

**Topic: Anomalous Secondary
Growth in Nyctanthes
B.Sc. Botany (Hons./Sub.) II
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The T.S. of *Nyctanthes* (Family- Oleaceae) stem appears quadrangular and reveals the following tissues from outside with in-

Epidermis

- Single-layered epidermis consists of rectangular cells.
- A thick uninterrupted cuticle is present on the epidermis.
- Many multicellular hairs are present.

Cortex

- It is differentiated into collenchyma and parenchyma.
- Collenchyma is several cells deep below the four protruded comers while only few layers deep at the other places just beneath the epidermis.
- Parenchyma is present below the collenchyma. Many intercellular spaces are present. The region extends up to the vascular tissue.

Cortical bundles

- Four vascular bundles are present in the cortex, situated one each in each protruded bulge.
- Each conical bundle faces its pointed xylem end towards outer side, i.e., epidermis, and is conjoint, collateral, open and exarch.
- These bundles may show secondary growth at maturity.

Endodermis

- Not well-developed.

Pericycle

- It is in the form of sclerenchymatous patches.

Vascular System

- It consists of primary phloem, secondary phloem, cambium, secondary

xylem and primary xylem.

- Primary phloem is crushed and irregularly present in patches below pericycle.
- Secondary phloem is present in the form of a continuous ring and consists of sieve tubes, companion cells and phloem parenchyma.
- Cambium is one to three cells thick continuous layer present in between phloem and xylem.
- Secondary xylem is present just inner to the cambial ring and consists mainly of thick walled wood parenchyma and fibres. Tracheids and vessels are also present.
- Primary xylem is situated just near the pith facing its protoxylem towards the centre.

Pith

- It is thin walled and parenchymatous.

Abnormality

- Abnormal secondary growth in *Nyctanthes* is due to abnormality in primary

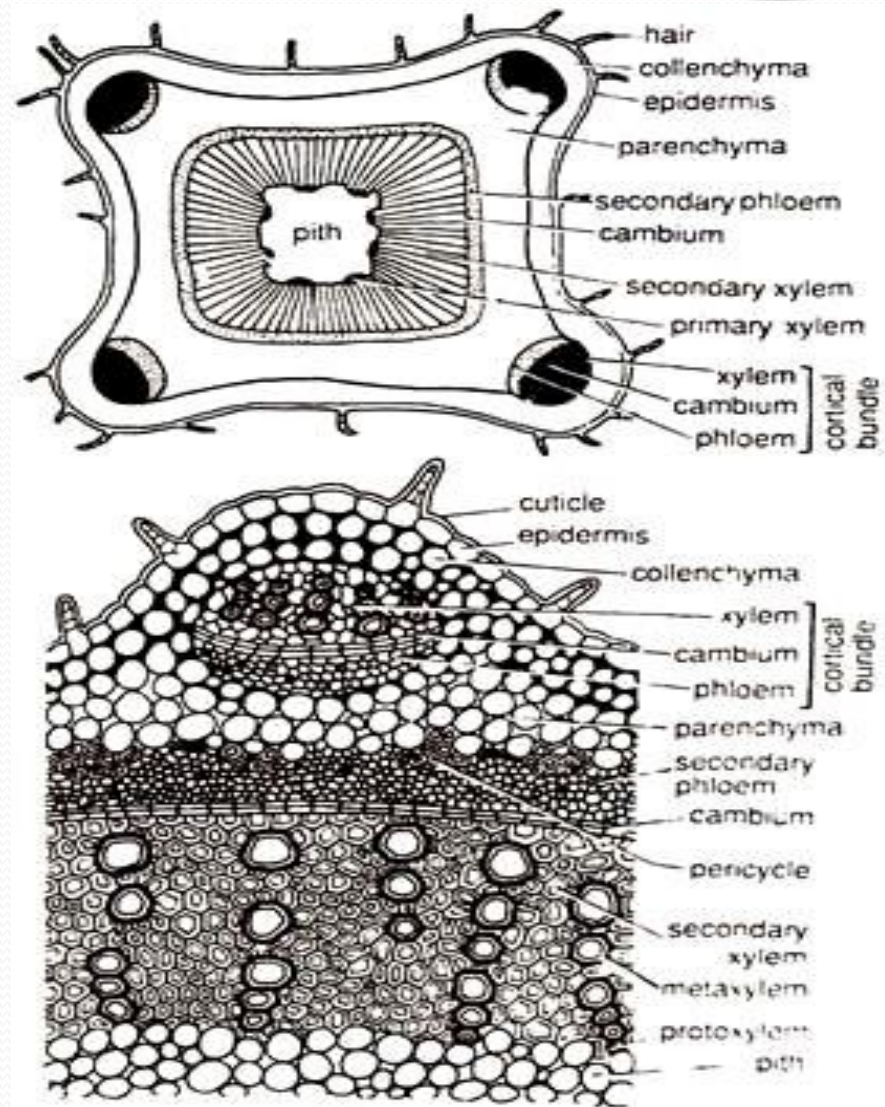


Fig. *Nyctanthes* : Upper - T S stem (diagrammatic).
 Lower - T S stem (A part cellular)

structure due to presence of medullary or cortical bundles.

- These cortical bundles are actually leaf trace bundles. Secondary growth in medullary vascular bundles of *Nyctanthes* is of normal type which takes place through a typical cambial ring formation while cortical bundles present in four corners of the stem.
- More of secondary xylem is formed on the outer side and less of the secondary phloem towards inner side.
- Due to more tissue differentiation towards outside distinct ridges would be formed at the four sides of *Nyctanthes* stem.