

Purple And Yellow Corn Plants



DR. EMERSON NAFZIGER

URBANA, ILL.

The corn crop that was planted in May is up and growing in most fields, but there have been numerous reports of fields with uneven plant sizes and colors, including purple and yellow plants. Many are wondering if this will decrease potential

yields.

Based on past experience many people expect to see purple corn when soils are cool and dry during early plant growth stages, or in that rare field with low soil test phosphorus levels. The purple color is from a pigment that forms when there is more sugar in the leaves than the plant can utilize. Low phosphorus inhibits sugar movement out of leaves, and cool, dry soils reduce root growth and sugar movement to the roots. Both of these increase sugars in the plant and can make the tissue turn purple.

Soils are not cool and dry in Illinois now, but surface soils are drying out in many fields, and it's likely that roots growth up to now has been restricted some by having soils too wet and in some cases also compacted by tillage and planting operations. In fields where the plants have taken up enough nitrogen and water to grow well but roots remain constricted, purpling might be common now, especially in those hybrids that have a tendency to form the purple pigment.

We expect the problem of purple corn to correct itself as root growth continues. It will help if wet soils continue to dry out, but in fields with dry surface soils, root growth might benefit from some rainfall. The high sugar content that leads to purpling means that the plant is producing sugars through photosynthesis, which is a good sign. There is no evidence that temporary purpling affects yield of the crop, though factors such as soil compaction that can lead to purpling might also reduce yields if the weather is dry later in the season.

Other fields are showing the yellow color that characterized nitrogen deficiency. In some cases this diagnosis is strengthened by our being able to see patterns such as N applicator knife tracks where the plants are greener. As is the case with purpling, we tend to see more yellow plants in the lower areas of the field. This is both where soils were wetter at planting time, so are more compacted, and where we would expect more N loss and poor root growth due to wet soils.

Some have already responded to yellow corn by applying a higher rate of sidedress N than

had been planned, or by, or applying sidedress N on top of a full rate of N already there. Some may even have applied foliar N or broadcast urea by air to try to get N into plants quickly. If soils are still wet in such fields, plants are continuing to struggle with poor root growth and poor root function, so adding N might not have much immediate effect.

It is likely that the problem of yellow corn is, like that of purple corn, more related to poor root growth than to low level of soil nutrients. Student interns working at the Orr Center in Perry sampled soils the first week of June in a study where different N rates were applied as UAN in the first week of April. That site received some 17 inches of rain in April and May, and we expected that some of the N would have been moved to below the top two feet.

In fact, we found as much or more total N (nitrate plus ammonium) in the top two feet the first week of June than we applied as UAN the first week of April. We recovered about 90 lb. of N where we had applied 60 lb., and just over 240 lb. of N where we had applied 240 lb. So it's likely that some of the N there now was produced by mineralization, and that some fertilizer N was moved down below two feet deep, but the net amount available to the crop after high-loss conditions certainly has not been drastically reduced.

As soils dry out in most areas of Illinois and temperatures stay warm, it's likely that many fields with yellow corn plants will improve, in some cases rapidly. Late planting and warm temperatures do tend to favor top growth over root growth, but we expect that as leaves grow and start improve in color and as soil oxygen levels increase as soils dry, sugars will become more available to the roots as well as the tops, and this will further improve root uptake of nutrients.

If crop color remains poor even after a week of drying soils and good growing conditions, then it is possible that N movement to below the rooting depth is affecting the ability of the crop to grow out of this problem. Our soil measurements suggest that in most cases N is likely still present, but a small "booster" shot of N might help the crop revive and reach the N more quickly. The crop has roots extending to the middle of the rows by the time it have 4 or 5 leaves, so injecting N between the rows should work to get it into the plant. Broadcast urea will need some rainfall to reach the roots. Δ

DR. EMERSON NAFZIGER: Professor/Research Education Center Coordinator, University of Illinois