

Inclusion of biotic stress (consumer pressure) alters predictions from stress-gradient hypothesis

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Spiny and toxic nurse plants facilitate undefended plants against large herbivores in various harsh and benign environments. These interactions tend to be negative without herbivores, due to competition for light or nutrients.



In contrast with predictions from currently debated facilitation-stress models (stress gradient hypothesis SGH), increased biotic stress by consumer pressure leads to hump-shaped curves: facilitators lose their protective function at high biotic stress (Fig. 2).

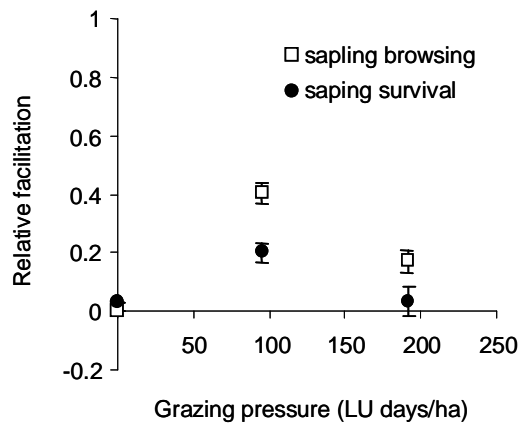


Fig. 2: Relative neighbour effects between thorny shrubs and tree seedlings with increasing grazing pressure. At high biotic stress thorny shrubs get destroyed and associated seedlings are no longer protected (Smit et al 2007, *Oecologia* 152: 265-273).

When biotic stress (constant consumer pressure) is included along gradients of abiotic stress (resource and non-resource based) the predicted outcome of the SGH alters strongly (Fig. 3).

Conclusion: studies should include stress gradients consisting of both abiotic and biotic components to truly improve our understanding of how species interactions change with stress.

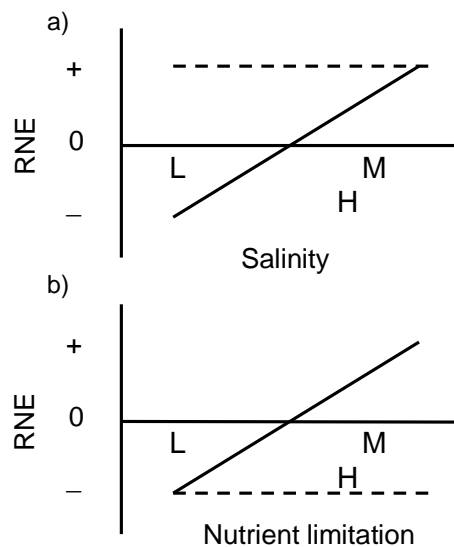


Fig. 3: Relative neighbour effects (RNE) of species interactions without (solid) and with (dashed) inclusion of biotic stress along abiotic stress gradient (L = low, M = medium, H = high). Inclusion of biotic stress changes RNE of: a) a stress tolerant benefactor and competitive beneficiary along a gradient of non-resource based stress (salinity) due to increased dominance of associational resistance, b) a competitive benefactor and stress tolerant beneficiary along a resource based stress gradient (nutrient limitation) due to dominance of associational palatability.