Nickel in Soils and Crops of New Jersey

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Nickel (Ni) availability affects crops' ability to convert urea into ammonium, withstand abiotic stress, and other physiological processes. Separate research groups found signs of Ni deficiency in Georgia in 2004 on pecan trees and in 2022 on soils of Wisconsin. Until recent years, the trace levels of Ni in plants posed a detection limit challenge to most standard elemental analysis equipment in agricultural service labs. This limited the ability to develop better practices for Ni nutrient management. Cranberry, a crop of economic importance to New Jersey, is grown on Spodosols soils. We applied nickel sulfate as a foliar fertilizer, to cranberry. The Ni fertilizer treatment did not elicit a yield response, and there was no observed protection against fruit rot. Additional research surveyed soils and leaf tissue of woody perennial crops across the coastal and piedmont regions of New Jersey. Crops evaluated in the 2023-24 survey were representative of local farming systems, including cranberry grown in saturated beds, fruit trees growing on silt to sandy loam soils and potted nursery trees. Soils were evaluated using the Mehlich-3 extract, and leaf samples were analyzed for elemental composition. Results from pecan, peach, and apple tree soil samples found mean Mehlich-3 extractable Ni values of 1.4 ppm. About 35% percent of the soil samples were below the suggested deficiency level of 1.3 ppm; comparable to findings from the 2022 Wisconsin soil test survey. The results demonstrated a potential deficiency in some mildly acid and strongly acid soils of New Jersey. Reported acute Ni deficiency in hazelnut trees at a Rutgers Horticulture Research farm in central New Jersey and in potted river birch trees at a commercial nursery in southern New Jersey were remediated by application of a foliar Ni fertilizer. Potted river birch trees with Ni deficiency recovered when transplanted into field soil.

Cranberry no response to Nickel treatment

Nickel Deficiency on River Birch