Image Analysis of Herbivory and Leaf Area of Infected and Uninfected Invasive Air Potato Leaves

Peracciny, Noah (School: Lakeland Christian School)

Dioscorea bulbifera, (air potato) is an invasive vine that has a smothering effect on native vegetation in Florida as well as other southeastern states in the U.S. In 2012, a beetle (Lilioceris cheni) was released as a biocontrol agent for air potato. Since then it has shown great success in bulbil reduction and reducing vine biomass, thus aiding to control the spread and severity of air potato. Recently, two novel viruses have been found to co-infect air potato. These viruses can elicit foliar mosaic symptoms and severe discoloration of the leaves. I compared the total leaf surface area and leaf area consumed by Lilioceris cheni of air potato samples naturally infected with these virus(es) to uninfected air potato samples. Air potato leaves were collected and analysed with imaging software that outputs the leaf surface area, leaf area surface consumed, and percent of leaf consumed from an image of a single leaf. Data were entered into a spreadsheet with the leaves grouped by vine and by infection status; averages from each category were compared. Uninfected leaves were consumed 3 times more than infected leaves sampled. Uninfected leaves were calculated to have 3.90% herbivory of their leaf area on average, while infected samples only had an average herbivory of 1.29%. Data from these two categories was used to compute a P-value of >0.0001 from a student's T-test, indicating statistical significance in the level of herbivory between infected, and uninfected leaves. Other effects of these novel viruses on the herbivory patterns of the air potato leaf beetle and the leaf area are unknown and could potentially be useful to measure the impact of these newly discovered viruses.

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