

DISTRIBUTION OF PROTEIN AND PHOSPHORUS IN SPRING GROWTH OF RUSTY BLACKHAW

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Abstract: Spring growth of rusty blackhaw (*Viburnum rufidulum*), a moderately preferred deer browse on southern ranges, contained more crude protein and phosphorus in the terminal inch of the twigs and the attached leaves than in segments 2 and 3 inches from the tip.

Great changes in the chemical composition of developing woody tissue should be expected during periods of rapid growth, as in the spring. In many species high levels of protein and phosphorus are associated with plant portions exhibiting the greatest growth activity. For woody plants these growth regions are the leaves and twig tips. This paper describes the variations that occurred in the distribution of crude protein and phosphorus within the distal 3 inches of current twig and leaf growth of rusty blackhaw during a period of rapid twig elongation in the spring.

Rusty blackhaw is relatively common on upland deer ranges in the mixed pine-hardwood forests of the South and is considered a moderately preferred forage for

deer. The phenology of this deciduous shrub, in east Texas, is characterized by a rapid flush of growth beginning in early March and subsiding by late April (Halls and Alcaniz 1965).

On April 19, 1964, the distal 3 inches of new shoot growth and the attached leaves were collected from a series of rusty blackhaw plants growing in the understory of a well-stocked pine-hardwood forest of east Texas. At each of three locations 100 to 150 current stems were collected from all positions on two or three plants, each 5 feet or less in total height. Twigs were segmented into three 1-inch sections and the leaves were removed (Fig. 1). The twigs and the leaves of each section were analyzed separately for crude protein and phosphorus by

the Feed and Fertilizer Laboratory, Louisiana Agricultural Experiment Station. Analytical determinations were on a moisture-free base (Assoc. Official Agr. Chem. 1960).

Three replicates of data were examined statistically by analyses of variance. When differences were significant, means were compared by Duncan's (1955) multiple range test, with Harter's (1960) table of critical values. All differences reported here are significant at the 0.05 level.

The plant parts were highly succulent, with leaves averaging 79 percent moisture and twigs 76 percent.

The terminal 1-inch section of twigs contained 42 percent more crude protein than the second 1-inch section, which in turn contained 20 percent more than the third section (Table 1).

Leaves from the terminal 1-inch section were 7 percent higher in protein than leaves from the other sections. In all cases protein was more abundant in leaves than in twigs, with the greatest difference occurring in

Table 1. Mean percentages of crude protein and phosphorus in distal 3 inches of current twig and leaf growth of rusty blackhaw, April 19, 1964.

PLANT FRACTION	CRUDE PROTEIN*	PHOSPHORUS*
Twig		
Terminal inch	10.2 a	0.25 a
Second inch	7.2 b	0.19 b
Third inch	6.0 c	0.16 c
Leaves		
Terminal inch	12.9 d	0.26 a
Second inch	12.1 e	0.21 d
Third inch	12.1 e	0.20 d, b

* Means followed by the same letter are not significantly different ($P > 0.05$).

the third twig section and the least in the terminal section. Higher protein contents in leaves than in stems were reported by Cook and Harris (1950) for snowberry collected during the growing season in Utah and by Aldous (1945:148) for browse species selected from a winter range in Nevada.

Phosphorus content in the twigs was highest in the terminal inch. As with protein, it decreased in each twig section back from the tip. Leaves from the terminal inch of twigs were higher in phosphorus than other leaves, but only in the second and third 1-inch sections were they higher in phosphorus than the twigs.

Thus, protein and phosphorus contents were highest in regions of newest growth. In twigs especially, the nutrient levels diminished rapidly with distance from the tip. Depending on the abundance of forage, deer may browse greater or less proportions of current growth. In rusty blackhaw, at least, appraisals of the nutrient quality of forage may err considerably unless the samples are restricted to the plant parts being eaten.

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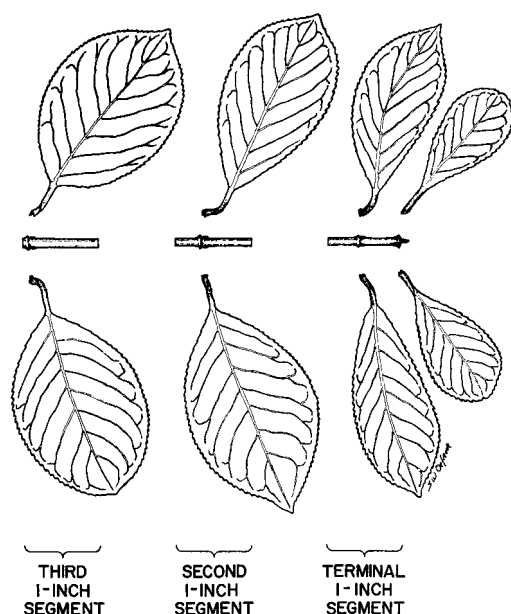


Fig. 1. Portion of current leaf and twig growth of *Viburnum rufidulum* analyzed for crude protein and phosphorus.

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Received for publication December 22, 1965.