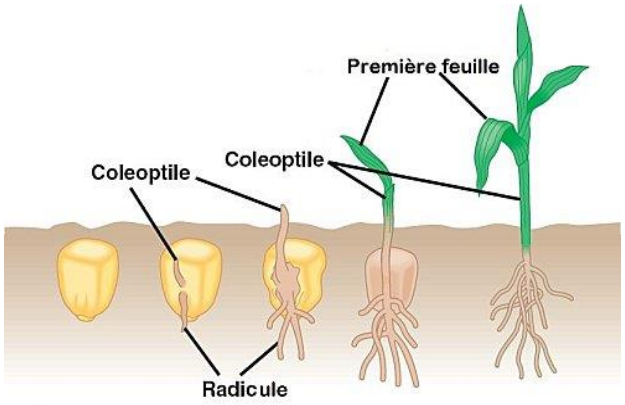
P n° 4. Anatomy of stems, roots and leaves of monocotyledonous plants.

1. Introduction

Monocotyledons are plants whose embryo has a single cotyledon, or primordial leaf and they differ from the Dicotyledonous plants (with two cotyledons - two primordial leaves).

The following figure summarises the morphology of monocots plants :



The morphology of monocotyledons plants

Il existe des différences entre les tiges, les racines et les feuilles des plantes monocotylédones et dicotylédones.

Anatomy of the roots

- Presence of **endodermis** and pericycle.
- The arrangement of the **xylem** and **phloem** is : **Alternate**
- Centripetal xylem differentiation: Near the pericycle, they are young and small (protoxylem). Towards the centre, they are large and old (metaxylem).
- Large stele;
- Cortical parenchyma with meatus;
- Suberolignification of the U-shaped endoderm;
- Number of Cribrovascular bundles is between 8 and 20 ;
- Marrow filled with medullary parenchyma;

- Absence of secondary formations.

Anatomy of the stem

- Presence of collenchyma and sclerenchyma.
- Placement of xylem and phloem: OVERLAPPED
- Centrifugal xylem differentiation: towards the centre, the cells are young and small (protoxylem). Near the periphery, they are large and old (metaxylem).
- Very small bark and large stele.
- A ring of sclerenchyma surrounding the outer circle of bundles
- Several concentric circles of cribrovascular bundles
- No secondary formations

Anatomy of the leaf

1. Homogeneous mesophyll consisting of a single type of assimilating parenchyma: lacunar parenchyma ;

2. Stomata are distributed on both sides;

3. Vascular cambium is absent from the veins, with only primary tissues: primary xylem and primary phloem.

2. Objective of the practice work

Study of root, stem and leaf tissues of monocotyledonous and dicotyledonous plants.

3. Materials

Pictures containing histological sections of stems, roots and leaves of monocotyledonous species.

4. Methodology

- Look at the histological sections (1 - 2 - 3) and identify the cross-sections: is it a cross-section of a stem, a root or a leaf?

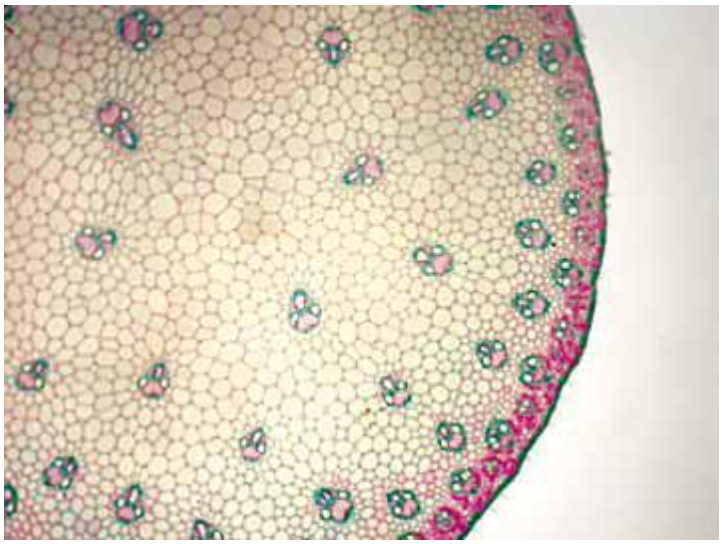
- Using the conventional signs (see table below), carefully draw the cross-sections of a root, stem and leaf of monocotyledonous plants. Give the titles and captions for each of the drawings observed.

5. Work required

- Draw a cross-section of a stem, root and leaf of a monocotyledonous plant (use conventional figures: see table below).

- Draw a conclusion from the drawings (differences between monocotyledons organs : leaf – root – stem).

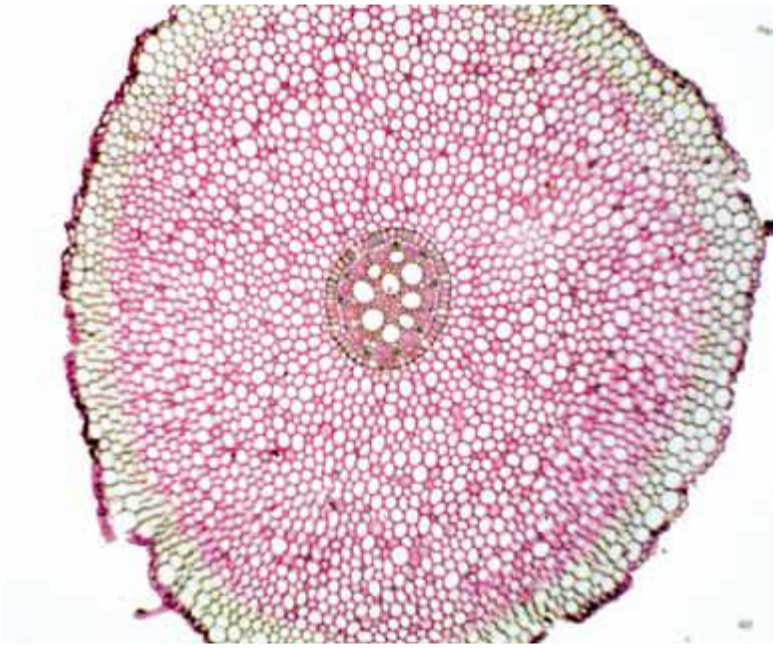
A



A

Coupes histologiques (A) numéro 1

B

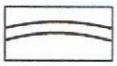
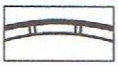
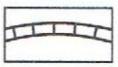
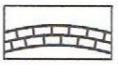
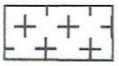
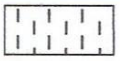


Coupes histologiques (B) numéro 2

C

Coupes histologiques (C) numéro 3

Table. Representation of observations in a diagram using conventional figures

Tissus	Figurés correspondants
Parenchymes	Pas de figuré conventionnel
Cambium, phellogène, péricycle, épiderme sans stomates et sans cuticule apparente	
Epiderme à stomates et à cuticule apparente	
Rhizoderme ou assise pilifère	
Endoderme, assise subéreuse	
Subéroïde	
Collenchyme	
Sclérenchyme	
Xylème primaire	métaxylème protoxylème 
Xylème secondaire ou bois	
Phloème primaire	
Phloème secondaire ou liber	
Liège ou suber