**A new class of leaf morphology mutants in pea**

Vander Schoor JK1,2, Wiltshire RJE1, Weller JL1,2

*Jacqueline.VanderSchoor@utas.edu.au*

1 School of Natural Sciences, University of Tasmania, Hobart, TAS 7001 Australia

2 ARC Centre of Excellence for Plant Success

Many legumes have pinnately compound leaves, and show an increase in the number and size of leaflets during development. In pea, the first true leaf features a single leaflet pair and a simple tendril, while later-formed leaves possess a increasing number of leaflet pairs and tendrils. While several of the genes controlling leaf identity in pea have been characterized, the genetic control of leaflet number is largely uncharacterized. It has been suggested that the change in leaflet number with development could represent a juvenility gradient [1] and might reflect regulation of the conserved *miR156/SPL* aging (heterochrony) pathway, but so far there is no genetic evidence to support this.

To investigate this question, we identified mutants that accelerate and or/extend the developmental transition in leaflet number mutants and characterised four distinct loci (*AERO1 [2]*, *AERO2*, *APC1* and *APC2*). Double and triple mutant combinations showed additive and increasingly pleiotropic effects, suggesting the existence of distinct regulatory pathways or potential redundancy. Each locus was mapped to a narrow genomic region and sequencing of candidate genes revealed putative causal mutations for all four mutants*.* Surprisingly, these genes have no known association with the aging/heterochrony pathway, and may instead regulate cell proliferation in meristems and leaf primordia. These findings introduce a novel class of pea mutants offering fresh insight into the regulation of vegetative development and diversity in leaf form.

***References:***

[1] Wiltshire RJE et al. (1994) The genetic control of heterochrony: evidence from developmental mutants of Pisum sativum L. J. Evol. Biol. 7, 447-465

[2] Taylor SA and Murfet IC (2003) A supaeromaculata mutation affects heterochrony in pea. Physiol. Plant. 117, 100-117