# Moises Aguayo, Agricultural Business Management

**University**: University of Missouri
**Year in School**: Junior
**Hometown**: Columbia, Missouri
**Faculty Mentor**: Dr. Georgia Davis, Plant Sciences
**Funding Source**: NSF Undergraduate Mentoring in Environmental Biology

## The ramosa1 gene plays a role in shoot-borne root patterning in Zea mays L.

*M. Aguayo, M. Gerau, and G. Davis*

Maize brace roots are the aerial portion of the shoot-borne root system that facilitates physical anchorage and water and nutrient acquisition. Shoot-borne roots develop from axillary meristems. Axillary meristems can also give rise to leaves and tillers and are important in inflorescence development. Evidence is accumulating that similar genes are involved in at least the early stages of axillary meristems development regardless of meristems fate. According to a previous quantitative loci mapping study on brace roots architecture the ramosa1 gene is a positional candidate for controlling brace root variation. ramosa1 (ra1) affects the development of maize tassels by suppressing tassel branching and promoting spikelet pair formation. Mutations in the ra1 results in a greater number of tassel branches that grow increasingly shorter near the apex of the tassel. A correlation analysis between tassel traits and root traits was performed using 25 diverse maize lines. The results show a significant and positive correlation between various brace roots traits and tassel branch length, a trait controlled by ra1. Further more, a comparison of ramosa1 mutant to wild-type plants revealed statistically significant differences in root phenotypes with the ra1 mutants producing fewer brace roots at a node and fewer nodes with brace roots. This suggest that ra1 is part of both the inflorescence and shoot-borne root development programs Mutations in ra1 appear to have opposite effects on maize brace roots relative to tassels indicating that the role of ra1 may differ depending developmental phase. This research was supported by the NSF UMEB Program, Life Science Mission Enhancement, and USDA ARS.