Public Abstract

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Title: Analysis of uptake of nitrate and ammonium in blueberry using the ^{15}N stable isotope

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Blueberry is a major fleshy fruit in the southeastern United States. Sustaining the profitability of blueberry production requires optimization of management practices, including that of nitrogen (N) nutrition. Blueberry is considered to display N-source preference for the ammonium (NH_4^+) form of N over the nitrate (NO_3^-) form. The basis for this preference remains unclear. Further, N uptake characteristics at different external N concentrations are not well characterized in blueberry. In this study, we used the ^{15}N stable isotope to determine N uptake characteristics across a wide range of N concentrations, and across the two forms of inorganic N, NH_4^+ and NO_3^-. We determined that at lower concentrations of N, NH_4^+ and NO_3^- uptake was mediated by respective high affinity transport systems (HATS) which were saturable. At higher N concentrations, N uptake was mediated by distinct low affinity transport systems (LATS). The LATS for NH_4^+ uptake could be best described using a linear relationship. However, the LATS for NO_3^- uptake was saturable. Further, under HATS, the V_{max} associated with NO_3^- uptake was substantially lower than that for NH_4^+ uptake, suggesting lower root NO_3^- uptake capacity in blueberry. This may likely contribute to N-source preference. The current preliminary data presented in this report are based solely on uptake of ^{15}N into roots. Further analyses are underway to determine ^{15}N uptake/transport into shoots. Together these data are expected to provide comprehensive information on N uptake characteristics over a wide range of N concentrations in blueberry. Such information will be valuable in fine-tuning N nutrition management practices.