

# Unusually Dry Soil Profiles Might Harm Fall Wheat Growth



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**W**inter wheat planting in Missouri is only a couple of weeks away. The number of wheat acres in Missouri has fluctuated widely during the past 5 years from a high of 1,250,000 in 2008 to a low of 370,000 in 2010. Although the acreage

will still be far below the nearly 3 million acres of wheat planted in the early 1980s, wheat planting in fall 2012 might be larger than in the past several years. Grain prices remain high and some farmers might use winter wheat for a quick source of forage.

Several factors have contributed to the general decline and the fluctuation of wheat acreage in Missouri, including price competition from other crops, winter survival and diseases. But, fall weather also influences the number of acres planted and the emergence success of those acres that are planted. Dry fall weather can cause poor emergence because soils do not hold enough water to drive germination and emergence to completion. In the recent past, some falls growers have had to resort to irrigation, if available, to establish a stand.

Missouri is familiar with dry falls. The usual scenario that develops is dry soil in the upper several inches, but adequate moisture deeper in the soil profile. In that scenario, wheat seeds are planted in dry soil, but a small amount of rain is enough to stimulate germination. If the rapidly elongating seminal roots find moisture, seedlings will survive, grow, and prepare for winter.

This year an unusual scenario is likely to occur. The 2012 drought involved a large number of days of high evapotranspiration. Hot temperatures combined with low humidity and fast wind speeds literally sucked water from plants. Where ever crops were grown, the soil profile is extremely dry. Crop roots are excellent as exploiting soil for water. As deep as crop roots

grew this summer, the soil profile has little to no plant available water.

Recent rains have wetted the top layer of soil in many locations in Missouri. So, the scenario this fall may be adequate moisture in the top several inches, but dry soil deeper in the soil profile. Most Missouri soils wet slowly. A 0.5-inch rain may only wet dry soil to about one inch in depth. Each rain event helps alleviate the potential problem, but it may take nearly 8 to 12 inches to wet the soil deep into the profile.

If this second scenario remains, wheat will be planted into soil wet enough to allow germination and emergence to proceed. Unfortunately, crop roots will not extend into dry soil, so rooting depth may be shallow. A shallow root system means that wheat plants will be highly affected by fluctuating dry and wet periods. Most of the tillers necessary for high yield are initiated during the fall. Roots need to supply enough water to the plant for the plant to remain healthy and capable of producing tillers. A shallow root system combined with intermittent dry periods may reduce tiller numbers.

Wheat plants also need to acclimate during cool fall weather, so that they can survive winter temperatures. Young wheat seedlings can be harmed by temperatures slightly less than 32°F, but acclimated plants can survive temperatures as cold as 0°F. Plants suffering from even minor drought stress may not be able to prepare for winter, increasing the likelihood of winter kill.

As we learned during the summer, our soils vary widely in their water holding capacity, even within a field. So, variation in wheat plant health will be visible if soil profiles remain dry. Unfortunately, there is little a person can do to rectify the scenario. Conservation tillage increases water infiltration and reduces runoff, and this might lead to deeper water percolation. Managing wheat to reduce soil compaction and produce a healthy root system will enable plants to better withstand short periods of dry weather.

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