

# Marie Pascal Descorbeth

---

Major: Biology  
University: Kingsborough Community College  
Faculty Mentor: Dr. Bruce McClure  
Mentor Department: Biochemistry  
Funded by: Molecular Biology Program

## Genotype and phenotype of *Nicotiana alata* x *Nicotina rastroensis*

Gametophytic self-incompatibility (SI) is a process which enables plants to prevent inbreeding depression by rejecting self-pollen and pollen from closely related individuals. S-specific pollen rejection is controlled on a multi-allelic locus, the S-locus. If the S-allele of the haploid pollen matches either of the diploid pistil S-alleles, pollen tube growth is inhibited. The product of the S-locus is the active ribonuclease, S-RNase. We set out to test whether putative  $S_{C10}$  S-RNase growth from *Nicotiana rastroensis* truly segregates as an allele of the S-locus. We used a hybrid of *Nicotiana alata* and *N. rastroensis* for our study. The *N. alata* parent was homozygous for the  $S_{105}$  S-allele and the *N. rastroensis* parent had an  $S_{C10}$  and another unknown S-allele (Sx). Our experiment was to find out the genotype of the hybrids, and test the plants for rejection of  $S_{C10}$  pollen. We emasculated and pollinated flowers with  $S_{A2}$ ,  $S_{105}$ , and  $S_{C10}$  pollen from *N. alata*. S-RNase expression leading to a pollen rejection phenotype was determined by fruit set. SDS-PAGE and western blot analysis with specific S-RNase antibodies was used to determine the genotype of the hybrids. The result expected was 50% of the plants have  $S_{105}/S_{C10}$ , and 50% have  $S_{105}$  and the unknown Sx, but we found that 75% contained  $S_{C10}$  + 25% had Sx. We saw that *N. rastroensis*  $S_{C10}$  S-RNase rejects  $S_{C10}$  pollen and accepts  $S_{105}$  pollen. Thus, we observed allele specific pollen rejection from the  $S_{C10}$  allele.