Universität Basel

Research Project

Explaing the coexistence of ecologically similar plant species

Third-party funded project

Project title Explaing the coexistence of ecologically similar plant species
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Organisation / Research unit
Departement Umweltwissenschaften / Naturschutzbiologie (Baur)
Department
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Status Completed
Goals of the research project Our projects goal is an increased understanding of mechanisms that allow ecologically similar plant species (e.g. herbaceous forbs) to coexist rather than to competitively exclude each other. Context and significance of the project Competitive exclusion of species has long been considered the rule rather than the exception. Indeed, classical models of plant competition (e.g. Lotka-Volterra models) allow coexistence only if competition within species (intraspecific competition) is stronger than competition among species (interspecific competition). The more common outcome is that one species excludes the other possibly under founder control (i.e. depending on initial conditions). In contrast, plant communities (e.g. calcareous grasslands or tropical forests) are often very species rich. The apparent contradiction between theoretical models and natural communities has driven much of the conceptual development of ecology in the last decades. One radical theoretical development has been the formulation of 'neutral theories' which explain the dynamics of species within communities as neutral drift over large temporal and spatial scales. More medium- and small-scale theoretical models started to explicitly treat the spatial positions of individuals and trade-offs among various life-history characteristics of species into account. Most of these theories, however, remain to be experimentally tested which is one reason why some of them remain intensively debated. Methodology We experimentally test theoretical models used to formulate hypotheses on plant species coexistence. For example, 'heteromyopia' has been proposed as a mechanism that allows plant species to coexist if competition within species occurs over larger distances than competition between species. Our model systems are as simple as possible and include competition experiments in which plant individuals compete with individuals of the same or different species at various distances. Because arbuscular mycorrhizal fungi (AMF) living in symbiosis with plant roots are likely to modify interaction distances, additional experimental treatments include presence or absence of AMF.

Keywords biodiversity, spatial pattern, competition, coexistence
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Add publication

Published results

101245, Vogt, Deborah Ruth, Spatial mechanisms promoting plant coexistence: the role of dispersal and competition, Publication: Thesis (Dissertationen, Habilitationen)

69541, Wassmuth, Birte Eleen; Stoll, Peter; Tscharntke, Teja; Thies, Carsten, Spatial aggregation facilitates coexistence and diversity of wild plant species in field margins, 1433-8319, Perspectives in plant ecology, evolution and systematics, Publication: JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

103890, Vogt, Deborah R; Murrell, David J; Stoll, Peter, Testing spatial theories of plant coexistence : no consistent differences in intra- and interspecific interaction distances, 0003-0147, The American naturalist, Publication: JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)

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