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Late Season Purpling of Corn Plants

Key Points:

- Corn leaves, stalks and husks can turn a purplish or reddish color late in the season due to a buildup of anthocyanin pigments.
- Plants produce anthocyanins when the quantity of sugars produced through photosynthesis exceeds demand for grain fill, causing sugars to build up in green tissues.
- Anthocyanin production is influenced by several different genes, so expression can vary among hybrids.

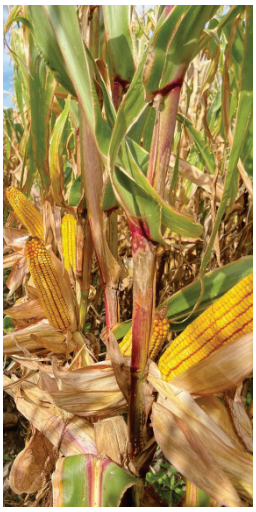
Reddish or Purplish Plants Late in the Season

- Corn plants with a noticeable amount of purple or reddish coloration are commonly observed in corn fields late in the growing season.
- The purple or reddish coloration can appear on the stalks, leaves, husks, and leaf sheaths.
- This coloration is caused by the accumulation of pigment molecules called anthocyanins.

Pigments are Formed From Excess Sugars

- There is a vast array of anthocyanin pigments produced by different plant species. Corn produces two types: cyanidin glucosides and pelargonidin glucosides.
- The production of anthocyanins late in the season in corn occurs when the quantity of sugars produced through photo-synthesis exceeds the quantity needed to support grain fill.
- When sucrose is produced in photosynthetic tissues faster than it is translocated away, it builds up in the tissues, triggering anthocyanin production.
- This biosynthetic pathway functions as a channel for plants to divert excess sugars. Anthocyanin pigments are stored in the vacuoles of the cells and, when enough of them accumulate, they cause the tissue to appear reddish or purplish.

Expression Can Vary Among Hybrids



- There are many genes that can influence production of anthocyanin. Individual hybrids may carry one, multiple, or none of those genes, which determines if and how much purpling they may express.
- Accumulation of dry matter into the kernels stops when the grain reaches physiological maturity, significantly reducing the demand for sugars produced by the plant.
- Good late season plant health after physiological maturity can contribute to the expression of late season purpling or reddening since the plant is still producing sugars it no longer needs for kernel fill.

Plant Stress Can Reduce Sugar Demand

- Crop stress that has interfered with the plant's ability to produce or fill kernels can also trigger purpling if more sugars are being produced by the plant than it needs for the available kernels. There are many stress factors that can reduce ear development, kernel set, or kernel fill including:
  - Poor pollination
  - Kernel abortion
  - Disease
  - Insect feeding damage to the stalk
  - Soil compaction
  - Nutrient deficiency
  - Drought stress

- Purpling or reddening induced by crop stress will frequently have an uneven expression across the field due to the field variability of the level of stress that is imposed on the crop.
- The most extreme purpling occurs when ear development has been disrupted by stress or injury. With no ear to provide a sink for photosynthate, the entire plant can turn purple.

References

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