

ASTERACEAE FAMILY – Flower seedlings with tall hypocotyls - ex. *Tagetes* spp. Marigold

Ageratum spp., ageratum

Callistephus chinensis, China aster

Cosmos bipinnatus, cosmos

Cosmos sulphureus, klondyke cosmos

Helichrysum bracteatum, helichrysum, strawflower

Symphotrichum novae-angliae, New England aster

Tagetes spp., marigold

Zinnia spp., zinnia

GENERAL DESCRIPTION

Seedling type: Epigeal dicot

Food reserves: Cotyledons which expand and become thin, leaf-like and photosynthetic.

Shoot system: The hypocotyl elongates and carries the cotyledons above the soil surface. The epicotyl usually does not show any development within the test period.

Root system: A long primary root. Secondary or adventitious roots usually do not develop within the test period unless the primary root has been damaged.

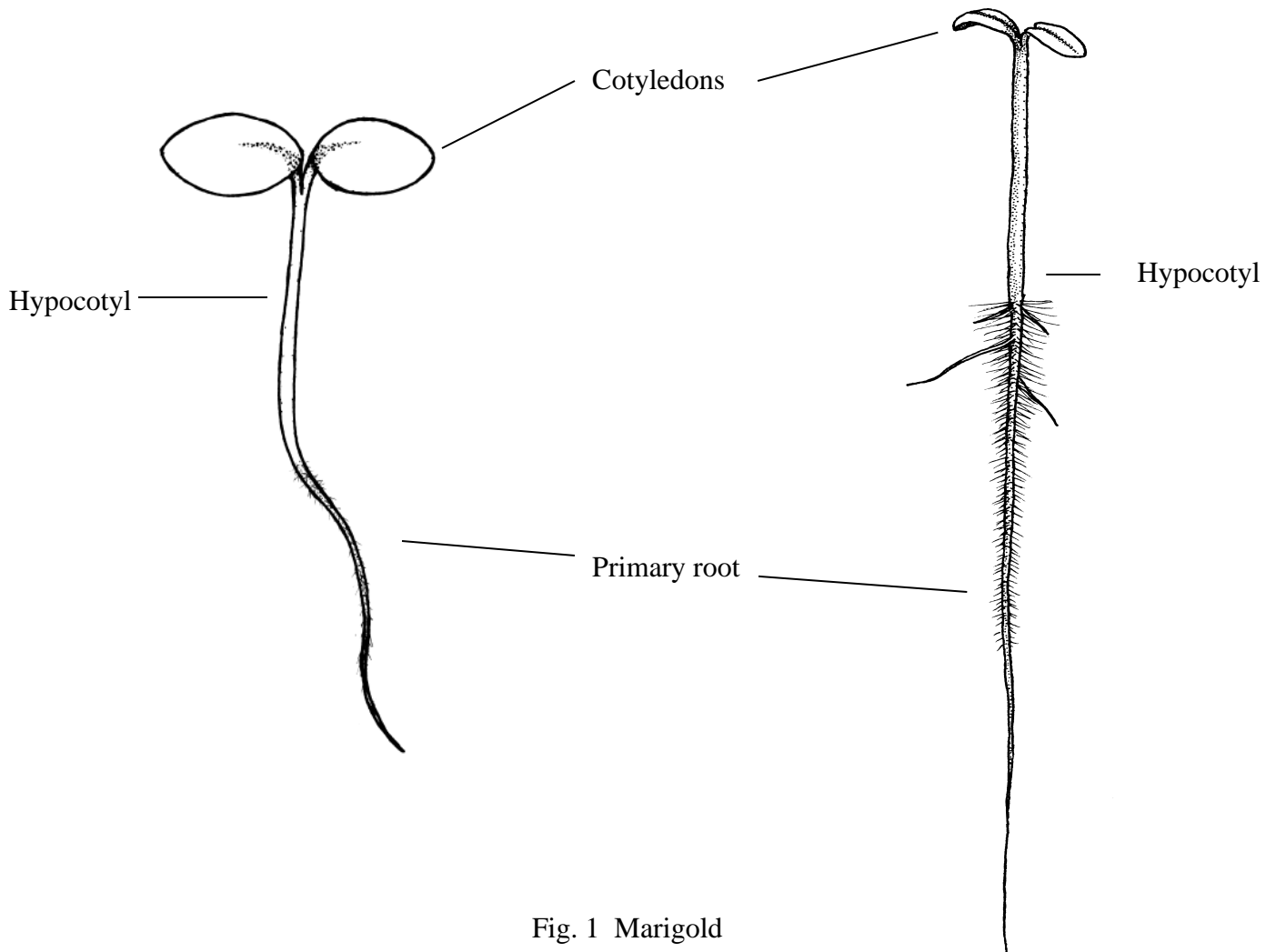


Fig. 1 Marigold

ABNORMAL SEEDLING DESCRIPTION

Cotyledons:

- less than half of the original cotyledon tissue remaining attached.
- less than half of the original cotyledon tissue free of necrosis or decay.

Epicotyl:

- missing (may be assumed to be present if cotyledons are intact).

Hypocotyl:

- deep open cracks extending into the conducting tissue.
- malformed, such as markedly shortened, curled or thickened.
- watery

Root:

- none.
- weak, stubby or missing primary root. Secondary roots will not compensate.

Seedling:

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

NOTES:

1. In rolled towel testing, at evaluation time if observed too many seedlings with lesions on hypocotyl or other part of seedling, it could be damage introduced by too tightly rolling up the towels (retest suggested).
2. If too many seedlings are missing primary roots double check the sowing method if used sowing heads (seeds sticking upright in holes and breaking of root tips at planting – retest suggested).

Fig. 2 Cotyledon defects

- 2a. Missing cotyledons
- 2b. Underdeveloped 3 cotyledons
- 2c. Cotyledons trapped in seed coat, need to remove seed coat to check if cotyledons are decayed. If decayed cotyledons, the seedling is abnormal.

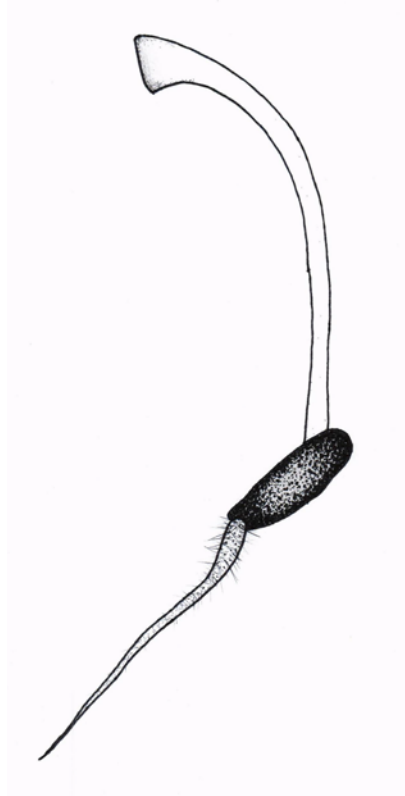


Fig 2a (-)

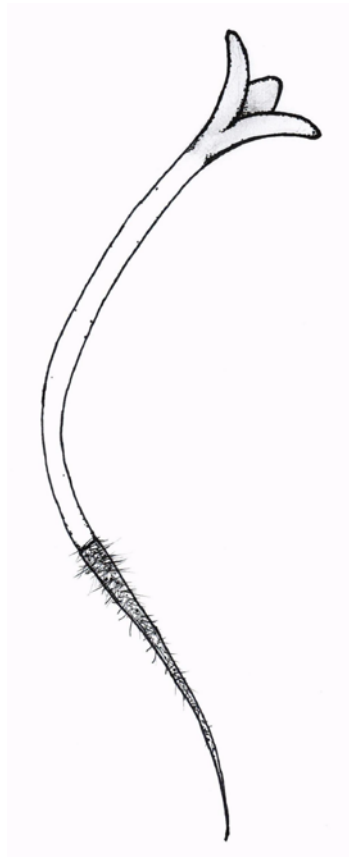


Fig 2b (-)

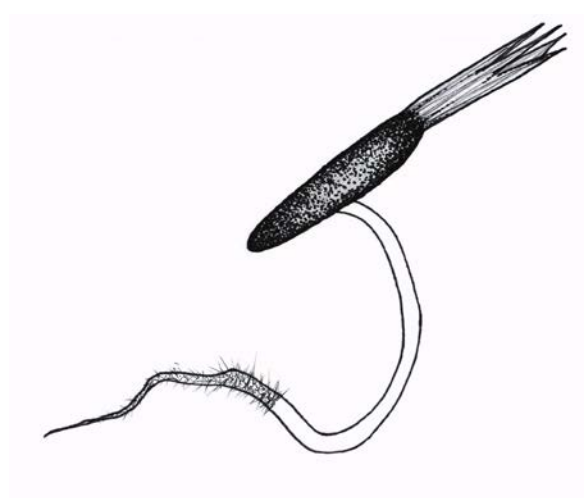
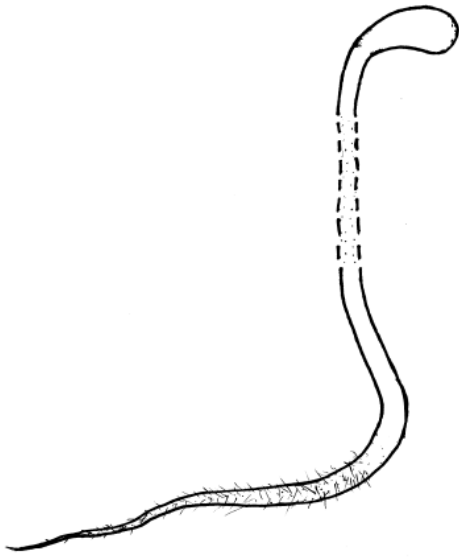


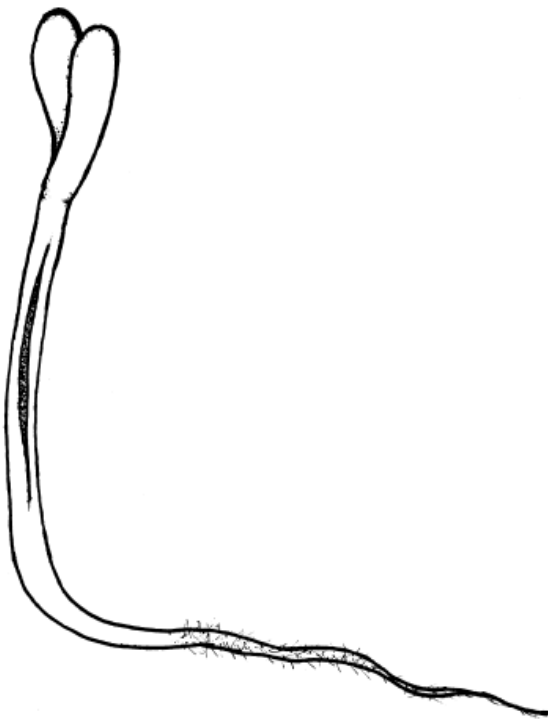
Fig 2c (-/+)

Fig. 3 Hypocotyl defects

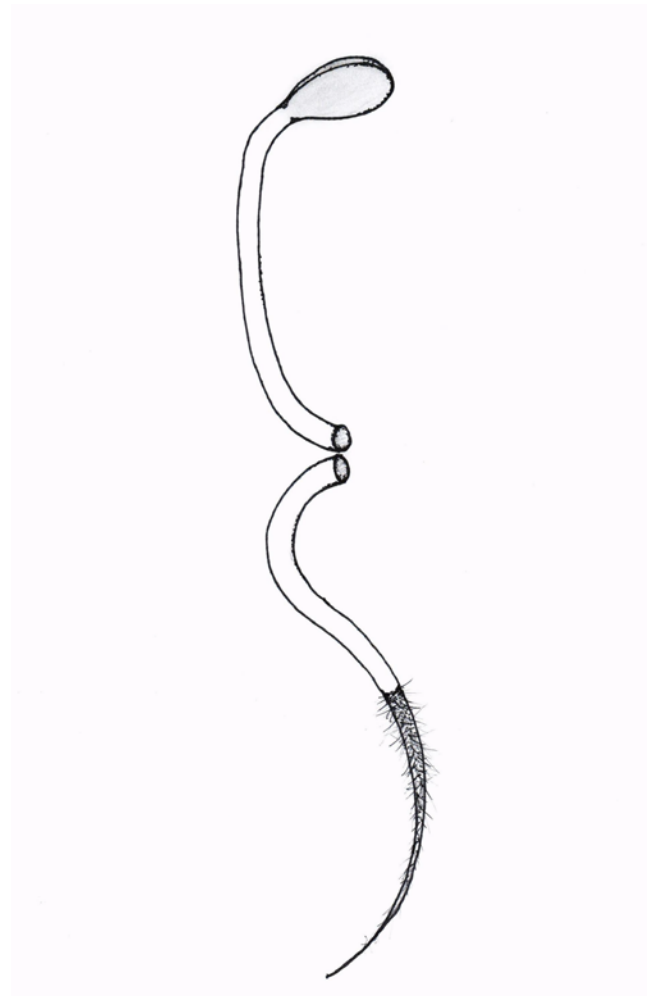
- 3a. watery hypocotyl
- 3b. lesion on hypocotyl
- 3c. broken hypocotyl



3a (-)



3b (-)



3c (-)

Fig. 4 Root defects

- 4a. root short and/or decayed as a result of primary infection
- 4b. primary root missing and secondary roots will not compensate for missing primary root

