

CHANGES IN SOIL AND PLANT NUTRIENT CONCENTRATIONS IN THREE BROWSE SPECIES OVER TIME

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Abstract

Browse is an important part of the diet for many species, not only as enrichment, but also as a source of required nutrients. However, soil nutrient concentration as well as seasonality may influence the nutrients in the browse plant. We evaluated the effect of season on soil and leaf nutrient concentrations before and after fertilizing from banana (*Musa* sp.; BAN), elaeocarpus (*Elaeocarpus decipiens*; ELC), and willow (*Salix caroliniana*; WIL) at six time points over one year. Browse species were grown in separate plots and each plot was divided into 4 zones. In each zone, 20 soil samples and 150 leaf samples were collected and pooled by zone at each time point (Jan, Feb, May, June, Sept, and Nov 2020). Plots were fertilized in March with a commercial fertilizer. Soil was analyzed for pH and minerals; leaves were analyzed for protein and minerals. Data were analyzed as repeated measures with browse species as the main effect, zone as a random effect, and time as the repeated measure (SAS 9.4, SAS Institute Inc., Cary, NC, USA). Across all browse species, there was no effect of time on soil pH ($P > 0.05$), but BAN soil had a lower pH than ELC and WIL soil ($P < 0.05$). Leaf crude protein was highest in Feb and lowest in Nov across all species ($P < 0.05$), and was lowest in ELC compared to BAN and WIL ($P < 0.05$). Soil Ca was not affected by species ($P > 0.05$), but was highest in Feb, May, and June ($P < 0.05$). Leaf Ca was highest in WIL compared to BAN and ELC and was highest in May and lowest in Sept ($P < 0.05$). Soil Cu was highest in BAN and lowest in WIL and was higher in May and June compared to Sept and Nov. Leaf Cu was also highest in BAN but lowest in ELC and was highest in Sep and lowest in Jan and June ($P < 0.05$). Examining trends in soil characteristics can be useful for developing a fertilization program specific to the plant species and time of year, while determining differences in leaf nutrients are helpful for formulating diets. Ensuring adequate mineral intake can be accomplished by strategically supplementing minerals using balanced pellets or supplements to complement the changes in browse mineral content throughout the year.