Cumulative Effects of Clipping on Yield of Bluebunch Wheatgrass

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Highlight

Bluebunch wheatgrass is particularly susceptible to defoliation injury during the boot stage. At this stage, grazing at ground level for three or more consecutive years may result in almost complete disappearance of bluebunch wheatgrass from range land.

Bluebunch wheatgrass (Agropyron spicatum (Pursh) Scribn. and Smith) yields are susceptible to reduction by defoliation (Branson, 1954; Daubenmire, 1940; Stoddart, 1946). This paper reports 1964 bluebunch wheatgrass yields as influenced by clipping at three heights and four growth stages in 1961, 1962, and 1963.

Procedure

Our experimental site was located 8 miles southwest of Lacrosse, Washington, within the Agropyron spicatum-Poa secunda habitat type described by Daubenmire (1942). October to June precipitation, reported at the Lacrosse station, for the years 1961 to 1964 was 13.1, 11.1, 9.1, and 9.8 inches as compared with an average of 11.8 inches during the preceding 10 years. The soil often dries in early summer and remains dry until fall.

The experiment was conducted as a randomized complete block with 10 replications and 9 clipping treatments (Table 1). Plots (10 by 50 ft) were clipped with a sickle bar mower mounted on a garden tractor. Ground-level clipping was accomplished by holding the sickle bar on the ground. Because of the rough ground surface, stubble heights of these plots varied from 0 to 1 inch. Shoes were attached to the sickle bar for clipping 4 and 8 inches above the ground.

Bluebunch wheatgrass on this site produces up to 4 inches of fall growth when moisture is adequate, but produces little growth during low temperatures of winter months. Clipping was accomplished in the spring when bluebunch wheatgrass leaves had grown an additional 1-2 inches or 5-7 inches. Later clipping treatments were imposed when bluebunch wheatgrass was in the boot and maturing stages. Each plot was clipped once a year in 1961, 1962, and 1963, but left unclipped in 1964. As bluebunch wheatgrass heads were yellowing in 1964, plants in five 0.5 by 2.0 meter quadrats in each plot were hand-clipped at ground level and oven-dried.

Results and Discussion

Bluebunch wheatgrass clippings were weighed in 1961 to determine the average amounts of forage available for grazing at the selected growth stages and clipping heights (Table 1). Comparing the weight of bluebunch wheatgrass harvested in the 4- and 8-inch clipping treatments with the weight harvested in the ground-level clipping treatment gives an estimate of the percentage of top growth removed. The 4-inch clipping of plants that had grown 5-7 inches in the spring removed 43% of the top growth. The 4-inch clipping of plants in the boot and maturing stages removed an average of 62% of the top growth. The 8-inch clipping of plants in the boot and maturing stages removed an average of 30% of the top growth.

The 1964 bluebunch wheatgrass yields reflect the cumulative effects of clipping in the 3 preceding years (Table 2). The 4-inch clipping of plants reduced yield of bluebunch wheatgrass considerably, but the ground-level clipping produced little additional change in yield. This may be attributed to the fact that at these stages the 4-inch clipping removes most of the leaves and the remaining stubble consists largely of stems.

Bluebunch wheatgrass was most susceptible to injury when clipped during the boot stage. This may have been due to differential effects of clipping on growth of roots and carbohydrate accumulation in roots. New leaves produced after the two-early-season clipping treatments would continue to supply photosynthetic products needed for root growth. Plants clipped at ground level in the boot stage, when root

<table>
<thead>
<tr>
<th>Stage of development</th>
<th>Lb/A dry wt clipped at</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approx. date of clipping</td>
<td>inches</td>
</tr>
<tr>
<td>1-2 inches of spring growth</td>
<td>April 3 150</td>
</tr>
<tr>
<td>6-7 inches of spring growth</td>
<td>April 24 200 86</td>
</tr>
<tr>
<td>Boot stage</td>
<td>May 11 290 190 94</td>
</tr>
<tr>
<td>Maturing, heads yellowing</td>
<td>June 27 420 240 120</td>
</tr>
</tbody>
</table>

Table 1. Weight of bluebunch wheatgrass harvested when clipping treatments were imposed in 1961.

<table>
<thead>
<tr>
<th>Stage of development</th>
<th>Approx. date of clipping</th>
<th>Yield (lb/A dry wt) (^1) when clipped in preceding years at 0, 4, or 8 inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 inches of spring growth</td>
<td>April 3</td>
<td>250*</td>
</tr>
<tr>
<td>5-7 inches of spring growth</td>
<td>April 24</td>
<td>180**</td>
</tr>
<tr>
<td>Boot stage</td>
<td>May 11</td>
<td>110*</td>
</tr>
<tr>
<td>Maturing, heads yellowing</td>
<td>June 27</td>
<td>240**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>250*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>380*</td>
</tr>
</tbody>
</table>

\(^1\)Means having the same letter in the superscript do not differ significantly at the 5% level using Duncan's Multiple Range Test.

carbohydrates are low (McIlvianie, 1942), produced no regrowth. Delaying defoliation until the maturing stage would allow season-long root growth and accumulation of carbohydrates in roots.

From the standpoint of bluebunch wheatgrass survival, the same principles evidently apply in southeastern Washington as in northern Utah (Stoddart, 1946). Early- or late-season grazing appear less damaging than grazing in mid-season. But the possibility of trampling damage in early spring or loss of nutritive value as bluebunch wheatgrass matures (Stoddart, 1946) should be considered in developing a grazing plan.

Summary

Bluebunch wheatgrass on native range was clipped once each year in 3 consecutive years at 0, 4, or 8 inches above the ground. Clipping treatments were imposed at four stages of development. Bluebunch wheatgrass was more susceptible to injury in the boot stage than in earlier and later stages of growth. Measurements in the fourth year, during which clipping treatments were not imposed, indicated that ground-level clipping of plants in the boot stage in the 3 preceding years decreased yield 70%.

LITERATURE CITED


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**Brachiaria dura**, a Promising New Forage Grass

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Highlight

In Barotseland, Zambia, in Central Eastern Africa a grazing and ecological survey has revealed Brachiaria dura to have unusually favorable characteristics as a forage grass on sandy soils of low fertility. Chief among these characteristics are relatively high protein content, a long period of succulence, and a special root adaption to sandy soil.

Range managers are always on the lookout for promising new grasses, especially those which show some adaptability to adverse growing conditions. During a recent ecological study in Barotseland in Zambia, I became convinced that Brachiaria dura (a signal grass) has unusually valuable characteristics as a forage species on low quality sandy soils where rainfall is abundant. The purpose of this paper is to state what is presently known about this grass and to discuss its possibilities.

Soils.—The loose Barotseland upland sands have a complex history. Starting from river alluvium and lake deltas this sand has been re-assorted by stream, wave, and wind action. In the process it lost its clay and silt content. It has been bleached by organic solvents seeping out of the peat formations formed in the past on the floor of shallow seasonal lakes, then blown from exposed lake shores into lacustrine dunes. This resulted in a loose, uniform, mainly coarse sandy soil consisting of rounded and frosted silica dioxide particles, with: a) low mineral content, b) low organic content, c) low absorption complex, d) high leaching potential, and e) poor water retention capacity.

All this soil has to offer to the plants living on it is a loose well-aerated but inert medium in which to anchor. Only plants with special adaptions can thrive in this kind of solum. Some trees find this in a very deep penetrating and wide spreading root system, for access to subsoil moisture and to cover a wide range to obtain the scarce minerals. Some grasses like Brachiaria dura encase their roots by exuding selective absorbent resins (polysaccharides) and covering them with

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