Impact of Endophytic Inoculation on Buckwheat Root and Stem Traits: A Viable Alternative to Harmful Agrochemicals

Koentopp, Maizie (School: Northside College Preparatory High School)

Harmful agricultural practices have degraded topsoil and reduced organic matter, leaving farmers reliant on costly and damaging soil amendments. This threatens the ability to produce food for the growing population. Sustainable practices like cover crop use and inoculation help accelerate soil regeneration and promote plant productivity. My project aimed to explore the effects of endophytic bacteria on overall buckwheat health to see if the inoculant could be an alternative to harmful agrochemicals. The experiment was done by planting inoculated and non-inoculated buckwheat seeds on a farm that uses organic growing practices. The plants were collected from each group after two, four, and six weeks of growth, and Brix levels of the leaves were measured with a refractometer. The roots were washed, scanned, and analyzed with the Rhizovision software for morphology traits, and the stem diameter was measured. Root hairs on lateral roots were counted, and the roots were dried to collect the biomass. The inoculated buckwheat had higher average sugar levels of the leaves, flowers, and stems, as well as larger stem diameters in 6 out of the 9 groups measured. The morphology traits were more successful in areas such as root surface area and branching. Additionally, the root hairs along the lateral roots were denser, with around 100 more root hairs per 5 mm. The overall biomass of inoculated roots was larger.

Awards Won:

Third Award of $1,200