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## Experimental unravelling of ecosystem function

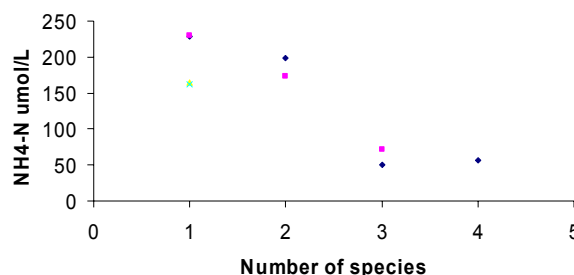
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David Paterson, Rebecca Aspden, Kirsty Dyson and James Saunders

Gatty Marine Laboratory, University of St Andrews, Scotland

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The question of how biodiversity gives rise to functionality (BEF questions) in aquatic ecosystems is not straightforward. The historic approaches developed in terrestrial ecology are now being repeated. However, there are some inherent advantages in using aquatic systems for the development of an experimental approach to BEF problems (Solan 2006). It is often easier to select and measure functional responses that can be contained and controlled under experimental conditions. In addition, the test organisms are relatively small and can be fairly easily manipulated although the logistic strains of collecting and sorting the required biomass should not be underestimated. However, experimental studies will always have their detractors and there are valid criticisms of the experimental approach. Synthetic assemblages do not exactly replicate any real life conditions, the scale and temporal scale of the experiments is a trade-off between resources, time and the desired design. In addition, there are the theoretical problems of low biodiversity, the importance of species identity and potential interactions. For example negative relationships between diversity and functionality may be related to the indirect effects of the species in question (Figure 1). This paper follows a progression of experimental designs used to address the BEF question leading from simple laboratory manipulations (Biles et al 2003a, 2003b), toward more complex systems (Emmerson et al 2001, Solan et al, unpublished data), field manipulations (Dyson and Saunders, unpublished data) toward the ultimate goal of establishing BEF relationships under natural conditions. Interpretation of effects must be carefully considered throughout this gradient to prevent inaccurate conclusions dependant on the experimental protocol.



**Figure 1.** Decreasing ecosystem function with increasing diversity can be attributed to competition/interference between species.

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