

The iDiv Ecotron - a flexible research platform for multitrophic biodiversity research

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Abstract

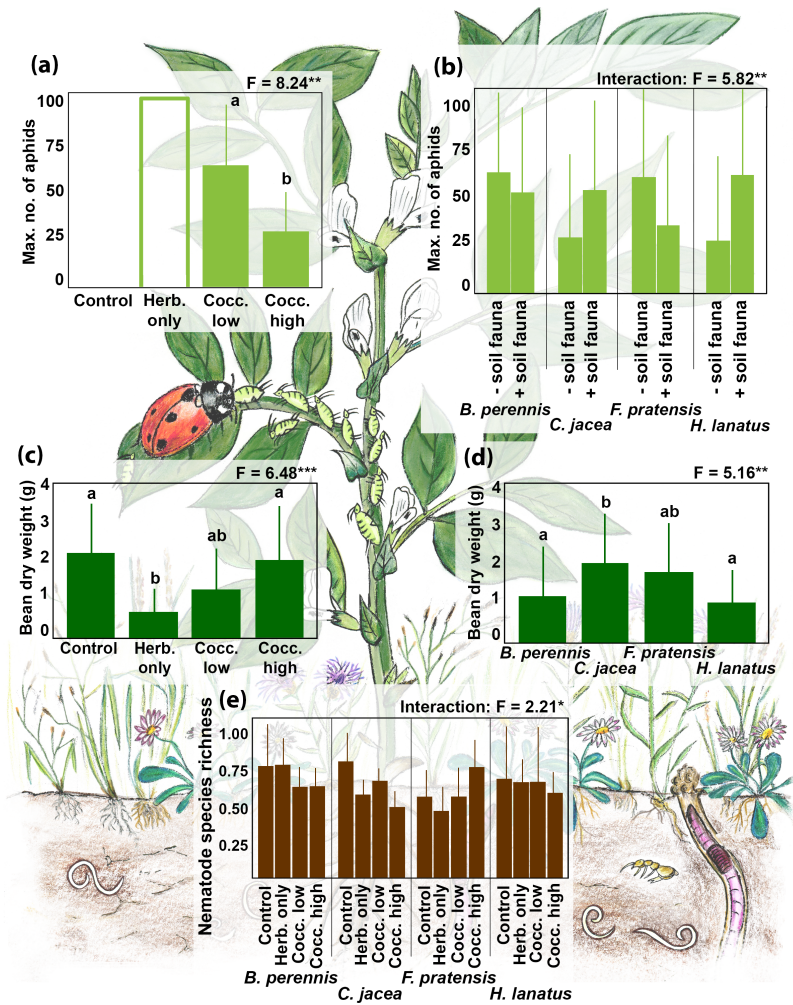
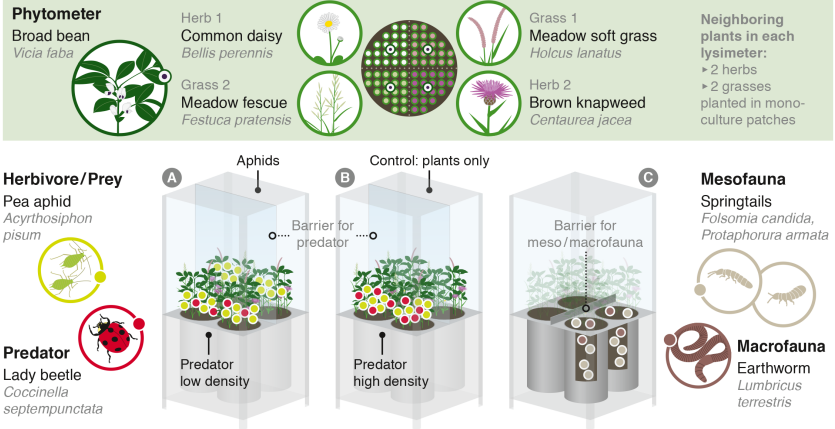
Across the globe, ecological communities are confronted with multiple global environmental change drivers, and they are responding in complex ways ranging from behavioural, physiological, and morphological changes within populations to changes in community composition and food web structure with consequences for ecosystem functioning. A better understanding of global change-induced alterations of multitrophic biodiversity and the ecosystem-level responses in terrestrial ecosystems requires holistic and integrative experimental approaches to manipulate and study complex communities and processes above and below the ground. We argue that mesocosm experiments fill a critical gap in this context, especially when based on ecological theory and coupled with microcosm experiments, field experiments, and observational studies of macroecological patterns. We describe the design and specifications of a novel terrestrial mesocosm facility, the iDiv Ecotron. It was developed to allow the setup and maintenance of complex communities and the manipulation of several abiotic factors in a near-natural way, while simultaneously measuring multiple ecosystem functions. To demonstrate the capabilities of the facility, we provide a case study. This study shows that changes in aboveground multitrophic interactions caused by decreased predator densities can have cascading effects on the composition of belowground communities. The iDiv Ecotrons technical features, which allow for the assembly of an endless spectrum of ecosystem components, create the opportunity for collaboration among researchers with an equally broad spectrum of expertise. In the last part, we outline some of such components that will be implemented in future ecological experiments to be realized in the iDiv Ecotron. Key words: food webs, biodiversity and ecosystem functioning, mesocosms, biotic interactions, lysimeters, climate chambers

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(A)

341	367	398	388	372	341
374	407	431	423	407	367
390	421	445	445	429	397
399	433	448	447	424	390
370	411	428	433	408	373
339	373	390	398	368	340

(B)

0.76	0.82	0.89	0.87	0.83	0.76
0.84	0.91	0.96	0.95	0.91	0.82
0.87	0.94	0.99	0.99	0.96	0.89
0.89	0.97	1.00	1.00	0.95	0.87
0.83	0.92	0.95	0.97	0.91	0.83
0.76	0.83	0.87	0.89	0.82	0.76