

研究论文

生物土壤结皮对荒漠土壤种子库和种子萌发的影响

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摘要 研究了腾格里沙漠东南缘在不同自然条件(风、温度、水分)下, 人工固沙植被区(24龄、41龄、50龄)和相邻天然植被区的两种生物土壤结皮对荒漠土壤种子库和种子萌发的影响。结果表明, 荒漠土壤种子库在苔藓结皮上的储量显著高于藻类结皮。随着生物土壤结皮的发育, 种子萌发量在苔藓结皮上增加, 在藻类结皮上减少。生物土壤结皮层的含水量对种子萌发有显著的影响(p<0.05), 植物种子在湿润处理的生物土壤结皮上的萌发量高于干燥处理的生物土壤结皮上的种子萌发量。生物土壤结皮表层温度和亚表层温度对荒漠植物种子萌发无显著影响(p>0.05), 但总体而言, 对于苔藓结皮, 植物种子在较高温度下的萌发量略高于在较低温度下的萌发量, 而对于藻类结皮, 植物种子在较低温度下的萌发量略高

关键词 生物土壤结皮; 藻类结皮; 苔藓结皮; 土壤种子库; 种子萌发

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Effects of biological soil crusts on soil seed bank and seed germination of desert plants in North China

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Abstract We investigated the influences of algae crust and moss crust universally spreading in southeast of the Tengger Desert with four developing phases (24-, 41-, 50-year-old crusts in the sand-binding vegetation areas and crusts in natural vegetation) on desert plants. Variable treatments (natural field condition, greenhouse and shadow) were assigned, and two soil moisture regimes were designed to investigate how desert plants responded under different moisture regimes of crusts. Our results showed that seed bank storage was significantly higher in moss crust than in algae crust. With the development of crusts, seed bank storage increased in moss crust while decreased in algae crust. With regard to the moisture, Significant differences in crust moisture were found among four developing phases for both algae and moss crust (p<0.05). The higher moisture kept in crusts, the more seedlings occurred. However, crust surface temperature and subsurface temperature did not have significant effects on seed germination for both crusts (p>0.05). For moss crust, more seed germination occurred under higher surface temperature, contrarily, more seed germination occurred under lower temperature on algae crust.

Key words biological soil crust _ moss crust _ algae crust _ soil seed bank _ seed germination

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