Extinction risks in a variable environment – the role of flexible consumers in food webs

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The response of ecosystems to different kind of disturbances is context dependent and is governed by properties such as species composition, diversity and trophic structure. A predicted consequence of the future rise in global temperature is an increased environmental variation - a disturbance that can have impacts on single species as well as entire communities. While most theoretical studies assume food web predation links to be static, it has been suggested that flexible consumers with an ability to switch prey may enhance community persistence and buffer against environmental fluctuations. Another factor that can affect community persistence is the rate of prey capture by a consumer as a function of prey abundance (the type of functional response). Here, we explore the role of flexible consumers *in silico*, using model food webs of different size exposed to high environmental variability. Consumers are either able to switch to a new prey if all its original preys are lost, or not. The functional response used is either Holling's type II or type III. Overall, the results show increasing per species extinction risk with higher biodiversity. Moreover, flexible consumers do not always have a stabilising effect – for type II functional response, flexibility in consumers leads to increased extinction risks at all trophic levels. These results highlight the possible differences of natural systems and thus the importance of further empirical studies, to be able to parameterise food web models more accurately and improve the quality of future predictions on ecosystem stability.