

研究报告

苜蓿与沙打旺苗期生长和水分利用对土壤水分变化的反应

徐炳成; 山仑; 李凤民

中国科学院水利部水土保持研究所 黄土高原土壤侵蚀与旱地农业国家重点实验室, 西北农林科技大学, 杨凌 712100

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摘要

通过室内生长箱内盆栽实验,比较了苜蓿和沙打旺苗期的根冠生长和水分利用对5种土壤水分环境变化的响应和差异.结果表明,充分供水下苜蓿和沙打旺苗期生物量和蒸腾效率均最高,苜蓿均显著高于沙打旺.土壤水分减少后苜蓿苗期生物量和蒸腾效率下降幅度均大于沙打旺.从低水到阶段低水处理后土壤水分逐渐降低和降低后再复水到低水处理,苜蓿和沙打旺的生物量分别较持续低水处理显著减少47.8%和27.9%.旱后复水后苜蓿根冠比和单位根量耗水量较显著增加,蒸腾效率显著下降;沙打旺根冠比显著下降,单位根量耗水量和蒸腾效率变化不显著.

关键词 [苜蓿; 沙打旺; 苗期生长; 土壤水分; 耗水量](#)

分类号

Responses of *Medicago sativa* and *Astragalus adsurgens* seedlings growth and water use to soil moisture regime

XU Bingcheng, SHAN Lun, LI Fengmin

State Key Laboratory of Soil Erosion and Dryland Farming on the Loess Plateau, Institute of Soil and Water Conservation, CAS and MWR, Northwest A & F University Yangling 712100, China

Abstract

In the semi-arid area of Loess Plateau, seasonal drought often occurs during the vegetative stage of grass plants, leading to the subsequent serious reduction of their yield. Aimed to study the responses of the seedlings growth and water use of two perennial leguminous grasses *Medicago sativa* and *Astragalus adsurgens* to different soil moisture regimes, a pot experiment was installed with five treatments, i.e., adequate water supply (HW), moderate water stress (LW), soil drying gradually from HW (DHW) and LW (DLW), and refilling water to LW after soil drying from LW (RWL). The results showed that under HW, the seedlings of both *M. sativa* and *A. adsurgens* had the highest biomass and transpiration water use efficiency (TWUE), and *M. sativa* had a significantly higher biomass than *A. adsurgens* ($P < 0.05$). When the soil moisture content declined, *M. sativa* had a higher reduction rate in biomass and TWUE than *A. adsurgens*, and after the soil moisture regime changed from LW and DLW to RWL, the biomass of *M. sativa* and *A. adsurgens* was reduced by 47.8% and 27.9%, respectively, as compared to LW ($P < 0.05$). At the same time, the root/shoot ratio (R/S) of *M. sativa* and its water consumption per unit root increased significantly, while the TWUE decreased significantly ($P < 0.05$); but for *A. adsurgens*, its R/S decreased significantly ($P < 0.05$), while the TWUE and the water consumption per unit root had no significant change.

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