1961

**Harvesting Native Grass**

Cooperative Extension, South Dakota State University

Follow this and additional works at: https://openprairie.sdstate.edu/extension_fact
FREQUENCY OF

Harvesting Native Grass

Native grass, as a hay crop, is the oldest harvested crop in South Dakota, yet the management of this valuable asset has received little attention.

Experiments were started in 1942 at Cottonwood and Eureka to determine how frequently native hay should be cut to get good yields of high quality hay and still leave the grasslands in good condition. Eighteen randomized plots of one-hundredth acre were laid out at each station in three replications.

One series was cut for hay every season, annually; the second every other year, biennially; and the third, triennially. Harvesting was performed with a 3-foot mower and the hay weighed immediately. Air dry weights were computed from 5 pound samples taken from each plot. No fertilizer was added to any of these plots.

WHICH IS BEST?

This study shows that frequency of harvesting native grass may have a marked long-time effect on yields obtained. Yields under the annual-harvest treatment tend to decrease progressively to a low level while yields under biennial and triennial harvest treatments appear to be more nearly maintained.

This may be a result of depletion of available plant nutrients in conjunction with less favorable moisture, since the accumulation of dead grass would act as a sponge in holding water. Reasoning on this basis, it might be expected that differences will be greater as treatments are continued over the years. It is not possible to say to what extent the use of fertilizer on these plots would make annual harvesting more profitable. Work is being planned to ascertain this.

From results of the first 10 years, harvesting every 2 years would appear most desirable from the standpoint of yield and cost of harvesting, and also in the maintenance of desirable grasses. Since that time, harvesting every 3 years has begun to show an advantage. Whether this is a permanent change will not be known until more years have elapsed.

EFFECT ON YIELDS

The average yields obtained at both Cottonwood and Eureka from 1942-60 are shown in Table I.

The average yields at the different frequencies of harvest show an increase with increasing time interval between harvests, as might be expected. Comparative sizes of the yields from annual, biennial, and triennial harvests are shown in Figure 1. The increase in yields, however, as shown in Table 1, was not in direct proportion to the number of years between harvests.

Table 1. Average Yields of Native Hay When Harvested Annually, Biennially, and Triennially at Cottonwood and Eureka from 1942-60

<table>
<thead>
<tr>
<th></th>
<th>Annual</th>
<th>Biennial</th>
<th>Triennial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cottonwood Yield at harvest</td>
<td>977</td>
<td>1,579</td>
<td>2,012</td>
</tr>
<tr>
<td></td>
<td>Yield on yearly basis</td>
<td>977</td>
<td>798</td>
</tr>
<tr>
<td>Eureka   Yield at harvest</td>
<td>1,479</td>
<td>2,414</td>
<td>2,858</td>
</tr>
<tr>
<td></td>
<td>Yield on yearly basis</td>
<td>1,479</td>
<td>1,208</td>
</tr>
</tbody>
</table>

Figure 1. Annual, biennial, and triennial harvest of native grass at Cottonwood in 1956 showing the relative amounts of hay harvested.
Thus the average yield for the biennial harvest was approximately one and two-thirds times greater than that of the annual harvest, but that of the triennial harvest was only two times greater than that of the annual. When the yields are computed on a yearly basis, this is further illustrated in the lower yields of the triennial than of the biennial, and of either triennial or biennial, than of the annual.

A trend toward greater differences in yield between frequencies of harvest has become more accentuated the longer the treatments have been continued. This is illustrated in graphs in Figures 2 and 3, where 5-year averages computed on the basis of the series of moving averages from 1942-60 are plotted for the annual, biennial, and triennial harvest for Cottonwood and Eureka, respectively.

Though yields were approximately the same during the first 2 or 3 years for each of the frequencies of harvests at both stations, the first 5-year average indicated a marked drop of the annual harvest yield. Differences have varied since that time, but in later years have tended to become greater. This has resulted from an increase in the 5-year average yields of the biennial and triennial harvest while those of the annual harvest have remained at a constant low level.

**EFFECT ON QUALITY**

Quality of the hay, as well as yield, is of great importance when considering the frequency of harvest. Average protein contents of hay taken from 6 of the years' harvests during which the experiment has been under way, are shown in Table 2.

<table>
<thead>
<tr>
<th>Location</th>
<th>Annual</th>
<th>Biennial</th>
<th>Triennial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cottonwood</td>
<td>8.86</td>
<td>7.65</td>
<td>7.45</td>
</tr>
<tr>
<td>Eureka</td>
<td>8.88</td>
<td>7.56</td>
<td>7.35</td>
</tr>
</tbody>
</table>

The average protein content did not differ appreciably between the two stations. A decrease of over 1% in average protein content was found when the harvest was made biennially rather than annually, but percent protein content decreased only 0.2% from the biennial to the triennial harvest.

These decreases are a reflection of the greater amount of dead grass found in the deferred harvests, but surprisingly do not appear to be in direct proportion to the percentage of dead growth from previous years in the hay. Estimation of the amount of this growth from previous seasons indicated about 8-10% in the biennially-cut hay and 15-20% in the triennially-cut hay.

The higher than expected protein analysis may perhaps be a result of a slightly higher nitrogen content of grass from the biennial and triennial harvests than from the annual harvest. This possibility has not been investigated.

**CHANGES IN GRASS SPECIES**

In Figures 4 and 5 the percentages of certain species of grass are shown for the plots harvested annually, biennially, and triennially at Cottonwood and Eureka in 1956 after the treatments had been continued for 15 years.

At Cottonwood the percentage of high yielding midgrass, western wheatgrass, had declined to 6% in the annual harvest while it made up 15% and 25% respectively, in the biennially and triennially harvested plots. On the other hand, the short grasses, blue grama and buffalo increased under annual harvest to
36% of the total, while making up 31% and 16%, respectively, in the biennial and triennial harvests.

The infestation of Japanese bromegrass, an annual grass, did not seem to be greatly affected, though a greater percentage was present in the triennial harvest. The percentage of forbs, nongrassy plants, was greater in the plots harvested every year and became less in the biennially and triennially harvested plots. The lack of competition from the aggressive grasses in annually harvested plots was probably responsible for this.

At Eureka, composition of the hay was different from that at Cottonwood but the same type of change was noted. Western wheatgrass decreased with greater frequency of harvest while blue grama increased. Western needle grass increased also under more frequent harvest and green needle grass, which is more desirable, decreased.

The invasion of smooth bromegrass, a cultivated grass, into these plots, was noted. There may be a relationship between the heavy invasion of smooth bromegrass, and delayed cutting, since the invasion was more marked in triennially harvested plots.

Figure 4. Composition of hay in 1956 after 14 years of annual, biennial, and triennial harvest at Cottonwood.

Figure 5. Composition of hay in 1956 after 14 years of annual, biennial, and triennial harvest at Eureka.

5M—4-61—File: 1.141—8881