

WHEAT PLANTING DEPTH STUDY

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OBJECTIVE:

Evaluate the influence of planting depth on the performance of wheat.

METHODS:

The experiment was established at the UKREC at Princeton in the fall of 2000. The wheat variety, Pioneer 2552, was planted on October 16, 2000 at a seeding rate of 35 seeds/ft² with a Lilliston 9670 no-till drill (7-inch row spacing) in a tilled (chisel plow, 2 diskings, rotterra) seedbed following a corn crop. All treatments received the following: Warrior insecticide (3 oz/A) on 10-31-00 and Tilt fungicide (4 oz/A). Fertilizer (50 lbs. Of 0-46-0 per acre) was applied to the study area prior to tillage and planting. A total of 100 lbs. Of N/acre as Ammonium nitrate was applied in the spring in a split application (40 lbs. on 2-19-01 and 60 lbs. on 3-20-01).

Four wheat planting depths were compared: ½, 1-1½, 2-2½, and 3-3½ inch depths. The drill was adjusted for each planting depth treatment and seed depth measurements taken to insure that a great majority of the seed was placed at the planting depth treatment goal. Wheat data was collected on: date of 50% emergence, fall stand counts (10-30-00), spring head counts (6-1-01), and yield (6-13-01).

RESULTS:

The wheat planting depth study results are shown in Table 1. Wheat emergence was affected by planting depth. Based on 50% emergence data, it took 2½ to 3½ days longer for the two deepest planting depths to emerge as compared to the recommended planting depth of 1-1½ inches. Likewise, the shallowest planting depth (½ inch) emerged 1 day later and can be attributed to drier conditions at the soil surface.

Good stand establishment was achieved at all planting depths. The % stand achieved, based on a seeding rate of 35 seeds/ft², was over 90% for the two intermediate planting depths and 85% for the deepest planting depth. Even though the shallowest planting depth (½ inch) had a significantly lower stand than the deeper planting depths, the final stand of 27 plants/ft² is still adequate to achieve a high yield potential. The lower stand achieved at the shallow planting depth can be attributed to drier conditions near the soil surface. Although rainfall totaled 2.8 inches for the 3-week period prior to planting, (10-16-00), none of the rainfall occurred in the 10 days preceding planting. Likewise, no measurable rainfall was recorded for the 3-week

period after planting. A planting delay would have further reduced germination and emergence at the shallow planting depth.

Wheat head numbers were the highest and very similar (47-49 heads/ft²) at planting depths of 2-2½ inches or less. The deepest planting depth (3-3½ inches) had significantly fewer head numbers. These results verify that wheat plants emerging from deeper depths have reduced tillering.

Highest wheat yields were obtained at planting depths of 1½ inches or less. A planting depth of 2-2½ inches reduced yields slightly. The deepest planting depth (3-3½ inches) significantly reduced yields by ~ 3 bu/acre and can be related to reduced tillering (fewer heads).

CONCLUSIONS:

Wheat seed should be planted 1-1½ inches deep if soil moisture is adequate. In this study, a planting depth of 1-1½ inches had the best overall wheat performance (faster emergence, excellent stands, high head counts, and high yields). A slightly deeper depth (2 inches) is justified if soil moisture is deficient. Shallow seed placement (< 1 inch) can result in reduced and uneven germination and emergence under dry soil conditions. Shallow seed placement also has the potential for more winter injury and greater susceptibility to heaving which can further reduce stands. Conversely, deep seed placement (as shown in this study) delays emergence, can reduce stand, and emerged plants have less vigor and reduced tillering (less yield). When seed is planted deeper than 2 inches, there can also be a differential response among varieties. Wheat emergence is more difficult for varieties that have short coleoptiles or small seed.

TABLE 1. EFFECT OF PLANTING DEPTH ON WHEAT PERFORMANCE				
Planting Depth (inches)	50% Emergence (Days after Planting)	Fall Plant Stand (Plants/ft²)	Head Counts (Heads/ft²)	Grain Yield (Bu/Ac)
½	7.2 c	27.4 b	46.9 a	94.1 ab
1 - 1½	6.0 d	31.7 a	49.6 a	94.3 a
2 - 2½	8.5 b	32.2 a	47.6 a	92.7 b
3 - 3½	9.5 a	30.0 a	43.2 b	91.1 c
Means in a column followed by the same letter are not significantly different at the 10% level.				