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A METHOD OF ESTIMATING GRAZING USE OF BITTERBRUSH

By

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Not more than 60 percent of the current twig growth of bitterbrush (Purshia tridentata) should be grazed each season if the plant is to retain its vigor and produce abundant seed.[2/] A simple method of determining the grazing use of this valuable browse is outlined below. It consists in estimating the amount of current twig growth grazed on marked bushes on sample plots.

Size and shape of plot

The sample plots should be all the same size, and narrow and long enough to include 20 to 25 average-size bitterbrush plants. Plots 20 inches wide and 2 or 3 chains long — approximately 0.0050 to 0.0075 acres in size — have been used in stands of about 0.2 density.

Number of plots

The number of plots needed depends on the variability of the bitterbrush stand and the variability of grazing rather than on the area of the stand. Twenty- to twenty-five plots of the size and shape described above should give a reliable estimate of grazing use. More plots may be used but it is inadvisable to use fewer than 20.

1/ Mr. F. D. Douthitt, Division of Wildlife and Range Management, Region 5 assisted directly in the field work of this study. His cooperation, including suggestions on the manuscript, has been very helpful.

2/ Hormay, A. L. 1943. Bitterbrush in California. Calif. Forest & Range Expt. Sta. Res. Note No. 34. 13 pp. (Multilithed.)

* MAINTAINED AT BERKELEY, CALIFORNIA, IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA.

Distribution of plots

The area of the stand is divided into as many approximately equal-size blocks as the number of plots to be used. One plot is located in each block in a representative area reasonably close to roads and trails to avoid excessive travel to and from the plots. Each plot is numbered and marked.

Identification of bushes

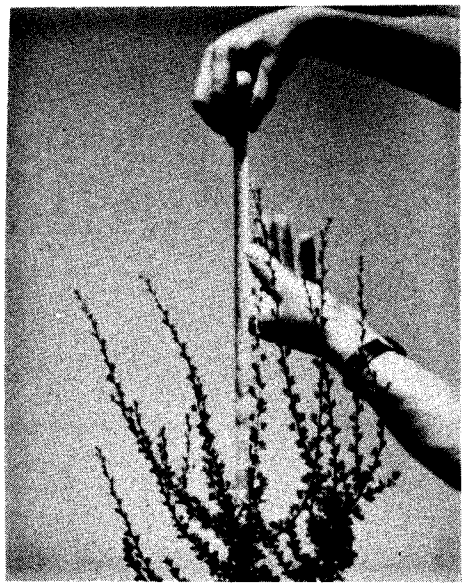
Each bitterbrush plant growing on the plot is marked with a durable numbered stake driven into the ground on the same side of each bush where it may be easily located. Metal tags may be used, but they are hard to find on the bushes. If used the tags should be placed in approximately the same place on each plant on a large branch that will not be removed by grazing.

Measurements of the bushes

The following records are made of each marked bush:

(1) Measurement of the average diameter of the entire crown to the nearest inch. Two or more measurements may have to be made in different directions across the crowns of irregularly shaped plants to arrive at an average.

(2) Estimate in inches of the average length of all ungrazed twigs.



To aid in judging average twig length measure several twigs on different parts of the plant with a ruler.

(3) Estimate in percentage of the total amount of twig growth grazed on the bush.

Differences in leafiness of the twigs at different times of the season should not be allowed to distract the eye from estimating the proportion of the actual length of the twigs that have been grazed. In the fall the

twigs are covered with green or drying leaves. In early spring they are bare but a few weeks later, before the new season's twig growth starts, they are again clothed with green leaves.

Calculation of utilization

In order to calculate percentage utilization of a bush, a plot, or the area studied, values representing the amount of forage produced and the amount grazed have to be obtained. In the present method these quantities are expressed by arbitrary numbers. For example, the amount of forage produced on a bush is expressed by the product of the area of the plant crown and the average ungrazed twig growth on the bush. This product is correlated with volume and yield but is not a direct measurement of either. It is simply a number that can be compared directly with similar numbers calculated for other bushes and serves the purpose of permitting relative comparison to be made in total production and total utilization as well as percentage utilization. Percentage utilization figures are calculated for each plot and for the area as a whole. The utilization of the area as a whole is the average of utilization percentages of all the plots.

To determine the percentage utilization of a plot —

1. Multiply the area of the plant crown by the average ungrazed twig growth of each plant and add the results for all the bitterbrush plants on the plot. This quantity expresses the total forage produced.

2. Multiply the products obtained for each plant in step 1 by the estimated percentage utilization of the twig growth of each plant and add the results for all bitterbrush plants on the plot. This quantity expresses the total forage grazed.

3. Divide the total forage grazed by the total forage produced and multiply by 100. This gives the percentage utilization of the plot.

Some results from field use of this method

The method described above was used to measure grazing of bitterbrush on the Modoc National Forest during the summer and winter seasons of 1940 and 1941. During the summer the area was grazed primarily by sheep and during the winter by deer. The stands studied had an average density of 0.2 or 0.3. Utilization estimates were made in the fall after the livestock were taken off the range and current twig growth was completed and again the following spring before the livestock were put back on the range and before new twig growth started.

The figures showed that by October (1940) 19 percent of the current twig growth of bitterbrush had been utilized by sheep. Deer grazing in this locality was negligible during the summer because of the small population. From October 1940 to May 1941 deer ate 51 percent of the total twig growth produced the previous summer. Sheep and deer together

ate 70 percent of the seasonal growth. In the next season 71 percent of the twig growth was utilized, 38 percent by sheep in summer and 33 percent by deer in winter. A picture of the summer use of bitterbrush by sheep and the winter use by deer was thus obtained for this area. It should be mentioned that in sparse bitterbrush stands even a few deer will graze the scattered plants closely, and utilization by livestock and by game cannot be differentiated.

The reliability of the method depends principally on the number of plots used and on the accuracy of the estimates of twig length and utilization of each bush. It can be applied to other browse species on which current twig growth is easily recognized.