



RESEARCH NOTES

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FUEL WEIGHTS OF POND PINE CROWNS

Pond pine (*Pinus serotina*, Michx.) is the most frequent component of the overstory in the fuel types on organic soils areas of coastal North Carolina. Although pond pine stands are characteristically rather open, in blowup fire situations the burning foliage and branchwood contribute significantly to the total energy released.

To determine the weights of these overstory fuels, foliage and branchwood from 20 dominant or codominant trees were measured. Tree diameters ranged from 2.6 to 14.8 inches at breast height. Pine needles were stripped from the branchwood and the two components of the crown were weighed separately. Analysis procedure followed Storey's, ^{1/} except that diameter breast height instead of diameter at base of crown was used as the independent variable.

The contribution of foliage or foliage plus branchwood for individual trees to total overstory fuel weight can be estimated from the two graphs on the reverse side or from the following relationships:

$$W_{df} = 0.486 (d. b. h.)^{1.697} \quad (A)$$

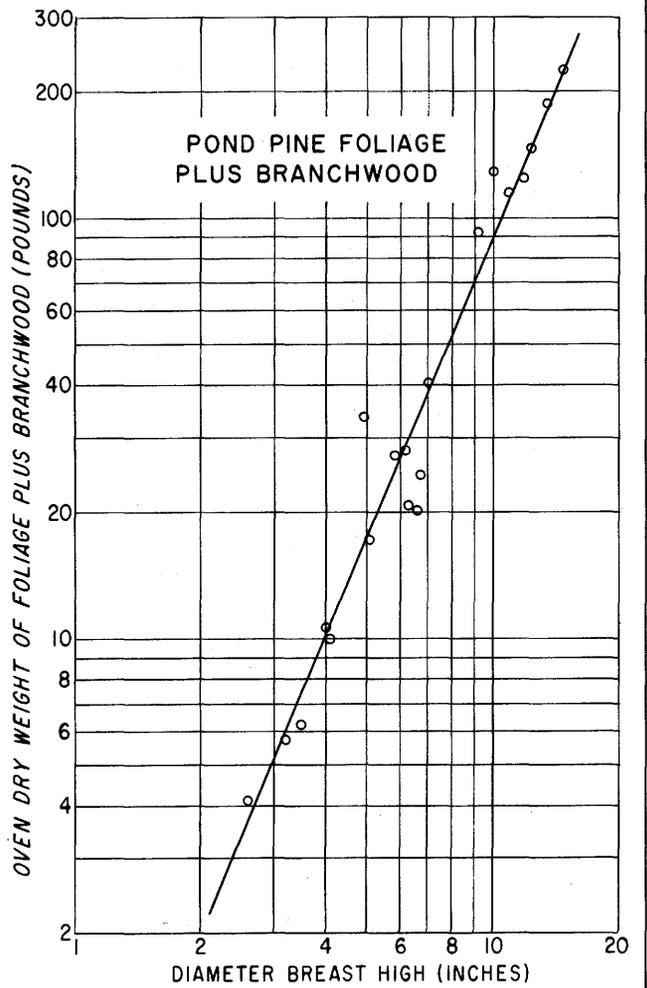
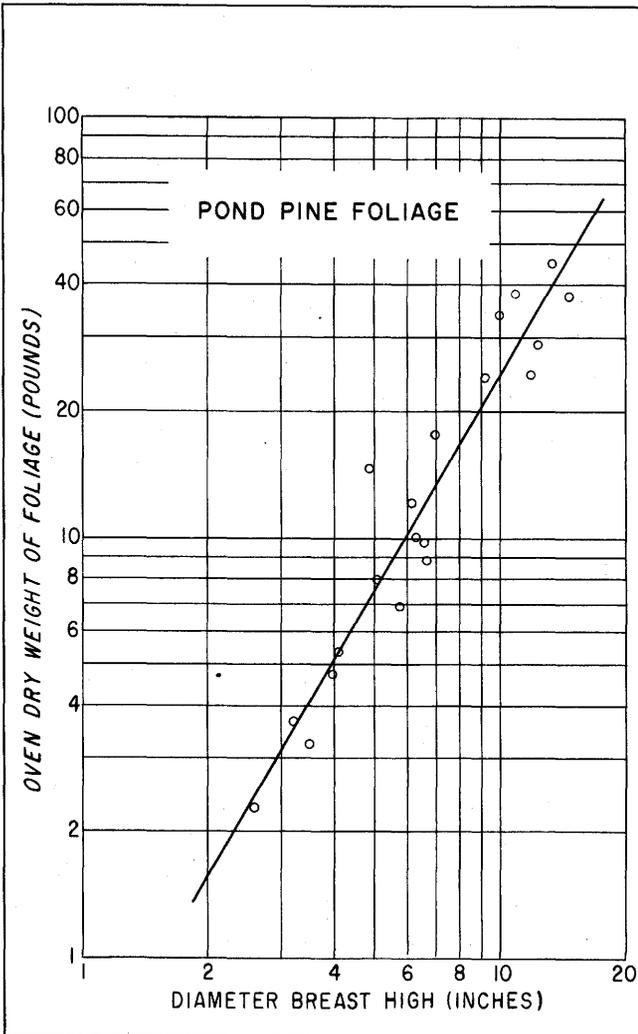
$$W_{dc} = 0.369 (d. b. h.)^{2.390} \quad (B)$$

where W_{df} is weight of overstory foliage, W_{dc} is the weight of the overstory foliage plus branchwood, and d. b. h. is diameter breast high outside bark. The coefficient of determination for equation (A) is 0.912 and the standard error of estimate is 28 percent. For equation (B), the coefficient of determination is 0.957 and is 27 percent. Analyses of variance showed highly significant linear dependence between W_{df} and d. b. h. and W_{dc} and d. b. h.

The contribution of the foliage or foliage plus branchwood to total overstory weight of fuel per unit area can be readily determined. For example, a fuel type was found to have an overstory averaging 20 trees per acre and 10 inches d. b. h. Referring to the curves we find that a 10-inch tree will average 25 pounds of foliage overstory and 90 pounds of foliage plus branchwood overstory, giving a mean for the stand of 500 pounds of foliage and 1800 pounds of foliage plus branchwood per acre.

^{1/} Storey, T. G., Fons, W. L., and Sauer, F. M. Crown characteristics of several coniferous tree species. U. S. Forest Serv. Div. Forest Fire Res. Interim Tech. Rpt. AFSWP-416. 1955.

Suppose further that this fuel type contains 8 tons per acre of understory vegetation and litter--about average for the fuels in the pocosins. If a very hot fire burned in this type and if all foliage and branchwood were consumed, the total fuel weight and resultant total fuel energy released would be increased by about 11 percent. Even in very severe fires, however, it is unlikely that most of the branchwood would be consumed, except in small areas. If the fire were slightly less intense, probably only the needles on the crowns would be consumed. In our example, the total fuel weight and the total fuel energy would be increased by only about 3 percent.



Relation between the oven dry weight of pond pine foliage and d.b.h. Hofmann Forest, N. C.

Relation between the oven dry weight of pond pine foliage plus branchwood and d.b.h. Hofmann Forest, N. C.

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