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Functional characters, texture and stress

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Highlighted papers of 2007

In considering papers for the *Journal of Vegetation Science* Editors' Award, the Chief Editors narrowed the choice to five papers, all very worthy of consideration. They cover something of the range of the journal (though it happens that no modelling paper was amongst them this year).

The *Journal of Vegetation Science* publishes work that is relevant to the description and understanding of multi-species plant communities. Some papers tell us about the structure of plant communities by careful observation, and studies of temporal change are often informative. The concept of successional convergence has been in the background or foreground of vegetation science ever since Clements (1905). It has been variously assumed to be the truth, dismissed or ignored, all with little evidence on whether it actually occurs. Most of the evidence brought to bear has come from 'space for time substitution'. As Egler (1977) wrote: "a large number of [successional] diagrams indicate, not an actual observed change in t i m e, but a change in s p a c e, assumed (mainly wrongly) to be the same as a time-change!". The eruption of Mount St. Helens in 1980 was a disaster for many (57 people died), but a huge opportunity for ecologists to set up permanent plots and record, to use Egler's words, "actual observed change". del Moral (2007) analysed vegetation records from Mount St. Helens for the first 25 years after the eruption. There was only slight evidence for convergence.

An important and growing trend in vegetation science is to analyse communities not so much by the taxonomic identity of their species but by their morphological and physiological functional characters. This can be done through functional types, and the *Journal of Vegetation Science* has been the leading journal in this field. The other approach is to characterise species and communities on a continuous scale – the 'texture' of the community as Barkman (1979) termed it. Easdale et al. (2007) characterised 40 tree species from an Argentinian forest by measuring 14 functional characters. They compared these with the species' distributions along gradients of soil fertility and of shade. Species able to tolerate the two types of stress tended to have thick, evergreen leaves of high tensile strength. Proponents of C-S-R theory will be unsurprised, but confirmation of this theory with hard evidence is welcome.

Often, field experimentation can give greater insights than just observing. An example is the herbivore exclusion experiment of Peters (2007), part of his Ph.D. work. Unusually, he excluded factorially both small mammalian grazers and gastropods (the latter using barriers of copper, apparently an element that slugs hate). Small mammals grazed almost exclusively on grasses but the diet of the gastropods was more diverse, also including forbs and especially legumes. However, gastropod grazing in the presence of mammals led to an increased proportion of grasses, while the removal of any of the two groups increased the relative contribution of forbs. There were effects on the size distribution among individual plants too: gastropod grazing led to a greater difference between the big plants and the small ones. All these effects will have community- and ecosystem-wide repercussions.

In the greenhouse, still greater control is possible. It has long been questioned whether the species in a community will form a competitive hierarchy. The alternative is that there are non-linear relations, or even circular competitive networks. Discussion has been hampered by lack of agreement on methods for comparing competitive abilities. Perkins et al. (2007) proposed a new method for analysing hierarchies. They then set up microcosms of four old-field species. Previously, competitive hierarchies have been calculated from pairwise competition experiments, yet indirect interactions and diffuse competition have long been discussed by ecologists. Perkins et al. investigated whether the competitive hierarchy remained the same when there were three species in the mix. It didn't. *Dactylis glomerata* L. remained as being the least affected by interference from other species, but *Plantago lanceolata* L. moved from second in the ranking to last,

i.e. the species most suppressed, when indirect effects were included. This sort of well-controlled experiment could provide interpretation for the patterns and processes observed in natural plant communities, and thus significantly increase our knowledge of vegetation.

The *Journal of Vegetation Science* and *Applied Vegetation Science* welcome research on climatic change. It is often suggested that the effects of climatic change will be seen first in ecotones (Malanson 1997), but the mechanisms of any changes are unclear. Weber et al. (2007) investigated the physiology behind such change at an ecotone between *Pinus sylvestris* L. and *Quercus pubescens* Willd. in Switzerland. Temperatures in the area have risen since 1980 with increasing drought, and *Pinus* species have declined. Correlation of ring widths with climatic records since 1864 indicated that the growth of *P. sylvestris* is strongly reduced by drought. Weber et al. suggested this is because it starts growth two months later in spring than *Q. pubescens* so more of its growth occurs in mid-summer, when drought is maximal. If the trend to warmer temperatures and hence more severe drought continues, *P. sylvestris* will continue to decline at the ecotone. *Q. pubescens* will displace the pines, and the ecotone will move to higher altitudes.

Editors' Award for 2007

From among the papers above, the Chief Editors have chosen the paper of Easdale et al. (2007) for the 2007 Editors' Award. A very competent paper addressing a general problem at the pitface of vegetation science.

Publishing developments

There have been some publication changes for the *Journal of Vegetation Science*.

- Opulus Press have developed an online system for manuscript submission and handling.
- The new First Online system allows online access to manuscripts that have been accepted, have been through the proof approval process and are waiting to be placed in an issue. They will not have page numbers, but since they have a DOI (Digital Object Identifier) which will remain with them permanently, they can be cited with this number.
- Opulus Open Access is a system whereby an author pays a fee to allow free online access to their paper to all, and thus encourage reading of their paper. Such papers will be peer-refereed and edited exactly as other papers. See www.opuluspress.se for details. Open Access continues for Editorials, Invited Perspectives, Forum papers, Introductions to Special Features and Book reviews.

References

Barkman, J.J. 1979 The investigation of vegetation texture and structure. In: Werger, M.J.A. (ed.) *The study of vegetation*, pp. 123-160. Junk, The Hague, NL.

Clements, F.E. 1905 *Research methods in ecology*. University Publishing, Lincoln, NB, US.

del Moral, R. 2007. Limits to convergence of vegetation during early primary succession. *Journal of Vegetation Science* 18: 479-488.

Easdale, T.A., Gurvich, D.E., Sersic, A.N. & Healey, J.R. 2007. Tree morphology in seasonally dry montane forest in Argentina: Relationships with shade tolerance and nutrient shortage. *Journal of Vegetation Science* 18: 313-326.

Egler, F.E. 1977. *The nature of vegetation: its management and mismanagement*. The author, Aton Forest Connecticut; in cooperation with the Connecticut Conservation Association, Bridgewater, CT, US.

Malanson, G.P. 1997. Effects of feedbacks and seed rain on ecotone patterns. *Landscape Ecology* 12: 27-38.

Perkins, T.A., Holmes, W.R. & Weltzin, J.F. 2007. Multi-species interactions in competitive hierarchies: new methods and empirical test. *Journal of Vegetation Science* 18: 685-692.

Peters, H.A. 2007. The significance of small herbivores in structuring annual grassland. *Journal of Vegetation Science* 18: 175-182.

Weber, P., Burgmann, H. & Rigling, A. 2007. Radial growth responses to drought of *Pinus sylvestris* and *Quercus pubescens* in an inner-Alpine dry valley. *Journal of Vegetation Science* 18: 777-792.