

Climatic gradients and ecosystem functioning at a deserts margins and their consequences for the impact of climate change

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Climatic gradients are often used as model systems to analyse the consequences of global change on vegetation and ecosystems. Especially the arid and semi-arid ecosystems are endangered by climate change and desertification. Understanding of the ecological processes in time and space is important for a sustainable land-use and the protection of biodiversity. However, the knowledge of the interactions of these processes on different scales is limited. It is a well-known fact from large-scale comparisons that standing biomass and rainfall show a close positive relationship. Vegetation cover and biomass show the same decrease from humid to arid climates as does mean annual rainfall, which is supposedly the controlling factor along climatic gradients. However, in the sand dunes of the northwestern Negev biomass and vegetation cover along a climatic gradient from north to south (170 mm – 90 mm) is negatively linked to rainfall. The change of surface properties counteracts the effects of increasing rainfall on the vegetation along the geo-ecological gradient (Fig. 1). The implications for ecological studies along climatic gradients at desert margins and for global change studies will be discussed.

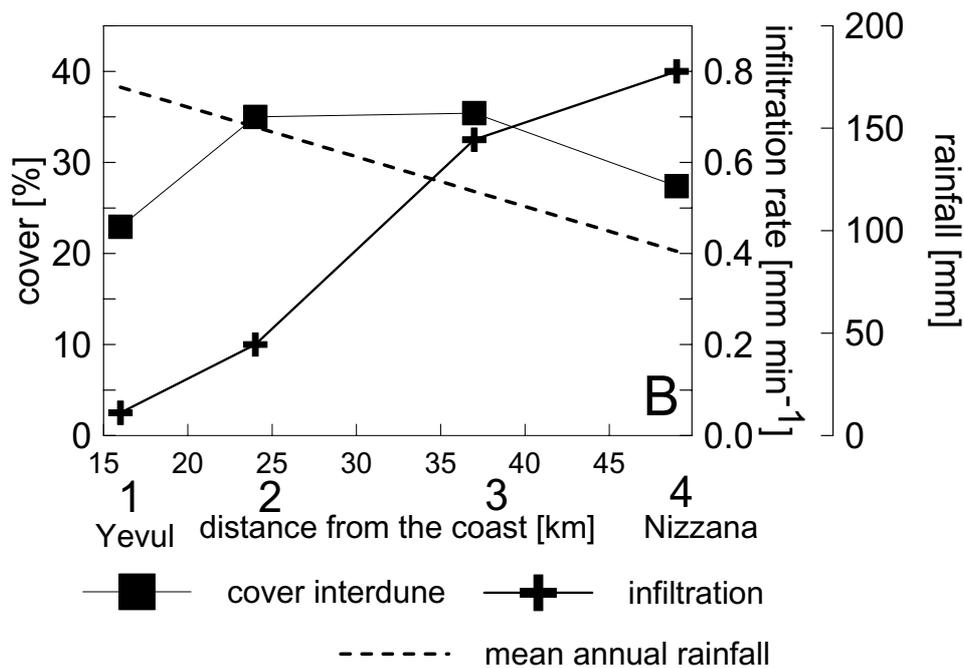


Figure 1: Mean annual rainfall, infiltration rate and mean vegetation cover in the interdunes along the climatic gradient in the sand dunes of the northwestern Negev

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