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TRACKING TRENDS & PERFORMANCE IN BASIC RESEARCH

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2009 : February 2009 - Fast Breaking Papers : Rob W. Brooker

FAST BREAKING PAPERS - 2009

February 2009



Rob W. Brooker talks with *ScienceWatch.com* and answers a few questions about this month's Fast Breaking Paper in the field of Environment & Ecology. The author has also sent along images of their work.



Article Title: Facilitation in plant communities: the past, the present, and the future

Authors: Brooker, RW, et al.

Journal: J ECOL

Volume: 96

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(addresses have been truncated)

SW: Why do you think your paper is highly cited?

The paper focuses on facilitative (i.e., beneficial) plant-plant interactions. Over the last 10 to 15 years, this topic has received increasing interest in the field of plant ecology, and facilitative interactions are now recognized as important processes in many plant communities, particularly those in more severe environments.

Although there were a number of synthesis papers in this field in the mid-late 90s, things have progressed rapidly since then. I think that this paper has been a major help to researchers both working in and interested in this field in that it summarizes recent research developments—it's a good place to go to get an overview of what's been happening. This also makes it a valuable resource for students.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

As mentioned above, the synthesis of recent knowledge is new. In addition the paper was developed from a European Science Foundation (ESF)-funded workshop in Arcachon in southwestern France in 2007, which had been organized by Richard Michalet of the University of Bordeaux (France), where we had the opportunity to consider topics which had not previously been discussed in relation to this field, for example evolutionary modelling and facilitation. We also used both the workshop and synthesis paper as an opportunity to look forward and explore which way this field is going. I hope this has also made it a useful starting point for sparking off new research ideas.

SW: Would you summarize the significance of your paper in layman's terms?

The paper reviews current understanding in the field of positive plant interactions, i.e., interactions where one plant has a beneficial effect on its neighbors. Classic examples of facilitation are nurse plant effects in deserts, where plants capable of withstanding the severe desert environment provide conditions suitable for the growth of other species. The paper covers a range of topics related to such interactions, including the way in which plant interactions change along environmental gradients, (i.e. whether facilitation gets more important as the environment gets harsher), and the way in which facilitation might drive the evolution of plants or control how they respond to climate change. We also tried to set out targets for future research—areas of the field that we think would be exciting to examine and might be useful as starting points for new work.

Figure 1:



+ [View larger image & details.](#)

How did you become involved in this research, and were there any problems along the way?

My Ph.D. supervisor, Terry Callaghan, introduced me to the subject when I was doing my Ph.D. in Arctic Ecology at Sheffield University. I have also benefited hugely from collaborative links with, amongst many, Ray Callaway, and an international group of like-minded researchers which has somehow become known collectively as the "Alpine Pals" (see photo).

This research is basic plant community ecology, and in many cases have been pursued using simple techniques and experimental approaches such as neighbor removal experiments. Furthermore (direct) facilitation is unlikely to be a key process in many of the plant communities in the UK—or at least its role is not as obvious as in alpine or desert systems. This has made it tricky to get funding for this work in the UK in an already highly competitive environment. Working with the "Pals" and other collaborators has enabled me to keep pursuing and developing these ideas. I am very grateful to them for the opportunities which our collaborations have provided.

Where do you see your research leading in the future?

I am currently heavily involved in organizing the 2009 British Ecological Society Symposium on Facilitation in Plant Communities, which will be held in Aberdeen, Scotland in April. This will be the first open international meeting on this topic, and we expect it to be a highly stimulating and exciting event. At the same time I am working on a number of collaborative studies with the "Alpine Pals" and other research colleagues, trying to understand the context specificity of plant interactions—particularly their changing role along environmental gradients—and their consequences for plant evolution and plant community responses to climate change.

Do you foresee any social or political implications for your research?

The main social implication that I can see is the long-term goal of better understanding the processes that regulate biodiversity in order to help manage and conserve it.

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Figure 1:



Figure 1:

The Alpine Pals (an international team of scientists working on alpine ecology in over 10 countries and on four continents) at work measuring facilitation in cushion plant communities in the Torres del Paine National Park, Chile, in January 2009 (Fieldwork.jpg). This fieldwork is part of a global study of the biodiversity impacts of cushion plants in alpine systems being directed by Lohengrin Cavieres (University of Concepcion, Chile) and Ray Callaway (University of Montana, USA). The goal is to use mechanistic, rather than observation-driven, approaches to predict the effects of climate change on the diversity and composition of alpine vegetation. [Click](#) for an even larger view.

Keywords: NEGATIVE SPECIES INTERACTIONS; STRESS-GRADIENT HYPOTHESIS; SALT-MARSH PLANTS; POSITIVE INTERACTIONS; BIOTIC INTERACTIONS; ARID ENVIRONMENTS; NURSE-PLANTS; RELATIVE IMPORTANCE; ABIOTIC STRESS; CLIMATE-CHANGE.

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