IRREGULAR GERMINATION OF WHEAT IN A DRY SOIL

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Winter wheat frequently is sown in dry soil in the Southern Great Plains, and, under such conditions, germination is delayed until rains come. During the season of 1939-40 at the Southern Great Plains Field Station, Woodward, Okla., the germination and emergence of wheat continued over a period of about 5.7 months. Because such a season is very unusual the conditions attendant thereto will be of interest.

The fall of 1939 was the driest since the inception of weather records in Woodward County, Okla., in 1873. The last effective rain, totaling 1.16 inches, occurred on July 22. By September 15, when seeding began, 3 to 6 inches of the surface soil was very dry, although below these depths there was ample moisture to a depth of 7 feet. No effective rain was received during the seeding period. In September and October there were but three showers, the largest 0.08 inch.

A rain of 0.34 inch on November 9 prompted the germination of only a relatively small number of seeds and left a light crust which retarded the emergence of seedlings.

In the previous 9 years the average date of emergence was September 21, October 7, October 22, November 14, and December 9 for wheat seeded approximately September 15, October 1, October 15, November 1, and November 15, respectively. During those years the maximum period observed from seeding to emergence was 34 days as compared with 100 to 170 days in 1939.

In an attempt to reach moist soil in 1939 the wheat was sown as deep as a single disk drill would penetrate, roughly 2 to 3 inches. A hard layer of soil prevented deeper seeding. The seed reached varying amounts of moisture. On September 21 an estimated 5% of plants were emerging and continuous but slow, irregular emergence occurred from then until early in March. After December 13, wheat sown on all five dates from September 15 to November 15 showed irregular root and top development similar to that illustrated in Fig. 1.

Cool weather after October 1 prevented appreciable top growth of any plants emerging after that date.

Sprouts that were 1 inch long or longer and still under ground, were for the most part yellowish-green to yellow in color and fresh in appearance, although a few 2½ inches long were entirely green. About 10% of the sprouts were 2 to 2½ inches long on December 13 and approximately half of these were slightly to severely bent or crinkled. The crinkled leaves had grown to various lengths but failed to emerge, and a few of the seedlings lived in this crinkled condition for more than 90 days before dying. Few leaves were observed to crinkle after the snow of December 22. The snow covering, varying from a trace to 6 inches, was gone by January 29. Many plants emerged