Characterizing the interactions between *Suppressor of Sessile Spikelet* Mutations (*Sos2 and Sos3*)

Connor Nordwald, Katy Guthrie, Amanda Blythe and Paula McSteen

Maize and other grasses provide the globe with the large quantities of food needed to sustain a growing population. One major developmental difference of maize is that it produces spikelets in pairs rather than the single spikelet structure seen in rice, wheat and barley. These spikelets are of great importance to the plant, as well as to the farmer due to the fact that they go on to house the anthers in the tassel and the kernels in the ear, this is why there is always an even number of kernels on an ear. Maize spikelets form in pairs from the inflorescence meristem (IM) which produces spikelet pair meristems (SPM). The SPM then splits into two spikelet meristems (SM). In order to understand this process, the semi-dominant Suppressor of Sessile Spikelets mutations (*Sos2 and Sos3*) are being studied and compared to observe the genetic interactions of the two genes. Mapping by sequencing has also been done on these genes to compare their chromosome number and loci. Heterozygous *Sos2 and Sos3* mutants produce single spikelets in the tassel and the ear indicating a defect in SPM development. Homozygous *Sos2* plants produce ears and tassels with only a few spikelets present while homozygous *Sos3* plants are characterized as having barren patches throughout the tassel and ear. To observe the relationship between these two genes, a double mutant analysis has been reproduced to determine the genetic interactions between the crosses of *Sos2 and Sos3* with other mutants withing their predicted pathway. Confocal microscopy has also been performed on the mutations using the marker PIN: YFP, in order to see what affect the mutations have on localization and concentration of the plant growth hormone, auxin. The results of these experiments should provide a clearer insight as to whether or not *Sos2 and Sos3* are related genes.