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地上竞争与地下竞争对科尔沁沙地榆树幼苗生长的影响

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Effects of aboveground and belowground competition between grass and tree on elm seedlings growth in Horqin Sandy Land.

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摘要 榆树疏林草原对科尔沁沙地植被恢复和景观保护有着重要意义.本文采用双因素两水平控制试验，从幼苗生物量、地下/地上生物量、茎高、根茎比、叶片数等方面，研究了草-树地上、地下竞争对科尔沁沙地榆树幼苗生长的影响.结果表明：对于1年生榆树幼苗，单株平均生物量表现为无竞争>地上竞争>全竞争>地下竞争；地下/地上生物量表现为地下竞争>全竞争>无竞争>地上竞争；幼苗高度表现为地上竞争>无竞争>全竞争>地下竞争；根茎比表现为地下竞争>全竞争>无竞争>地上竞争；叶片数表现为地上竞争>无竞争>地下竞争>全竞争.地下竞争对1年生榆树幼苗生长影响显著，而地上竞争对榆树幼苗生长无显著影响.地上竞争与地下竞争对2年生榆树幼苗生长的影响均不显著.科尔沁沙地草本植物对榆树幼苗生长的影响主要通过地下竞争的方式实现，但地下竞争并没有改变榆树幼苗的资源分配方式.随榆树幼苗龄级的增长，草本植物竞争作用的影响逐渐减弱.

关键词： 榆树疏林草原 草-树竞争 天然更新 科尔沁沙地

Abstract： Elm sparse woodland steppe plays an important role in vegetation restoration and landscape protection in Horqin Sandy Land. In this paper, a two-factor and two-level field experiment was conducted to explore the effects of aboveground and belowground competition between grass and tree on the growth of elm seedlings in the Sandy Land. Five aspects were considered, *i.e.*, seedling biomass, belowground biomass/aboveground biomass, stem height, ratio of root to stem, and leaf number. For the one-year-old elm seedlings, their biomass showed a trend of no competition > aboveground competition > full competition > belowground competition, belowground biomass / aboveground biomass showed a trend of belowground competition > full competition > no competition > aboveground competition, stem height showed a trend of aboveground competition > no competition > full competition > belowground competition, root / stem ratio showed a trend of belowground competition > full competition > no competition > aboveground competition, and leaf number showed a trend of aboveground competition > no competition > belowground competition > full competition. Belowground competition had significant effects on the growth of one-year-old elm seedlings, while aboveground competition did not have. Neither belowground competition nor aboveground competition had significant effects on the growth of two-year-old elm seedlings. It was suggested that in Horqin Sandy Land, grass affected the growth of elm seedlings mainly via belowground competition, but the belowground competition didn’t affect the resource allocation of elm seedlings. With the age increase of elm seedlings, the effects of grass competition on the growth of elm seedlings became weaker.

Key words： elm sparse woodland steppe grass-tree competition natural regeneration Horqin Sandy Land

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