



S. G. V. C. Vidya Prasarak Trust's,

**Matoshri Gangamma Veerappa Chiniwar  
Arts, Commerce & Science College,**

**MUDEBIHAL-586212.** Dist. Vijayapur (Karnataka)

(Accredited with CGPA of 3.31 on seven point scale at 'A+' Grade)

☎ : 08356220329

FAX : 08356220329

\* email : princmgvc@gmail.com \* www.mgvcmb.in \*

Ref. No. : .....

Date : 2022-23

### Certificate

This is to certify that following are the list of Experiential Learning  
through Project work/ Field Work/ Internship during the year 2022-23

*Co-ordinator,*

Internal Quality Assurance Cell

S.V.C. Arts, Commerce & Science College

MUDEBIHAL-586212. Dist: Vijayapur

**PRINCIPAL,**

M.G.V.C. Arts, Commerce & Science College

MUDEBIHAL-586212. Dist: Vijayapur.



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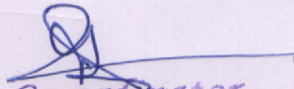
Date : ..... 2022-23 .....

**Department of Botany**

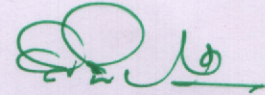
**Title of the Project: Anomalous Secondary Growth**

**B.Sc III Semester- 2022-23**

Sl. No	Reg. No	Name of the Students
01	U15NU21S0086	Rajiya Rudravadi
02	U15NU21S0065	Vinuta
03	U15NU21S0035	Sangeeta
04	U15NU21S0024	Manjula
05	U15NU21S0027	Pratibha Dodamani
06	U15NU21S0087	Muskan Mujawar
07	U15NU21S0093	Bhagyashree

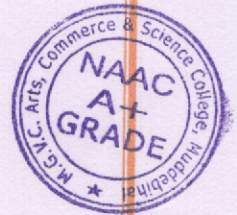
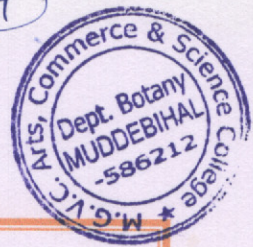
  
Co-ordinator,

Internal Quality Assurance Cell  
S.V.C. Arts, Commerce & Science College  
MUDDABIHAL-586212. Dist: Vijayapur.



**PRINCIPAL,**

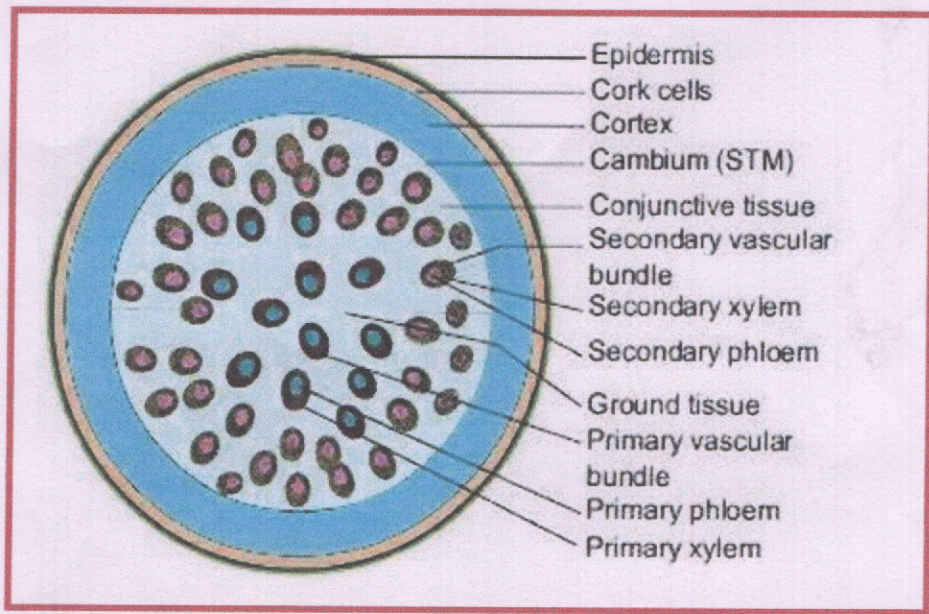
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S.G.V.C VIDYA PRASARK TRUST'S  
M. G.V.C. ARTS, COMMERCE AND SCIENCE COLLEGE  
MUDEBIHAL

**DEPARTMENT OF BOTANY**

**PROJECT WORK  
ON  
ANOMALUS SECONDARY GROWTH**



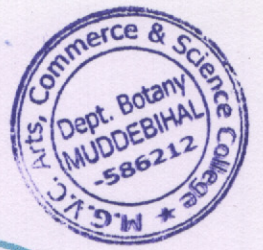
**B.Sc THIRD SEMESTER STUDENTS**

**DURING THE YEAR**

**2022-23**

**Co-ordinator,**  
Internal Quality Assurance Cell  
M.G.V.C. Arts, Commerce & Science College  
MUDEBIHAL-586212. Dist: Vijayapura

**PRINCIPAL,**  
M. G. V. C. Arts, Com. & Science College  
MUDEBIHAL - 586212.



S.G.V.C Vidya Prasarak Trust's

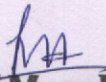
M.G.V.C ARTS, COMMERCE AND SCIENCE COLLEGE  
MUDDEBIHAL-586212


## DEPARTMENT OF BOTANY

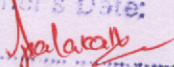
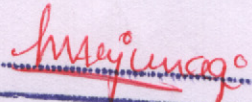
# CERTIFICATE

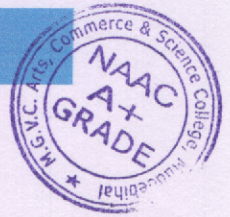
Examination Seat No: U15NUR160032 Class: B.Sc Third Sem

This is to certify that, Mr/Mrs. Muskan S. Mujawar Has satisfactorily completed Mini Project Work on Anomalous Secondary Growth under our supervision in M.G.V.C Arts, Commerce and Science College Muddebihal, Department of Botany during the year 2022-23.

  
Staff Member in charge

  
Head Department of Botany  
Head of the Department of Botany  
M.G.V.C. College, MUDDEBIHAL-586212  
Dist: Biiapur.

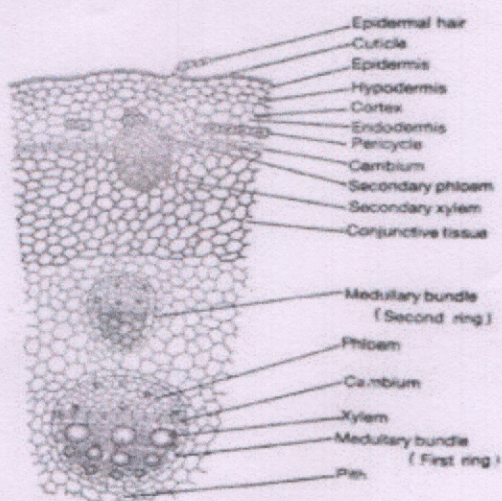
<b>VALUED</b>	
Examiner's Date:	
1.	
2.	



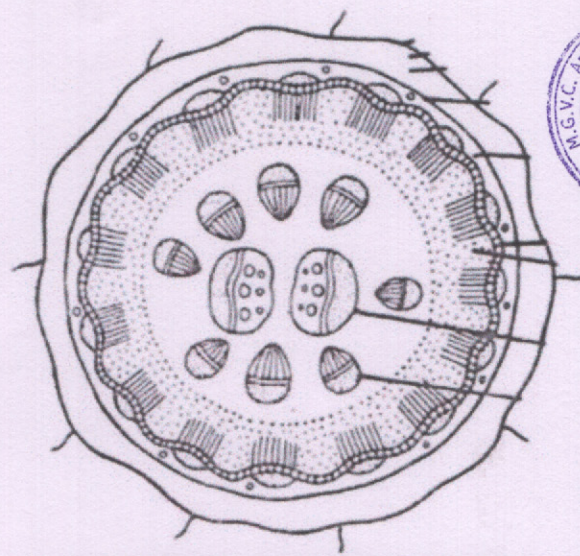
## 1. Anomalous Growth in Boerhaavia Stem:

The primary structure consists of the

- i. Epidermis with a thick cuticle and some stomata
- ii. Hypodermis (collenchyma) below the epidermis, interrupted by the underlying cortex, usually below a stoma,
- iii. cortex (chlorenchyma) in several layers with abundant chloroplasts,
- iv. the endodermis, clearly defined,
- v. the pericycle, sometimes with strands of sclerenchyma,
- vi. vascular bundles,
- vii. the pith. Vascular bundles two large bundles on the two sides of the pith, and a number of small bundles (6-14) just outside, arranged in a second or middle ring. The bundles, particularly the bigger ones, show only a limited amount of growth in thickness by their fascicular cambium. Soon secondary growth begins. The cambium arises secondarily from the pericycle or from certain layers outside the primary bundles, and becomes active. It cuts off a peripheral ring (third or outer ring) of several collateral bundles (secondary), each consisting of xylem on the inner side and phloem on the outer, with the fascicular cambium lying in between. Soon, the interfascicular cambium becomes active and begins to produce rows of cells internally. These soon become thick walled and lignified and are called the conjunctive tissue. The former also produces some amount of parenchyma externally. A little later, cork and lenticel develop outside the hypodermis.



**Anomalous Secondary Thickening  
 In Boerhavia Stem (Cellular Diagram)**



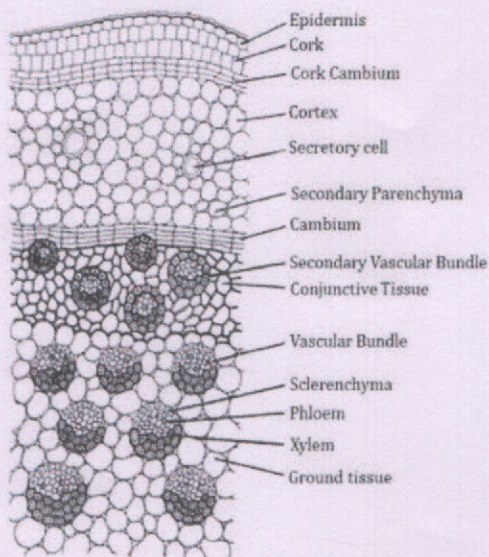
**Anomalous Secondary Thickening  
 In Boerhavia Stem (Diagrammatic)**

## 2. Anomalous Secondary Growth in Dracaena Stem.

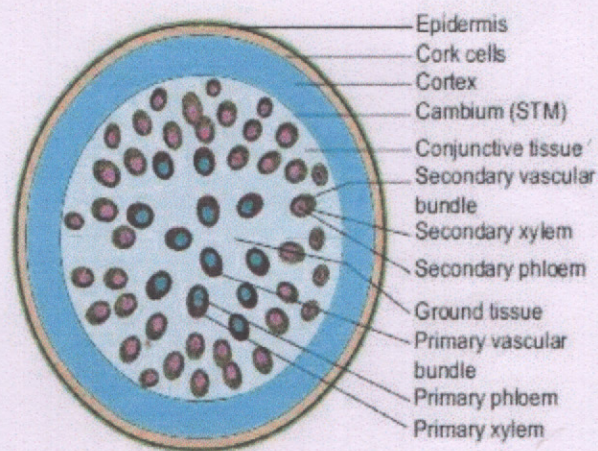
The primary structure is a typically monocotyledonous one with many closed and collateral or concentric amphivasal vascular bundles lying scattered in the ground tissue. Secondary growth begins with the formation of a secondary meristematic tissue-the cambium-in the parenchyma outside the primary bundles. This parenchyma divides tangentially and forms a band of cambium, a few layers in thickness. The cambium thus formed is more active on the inner side. It begins to cut off new cells towards the inside, which soon become differentiated into distinct vascular bundles (secondary) and thick-walled, often lignified parenchyma (secondary). On the outer side, the cambium produces only some amount of thin-walled parenchyma which may contain some crystals. While the primary bundles remain scattered, the secondary ones are somewhat radially seriated as is the surrounding secondary parenchyma. The vascular bundles are oval in transection, and concentric with phloem in the centre surrounded by xylem (amphivasal). In some species of Dracaena, the vascular bundles are, however, collateral. The

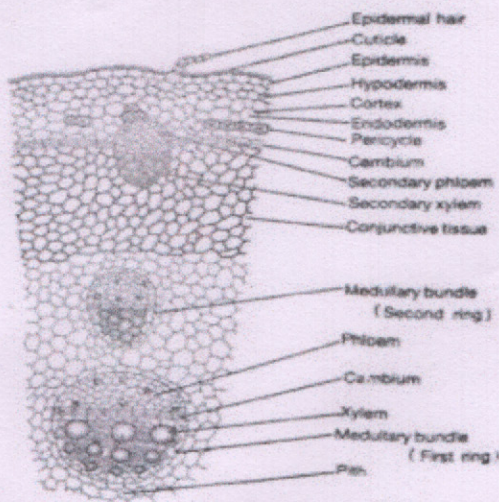
phloem consists of short sieve-tubes, companion cells and phloem parenchyma, while the xylem consists of long tracheids with a small amount of thick-walled (lignified) wood parenchyma.

After the secondary growth has proceeded to some extent, the peripheral paraenchyma becomes meristematic and begins to divide tangentially, as do the cells derived from them until a few linear layers are formed. The cells then become suberized and differentiated into cork. Some deeper lying parenchyma begins again to divide and the new layers formed again give rise to a strip of cork in the same way. Thus, the cork in *Dracaena* appears in seriated bands without the formation of cork-cambium (phellogen) and is known as storied cork.

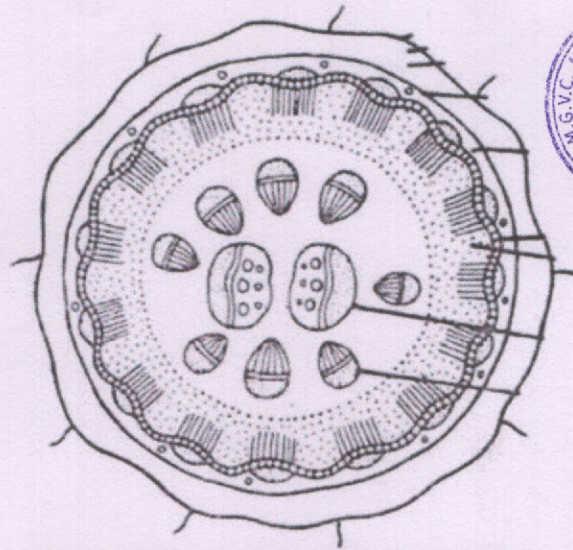


**Anomalous Secondary Thickening in *Dracaena* (Diagram)**





**Anomalous Secondary Thickening  
 In Boerhavia Stem (Cellular Diagram)**

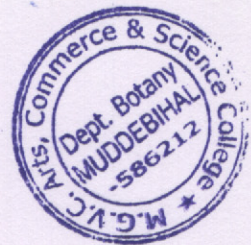


**Anomalous Secondary Thickening  
 In Boerhavia Stem (Diagrammatic)**

## 2. Anomalous Secondary Growth in Dracaena Stem.

The primary structure is a typically monocotyledonous one with many closed and collateral or concentric amphivasal vascular bundles lying scattered in the ground tissue. Secondary growth begins with the formation of a secondary meristematic tissue—the cambium—in the parenchyma outside the primary bundles. This parenchyma divides tangentially and forms a band of cambium, a few layers in thickness. The cambium thus formed is more active on the inner side. It begins to cut off new cells towards the inside, which soon become differentiated into distinct vascular bundles (secondary) and thick-walled, often lignified parenchyma (secondary). On the outer side, the cambium produces only some amount of thin-walled parenchyma which may contain some crystals. While the primary bundles remain scattered, the secondary ones are somewhat radially seriated as is the surrounding secondary parenchyma. The vascular bundles are oval in transection, and concentric with phloem in the centre surrounded by xylem (amphivasal). In some species of *Dracaena*, the vascular bundles are, however, collateral. The





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**DEPARTMENT OF BOTANY**



**REPORT**

**B.Sc Third Semester students has satisfactorily completed Mini Project Work on Anomalous Secondary Growth under our supervision in M.G.V.C Arts, Commerce and Science College Muddebihal during the year 2022-23.**

**HOD of Botany**

*Head of the Department of Botany*  
M.G.V.C. College, MUDDEBIHAL-586212  
Dist: Bijapur.