot experiments, which included two fertilization experiments (N or P fertilizer) with 10 levels of 0, 0.5, 1, 2, 4, 8, 16, 32, 64, 128 g·m<sup>-2</sup> and a water supply experiment at 11.5, 12.7, 14.3, 16.4, 19.1, 22.9, 28.7, 38.2, 57.3, 114.6 mL·cm<sup>-2</sup>, were conducted to evaluate effects of N or P fertilizer and watering on biomass and nutrient allocation of *Leymus chinensis* in this study. The results showed that with increase of N and P application, biomass and nutrient contents of both aboveground and underground of *L. chinensis* tended to increase firstly and then decrease, while root/shoot ratios showed decreasing trends. The responses of biomass and nutrient contents of both aboveground and underground to water gradients were similar as those to the nutrient gradients, but the root/shoot ratios did not show significant change in the water supply experiment. The biomass and nutrient contents of aboveground were higher than those of underground during growth season (in August), whereas there was a contrary trend at the end of growth season (in October). These results indicate that changes in N, P and water availabilities in soil could affect the accumulation of biomass and nutrients both in aboveground and underground of *L. chinensis* substantially; more biomass and nutrients were allocated to aboveground in August and then transferred to underground at the end of growth season. Therefore, global climate change changed growth and nutrient use of plant, which will further influence structure and function of the plant-soil system in Inner Mongolia temperate steppes.

Keywords: biomass allocation *Leymus chinensis* N addition nutrient allocation P addition water control in pot culture

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