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**GFP labeling in *Nicotiana section Alatae***

*Nicotiana* section *Alatae* possesses gametophytic self-incompatibility (SI). SI is a general mechanism that many angiosperms use to prevent self-pollination. Gametophytic SI is controlled by the S-locus. The S-locus codes for two recognition proteins, the pistil-expressed S-RNase, and the pollen-expressed S-Locus F-box (SLF). Pollen containing SLF from either of the S-loci in the diploid pistil is recognized and actively rejected. The physical interaction between SLF and S-RNase is responsible for the specificity part of the SI response. In the current model of gametophytic SI, S-RNase and other proteins’ uptake and sequestration are central to compatible pollen’s ability to overcome S-RNase cytotoxicity. This sequestration presumably prevents S-RNase’s cytotoxic activity from occurring in the cytoplasm, thus suppressing the incompatibility response. *Nicotiana longiflora*, and the putative species “Rastroensis” have been transformed with GFP under control of the LAT52 promoter labeling the cytoplasm of their pollen.

Furthermore, membrane associated proteins, fused to Green Fluorescent Protein (GFP), have been used to label cellular membranes in plants without disrupting protein function or localization. We plan to make several constructs that will label specific compartments in living pollen tubes. Subsequent labeling of membrane bound vesicles in the pollen tubes of these two species will allow for tracking of proteins involved in both compatible and incompatible pollinations in vivo, which will lead to a better understanding of the SI mechanism.