Messy Communities: Editor's Note

Editor's Note: In this edition of the *Paper Trail*, an outsider might surmise that the state of community ecology is vanity of vanities with enough theories to make one's head spin. Local vs. regional, deterministic vs. stochastic, and the list goes on. However, two individuals and an entire field would beg to differ and rightly so. Community ecology has a history of being very messy, yet patterns and trends soon emerge when a different view is taken based on a level of understanding and the use of research tools that perhaps the up and coming and established ecologists' predecessors did not have in their day. Now, instead of opposition, these two researchers have been studying these earlier theories and have gone on to dig deeper through, for example, a Bromeliad Working Group and long-term natural microcosms. And, along the way, they are asking many more questions that will continue to stir up, stimulate, and help advance the messy field of community ecology.

— *Stephen L. Young*

The Arising Researcher

I was a new Ph.D. student at the University of Tennessee, inspired by papers that my advisors, Jim Drake and Dan Simberloff, had written to work on community ecology, when John Lawton published his provocative essay on why "community ecology is a mess" (Lawton [1999] *Oikos* 84:177–192). In this now well-known paper, Lawton, himself a community ecologist, argued that community ecology was a futile field that contained few general principles because there was too much contingency in the way local communities assemble. His recommendation was for everyone to abandon the field and move on to macroecology, the field that seeks patterns at larger scales.

As a primary example of the more promising macroecological research, Lawton discussed analysis of the relationship between species richness measured at local and regional scales. In many cases, we see a simple linear relationship between local and regional richness. Lawton had two points to make. First, this recurrent pattern is the kind of generalities we can expect only at the large, macroecological scale. Second, this pattern runs counter to the central tenet of community ecology that local species interactions shape local communities. Having read this paper in a laboratory meeting, I was eager to find out if the field I thought was most exciting was really as dead as Lawton made it out to be.

That is how I ran into Diane Srivastava's work. Much of Lawton's discussion about the local–regional richness relationship was based on work by Srivastava, who had recently finished her Ph.D. with Lawton as her advisor at Imperial College. When I looked at the original paper (Srivastava [1999] *Journal of Animal Ecology* 68:1–16), I realized there were a lot of important nuances in analysis of the local–regional relationship, both technical and conceptual. Diane explained, for

Tadashi Fukami with his natural microcosm, the microbial communities that develop in flowers, at the Jasper Ridge Biological Preserve in California. Photograph by Anne Rosenthal, used with permission.

example, how local species interactions could be strong and important to community structuring even when we see a linear local–regional relationship that appears to tell us otherwise. The paper made a compelling case that local–regional richness plots were informative, but only when used judiciously and in combination with other supporting evidence.

Diane's work made me think more deeply about the local–regional relationship and what it could teach us. I liked its simplicity and thought it was a good way, or a good starting point at least, to assess the role of two fundamental processes of community assembly: dispersal, happening at the regional scale, and species interactions, happening at the local scale. In my own Ph.D. research, I found that dispersal and species interactions would act together to cause priority effects in local communities. I also found, however, that these priority effects could become more important as regional richness increased, and showed how this change could make local–regional richness patterns linear or non-linear depending on the spatial scale at which we delineate "local" communities. I was lucky to meet Diane at the 2001 ESA annual meeting in Madison, Wisconsin, and remember feeling very encouraged by the interest she showed in my results.

It is true that community ecology is a mess, replete with contingency, but Diane's research convinced me that it would still be possible to find general principles, those of contingency, by studying more about how dispersal, species interactions, and other processes jointly shape communities. One powerful tool for this endeavor is natural microcosms, which is another thing that I believe Diane, with her co-authors, articulated more clearly than anyone else (Srivastava et al. [2004] *Trends in Ecology & Evolution* 19:379–384). This paper article has given me the confidence to keep going with my natural microcosm over the past decade.

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The Established Researcher

Like Tadashi Fukami, my ecological thinking was strongly influenced by John Lawton's famous essay (Lawton (1999) *Oikos* 84:177–192), in which he argued that "The theories of community ecology are contingent on the organisms involved and their environment … in so many ways … as to make the search for patterns unworkable." I had a front row seat on this paper, having just finished my PhD under John Lawton's supervision, part of which involved working with him on how communities are affected by larger-scale processes.

The year after John Lawton published his essay was a new century, and it was as if community ecologists had heeded John's suggestion that it was "time to move on". At the time, it felt like a renaissance in community ecology, when a slew of