Concerning the "Long-term Tillage Effects of Interrow Runoff and Infiltration"

The authors of a recent article entitled "Long-term Tillage Effects on Interrow Runoff and Infiltration" (Lindstrom et al., 1981) draw a number of conclusions which we find misleading and would like to call to the attention of journal readers.

This paper presents bulk density, runoff, and infiltration data on three tillage systems after 10 years of tillage work, but, in fact, the spring field cultivation on the tilled systems had been completed only 4 days before infiltration work was begun. Their reports of bulk density differences of up to 0.26 g/cm³ in the surface 7.6 cm are hardly surprising in view of the recent loosening by the field cultivator and are confirmed by the 5-cm-deep tracks left by planting machinery (see their Fig. 2.)

The infiltration results are also misleading. Their Fig. 1 suggests that infiltration is exceedingly slow under no-tillage. Their Table 2 does not support this interpretation. We have plotted their infiltration data for the wheel-tracked plots of conventional and no-tillage treatments in Fig. 1. Firstly, there is a high standard error associated with each mean value. Secondly, it is apparent that the infiltration rate declines less sharply with time for the no-tillage than for the conventional treatment. An infiltration rate of 3 cm/h under no-tillage on a clay loam soil in the 25- to 30-min portion of the runoff period is fairly high, exceeding that found on wheel-tracked plots of both tilled systems. The wheel-tracked zones in the tilled systems promote runoff and increase the erosion potential of these systems relative to no-tillage. These data suggest that the wheel-tracked areas are the weakest links in the tilled systems, rendering them inferior to the no-tillage system when such results are "scaled up" to a farmer's field.

It seems fundamentally unsound to attempt to characterize the performance of various tillage systems in the control of runoff and the promotion of infiltration with the first, and only, short duration rainfall event. The kinetic energy required to initiate runoff would be a more meaningful way in which to evaluate tillage systems if it were measured several times during the year. The lack of accounting for surface storage of applied water in the "fluffy" non-wheel-tracked zones of both tilled systems nullifies any interpretation of infiltration based on single-event data. A bulk density of 1.35 to 1.40 g/cm³ in a "consolidated soil surface" is not sustained by their data.

Fig. 1—Plot of infiltration data for the wheel-tracked plots of conventional and no-tillage treatments from the paper by Lindstrom et al. (1981).