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Tiling Report 2001

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Abstract
Southern Iowa producers have faced several years of above-average rainfall during spring planting season. Little crop was grown in 1993 and 1995 due to above-average rainfall and flooded fields. Most yields were reduced again in 1996, 1998, 1999, and 2001 due to wet soils and late planting. Wet autumns also delay harvest. Many of the soils common in southern Iowa are described as poorly drained. Producers are hesitant to invest in pattern tiling because of local soil characteristics – high clay, silty loams. Few fields in southern Iowa are pattern tiled. Producers believe that tile lines are only functional for a limited time due to a hard pan forming over the lines and are hesitant to invest significant dollars in installation. In other areas of Iowa with well-drained soils, pattern tiling has been proven successful, however not in southern Iowa.

Disciplines
Agricultural Science | Agriculture

Tiling Report 2001

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Introduction

Southern Iowa producers have faced several years of above-average rainfall during spring planting season. Little crop was grown in 1993 and 1995 due to above-average rainfall and flooded fields. Most yields were reduced again in 1996, 1998, 1999, and 2001 due to wet soils and late planting. Wet autumns also delay harvest. Many of the soils common in southern Iowa are described as poorly drained. Producers are hesitant to invest in pattern tiling because of local soil characteristics – high clay, silty loams. Few fields in southern Iowa are pattern tiled. Producers believe that tile lines are only functional for a limited time due to a hard pan forming over the lines and are hesitant to invest significant dollars in installation. In other areas of Iowa with well-drained soils, pattern tiling has been proven successful, however not in southern Iowa.

The purpose of this project was to measure the effect of pattern tiling on yield and the duration of the effect of tiling, and to compare installation of tile by trenching or plowing.

Materials and Methods

Experimental design was a randomized, split-plot design with four replications. Main treatments were no tile, trenched tile, and plowed tile. Subplots were two trench machines (Hydra Max wheel trencher and Sampson wheel trencher) and two tile plows (Gold Digger plow and Wolfe plow).

The tiled field contains soils classified as 211-Edina silt loam (see soil survey of Lucas County). Edina soils contain about 10% inclusions, landform is upland depressions, drainage class is poorly drained, and the water table is 0.5 foot above to 1.0 foot below the surface. The soil texture is:
0–9 inches, silt loam; 9–16 inches, silt loam; 16–43 inches, silty clay or clay. Permeability is:
0–9 inches, 0.06–2.00 in/hr;
9–16 inches, 0.06–2.00 in/hr;
and 16–43 inches, 0.00–0.06 in/hr.

The field was planted with oats in the spring of 2000, and the oats were harvested for forage in mid-July. The field was surveyed for elevation and location using a laser and GPS. In September 2000, lateral tile lines were installed 40 feet apart; initial depth was 3 feet. grade was 0.01%. All tiling machines used laser-guided depth and grade control. Each machine installed two 500-foot lengths of tile/replication. Lateral tile was 4-inch, perforated. Main tile lines were 6-inch, nonperforated.

The tiled field received no tillage during fall 2000. Intentions were to field cultivate in spring 2001, prior to planting. However, due to excessively wet soils, no tillage was accomplished. Soybeans were no-tilled into the oat stubble in late June 2001, in 30-inch rows.

Soybeans were harvested in 10-foot widths (four 30-inch rows) in 450-foot lengths, beginning 25 feet from the tile line. Yield was calculated in 10-foot intervals and 40-foot widths.

Results and Discussion

Tiling increased soybean yield 9.6 bushels/acre (data not shown). Mean yields in the whole plot treatments were 25.7, 25.1, and 15.8 bushels/acre for trenched, plowed, and no tile, respectively. Yields in 40-foot widths were slightly higher for the trenched than the plowed tile, but the differences were slight (Table 1).

Yield in 10-foot widths were much higher over the tile line than between the tile lines or in areas with no tile (Table 2).

Tiling increased yield by 9.6 bushels/acre in 2001, compared to the non-tiled areas of the field. The increase in yield equaled almost $50/acre increase in gross income.

Data in Table 2 indicate that spacing lateral tile in 25–30 foot intervals rather than 40-foot intervals may result in more uniform increased yield; however, some of the yield difference may be due to surface drainage from ridges left after installation. Because the field was extremely wet and planting was delayed in spring 2001, no tillage was done to level the ridges prior to planting. Soybean plants were much taller over the tile lines compared with plants in the non-tiled areas or with plants midway between tile lines. The same effect was observed extending 12–15 feet away from non-perforated main lines.

Table 1. Yield in 40-foot intervals. Lateral tile line is located midway in each bar.

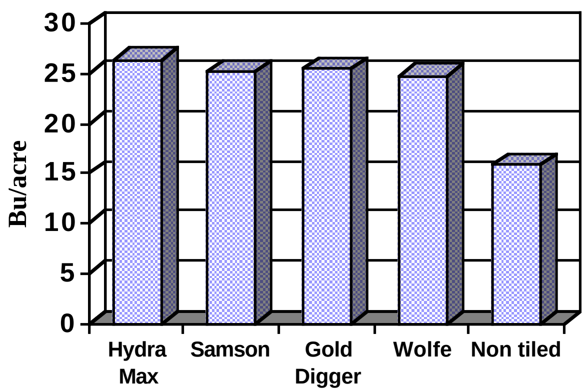

Table 2. Soybean yield measured in 10-foot intervals.