

Publication**A Neighborhood Analysis of the Consequences of Quercus suber Decline for Regeneration Dynamics in Mediterranean Forests****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 3287204**Author(s)** Ibáñez, Beatriz; Gómez-Aparicio, Lorena; Stoll, Peter; Ávila, José M.; Pérez-Ramos, Ignacio M.; Marañón, Teodoro**Author(s) at UniBasel** [Stoll, Peter](#) ;**Year** 2015**Title** A Neighborhood Analysis of the Consequences of Quercus suber Decline for Regeneration Dynamics in Mediterranean Forests**Journal** PLoS ONE**Volume** 10**Number** 2**Pages / Article-Number** e0117827-e0117827

In forests, the vulnerable seedling stage is largely influenced by the canopy, which modifies the surrounding environment. Consequently, any alteration in the characteristics of the canopy, such as those promoted by forest dieback, might impact regeneration dynamics. Our work analyzes the interaction between canopy neighbors and seedlings in Mediterranean forests affected by the decline of their dominant species (*Quercus suber*). Our objective was to understand how the impacts of neighbor trees and shrubs on recruitment could affect future dynamics of these declining forests. Seeds of the three dominant tree species (*Quercus suber*, *Olea europaea* and *Quercus canariensis*) were sown in six sites during two consecutive years. Using a spatially-explicit, neighborhood approach we developed models that explained the observed spatial variation in seedling emergence, survival, growth and photochemical efficiency as a function of the size, identity, health, abundance and distribution of adult trees and shrubs in the neighborhood. We found strong neighborhood effects for all the performance estimators, particularly seedling emergence and survival. Tree neighbors positively affected emergence, independently of species identity or health. Alternatively, seedling survival was much lower in neighborhoods dominated by defoliated and dead *Q. suber* trees than in neighborhoods dominated by healthy trees. For the two oak species, these negative effects were consistent over the three years of the experimental seedlings. These results indicate that ongoing changes in species' relative abundance and canopy trees' health might alter the successional trajectories of Mediterranean oak-forests through neighbor-specific impacts on seedlings. The recruitment failure of dominant late-successional oaks in the gaps opened after *Q. suber* death would indirectly favor the establishment of other coexisting woody species, such as drought-tolerant shrubs. This could lead current forests to shift into open systems with lower tree cover. Adult canopy decline would therefore represent an additional factor threatening the recruitment of *Quercus* forests worldwide.

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