Effect of Different Oat Spacings on Growth and Yield of Oats and Red Clover

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Several workers (1, 2, 4) have compared different widths of seeding in small grains. When clover was seeded, all workers noted a greater population and growth of the interseeded crop in small grains spaced in wider than normal rows. Although results have not been uniform, generally a reduction in grain yield has been reported from wide row plantings.

Many workers have reported that the yield from border rows in various crops is superior to that from inner rows. The purpose of this investigation was to determine the influence of six different spacing arrangements of spring oats on the red clover companion crop and on the performance of the oats. Two of the arrangements were so designed as to allow the grain rows to benefit from border effect.

METHODS AND MATERIALS

Oats were drilled in five different row spacing arrangements as well as seeded broadcast. Rows were spaced at 8, 16, and 24-inch intervals; two 8-inch rows with 16-inch borders on each side; and two 4-inch rows with 16-inch borders on each side. A 6 x 6 Latin square design was used for the experiment.

The oats were seeded with a small push-planter calibrated to sow an equivalent of 8 pecks per acre at the 8-inch spacing. This seeding rate was constant for each row regardless of the spacing arrangement. Seed for the broadcast method of seeding was weighed for a 10-peck seeding rate and spread by hand on each plot, then covered by stirring the soil with a garden rake.

The clover was seeded at right angles to the oat rows with a cultipacker clover seeder calibrated to seed 10 pounds per acre in 4-inch rows. An 8-foot strip of land on two sides of the experimental area was seeded to clover alone for observation and yield comparisons with the clover seeded with oats.

The experiment was conducted for three seasons (1950-1952) at Urbana, Ill., on Brenton silt loam of high fertility. Rainfall during May and June was below normal in 1950, normal in 1951 and above normal in 1952.

RESULTS

Effect of row spacings on small grain.—The height of the oat plants increased directly as the row width increased. At the time of early height readings, plants from broadcast seedings were shorter than in any row seeding, but at harvest their height exceeded the height of plants seeded in 8-inch rows. Tilling increased directly with increased row width. Wider spacings produced larger diameter straw and a greater number of spikelets per panicle (table 3).

Grain yields ranged from 43.6 bushels an acre for the 24-inch spacings to 67.9 bushels for the 8-inch spacing (table 1). In two of the three years, yields from 8-inch rows were not significantly higher than yields from two 8-inch rows bordered by a 16-inch space.

See Table 1 for yields from 24-inch rows. Larger kernels were produced in the wider spacings.

Effect of small grain spacings on red clover—Yield differences in clover stands and growth were greatest in the season of 1950, when a 3-week dry period occurred in May.

Early visual observations in 1950 indicated that clover stands varied directly with the distance from oat rows. Clover counts taken two weeks before oat harvest and shown immediately adjacent to oat rows, supported these observations. The clover stand was the greatest in the center of the alleyways, farther apart the spacings. A significant difference was found in clover population counts taken immediately adjacent to oat rows as compared to counts adjacent to south rows.

Height measurements of clover plants made in May showed plants in 24-inch oat spacings to be only 62 as tall as clover plants seeded alone and much taller than clover plants in any of the narrower spacings. Clover in 8-inch alleyways was only 62 as tall as clover plants seeded alone and much taller than clover plants in any of the narrower spacings.

Red clover stand and growth estimates by Leasure (3) were made by six observers soon after oat harvest and showed great differences in fallowings in wide spacings (table 1). Four of the six observers (all were agronomists, but with varied interests) rated the excellent stand and growth of the plots we seeded alone to be at or near 100%. Two of the observers estimated these plots to be below 100% and the averages shown for such plots in table 2 were 85%.

The 8-inch row spacing, which had an estimated 81% clover stand, was the poorest companion crop and on the performance of the oats. Two of the three years, yields from 8-inch rows bordered by 16-inch rows bordered by 16-inch spacings were significantly lower than yields from 24-inch rows. Larger kernels were produced in the wider spacings.

Table 1.—Yield of grain from spring oats grown in different row spacing arrangements at Urbana, Ill., 1950-1952.

<table>
<thead>
<tr>
<th>Spacing</th>
<th>1950</th>
<th>1951</th>
<th>1952</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-inch rows</td>
<td>77.7</td>
<td>46.5</td>
<td>79.6</td>
</tr>
<tr>
<td>16-inch row</td>
<td>75.5</td>
<td>47.2</td>
<td>85.5</td>
</tr>
<tr>
<td>24-inch row</td>
<td>78.9</td>
<td>48.1</td>
<td>79.6</td>
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<td>8-inch border</td>
<td>68.3</td>
<td>37.2</td>
<td>68.3</td>
</tr>
<tr>
<td>16-inch border</td>
<td>66.1</td>
<td>35.7</td>
<td>66.1</td>
</tr>
<tr>
<td>24-inch border</td>
<td>65.1</td>
<td>35.7</td>
<td>65.1</td>
</tr>
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