



# 水淹对克隆植物空心莲子草种内关系的影响

于国磊\*

中国科学院植物研究所植被与环境变化国家重点实验室, 北京 100093

YU Guo-Lei\*

State Key Laboratory of Vegetation and Environmental Change, Institute of Botany, Chinese Academy of Sciences, Beijing 100093, China

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**摘要** 为检验“水淹程度可以改变植物种内关系的类型和强度”的假说, 将克隆植物空心莲子草(*Alternanthera philoxeroides*) 的3种不同密度的植株(每盆种植1、4或16株)置于4种不同的水淹处理下(水位分别为-20(不水淹)、0、20或40 cm), 研究不同水淹程度对空心莲子草种内关系的影响。随着植株密度和水淹程度的增加, 空心莲子草的生长显著减慢, 但密度效应在不同的水淹处理下显著不同。在不发生水淹的情况下, 植株密度对生长的负面(竞争)效应最强; 在水位为0和20 cm的情况下, 植株密度对生长的效应仍为负面的, 但影响强度相对减小; 而在水位为40 cm的情况下, 空心莲子草植株的生物量随着植株密度的增大而倾向于增加。进一步分析相对邻体效应时发现, 随着水淹程度的增加, 相对邻体效应显著增加, 并且数值从负值(不水淹)逐渐变为正值(40 cm水位下)。这些结果支持胁迫梯度假说, 表明水淹可以影响植物的种内关系, 即随着水淹程度的增加, 植物种内竞争作用减弱, 而易化作用增强。

**关键词:** 竞争 易化 植物作用关系 胁迫 胁迫梯度假说 水位

**Abstract:** *Aims* Plant-plant interaction is fundamental in plant ecology. Many studies have examined the effects of environmental factors such as light, nutrients and water on plant-plant interactions, but few have tested the effects of waterlogging. Our objective is to investigate the effects of waterlogging on intraspecific interactions and test the hypothesis that waterlogging can modify the type and intensity of intraspecific interactions.

*Methods* We grew plants of *Alternanthera philoxeroides* outdoors at three densities (1, 4 or 16 plants in one pot) and four levels of waterlogging severity (water levels of -20 (no waterlogging), 0, 20 or 40 cm). After three months, plants were harvested and data were collected.

*Important findings* With increasing plant density or waterlogging severity, growth of *A. philoxeroides* decreased significantly. However, the effect of density differed greatly under different levels of waterlogging severity. With no waterlogging, the effect of density on growth was negative and the competition intensity was high. With water levels of 0 and 20 cm, the density effect was still negative, but the intensity decreased. With a water level of 40 cm, however, the density effect was positive. Moreover, waterlogging severity significantly affected the relative neighbor effect and its values increased gradually from negative (under no waterlogging) to positive (in 40 cm). The results support a stress-gradient hypothesis and suggest that waterlogging can affect intraspecific interactions. With increasing waterlogging severity, intensity of competition decreases while that of facilitation increases.

**Keywords:** competition, facilitation, plant-plant interactions, stress, stress gradient hypothesis, water level

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通讯作者 于国磊 Email: vacuous\_motley@163.com

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