

TECHNICAL NOTES

BUNCHGRASS FORM CLASSES FOR TREND STUDIES¹

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Idaho fescue (*Festuca idahoensis*) is a key forage grass on certain Montana elk ranges. While measuring basal areas and maximum leaf heights, differences were noted in growth forms of mature Idaho fescue plants. These forms were separated into Normal, Hollow Center and Clump Edge classes (Figure 1). The Normal class was as-

signed to plants if all portions of the bunchgrass clump produced leaves; the Hollow Center class, if a "ring" of leaves encircled a dead center by more than one-half the clump circumference; the Clump Edge class, if one or more segments of leaves grew on the edge of the clump and the largest segment did not encircle more than one-half the clump circumference. Segments of leaves were considered separate if they were apart from other segments by more than 0.3 inch.

Additional differences were noted on the surface of the dead portions of Hollow Center or Clump Edge plants. If old leaf structure was evident, an R (denoting *recent*) was assigned. If the surface was structureless, a D (denoting *decomposed*) was assigned.

Evanco and Peterson (1955) found that basal area measurements reflected differences in grazing intensities on Idaho fes-

cue. Various workers have used maximum leaf heights as an indication of grass vigor. As reported here, the basal area of a Normal or Hollow Center plant was the product of two opposed diameter measurements through the clump base; of a Clump Edge plant, the product of two opposed measurements through the base of one segment. Maximum leaf heights were measured by placing a rule vertically within a clump or segment. All measurements were to 0.1 inch.

Results from measurements and form class assignments on two adjacent ranges are shown in Table 1. A seedling category is included to isolate plants which were considered to be too small (basal area .06 inches or less) to reflect the Hollow Center or Clump Edge classes. Both ranges receive heavy winter and early spring elk use. In addition, Range B receives light to moderate late spring or early summer

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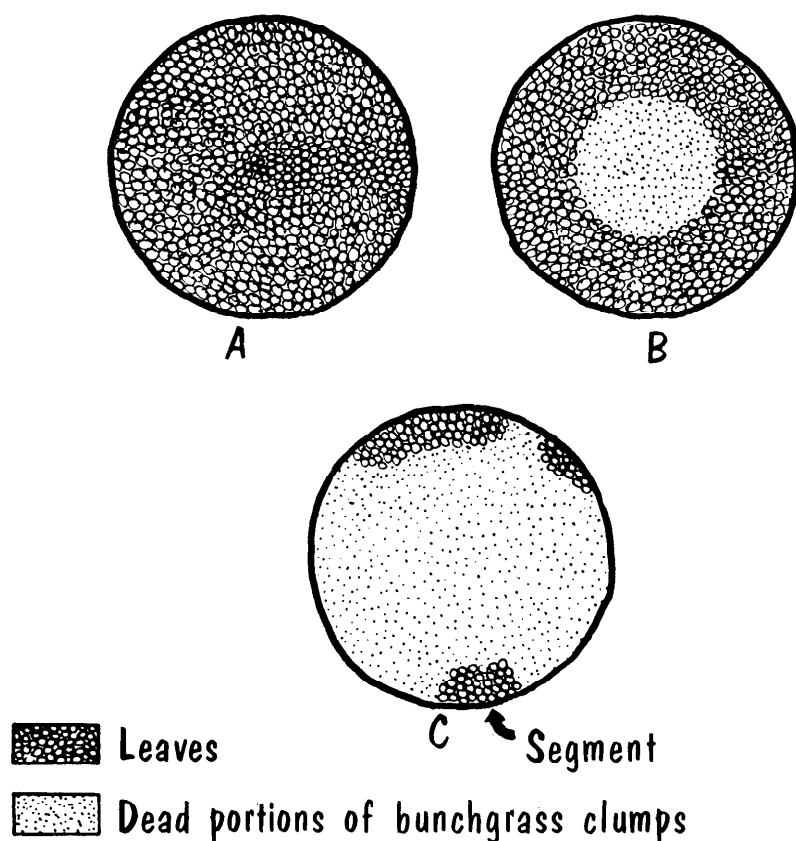


FIGURE 1. Bunchgrass form classes; A. Normal, B. Hollow Center, C. Clump Edge.

cattle use. Data from the two ranges were compared. A "Student's" *t*-test was employed to test hypotheses of equal leaf height and basal area means for the two ranges. A chi-square test was employed to check a hypothesis of equal form class percentages. The hypothesis of equal basal area means could not be rejected. Hypotheses of equal leaf height means and form class percentages were rejected at the 1 and 5 per cent significance levels, respectively.

If leaf height is considered an indication of grass vigor and the Hollow Center and Clump Edge classes represent stages of deterioration from the Normal class, it must be concluded that Idaho fescue plants on Range B are in a less vigorous and more deteriorated condition than those on Range A. In addition, the relatively high percentage of

Hollow Center and Clump Edge classes in the R category suggests that recent use is largely responsible for the condition of plants on Range B.

Apparently the deterioration of Idaho fescue plants on Range B has not progressed to the stage where it will be reflected by the basal area measurements. It is expected that subsequent measurements and form class assignments will more clearly show the trends in Idaho fescue condition on the two ranges. At pres-

ent, neither of the two ranges are grossly different. On other ranges, obviously in poorer condition, Hollow Center and Clump Edge classes have represented 71 out of 100 plants. This suggests that the use of form classes may permit an expression of condition trends over a scale of 100 percentage points.

Observations on various ranges suggested that a "Dead" class should also be used. Plants in this class would not have current leaf growth. Observations also indicated that the form class assignments could be applied to bunchgrasses other than Idaho fescue. Two important grasses, observed to reflect the described form classes, were bluebunch wheatgrass (*Agropyron spicatum*) and rough fescue (*Festuca scabrella*).

Observations of bluebunch wheatgrass within an enclosure provided evidence that ungrazed bunchgrasses will reflect the Hollow Center and Clump Edge from classes prior to dying from old age. Therefore, the use of the various form classes for trend studies must be based on the premise that overgrazing will cause mature bunchgrass plants to reflect the Hollow Center, Clump Edge and Dead classes at an accelerated rate.

LITERATURE CITED

- EVANCO, ANTHONY B. AND ROALD A. PETERSON. 1955. Comparisons of protected and grazed mountain rangelands in southwestern Montana. *Ecol.* 36: 71-82.

Table 1. Basal area and leaf height means (inches) and form class percentages from 300 Idaho fescue plants on each of two adjacent ranges.

Range	Use	Means and Standard Errors		Form Class Percentages*					
		Basal Area	Max. Leaf Ht.	Normal	Hollow Center		Clump Edge		Seedling
A	Elk	0.85 ± .06	2.9 ± .05	73	2	7	3	4	11
B	Elk-Cattle	0.80 ± .05	2.2 ± .04	57	8	9	11	8	7

* Form class percentages are from 200 plants only on Range A.