

2025 AOSA Rule Proposal #7

Anthocyanin Rule Proposal-Corn

PURPOSE OF RULE PROPOSAL: The purpose of this proposal is to add a note, under Poaceae Grass Family III-Corn in AOSA Rules for Testing Seeds Volume 4, clarifying the evaluation of anthocyanin color that can be present in *Zea mays* seedlings.

PRESENT RULE:

ABNORMAL SEEDLING DESCRIPTION

Seedling:

- .
- .
- . albino.

NOTES

1. Seedlings grown in the dark or in low intensity light will exhibit increased elongation of the coleoptile and mesocotyl. In towels, there may be considerable twisting of the shoot system. Overcrowding may cause splitting of the coleoptile and leaves.

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8. Slower developing seedlings with a short shoot and a longer root should be examined carefully to determine if the shoot is short because of damage or because it is a characteristic of the seed lot (i.e. inbred, tough pericarp) or due to test conditions.

PROPOSED RULE:

Seedling:

- .
- .
- . Albino.

.(see also note 9).

NOTES

- .
- .
- .

8. Slower developing seedlings with a short shoot and a longer root should be examined carefully to determine if the shoot is short because of damage or because it is a characteristic of the seed lot (i.e. inbred, tough pericarp) or due to test conditions.

9. A reddish to purplish coloration of the coleoptile and leaves (frequently observed at their tips), the mesocotyl, or roots, is due to the presence of anthocyanin pigments and should be evaluated as normal.

HARMONIZATION AND IMPACT STATEMENT:

The Federal Seed Act, Canada M&P, and ISTA Rules do not include notes on evaluating anthocyanins in seedling tissues of corn.

SUPPORTING EVIDENCE:

While reviewing the results of two seedling evaluation surveys (Poaceae, Grass Family-Cereals; Poaceae Grass Family-Corn), it was evident there was confusion among analysts how to handle seedlings that had anthocyanins present. A significant number of analysts wrongly classified seedlings with anthocyanins as abnormal. Anthocyanins are water soluble pigments found in different types of plant tissues and can range in color from blue, purple, to red. Under field conditions, anthocyanin development is usually the result of a combination of low temperature stress and high light intensity, producing the 'purpling' effect observed in corn seedlings and the 'striped' coloration of roots. In germination tests, the first leaf, coleoptile, mesocotyl, and roots of grasses can sometimes exhibit purplish-red coloration indicative of anthocyanin presence. As seedling development progresses, this purplish-red color disappears upon exposure to light and increased chlorophyll production.

Petrella, D.P., J.D. Metzger, J.J. Blakeslee, E.J. Nangle, and D.S. Gardner. 2016. Anthocyanin production using rough bluegrass treated with high intensity light. *HortScience*. 51(9) 1111-1120. doi:10.21273/HORTSCI10878-16.

Zykin, P.A., E.A. Andreeva, A.N. Lykholay, N.V. Tsvetkova, and A.V. Voylovkov. 2018. Anthocyanin Composition and content in rye plants with different grain color. *Molecules*. 23(4):948. doi: 10.3390/molecules23040948. PMID: 29671758; PMCID: PMC6017340.

SUBMITTED BY:

Seedling Images Working Group: Heidi Jo Larson (Heidi.larson@sgs.com), Laura Donaldson (donaldson@indianacrop.org), David Johnston (david.m.johnstonrst@gmail.com), Kathy Mathiason (katherine.mathiason@sdstate.edu), Marija Topic (marijat@crookham.com), and Riad Baalbaki (rbaalbaki@cdfa.ca.gov).

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