Research Unit
Environmental Engineering and Biotechnology

ChemicalsFate

IP Controlling Chemicals‘ Fate Lecture

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Leipziger KUBUS, Lecture Hall 1A
Permoserstr. 15, 04318 Leipzig

Chemical cues, dispersal plasticity and large scale consequence

While dispersal is both a central ecological and evolutionary process, scientists still tend to think about dispersal as being neutral and a random process. This view has important consequences for our understanding and ability to predict the dynamics of spatially structured systems and large scale spatial patterns such as the distribution of species on earth.
I will introduce dispersal as a reaction norm, that is, dispersal being a function of the external context, for instance, population density. Using protist microcosms I will show how microbes use chemical cues from conspecifics and heterospecifics to plastically adjust their dispersal decisions in an adaptive way. This context-dependency holds true at the horizontal community level, that is, for species that compete for the same set of resources. Importantly, dispersal is also context dependent across trophic levels and responds to both bottom-up (resource limitation) and top-down (predation risk) effects. These bottom-up and top-down effects can be found across a wide range of organisms, from unicellular protists to vertebrates, as we could demonstrate in a coordinated distributed experiment.
After having shown that chemical cues from con- and heterospecifics are being used by a variety of organism as proximate dispersal cues, I will demonstrate consequences for both ecological and evolutionary dynamics using theory and experimental evolution. Context-dependent dispersal has consequences at the metacommunity level where it has a stabilizing effect. At larger spatial scales, specifically for range expansions, context-dependent dispersal can constrain range expansions and prevent evolutionary change.

All interested colleagues are kindly invited.