

Preface: plants in hydrosystems: from functional ecology to weed research

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Introduction

Aquatic plants are important components of aquatic ecosystems (Chambers et al., 2008). They produce consumable materials that form the basis of trophic networking, they influence the hydrological, geomorphological and chemical environments and they interact in different ways with microbial and animal compartments and ecosystem processes.

The interplay between humans and aquatic environments is often mediated through aquatic plants to both positive and negative ends. The biological traits of those plants and their communities are an essential aid to understanding the role of aquatic vegetation and their ecological interactions across different spatial

and time scales (Capers et al., 2010; Gurnell et al., 2010; Bornette & Puijalon, 2011). For example, combinations of environmental conditions and traits can lead to invasive processes harmful to human activities and ecosystems (Gordon & Gantz, 2011). But plants can also be used to mitigate human impacts, such as the use of constructed macrophyte beds for nutrient removal (Xian et al., 2010). A mechanistic understanding of plant-ecosystem interactions, and how they are perturbed by human disturbances, enables the monitoring of the macrophyte communities and water bodies where they exist, and ultimately provides the clues and tools to protect and rehabilitate aquatic environments and plant populations (Lumbreras et al., 2013; Aguiar et al., 2014). The present volume is a contribution to such understanding of ecological interactions and its applications to freshwater management.

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The present issue

This special issue of *Hydrobiologia* comprises the refereed proceedings of the International Symposium on Aquatic Plants held in Poznan, Poland during 27–31 August 2012. The symposium has hosted the 13th International Symposium on Aquatic Plants of the European Weed Research Society, and the 2nd International Workshop of the Working Group on Macrophytes of the International Limnological Society. The present volume includes 24 papers, divided

into four topics, (1) Vegetation and Ecological interactions, (2) Biology and Taxonomy, (3) Bioindication and Biomonitoring and (4) Vegetation Management and Restoration.

The symposium was attended by 140 participants from 24 different countries, resulting in 67 presentations and 78 posters. These countries included Belgium, Brasil, Bulgaria, Canada, Czech Republic, Egypt, Estonia, France, Finland, Germany, Hungary, Italy, Japan, Latvia, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and United Kingdom. The Symposium's prime theme was 'Plants in Hydrosystems: from Functional Ecology to Weed Research'.

History

In 1964 the European Weed Research Council (EWRC), later called the European Weed Research Society (1975), started a series of international symposia on aquatic weeds through its Working Group (WG) on Aquatic Weeds. Up to 2002, these symposia were held with a 3–4 year interval in: La Rochelle, France (1964), Oldenburg, Germany (1967), Oxford, UK (1971), Vienna, Austria (1974), Amsterdam, The Netherlands (1978), Novi Sad, Yugoslavia (1982), Loughborough, UK (1986), Uppsala, Sweden (1990), Dublin, Ireland (1994), Lisbon, Portugal (1998) and Moliets et Maâ, France (2002). During two decades, the focus of these Symposia was the nuisance plants (so-called 'weeds' in the sense of being harmful to human activities, mainly agriculture), their biology and forms of control. Progressively, other aspects took dominance, such as interactions with other components of the ecosystem, non-native invasion processes, plant conservation and the monitoring of water quality. In general, a human-dominated view gave way to an ecosystem-based perspective, and management practice driven by ecosystem functioning.

The importance of technical aspects and case-studies was also progressively complemented, and later overrun by theoretical aspects and concepts of functioning, at individual, population and ecosystem levels, and these were used to predict management and ecosystem restoration outcomes. From the 9th Symposium onward (Dublin, 1994), the authors were also invited to elaborate their contributions into full papers

to be published in a special issue of the journal *Hydrobiologia* (Caffrey et al., 1996; Caffrey et al., 1999; Caffrey et al., 2006). After the 11th International Symposium on Aquatic Weeds in Moliets et Maâ, in 2002, the WG on Aquatic Weeds ceased to exist independently within the EWRS. Eventually the Finnish Environment Institute (SYKE) took the lead in organising the follow-up 12th International Symposium on Aquatic Weeds in Jyväskylä in 2009 in co-operation with The International Society of Limnology (SIL), by means of their Working Groups on Aquatic Macrophytes and Wetlands (Pieterse et al. 2010). The success of the Jyväskylä Symposium enabled the continuity of the series, with the 13th EWRS International Symposium on Aquatic Plants. The Aquatic Symposium series, now with a proud tradition of half a century (1964–2014), will be next organised in Edinburgh, United Kingdom, in 2015, and further in New Zealand in 2019.

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References

- Aguiar, F. C., P. Segurado, G. Urbanič, J. Cambra, C. Chauvin, S. Ciadamidaro, J. Ferreira, G. Dörflinger, M. Germ, P. Manolaki, M. R. Minciardi, A. Munné, E. Papastergiadou & M. T. Ferreira, 2014. Comparability of river quality assessment using macrophytes: a multi-step procedure to overcome biogeographical differences. *Science of Total Environment* 476–477: 757–767.
- Bornette, G. & S. Puijalon, 2011. Response of aquatic plants to abiotic factors: a review. *Aquatic Sciences* 73: 1–14.
- Caffrey, J. M., P. R. F. Barrett, K. J. Murphy & P. M. Wade (Guest Editors), 1996. Management and ecology of freshwater plants. *Hydrobiologia* 340: 1–354.
- Caffrey, J. M., P. R. F. Barrett, M. T. Ferreira, I. S. Moreira, K. J. Murphy & P. M. Wade (Guest Editors), 1999. Biology, ecology and management of aquatic plants. *Hydrobiologia* 415: 1–339.
- Caffrey, J. M., A. Dutartre, J. Haury, K. J. Murphy & P. M. Wade (Guest Editors), 2006. Macrophytes in aquatic ecosystems: from biology to management. *Hydrobiologia* 570: 1–263.
- Capers, R. S., R. Selsky & G. J. Bugbee, 2010. The relative importance of local conditions and regional processes in structuring aquatic plant communities. *Freshwater Biology* 55: 952–966.
- Chambers, P. A., P. Lacoul, K. Murphy & S. Thomaz, 2008. Global diversity of aquatic macrophytes in freshwater. *Hydrobiologia* 595: 9–26.
- Gordon, D. R. & C. A. Gantz, 2011. Risk assessment for invasiveness differs from aquatic to terrestrial plant species. *Biological Invasions* 13: 1829–1842.
- Gurnell, A. M., J. M. O'Hare, M. J. Dunbar & P. M. Scarlett, 2010. An exploration of associations between assemblages of aquatic plant morphotypes and channel morphological properties within British rivers. *Geomorphology* 116: 135–144.
- Lumbreras, A., C. Pardo & J. A. Molina, 2013. Bioindicator role of aquatic *Ranunculus* in Mediterranean freshwater habitats. *Aquatic Conservation: Marine & Freshwater Ecosystems* 23: 582–593.
- Pieterse, A. H., S. Hellsten, J. Newman, J. Caffrey, F. Ecke, T. Ferreira, B. Gopal, J. Haury, G. Janauer, T. Kairesalo, A. Kanninen, K. Karttunen, J. Sarvala, K. Szoszkiewicz, H. Toivonen, L. Triest, P. Uotila & N. Willby, 2010. Aquatic invasions and relation to environmental changes. *Hydrobiologia* 656: 1–267.
- Xian, Q., L. Hu, H. Chen, Z. Chang & H. Zou, 2010. Removal of nutrients and veterinary antibiotics from swine wastewater by a constructed macrophyte floating bed system. *Journal of Environmental Management* 91: 2657–2661.