Sweet Potato Whitefly Infestation in the Agricultural Industry: Examining the Effects of Nitrogen Fertilizer on Whitefly Fecundity

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Whiteflies (Bemisia Tabaci) are phloem-feeding pests that carry and spread diseases, with the capability of causing widespread damage to global food production. Thus, whiteflies are one of the most serious crop protection problems. They quickly develop chemical resistance for the pesticides and insecticides used to eliminate them. Therefore, cultural approaches to moderate whitefly populations, including nutrient management become viable pest control options. To test the effect of plant fertilizer concentration on whitefly reproduction, whiteflies were placed cage-bound on the leaves on melon vines (Top Mark) at various fertilizer concentrations. The manipulation of plant nitrogen (N) was fertilized in different replicates. Based on the results, plants that were fertilized at 25-50 ppm allow for high whitefly fecundity, while plants fertilized at 100-200 ppm reduced whitefly reproduction relative while increasing the nutrient deficiency in the plants. This study has a quadratic response in whitefly fecundity, with nutrient concentrations exceeding 50 ppm resulting in decreased reproduction. Plants increased in all measured metrics of health (tendril length, leaf size, and leaf condition) as the concentration increased. In conclusion, whiteflies require a minimum level of nitrogen in their host, however they reproduce less under the recommended nutrient supply conditions. Thus future studies may need to examine the effect of nitrogen concentration on different plant varieties, as well as independently manipulating other nutrients, in order to determine their role in whitefly reproductive success. This experiment successfully reduced the amount of whitefly fecundity with 200 ppm concentration, while benefiting the host plants that are significant to the consumers.

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