

2025 AOSA Rule Proposal #5

1. PURPOSE OF PROPOSAL: The purpose of this proposal is to update the identification and description of aerial seedling structures of cyclamen (*Cyclamen africanum*; PRIMULACEAE, PRIMROSE FAMILY I, Vol. 4 of AOSA Rules), namely changing the identification and description of 'cotyledons' to 'epicotyl.' Evaluation criteria of aerial seedling parts will not be impacted; these will apply to the newly named and described epicotyl if the proposal is accepted.

2. PRESENT RULE:

GENERAL DESCRIPTION

Seedling type: Epigeal dicot.

Food reserves: Fleshy endosperm; minor reserves in the cotyledon.

Shoot system: Swollen tuberous hypocotyl and a single cotyledon (normally there is no second cotyledon) borne on a petiole, the terminal bud lying at its base.

Root system: Several seminal roots, developing more or less simultaneously at the distal end of the hypocotyl. More than one sufficient seminal root is required.

ABNORMAL SEEDLING DESCRIPTION

Cotyledons:

- cotyledon petiole broken or split (see note 2).

Epicotyl:

- missing (may be assumed to be present if cotyledon petiole is intact).

Hypocotyl:

- not forming a tuber.
- split, constricted, spindly, glassy.

Root:

- none, or only one seminal root.
- stunted or stubby.

Seedling:

- one or more essential structures impaired as a result of decay from primary infection.
- albino.

NOTES

1. The cotyledon petiole should be examined at the point of entry into the seed coat for signs of decay.
2. Normally there is no second cotyledon. The dark green, heart-shaped blade of the single cotyledon is not usually evident during the prescribed test period.

REFERENCES

Bekendam, J. and R. Grob. 1979. Handbook for Seedling Evaluation, Second Edition. International Seed Testing Association, Zurich, Switzerland.

3. PROPOSED RULE:

GENERAL DESCRIPTION

Seedling type: Epigeal dicot.

Food reserves: Fleshy endosperm; minor reserves in the cotyledon **if present**.

Shoot system: Swollen tuberous hypocotyl and an epicotyl consisting of a first leaf borne on a petiole, with a terminal bud lying at its base. Cotyledons do not usually develop; if present, they usually remain small with no contributing function to seedling development.

Root system: Several seminal roots, developing more or less simultaneously at the distal end of the hypocotyl. More than one sufficient seminal root is required.

ABNORMAL SEEDLING DESCRIPTION

Cotyledons:

- not usually present.

Epicotyl:

- missing first leaf.
- less than half of the original leaf tissue remaining attached (see note 1).
- less than half of the original leaf tissue free of necrosis or decay (see note 1).
- petiole broken or split (see note 2).
- decay at the leaf-petiole juncture.

Hypocotyl:

- not forming a tuber.
- split, constricted, spindly, glassy.

Root:

- none, or only one seminal root.
- stunted or stubby.

Seedling:

- one or more essential structures impaired as a result of decay from primary infection.
- albino.

NOTES

1. In previous editions of Vol. 4, the first leaf was interpreted as a single cotyledon, although its structure is identical to that of subsequent leaves. Cotyledons usually remain rudimentary. In some cases, small cotyledons are distinguishable at the early stage of germination, usually disappearing upon further seedling development.

2. The petiole should be examined at the point of entry into the seed coat for signs of decay.

REFERENCES

~~Bekendam, J. and R. Grob. 1979. Handbook for Seedling Evaluation, Second Edition. International Seed Testing Association, Zurich, Switzerland.~~

de Vogel, E.F. 1980. Seedlings of Dicotyledons. Structure, Development, Types. Pudoc, Wageningen, the Netherlands. p. 63.

4. HARMONIZATION AND IMPACT STATEMENT:

If adopted, this proposal will diverge from ISTA's description of *Cyclamen africanum* seedlings. ISTA's description implies that the first emerging aerial structure should be regarded as a single cotyledon.

5. SUPPORTING EVIDENCE:

Characterization of the first *Cyclamen* seedling aerial structure as a single cotyledon was first proposed by Lubbock (1892) when describing *Cyclamen persicum*. However, the author referred to this cotyledon as "enlarging and performing the functions of a leaf which it resembles in all

respects.” Later, de Vogel (1980) stated that this structure should be identified as a leaf and its petiole (the complete structure would therefore be an epicotyl) and noted that cotyledons do not usually develop in cyclamen-type seedlings. According to de Vogel (1980) “The cotyledons may be present or not, if present they are at most small and remain subterranean and sometimes they are only retardedly freed from the envelopments. The food in the hypocotyl or root part supports the development of a single leaf. In seedlings where two cotyledons are present, the foliar nature of this leaf is obvious. In the ones without cotyledons the single leaf has often been interpreted as a single cotyledon. This is, however, not much different from the subsequent leaves, and fits their sequence, similarly like in those seedlings in which the cotyledons are small but present. One can conclude that in the former the true cotyledons have entirely disappeared, while in the latter such a reduction process is not yet completed. The single leaf serves for a long time as the only assimilating paracotyledon, in some cases even during the entire first season.”

References:

1. de Vogel, E.F. 1980. Seedlings of Dicotyledons. Structure, Development, Types. Pudoc, Wageningen, the Netherlands. p. 63.
2. Lubbock, J. 1892. A Contribution to Our Knowledge of Seedlings. D. Appleton and Co. p. 184.

6. SUBMITTED BY:

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7. DATE SUBMITTED:

October 3, 2024