

Ecological restoration as a central theme for applied vegetation science

Chiarucci, Alessandro¹; Collins, Beverly²; Díaz, Sandra³; White, Peter S.⁴; Wilson, J. Bastow^{5*}

¹Department of Environmental Science 'G. Sarfatti', University of Siena, Via P.A. Mattioli 4, 53100 Siena, Italy;

²Department of Biology, Western Carolina University, Cullowhee, NC 28723, USA; E-mail collinsb@wcu.edu;

³Instituto Multidisciplinario de Biología Vegetal, Universidad Nacional de Córdoba, Casilla de Correo, RA-5000 Córdoba, Argentina; E-mail sdiaz@com.uncor.edu;

⁴Department of Biology, University of North Carolina, Chapel Hill, NC 27599-3280, USA; E-mail peter.white@unc.edu;

⁵Botany Department, University of Otago, Dunedin, New Zealand;

*Corresponding author: bastow@bastow.ac.nz

AVS Editor's Award for 2006

Restoration ecology is becoming an important part of applied science, especially because of the pressing need to restore to a pristine state, or to another functionally stable state, many sites that have been degraded by human pressure, pollution, or management. In almost all terrestrial habitats and in many aquatic ones ecological restoration passes through some process of vegetation restoration, since vegetation is vital for ecosystem structure and function. Fittingly, vegetation restoration was a theme of *Applied Vegetation Science* in 2006. The two issues included 34 papers and a total of 316 pages. The first issue included many papers on the theme *Conservation and restoration of the Pinus palustris ecosystem*, while the second was fully dedicated to the theme *Fens and floodplains of the temperate zone: Present status, threats, conservation and restoration*. Restoration of natural vegetation was the aim of most of these papers, using a variety of approaches and methods for the recruitment of structurally important plant species in different ecosystems.

Each year the Chief Editors of *Applied Vegetation Science* select a paper that impressed them for its quality and novelty. For 2006 we have selected a paper by Castro et al. (2006) investigating nurse effects. *Salvia lavandulifolia* is a pioneer shrub in southern Spain that dominates the vegetation with 28% cover in successional shrubland during natural regeneration after fire. The authors ask whether it might facilitate the reforestation process by acting as a nurse species for *Quercus pyrenaica*. A well-planned, randomised experiment allowed them to demonstrate that *Q. pyrenaica* seedlings planted under the canopy of *S. lavandulifolia* shrubs had a survival rate 6.3 times greater than those planted in open areas, and also had shoots almost twice as long. Remarkable was the fact that to minimise the disturbance to the existing plants of *S. lavandulifolia*, no further cultivation was done around these plants; thus, initial conditions for establishment and growth were poorer in the *S. lavandulifolia* microhabitat

due to the lower volume of loose soil (further cultivation was done around *Q. pyrenaica* seedlings planted in open areas). Summer drought was the main cause of mortality and the *S. lavandulifolia* nurse plants protected the *Q. pyrenaica* seedlings during this unfavourable period. This simple and clear paper reported scientifically-sound results from an applied project and can be considered a paradigmatic example of how applied vegetation science can combine the approaches of basic research and land management.

Other nominated papers

Among the other papers rated by the Chief Editors for the above Award, the runner-up was the paper by Galatowitsch (2006) that compared for different guilds the effects of regional species pools, landscape isolation, and local-scale ecological constraints on the colonisation of restored wetlands in Iowa, Minnesota, and South Dakota, USA. By using floristic censuses performed in 41 restored wetlands three and 12 years after wetland restoration, Galatowitsch (2006) tried to answer two questions. 1. Does the likelihood that species from the regional species pool will become part of the local species pool differ among plant guilds? 2. To what extent does landscape isolation affect the local species pool? Then, the author tried to answer a third question, the extent to which the local species pool of a restored wetland is limited by dispersal, competition and environmental suitability, by comparing the colonisations, extinctions, and species establishments in the 41 restored wetlands with an eight-year old wetland that had been seeded and weeded since reflooding, and with ten relatively unimpacted natural wetlands within the region. This paper by Galatowitsch presents a powerful attempt to demonstrate patterns in the vegetation dynamics of restored ecosystems by using a combination of temporal and spatial surveys, a very classic approach in vegetation science with a potentially high power also in applied issues

such as those required by management and conservation problems.

Another paper nominated was that by Ghorbani et al. (2006). These authors investigated, by using a truly experimental approach, the effects of *Pteridium aquilinum* (bracken) litter on seed banks during experimental restoration of grasslands. In many temperate areas the spread of bracken has become a problem for the conservation of some vegetation types. Ghorbani et al. (2006) showed that bracken litter acts as an inert barrier containing 38% - 67% of the seeds available in the litter-soil profile. Different restoration treatments applied for about ten years changed the balance between seed inputs and outputs in the bracken litter layer significantly for some species. These data allowed the authors to conclude that for heathland and acid-grassland restoration, the bracken litter layer may be an important seed source, but it must be disturbed or specifically treated before adding seeds.

Finally we would like to mention the literature review by Middleton et al. (2006) of the effects of grazing, cutting, and burning in the management and conservation of plant species diversity in the fens and fen meadows of Europe and North America. Since the first author of this paper is one of the Associate Editors of our journal, we omitted it from consideration for the Award. However, we really liked this review paper and decided to mention it. Its survey of previous work demonstrates that the reduction of cattle grazing, mowing, and burning in fens leads to a reduction in their biodiversity. The vegetation of abandoned fens is subject to rapid colonisation and spread of trees and shrubs that after only 10-15 years shade the smaller and rarer species present in these habitats and thereby reduce that abundance. This paper also suggests some possible approaches for management of fens and fen meadows for conservation of biodiversity, making it valuable as a reference for both scientists and managers.

Impact Factor and journal issues

Lastly, a few words on the scientiometric performance of *Applied Vegetation Science*. The journal first received an Impact Factor from the Institute for Scientific Information in 2003. In that year the Impact Factor was 0.877 and this almost doubled in the following two years (1.571 in 2004 and 1.517 in 2005). In these days of research performance evaluation, receiving an impact factor and improving its value makes any journal more attractive to scientists for publishing their papers, and the number of papers submitted to *Applied Vegetation Science* has increased significantly. This means that the journal staff need to make a more rigorous selection for the publication of papers, but this will have positive ef-

fects on the journal's performance in the development of applied issues in vegetation science. The number of submitted manuscripts is so high that it has been decided, in consultation with the International Association for Vegetation Science and Opulus Press, to increase the frequency of the journal. Starting in 2007, *Applied Vegetation Science* will be printed with three issues per year; a very promising situation for a young journal in a specialised niche!

References

- Aerts, R., November, E., Van der Borgh, I., Behailu, M., Hermy, M. & Muys, B. 2006. Effects of pioneer shrubs on the recruitment of the fleshy-fruited tree *Olea europaea* ssp. *cuspidata* in Afri-montane savanna. *Appl. Veg. Sci.* 9: 117-126.
- Castro, J., Zamora, R. & Hódar, J.A. 2006. Restoring *Quercus pyrenaica* forests using pioneer shrubs as nurse plants. *Appl. Veg. Sci.* 9: 137-142.
- Galatowitsch, S.M. 2006. Restoring prairie pothole wetlands: does the species pool concept offer decision-making guidance for re-vegetation? *Appl. Veg. Sci.* 9: 261-270.
- Ghorbani, J., Le Duc, M.G., McAllister, H.A., Pakeman, R.J. & Marrs, R.H. 2006. Effects of the litter layer of *Pteridium aquilinum* on seed banks under experimental restoration. *Appl. Veg. Sci.* 9: 127-136.
- Middleton, B.A., Holsten, B. & van Diggelen, R. 2006. Biodiversity management of fens and fen meadows by grazing, cutting and burning. *Appl. Veg. Sci.* 9: 307-316.