Introduction to “Ecological and Evolutionary Consequences after Invaders Hybridize”

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The motivation for this special issue was a symposium organized by Ayres and Schierenbeck at the 2006 American Botanical Society annual meeting that took its title from Ellstrand and Schierenbeck’s highly cited 2000 paper in Proceedings of the National Academy of Science, “Hybridization as a Stimulus for the Evolution of Invasiveness”. Ellstrand was the keynote speaker. As explored previously by Ellstrand and Schierenbeck (2000), the mixing of divergent genotypes can result in the creation of populations of hybrids that are more invasive than the parental species. The symposium sparked such interest in the participants and audience that Ellstrand suggested we collaborate on a special issue. Here we revisit the earlier examples (Schierenbeck and Ellstrand 2009), and in a series of papers, present case studies examining the ecological and evolutionary consequences of

hybridization in plants which range from hybridization between cultivars in ornamental pears (Culley and Hardiman 2008), to introgressive hybridization between species (Gaskin and Kazmer 2008; Sloop et al. 2009), to the formation of diploid (Abbott et al. 2008) and allopolyploid hybrid species (Ainouche et al. 2008; Ayres et al. 2008). We also consider the interplay between sexual and clonal reproduction in invaders (Bailey et al. 2008) whether hybrid plants are by their nature more invasive than non-hybridized taxa in a meta-analysis (Whitney et al. 2008), and outline approaches to modeling hybrid population dynamics (Hall and Ayres 2008). The case studies should serve as cautionary tales against the casual introduction of non-native taxa into areas occupied by conspecifics or congeners while this special issue illustrates the potential for hybrid studies to increase our understanding of evolution.

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References

- Abbott RJ, Brennan AC, James JK, Forbes DG, Hegarty MJ, Hiscock SJ (2008) Recent hybrid origin and invasion of the British Isles by a self-incompatible species, Oxford ragwort (*Senecio squalidus* L., Asteraceae). Biol Invasions. doi:10.1007/s10530-008-9382-3
- Ainouche ML, Fortune PM, Salmon A, Parisod C, Grandbastien M-A, Fukunaga K, Ricou M, Misset M-T (2008) Hybridization, polyploidy and invasion: lessons from *Spartina* (Poaceae). Biol Invasions. doi:10.1007/s10530-008-9383-2

- Ayres DR, Ryan FJ, Grotkopp E, Bailey J, John Gaskin J (2008) Tumbleweed (*Salsola*, section *Kali*) species and speciation in California. *Biol Invasions*. doi:[10.1007/s10530-008-9380-5](https://doi.org/10.1007/s10530-008-9380-5)
- Bailey JP, Bímová K, Mandák B (2008) Asexual spread versus sexual reproduction and evolution in Japanese knotweed *s.l.* sets the stage for the “Battle of the Clones”. *Biol Invasions*. doi:[10.1007/s10530-008-9381-4](https://doi.org/10.1007/s10530-008-9381-4)
- Culley TM, Hardiman NA (2008) The role of intraspecific hybridization in the evolution of invasiveness. A case study of the ornamental pear tree *Pyrus calleryana*. *Biol Invasions*. doi:[10.1007/s10530-008-9386-z](https://doi.org/10.1007/s10530-008-9386-z)
- Ellstrand NC, Schierenbeck K (2000) Hybridization as a stimulus for the evolution of invasiveness in plants? *Proc Natl Acad Sci* 97:7043–7050
- Gaskin JF, Kazmer DJ (2008) Introgression between invasive saltcedars (*Tamarix chinensis* and *T. ramosissima*) in the USA. *Biol Invasions*. doi:[10.1007/s10530-008-9384-1](https://doi.org/10.1007/s10530-008-9384-1)
- Hall RJ, Ayres DR (2008) What can mathematical modeling tell us about hybrid invasions? *Biol Invasions*. doi:[10.1007/s10530-008-9387-y](https://doi.org/10.1007/s10530-008-9387-y)
- Schierenbeck K, Ellstrand NC (2009) Hybridization and the evolution of invasiveness in plants and other organisms. *Biol Invasions*. doi:[10.1007/s10530-008-9388-x](https://doi.org/10.1007/s10530-008-9388-x)
- Sloop CM, Ayres DR, Strong DR (2009) The rapid evolution of self-fertility in *Spartina* hybrids (*Spartina alterniflora* × *foliosa*) invading San Francisco Bay, CA. *Biol Invasions*. doi:[10.1007/s10530-008-9385-0](https://doi.org/10.1007/s10530-008-9385-0)
- Whitney KD, Ahern JR, Campbell LG (2008) Hybridization-prone plant families do not generate more invasive species. *Biol Invasions*. doi:[10.1007/s10530-008-9390-3](https://doi.org/10.1007/s10530-008-9390-3)