

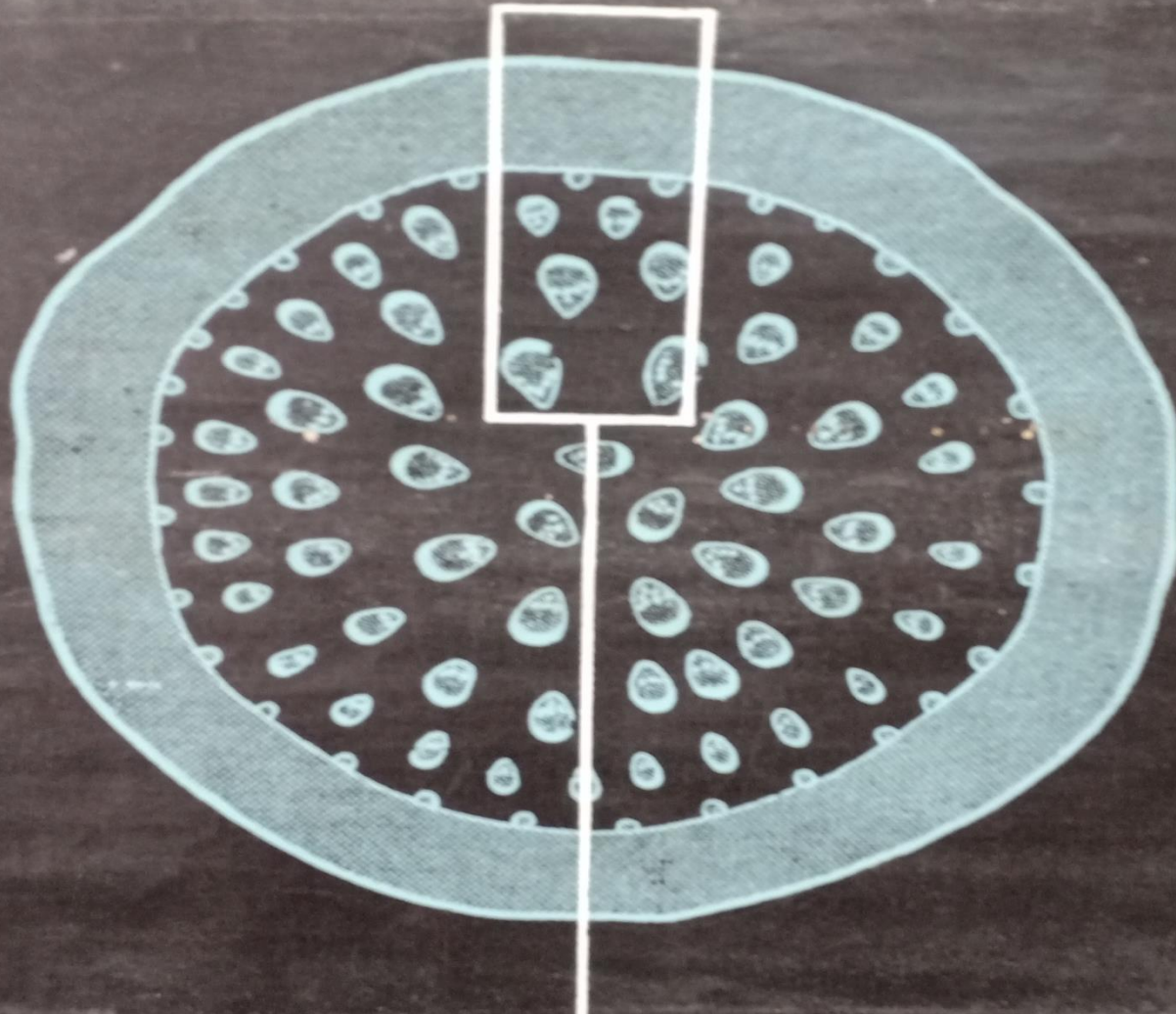
Dracaena

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Deptt. of Botany

MLSU

T.S.OF DRACAENA STEM



- Secondary growth does not take place normally in a monocot stem as the primary vascular bundle is conjoint, collateral but closed.
- The vascular bundles are scattered in the ground tissue.
- The outermost layer is epidermis followed by hypodermis.

- Secondary growth is usually absent in monocots but is seen in few monocots like *Yucca*, *Dracaena*, *Aloe*, *Agave*,
- *Dracaena* is taken as the typical case of secondary anomalous growth in monocot.

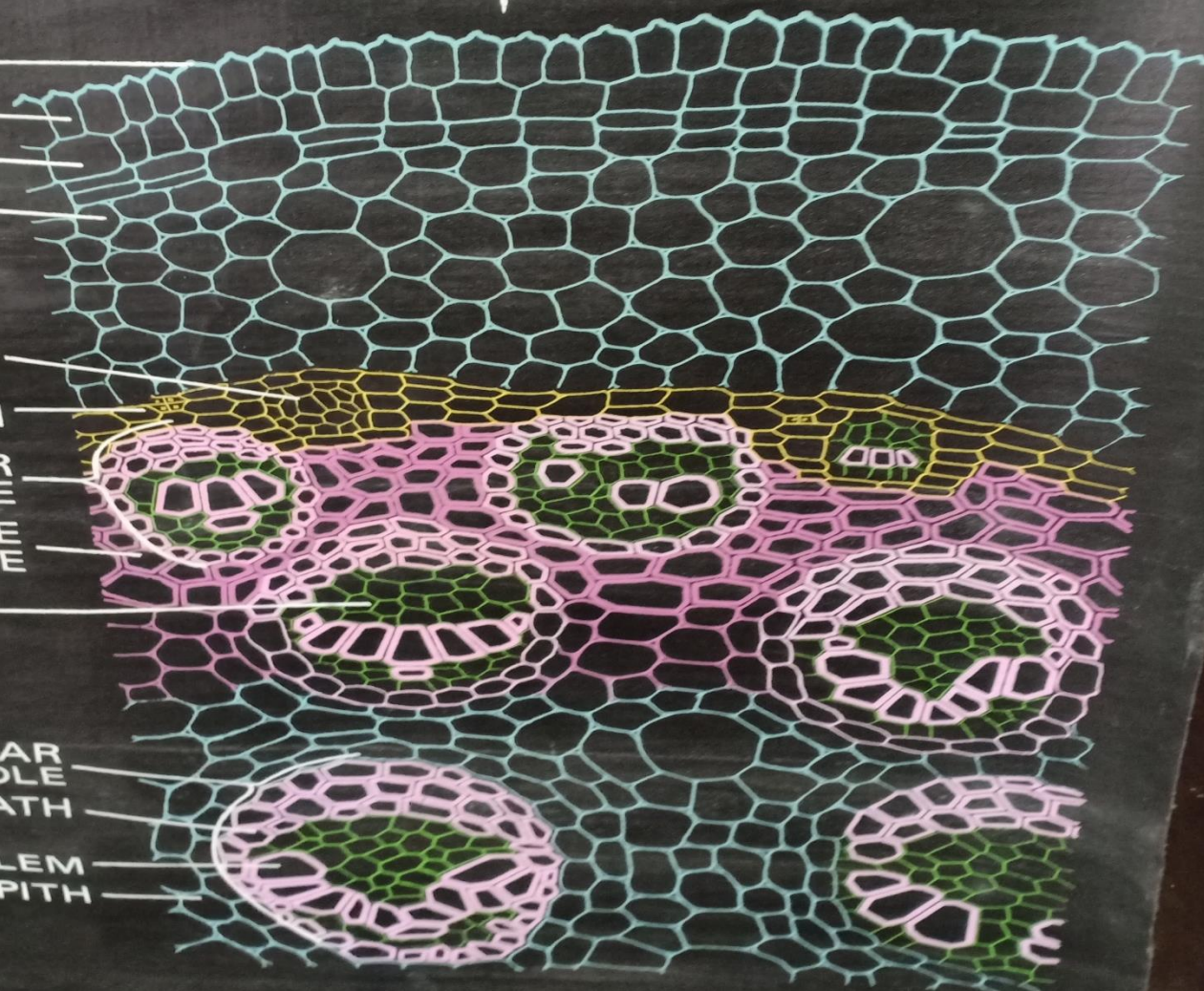
- Multilayer cambium develops from the inner cortical cells which cuts parenchyma cells towards inside which is more than the parenchyma cells produced outside
- Secondary Vascular bundles arises from a single initial cell(vascular bundle initial) from the parenchyma cells towards inside which divides and produces a mass of cell.

- The outer cells convert into xylem and the inner cells into phloem thus the secondary VB are concentric (amphivasal type). Successive cambium ring is produced which results in production of parenchyma cells which push the Secondary VB inside.

- This total process repeats many times.
- The parenchymatous cells of the last cambium ring are converted into conjunctive tissue
- A cork cambium may develop and produce bark

ENLARGED

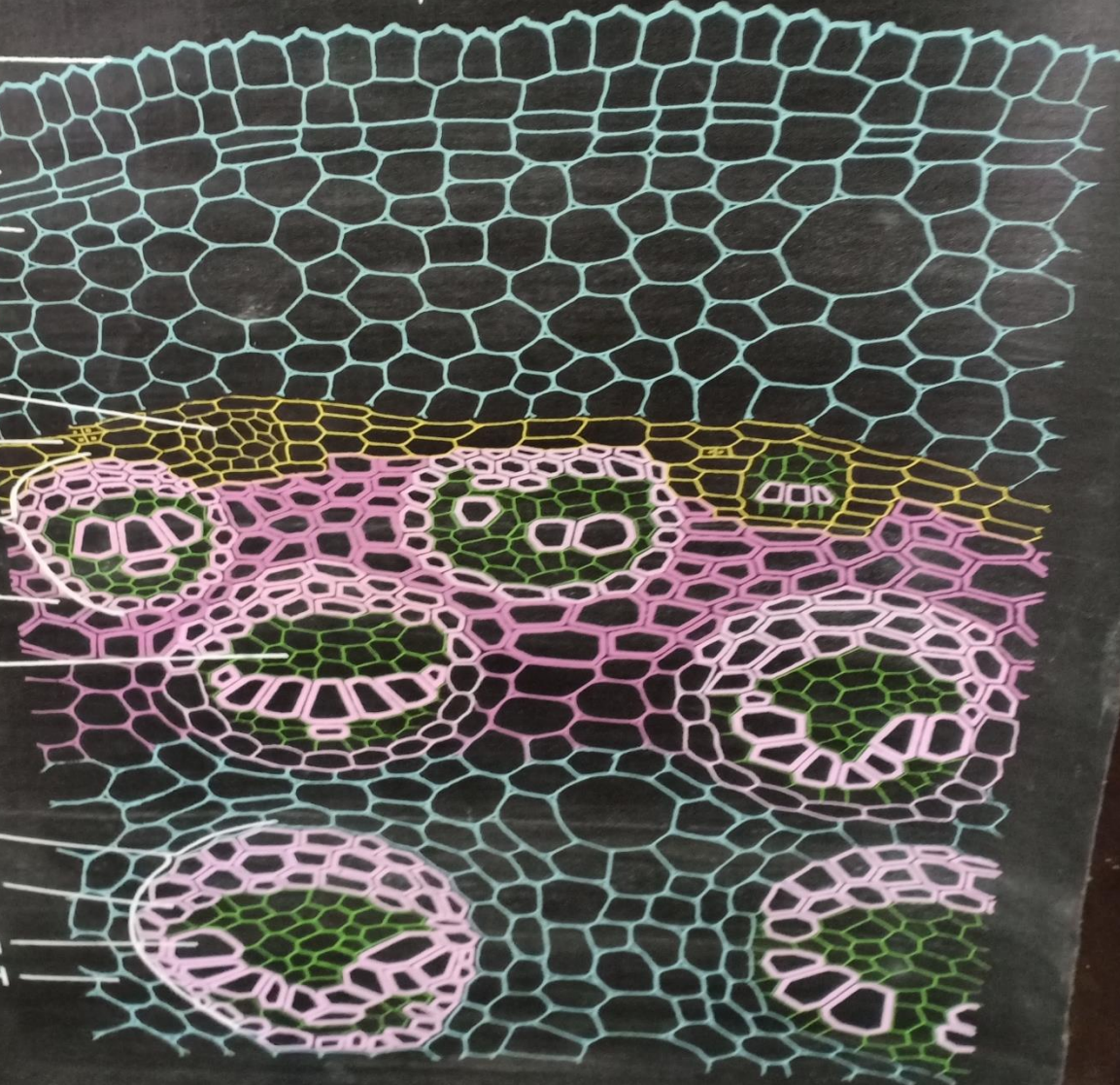
TICLE —
DERMIS —
CORK —
ENCHYMA —
ODERMIS —
RENCHYMA —
FORMATION OF
NEW BUNDLE —
CAMBIUM —
EC. VASCULAR
BUNDLE —
CONJUNCTIVE
TISSUE —
PHLOEM —
CAMBIUM —
XYLEM —
PRI. VASCULAR
BUNDLE SHEATH —
XYLEM
PITH —



ENLARGED

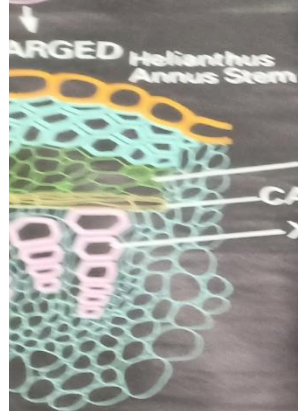
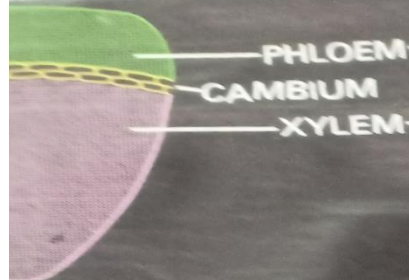


EPIDERMIS
CORK
PARENCHYMA
EPIDERMIS
PARENCHYMA
FORMATION OF
NEW BUNDLE
CAMBIAL
SEC. VASCULAR
BUNDLE
CONJUNCTIVE
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PHLOEM
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XYLEM
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BUNDLE
BUNDLE SHEATH
XYLEM
PITH

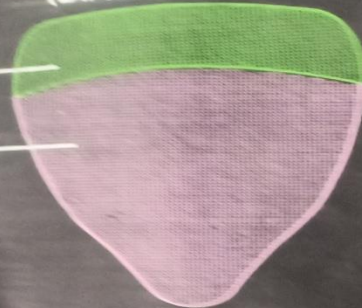


VASCULAR BUNDLES: TYPES

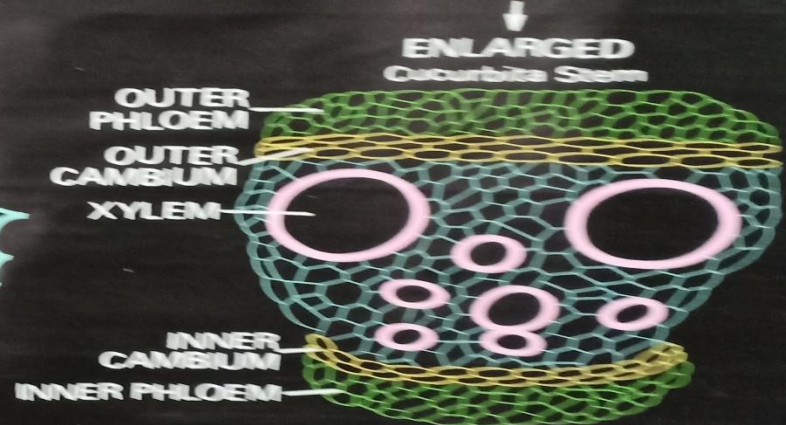
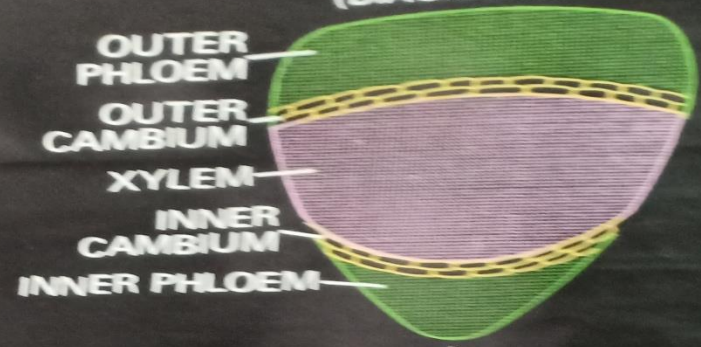
APICAL OPEN
(DIAGRAMMATIC)



COLLATERAL CLOSED
(DIAGRAMMATIC)



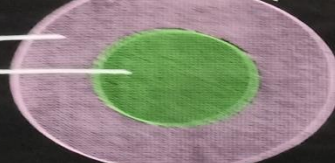
BICOLLATERAL
(DIAGRAMMATIC)



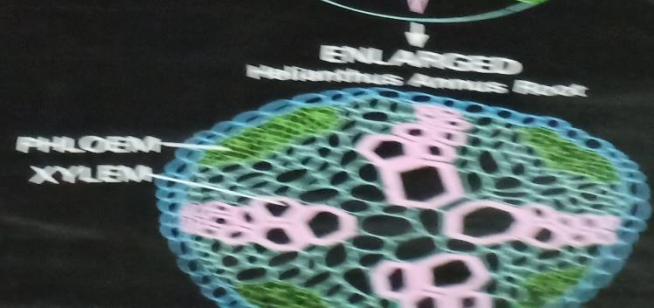
PHLOEMAL
(DIAGRAMMATIC)



AMPHIVASAL
(DIAGRAMMATIC)

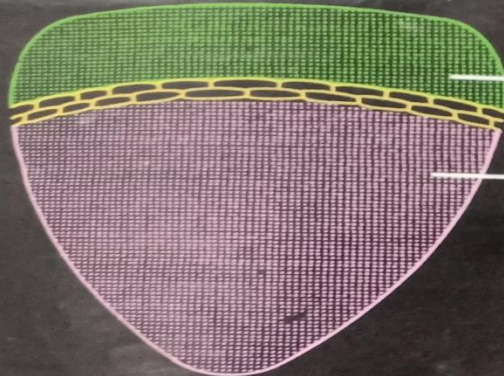


RADIAL (DIAGRAMMATIC)



VASCULAR BUNDLES

COLLATERAL OPEN (DIAGRAMMATIC)



PHLOEM

CAMBIUM

XYLEM



ENLARGED
Helianthus
Annus Stem



PHLOEM

CAMBIUM

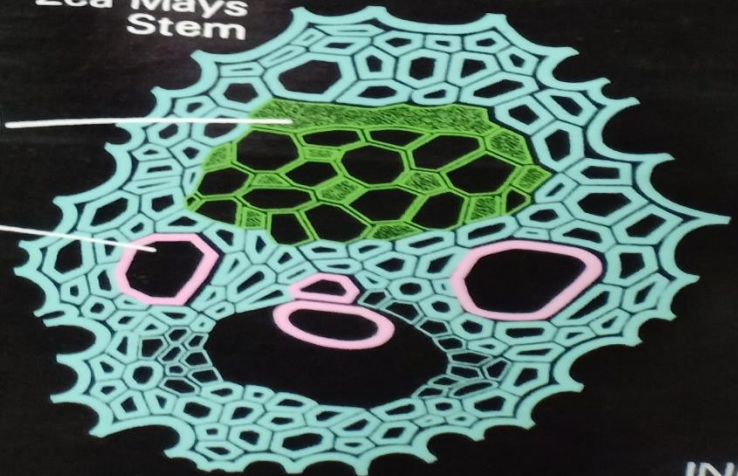
XYLEM

COLLATERAL CLOS (DIAGRAMMATIC)



ENLARGED

Zea Mays
Stem



PHLOEM

CAMBIUM

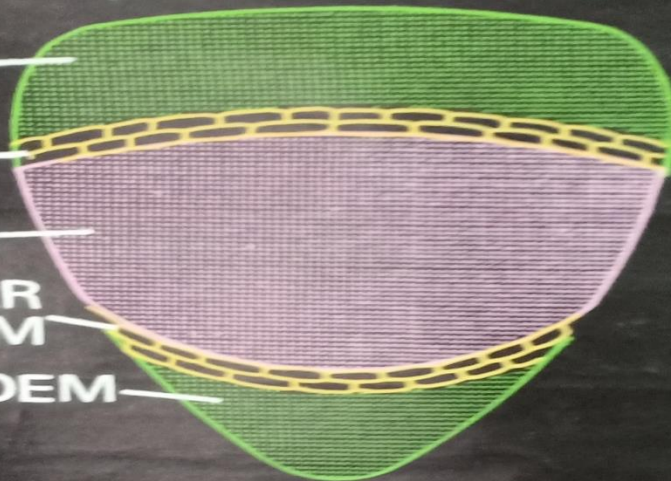
XYLEM

S: TYPES

SED

BICOLLATERAL (DIAGRAMMATIC)

OUTER PHLOEM
OUTER CAMBIUM
XYLEM
INNER CAMBIUM
INNER PHLOEM



ENLARGED
Cucurbita Stem

OUTER PHLOEM
OUTER CAMBIUM
XYLEM
INNER CAMBIUM
INNER PHLOEM



