10-1957

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University of Tennessee Agricultural Experiment Station

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University of Tennessee Agricultural Experiment Station; Parks, W. L.; and Chapman, E. J., "Oats for Winter Forage" (1957). Bulletins. http://trace.tennessee.edu/utk_agbulletin/197

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Oats for Winter Forage

W. L. Parks
and
E. J. Chapman

THE UNIVERSITY OF TENNESSEE
AGRICULTURAL EXPERIMENT STATION
John A. Ewing, Director
KNOXVILLE
Oats for Winter Forage

W. L. Parks
Agronomist

and

E. J. Chapman
Superintendent, Middle Tennessee Experiment Station

An adequate winter forage crop is an important asset to many dairy and livestock enterprises. Grazing produced by winter grain crops enables a farm operator to take animals off his permanent pastures which often are short from heavy grazing or from little growth due to dry summers.

Winter forage crops also provide savings in grain and hay that would be used to maintain the dairy and livestock programs if fall and winter grazing were not available. Results of air-dry forage yield tests with oats seeded at three rates and treated with different amounts of nitrogen are reported in this bulletin. These studies were conducted with Forkedeer oats on the high-phosphate Maury soil which tested high in potash. The soil pH was 6.4.

Total Forage Production

The forage produced during the entire growing season by oats is shown in Table 1. The 1955-56 results represent the combined yield in pounds per acre of all clippings made on January 2, March 28, April 18, and May 7. The 1956-57 results represent the combined yield in pounds of all clippings made on November 12, March 22, and May 1.

Two-Bushel Seeding Satisfactory—In terms of total forage production, a significant difference between rates of seeding occurred only in the 1955-56 season. During this year the 4-bushel rate was significantly better than the 2-bushel rate, but the 8-bushel rate was not better than the 4-bushel rate. There was no significant difference between the rates of seeding in the 1956-57 season, as the 2-bushel rate produced as much dry forage over all clipping dates as either of the higher rates of seeding. When the total yields for the 2 years were averaged, no significant difference was obtained in total forage production among the three rates of seeding.
TABLE 1.—Total air dry forage yields of oats with different rates of seeding and different amounts of nitrogen

<table>
<thead>
<tr>
<th>Nitrogen Treatment</th>
<th>1955-56</th>
<th>1956-57</th>
<th>2-Year Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 bu/A 4 bu/A 8 bu/A</td>
<td>Nitrogen Seeding Rates</td>
<td>Nitrogen Seeding Rates</td>
<td>Nitrogen Seeding Rates</td>
</tr>
<tr>
<td>Lbs. per Acre</td>
<td>Pounds per Acre</td>
<td>Average</td>
<td>2 bu/A 4 bu/A 8 bu/A</td>
</tr>
<tr>
<td>0</td>
<td>2551</td>
<td>3416</td>
<td>3703</td>
</tr>
<tr>
<td>30</td>
<td>3223</td>
<td>3909</td>
<td>3688</td>
</tr>
<tr>
<td>60</td>
<td>4172</td>
<td>4563</td>
<td>4651</td>
</tr>
<tr>
<td>120</td>
<td>4911</td>
<td>5739</td>
<td>5343</td>
</tr>
<tr>
<td>30+30</td>
<td>4676</td>
<td>5261</td>
<td>5029</td>
</tr>
<tr>
<td>60+60</td>
<td>6205</td>
<td>6352</td>
<td>6254</td>
</tr>
<tr>
<td>Rate of Seeding Ave.</td>
<td>4290</td>
<td>4873</td>
<td>4778</td>
</tr>
</tbody>
</table>

L.S.D. 5% Between Nitrogen Averages | 480 | 480 | 480 |
1% Between Nitrogen Averages | 660 | 640 | 560 |
5% Between Rates of Seeding Averages | 240 | N.S. | N.S. |
1% Between Rates of Seeding Averages | 360 | N.S. | N.S. |

Seeding dates were Aug. 13, 1955, and Sept 17, 1956; spring top-dressings of Nitrogen were February 23, 1956, and March 27, 1957.
Split N Application Best.—A highly significant difference between the nitrogen treatments was observed in the total forage yields. When all nitrogen was applied at seeding, 120 pounds of nitrogen per acre produced the most forage each year. However, in terms of fertilizer efficiency, more forage was obtained per unit of nitrogen when split applications were used. Sixty pounds of nitrogen per acre applied at seeding plus 60 pounds applied in early March produced by far the greatest amount of forage and was considerably better than any other nitrogen treatment. Thirty pounds of nitrogen per acre applied at planting plus 30 pounds applied in early March produced more forage than 60 pounds applied prior to planting.

The average forage production for the 2-year period showed that 30 pounds of nitrogen per acre at seeding plus 30 pounds in early March produced as much forage as 120 pounds applied at seeding. When 60 pounds of nitrogen per acre was applied at seeding plus an additional 60 pounds in early March, 17 percent more forage was produced in 1955-56 and 32 percent more forage in 1956-57 than when the entire 120 pounds was applied at seeding. This resulted in a 2-year average of 26 percent more forage produced by the split application than by the application of the entire 120 pounds of nitrogen per acre at seeding.

Fall Forage Production

It is often desirable to have a good supply of green forage available in the fall. The data presented in Table 2 show the amount of forage obtained during the fall period.

Heavy Seeding, Heavy Fall Grazing—Results from the different rates of seeding show that the 4-bushel-per-acre rate produced more forage than the 2-bushel rate; the 8-bushel rate produced more forage than the 4-bushel rate and considerably more than the 2-bushel rate. The differences in all cases were highly significant, indicating that the higher the rate of seeding up to the 8-bushel rate, the greater the fall forage production. Moisture conditions were more favorable for growth the fall of 1956, resulting in greater forage production at all three rates of seeding during this period.

The relation between the rate of seeding and fall forage production is perhaps connected with the amount of tillering. During the fall period the oats probably have not tillered to their fullest extent. The higher rates of seeding tend to offset this lesser tillering by giving a more complete cover and thereby producing more forage during the fall than would otherwise be obtained. It must be
TABLE 2.—Air dry forage yield of oats in the fall with different rates of seeding and different amounts of Nitrogen

<table>
<thead>
<tr>
<th>Nitrogen Treatment</th>
<th>Seeding Rates</th>
<th>Nitrogen Average</th>
<th>Seeding Rates</th>
<th>Nitrogen Average</th>
<th>Seeding Rates</th>
<th>Nitrogen Average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2 bu/A</td>
<td>4 bu/A</td>
<td>8 bu/A</td>
<td>2 bu/A</td>
<td>4 bu/A</td>
<td>8 bu/A</td>
</tr>
<tr>
<td>Lbs. per Acre</td>
<td>Pounds per Acre</td>
<td>Pounds per Acre</td>
<td>Pounds per Acre</td>
<td>Pounds per Acre</td>
<td>Pounds per Acre</td>
<td>Pounds per Acre</td>
</tr>
<tr>
<td>0</td>
<td>372</td>
<td>464</td>
<td>979</td>
<td>553</td>
<td>841</td>
<td>1353</td>
</tr>
<tr>
<td>30</td>
<td>403</td>
<td>898</td>
<td>936</td>
<td>740</td>
<td>1318</td>
<td>1661</td>
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<tr>
<td>60</td>
<td>763</td>
<td>1351</td>
<td>1419</td>
<td>1325</td>
<td>1563</td>
<td>2093</td>
</tr>
<tr>
<td>120</td>
<td>851</td>
<td>1391</td>
<td>2053</td>
<td>1500</td>
<td>1971</td>
<td>2410</td>
</tr>
<tr>
<td>Rate of Seeding Ave.</td>
<td>597</td>
<td>1026</td>
<td>1347</td>
<td>1030</td>
<td>1423</td>
<td>1887</td>
</tr>
<tr>
<td>L.S.D. 5% Between Nitrogen Averages</td>
<td>259</td>
<td>281</td>
<td>360</td>
<td>210</td>
<td>221</td>
<td></td>
</tr>
<tr>
<td>1% Between Nitrogen Averages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.S.D. 5% Between Rate of Seeding Averages</td>
<td>233</td>
<td>182</td>
<td>243</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1% Between Rate of Seeding Averages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
recognized that the higher rates of seeding may reduce the total amount of tillering that may occur. As previously mentioned, the 2-bushel rate produced as much total forage over the entire growing season as either of the higher rates of seeding.

**Most Forage From 120 Pounds N.**—The results obtained with the different rates of nitrogen at seeding on forage yield in the fall show that 120 pounds of nitrogen per acre produced the most forage. The largest increase in forage yield per pound of nitrogen occurred when the nitrogen rate was increased from 30 to 60 pounds per acre. The 30-pound treatment resulted in a 23 percent increase in 1955 and a 36 percent increase in 1956, with an average increase of 31 percent over the unfertilized treatment for the 2-year period. The 60-pound treatment resulted in a 58 percent increase in 1955 and a 33 percent increase in 1956 with an average increase of 42 percent over the 30-pound treatment for the 2-year period. The 120-pound treatment resulted in a 22 percent increase in 1955 and an 18 percent increase in 1956, with an average increase of 20 percent over the 60-pound treatment for the 2-year period.

**Summary**

The results obtained in these experiments indicate that higher rates of seeding of oats produced more early forage. In terms of total forage production, however, there was no significant difference among the 2-, 4-, and 8-bushel-per-acre rates of seeding.

Nitrogen at 120 pounds per acre produced more forage in the fall than lower rates of nitrogen produced. However, 60 pounds of nitrogen per acre applied at seeding plus 60 pounds applied in March produced significantly more total forage than any other nitrogen treatment.
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