

Developing a conservation strategy for *Senecio cambrensis* (Welsh ragwort), the only truly endemic plant of Wales

Supervisors:

Professor Simon Hiscock (School of Biological Sciences, University of Bristol) – Main supervisor

Dr Natasha de Vere (National Botanic Garden of Wales and IBERS, University of Aberystwyth)

Dr Matthew Hegarty (IBERS, University of Aberystwyth)

Host institution: University of Bristol

Project description: The Welsh ragwort *Senecio cambrensis* is the only truly endemic plant of Wales. The species was first recorded in 1946 in north Wales and research showed that it was the product of a rare hybridization event (allopolyploidization) between common groundsel (*Senecio vulgaris*) and the alien invasive species Oxford ragwort (*S. squalidus*)¹. Such cases of abrupt speciation within a known time scale are very rare worldwide (just 4 known examples), making them excellent model systems for studying speciation processes, especially at a genomic level. Indeed, over the past 12 years Hiscock and Hegarty, with NERC support, have provided major insights into genetic and genomic aspects of abrupt speciation in *Senecio*¹. Far less is known however about the ecology and population genetics of *S. cambrensis*, but a recent review² revealed that wild populations are in rapid decline.

Populations of *S. cambrensis* increased steadily from 1950-1990, but since 1990 its numbers have decreased¹ and it is now threatened with extinction unless measures are taken for its conservation. Reasons for this decline are not clear but may be due to habitat loss and climate change. In order to develop a meaningful conservation strategy for Welsh ragwort, critical data is needed to better understand its current distribution and population status in Wales, and its ecology, genetic diversity and reproductive biology. The aim of this project will be to gather these data and use them to make robust science-based recommendations for the conservation of *S. cambrensis*. To do this we will seek answers to the following questions (objectives):

1. How many populations of *S. cambrensis* remain in Wales and what are their estimated sizes?
2. How much genetic diversity is present in *S. cambrensis* today and how does this compare to past genetic diversity (as assessed through DNA analysis of herbarium specimens).
3. What is the predominant mode of reproduction in *S. cambrensis* – outcrossing or selfing?
4. What are the possible causes of *S. cambrensis*' decline over the last 20 years and how can this decline be ameliorated?

¹Hegarty et al. (2012) In *Polyploidy and Genome Evolution*, Eds. Soltis PS & Soltis DE. Springer-Verlag.

²Abbott et al (2009) *Biological Invasions* 11: 1145 - 1158.