Boron and Calcium Effects on Runner Peanut Production

A.S. VAN CLEAVE, J.A. HOWE, K.B. BALKCOM and **A.V. GAMBLE***. Crop Soil & Environmental Sciences, Auburn University, Auburn, AL, 36849.

Calcium (Ca) and boron (B) deficiencies in peanut (*Arachis hypogaea* L.) can reduce seed quality, yield, and crop value. Southeastern U.S. Coastal Plain soils are inherently low in Ca and B, requiring supplementation to reach soil and plant tissue levels sufficient for peanut growth and development. In addition, coarse-textured surface horizons and high rainfall promote nutrient leaching. Two studies investigating Ca and B application rate, source, and timing effects on runner peanut production were conducted. To evaluate foliar-applied B effects on larger-seeded runner peanut (cv. Georgia-06G) yield and seed quality, B application rate (0.02, 0.28, 0.56, 1.12, and 2.24 kg B ha^{-1}), source (boric acid and sodium borate), and timing (single and split applications at early bloom) were tested at the Wiregrass Research and Extension Center (WREC; Headland, AL) in 2015, 2016, and 2017. No yield or grade responses to B treatments were observed, and minor B deficiency was observed in 2017 only. Seed B concentration was not affected by B rate, timing, or source. Applied B described at least 83% of leaf B concentration variability. A high rate of applied B (2.24 kg B ha^{-1} as sodium borate) was the most effective treatment for increasing leaf tissue B. Source did not affect leaf B when similar rates were compared. Application timing did not affect leaf B when similar sources were compared. Though foliar B applications did not improve grade or yield, applied B increased leaf tissue B concentrations without harming productivity. To evaluate Ca source effects on yield and seed quality, a study was conducted at WREC in 2015, 2016, and 2017 comparing lime ($CaCO_3$), gypsum ($CaSO_4$), and products containing humic acid or micronutrients. Lime and gypsum applications resulted in significantly higher ($P < 0.05$) seed and soil Ca levels compared to the untreated control. Alternative Ca sources did not result in different seed Ca levels compared to the control.