An Evaluation of Methods of Side-dressing Corn with Nitrogen
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The application for nitrogenous fertilizers as side-dressings on intertilled crops has for a long time been an established practice in several sections of the United States. These areas are confined largely to the Southeastern and Gulf States where nitrogen deficiencies are prevalent, rainfall is intense, and the soils are open textured. This method of application has also been investigated in the Midwest (5, 8, 9) where it was concluded that side-dressing was neither an efficient nor reliable method of applying nitrogen fertilizers. The deeper placement of nitrogenous fertilizers at or near plow depth was then investigated and found effective in Indiana (8). Plow depth placement was accomplished by broadcasting the fertilizer before plowing, applying on the plow sole at the time of plowing or by utilizing special deep placement equipment prior to corn planting. Such deeply placed fertilizers were in the vicinity of the absorbing roots during the period of crop need, but there was too long an interim between application time and the period of maximum uptake by the corn for most efficient utilization of the applied nitrogen. Sayre (7) and Jones and Houston (2) found that the maximum rate of nitrogen absorption for corn was in the 2-week period prior to tasselling. On the basis of this time factor, side-dressing would seem to be the more effective method if it had equivalent positional availability.

There are many factors which may influence the effectiveness of a side-dressing. Three controllable factors closely related to the mechanics of the side-dressing operation are the depth of the fertilizer band, lateral placement with respect to the plant row, and time of application. Their effects would be modified by seasonal variants and soil characteristics; however, none of these interactions have been thoroughly studied. Some work has been done on depth of application. Scarseth, et al. (8) emphasized the importance of the rainfall factor in the effectiveness of side-dressings. Sayre (6) on the basis of his work advocated deep placements. However there has been little if any published data from the Midwest on time of application or placement with respect to the row. It is the purpose of this paper to evaluate the side-dressing method of supplying supplementary nitrogen as far as is possible on the basis of 2 years of field experimental data.

EXPERIMENTAL PROCEDURE

The following methods of nitrogen application were studied: (a) 1- to 2-inch depth versus 4-to 5-inch depth; (b) three dates of application including application at planting time, application at second cultivation when the corn was knee-high, and application at the last cultivation when the corn was waist high; and (c) three placements with respect to the row; 3 inches from the row, 10 inches from the row, and between the rows. These variables were arranged in combinations with the exception of the 3- to 6-inch placements. Due to the difficulty in application and the root pruning caused by the application procedure, the placement was limited to 6-inch placement 1 to 2 and 4 to 5 inches from the row. These two treatments were added to determine whether yield differences at the 30-pound rate were significant. Applications were made at the rate of 30 pounds per acre in all cases except for two 60-pound per acre applications. The corn was knee high and the larger rate was applied at the last cultivation when the corn was waist high. The experiment was conducted with special deep placement equipment prior to corn planting. Such deeply placed fertilizers were in the vicinity of the absorbing roots during the period of crop need, but there was too long an interim between application time and the period of maximum uptake by the corn for most efficient utilization of the applied nitrogen. Sayre (7) and Jones and Houston (2) found that the maximum rate of nitrogen absorption for corn was in the 2-week period prior to tasselling. On the basis of this time factor, side-dressing would seem to be the more effective method if it had equivalent positional availability.

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