Fertilizer Placement for Silage Corn
A. E. Rich and T. E. Odland

The question of the best method of placement of fertilizer for the corn crop has received much attention in recent years. Many experiments have been conducted with considerable variation in results. Plow-sole placement has been given special attention in some of these experiments.

Scarseth, et al. (2) obtained greatly increased yields of corn when the regular row application of fertilizer was supplemented by additional fertilizer plowed under. The test did not include a comparison of equal amounts of fertilizer plowed under and applied in the row.

Yoder (3) has reported results of a 3-year comparison of different methods of fertilizer placement for field corn in Ohio. Row application was as effective as plow-down placement when equal amounts of fertilizer were used. No advantage for the plow-down method was found even in an extremely dry year.

Millar (1) has reported results from a comparison of eight different methods of fertilizer applications for corn over a period of 11 years. Fertilizer applied on the bottom of the plow furrow produced the lowest average yield of corn for the period. There was little difference in average yield of corn between row application and broadcast plowed-down application.

A study was begun at the Rhode Island Experiment Station in 1944 in which eight different methods of applying the same amount of fertilizers were compared. The results for 3 years, 1944-46, will be reported in this paper.

DESCRIPTION OF EXPERIMENT

The Rhode Island fertilizer placement test on silage corn was conducted at the agronomy experimental plots in Kingston. The soil is classified as Bridgehampton very fine sandy loam and is in a good state of fertility. The fertilizer applications in this test consisted of 1000 pounds per acre of a 4-12-8 grade. The fertilizer was applied by hand as follows:

1. Broadcast before plowing; applied broadcast then plowed under.
2. Plow sole; applied in the bottom of each furrow following the plow.
3. Band; applied in two bands, one on each side of the seed, about 2 inches from the seed and at the same depth.
4. Broadcast after plowing; broadcast and harrowed with a disc harrow, thus the fertilizer was mixed with the soil to a depth of several inches.

The plots were plowed and the fertilizer applied in the spring just previous to planting. Each plot consisted of 24 rows, 24 feet long and 3 feet apart, with plants spaced 15 inches apart in the row. Each treatment consisted of four replicates. Yields of green material harvested for silage were determined and samples taken for calculation of dry matter content. The experiment was located on a different plot each year.

EXPERIMENTAL RESULTS

The 3 years of the experiment represent one very dry season (1944) and two with normal rainfall. Yields obtained are presented in Table I.

In 1944, the yields of corn cut for silage ranged from 0.44 tons per acre, when the nitrogen was placed on the plow sole and the phosphorus and potash in a band, to 11.54 tons when the fertilizer was broadcast after plowing and then harrowed. The dry weights ranged from 2.64 to 3.23 tons for these treatments, respectively. When all the fertilizer was placed on the plow sole, the corn made a much slower early season growth than the other methods of application. The most rapid early growth was made when all or part of the fertilizer was placed in bands near the seed.

In 1945, the green weights ranged from 12.88 to 14.67 tons per acre, when all the fertilizer was applied on the plow sole, to 20.06 tons when it was applied in bands. There was no benefit from applying either all or part of the fertilizer on the plow sole. The band method produced the most rapid early growth.

In 1946, the yields of green material ranged from 12.88 to 18.39 tons per acre. The differences were small and not significant. No treatment can be compared.

Table 1.—Tons of silage corn produced per acre with eight different methods of fertilizer placement, 1944-46, inclusive, at the Rhode Island Agricultural Experiment Station, Kingston, R. I.

<table>
<thead>
<tr>
<th>Method of placement</th>
<th>1944</th>
<th>1945</th>
<th>1946</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, broadcast before plowing</td>
<td>11.46</td>
<td>11.42</td>
<td>11.25</td>
<td>11.40</td>
</tr>
<tr>
<td>B, plow sole</td>
<td>11.09</td>
<td>10.05</td>
<td>11.25</td>
<td>10.98</td>
</tr>
<tr>
<td>C, band</td>
<td>2.81</td>
<td>2.35</td>
<td>2.25</td>
<td>2.54</td>
</tr>
<tr>
<td>D, 3/4 broadcast before plowing, 1/4 band*</td>
<td>10.05</td>
<td>11.25</td>
<td>11.25</td>
<td>10.98</td>
</tr>
<tr>
<td>E, 1/2 plow sole, 1/4 band*</td>
<td>9.44</td>
<td>11.25</td>
<td>11.25</td>
<td>10.98</td>
</tr>
<tr>
<td>F, nitrogen on plow sole, phosphorus and potash in band</td>
<td>9.44</td>
<td>11.25</td>
<td>11.25</td>
<td>10.98</td>
</tr>
</tbody>
</table>

*In 1944, one-half of the fertilizer was placed in bands.