

The evolutionary consequences of hybridisation between a native and invasive *Senecio*

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Summary The importance of hybridisation in the evolution and speciation of plants has long been recognised. Interspecific hybridisation between native and exotic plant species can result in enhanced weediness in hybrids, natives and/or exotics, extinction of parental species (Hegde *et al.* 2006) and the evolution of new hybrid lineages (Abbott and Lowe 2004). Intraspecific hybridisation between disparate source populations (admixture) has also been implicated in successful invasions, and may contribute to eventual allopatric speciation in the invaded range (Ellstrand and Schierenbeck 2000).

Senecio, the largest genus of flowering plants, is known for its globally important weed species and widespread occurrence of hybridisation. Australian fireweed (*Senecio madagascariensis* Poir.) is an invasive weed in the eastern states of Australia. The exact origins of fireweed are currently unknown but previous genetic studies using isozymes indicate that the KwaZulu-Natal and East Cape provinces of South Africa are potential sources (Radford *et al.* 2000). Molecular and morphological studies have demonstrated the potential for hybridisation between fireweed and the Australian native *Senecio pinatifolius* A.Rich (Radford 1997, Prentis *et al.* 2007).

I am working to pinpoint the South African source population(s) of fireweed and reveal if admixture has occurred. This is achieved by genotyping plants sampled from across the Australian and putative South African ranges for a combination of nuclear and chloroplast microsatellite markers. Additionally, I am investigating the demography of hybridisation in sympatric populations of fireweed and *S. pinatifolius* in Australia by probing samples with species specific markers to determine hybrid origins. Results will provide information on the rate of hybrid seed set, survival and fertility of hybrids, and the maternal and paternal parents of hybrids.

In order to ascertain the potential contributions of hybridisation and admixture to the successful invasion of fireweed in Australia, herbarium records have been used to map the temporal spread since introduction *circa.* 1918 (Radford 1997). The herbarium specimens are now being probed with species and source

specific molecular markers to reveal where and when any hybridisation or admixture occurred in fireweed's invasion history.

Keywords *Senecio*, hybridisation, admixture, herbarium, microsatellites, invasion.

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