A TECHNIQUE FOR ESTIMATING GRASS YIELDS IN GREENHOUSE EXPERIMENTS[1]

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A method for estimating yields of grasses and other herbaceous plants at specific intervals during their growth, without destroying the plants, is an important tool for detailed greenhouse studies. One weight-estimation technique which has been used on grasses growing in large containers in the greenhouse is the height times ground cover (HG) method (Evans, 1960). The HG method was originally developed to estimate forage yields of field plots an annual grassland vegetation in California (Evans & Jones, 1958). Measurements of height times ground cover in the field correlated well with yield. The HG method was tried on grasses growing in quart containers, but correlation with yield was poor because not enough sampling points could be taken efficiently on the small volume of grass growing in the containers.

The method tested in the experiment presented here involved a measure of length of longest blade in centimeters multiplied by the number of blades of each individual grass plant (LN method). Grasses included in the test were cheatgrass (*Bromus tectorum L.*), crested wheatgrass (*Agropyron desertorum* [Fisch.] Schult.), pubescent wheatgrass (*A. trichophorum* [Link] Richt.), intermediate wheatgrass (*A. intermedium* [Host] Beauv.), and Indian ricegrass (*Oryzopsis hymenoides* [Roem. and Schult.] Richer). These grasses were grown in 1-quart, waxed-paper containers. The plants were sampled by the LN method and then harvested, oven-dried, and weighed. LN values are averages from 4 plants per pot, whereas yields are combined oven-dry weights of the 4 plants.

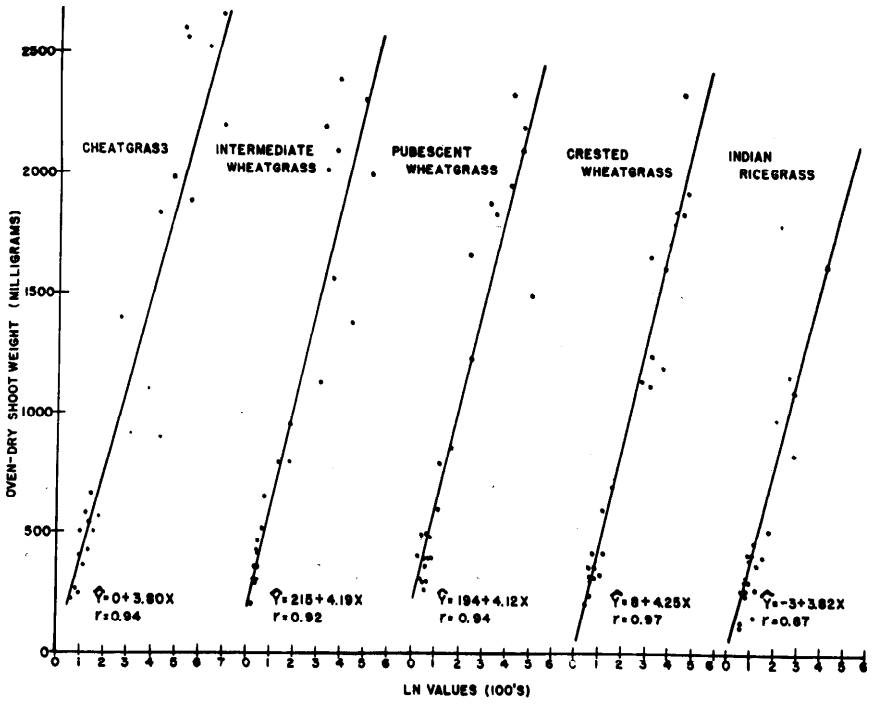

FIGURE 1. Regression lines, with scatter diagrams of individual sampling points, between oven-dry weights (milligrams) and LN values of 5 grass species grown in pots. Each point represents a LN value (average of 4 plants) and a combined weight of these 4 plants.

LN values and oven-dry weights of the 5 grasses were obtained after 10 weeks of growth in an experiment involving treatments of soil moisture and nitrogen. One hundred twenty comparisons of LN values and yield of the grass species were made. The range in yield in these comparisons was 120 to 2660 milligrams.

Correlation and regression coefficients and statistical significance for linearity of regression were determined for each species (Dixon and Massey, 1951). Prediction formulae were derived, and the regression line, with a

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scatter diagram of individual sampling points, was drawn for each of the 5 species (Figure 1).

Correlation coefficients between LN values and oven-dry shoot weights ranged from 0.87 to 0.97 for the 5 grass species. These indicated that 75 to 94% of the variation in yield was accounted for by variation in LN values depending upon the species. Regression coefficients for the 5 species were 3.8 to 4.2. All regressions were shown to be linear.

Comparison of LN values with yields of the 5 grasses in the experiment indicates (1) high correlation between the 2 sets of values; (2) similar regression coefficients for grasses of different species; and (3) relatively low variability in converting from LN values to yields.

Some variability was encountered in larger plants probably resulting from a combination of 2 factors: (1) the difficulty of accurately counting large numbers of leaves (up to 88 on a single plant in this experiment) and (2) the partial death of leaf tissue when the plants got older or were subjected to environmental stress. In some cases the longest or measured leaf began to die at the tip; then the heretofore next longest leaf was measured. The bias resulting from the dying of leaves of larger plants was greater because the length differences were multiplied by greater leaf numbers.

Despite these difficulties, the LN method of sampling shows promise in greenhouse studies in determining values correlated with yield at any time in the growth period. Probably the most useful application of this method is in deriving growth curves which are similar to yield curves, rather than directly converting LN values to yields.

LITERATURE CITED

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IDENTIFYING GREENBRIER GROWTH

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In a study in the Arkansas Ozarks, appearance of persistent leaf bases was found to be the best of several criteria for distinguishing the current season's growth of saw greenbrier *(Smilax bona-nox* L.). Greenbriers are among the most important deer browse plants in southern forests, but production and utilization are difficult to measure because old and new growth often look very much alike.

The leaf bases (Figure 1), which are ⅛- to ½-inch long, occur at the nodes and partially enclose a bud or stem. On old growth all bases look bleached and papery white. On current growth most are brown or light

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RESEEDING COMMITTEE MEETIN

The Range Reseeding Equipment Committee will meet for 2 d the Newhouse Hotel, Salt Lake City, headquarters for the Society's