Methods of Applying Ammonium Nitrate Fertilizer on Field Corn, and a Study of the Movement of $\text{NH}_4^+$ and $\text{NO}_3^-$ Nitrogen in the Soil Under Irrigation

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Experimental work (1) on new land in the Columbia Basin in Washington with fertilizers on field corn has shown nitrogen to be, in most cases, the major limiting nutrient in field corn production. The nitrogen fertilizers in these experiments were usually applied in single applications by either side placing or side dressing.

Among the soils in the Columbia Basin, Ephrata fine sandy loam (pH 6.8) has been a special interest as it is only two feet deep over cobble and gravel (figure 1). It has also been shown to have a low infiltration rate (1) in comparison with other soils of similar texture. There have been two general opinions concerning the application of nitrogen fertilizer to this soil: 1. Due to the low infiltration rate, a single fertilizer application plowed under would be as effective as banding. Fertilizer would be close to the young plant roots in earlier growth, and would leach less readily in the 2-foot profile, resulting in higher yields of corn. Several band applications during the growth of the crop would further lessen the leaching and would be more effective than a single application.

This experiment was divided into two parts:

1. Growing field corn in a field experiment with five methods of applying the nitrogen fertilizer.

2. Applying the fertilizer in bands, broadcasting and plowing under, and determining the movement of the $\text{NO}_3^-$ and $\text{NH}_4^+$ nitrogen with irrigation water in the soil without a crop in order to help evaluate the results from the corn experiment.

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