CLONAL INTEGRATION MODIFIES GROWTH AND REPRODUCTION OF THE BUNCHGRASS *Cleistogenes squarrosa* IN NUTRIENT-HETEROGENEOUS CONDITIONS

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Abstract

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Spatial heterogeneity in nutrient availability exists even at scales of centimeters. Therefore, genets of phalanx clonal plants such as bunchgrass may experience heterogeneous nutrient supply. We hypothesize that, as found in guerilla clonal plants, clonal integration may also benefit phalanx species in heterogeneous environments. We grew clonal fragments of the bunchgrass *Cleistogenes squarrosa* in both homogeneous and patchy conditions, and kept tiller ramets within a fragment either connected or disconnected. In patchy conditions, total biomass, biomass of aboveground asexual structures of tillers, root biomass, tiller production and aboveground tiller size were markedly larger in connected than in disconnected clonal fragments, whereas biomass of sexual structures were smaller. Also connected clonal fragments produced significantly more biomass (total, aboveground asexual structures, root), more and larger tillers in patchy conditions than in homogeneous ones that provided the same amount of nutrients as in the patchy treatments. We conclude that clonal integration enables phalanx clonal species to better use small-scale soil heterogeneity so that they may grow better in conditions with heterogeneous nutrient supply.

Key words: phalanx growth forms, physiological integration, resource sharing, spatial heterogeneity, tussock-forming grass

Introduction

Spatial heterogeneity in resource supply is a ubiquitous feature of ecosystems (Caldwell, Pearcy, 1994). It may occur at the scales relevant to individuals or even to plant organs (Ko-

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