What mutations caused the shift to selfing in *Capsella*?

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Many plants can recognize and reject pollen from close relatives through genetic self-incompatibility systems. These systems are based on male and female specificity genes that are expressed in the pollen and stigma. When the male specificity genotype is recognized by the female, an incompatibility response is triggered and fertilization cannot occur.

In some situations, it can be beneficial for plants to lose self-incompatibility and allow self-pollination to occur. Such transitions from outcrossing to self-fertilization have occurred very frequently in the evolution of flowering plants. Although self-incompatibility could in principle be lost through mutations in either the male or the female specificity gene, theory predicts that mutations in the male specificity component should be favored over those in the female component. This was recently shown to be the case in *Arabidopsis thaliana* (Tsuchimatsu et al 2010, Nature 464:1342-1346). However, although the transition to selfing occurs so frequently, there are few cases where we know what mutations are responsible for the loss of self-incompatibility.

The aim of this project is to test whether mutations in the male specificity gene were important for the loss of self-incompatibility in *Capsella*, a close relative of *Arabidopsis*. The self-fertilizing species *Capsella rubella* originated very recently from a self-incompatible outcrossing ancestor (Foxe, Slotte et al 2009, PNAS 106: 5241-5245; Guo et al 2009, PNAS 106: 5246-5251) but it is unclear what mutations caused the loss of self-incompatibility. This project involves sequencing the male and female specificity genes and scoring self-incompatibility in crosses to answer this question.