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Purpling in Corn Seedlings

By Annie DesRosiers, CCA

Every year, when corn comes out of the ground, it is not uncommon for farmers to notice that some of their corn plants have a purplish tint. Their first thought is that this is a symptom of a phosphorous deficiency. But there may be more to it than that.

Purple corn is not a new phenomenon and it has been observed over the years in many inbred and hybrid lines all over the world.

What causes purple corn?

Purple seedling colour results from a purple pigment found in corn called anthocyanin, which is the same pigmentation found in cells of many other plants such as red cabbage, the red root of table beet, the red, blue or purple petals of flowers and the red leaf of the red maple. Genetics will determine if a corn hybrid can produce anthocyanin, and most of the corn grown contains five of the eight genes required to produce this purple color. The other three genes are present in certain hybrids, and some of these genes are cold sensitive. Thus, when corn is exposed to cool temperatures, they induce purpling in the young plants. These temperature-sensitive genes are only expressed in seedlings prior to the six-leaf stage, which coincides with the period most likely to have low temperatures. This is the reason why, we often see this purple color disappear once the temperature warms up and corn resumes its growth, beyond the 6 leaf-stage.

In some other hybrids, the silks contain anthocyanin and

are pink or purple and in other hybrids, the tassel is purple. There is also a gene that causes the entire plant to be purple for the entire season and researchers use this gene to mark the border of their research plots.

Does purpling slow down corn growth?

Since anthocyanin synthesis is accelerated by stress such as cold temperature, we can use the purpling of young corn plants as a signal to indicate the plant is under cold stress. This stress will cause decreased or slowed growth. Research has shown that corn plants which exhibit genetic purpling at the seedling stage show no difference in plant metabolism, growth, chlorophyll production or final yield compared to other corn plants that remain green under the same cool conditions.

How can a farmer tell the difference between genetic purpling and symptoms of phosphorous deficiency?

First, examine the color of the plant over the entire field and its growth stage. If the purple color is uniform throughout the field, the cause is probably genetics. If purpling is quite erratic over the field, this may indicate that phosphorous is limited in those areas. If the plant is beyond the 6 to 8 leaf-stage, and is still purple, this is likely phosphorous deficiency and can be determined through soil testing and tissue analysis. For corn,

sampling the whole plant when 4 to 6 leaves are visible is the best time to assess phosphorous deficiency.

Other factors that can cause corn plants to turn purple in the spring are soil and environmental conditions that limit root growth, thus limiting phosphorous uptake by the plant. Any stressful condition such as cold soils, compaction, excessive moisture, tillage practices and excessive application of pesticide are all factors that can affect plant growth.



In summary, if your corn seedlings are purple, chances are it's simply a genetic trait that won't affect performance. Contact your seed dealer for hybrid characteristic information and be aware of environmental stress factors that can affect seedling growth. If the problem persists past the 6-7 leaf stage and weather conditions are back to normal, look over your soil fertility program through soil and tissue analysis. Don't forget, the ultimate goals are yield and harvestability and purple seedling color does not relate to either.



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