

## HISTO-ANATOMICAL AND HISTOGENETIC ASPECTS IN THE STEM AND ROOT OF *CHELIDONIUM MAJUS* L.

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**Abstract.** The present study focuses on aspects of anatomy and histogenesis in the root and stem of common celandine (*Chelidonium majus* L.). The stem is annual, having a primary structure. It is to be noticed the depositing parenchyma within the medullar rays and around the vascular bundles. The secretory tissue from the near vicinity of the primary phloem gets together with this in the composition of the collateral vascular bundles. The chlorenchyma initially present in the structure of the common celandine stem shall be subsequently replaced by depositing and mechanic tissues. The primary perennial root has a diarch secondary structure. This structure is due to the functioning of the cambium and the phellogen along several years. The secondary phloem is a deposit for the amyloplasts, there being present here several laticifers. The ritidoma is well represented, black in colour, also rich in laticifers. The secondary roots have a medullar origin and disticha distribution.

**Keywords:** *Chelidonium majus* L., stem, root, anatomy

### INTRODUCTION

The common celandine (*Chelidonium majus* L.) [1] has drawn the attention of the researchers in what concerns the anatomy of its vegetative organs. Thus, in our country, **Toma** and **Rugină** [4] have studied the structure of the stem and leaves of this species. Also, **Butnaru** [2] have taken into study aspects of anatomy of the vegetative organs at this species.

Our observations bring elements of novelty referring to the structure of the root and stem of common celandine.

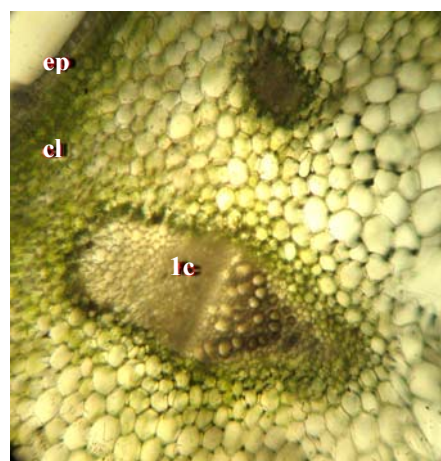
### MATERIALS AND METHODS

There have been used roots and stems of fresh common celandine, harvested at the end of March. Also there has been used vegetal material preserved in alcohol 70°, stems harvested in the previous year, towards the end of the vegetation period of this species. There have been carried out cross sections through the vegetative organs taken into study, with the shaving blades. Some sections were coloured in Congo red, others with iodated chloride of zinc, while others were analysed without being coloured. The provisional prepared materials were analysed at the optic microscope with objectives 4x, 10x and for details of

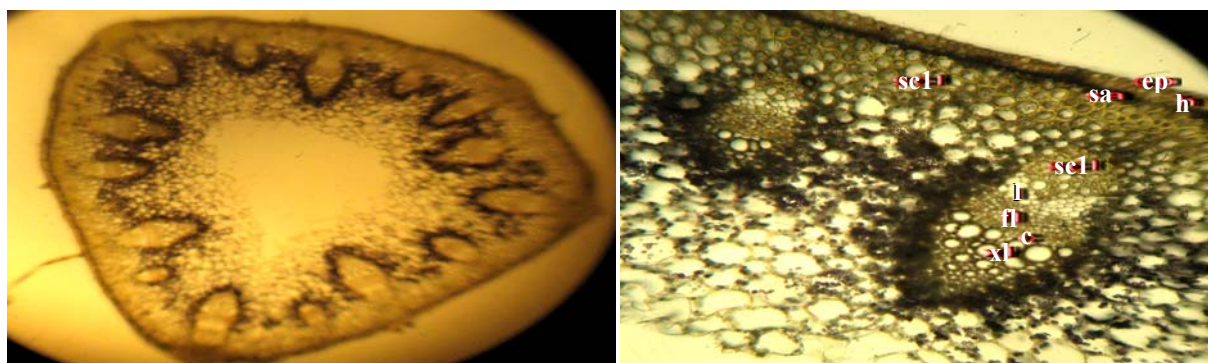
structure with 40x. The photographs were taken with a Canon 550 camera, fixed at ocular with an adapter.

### RESULTS AND DISCUSSIONS

The experimental results make the object of **figures 1 - 6**.

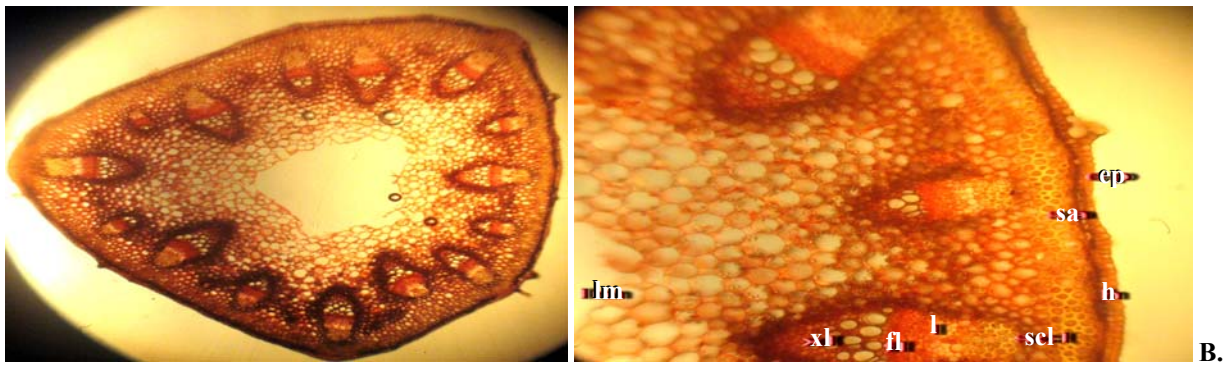


**Figure 1.** Anatomical structure of the young stem of *Chelidonium majus* L. (ep – epidermis; cl – chlorenchyma; fc – vascular collateral bundles) (100x)

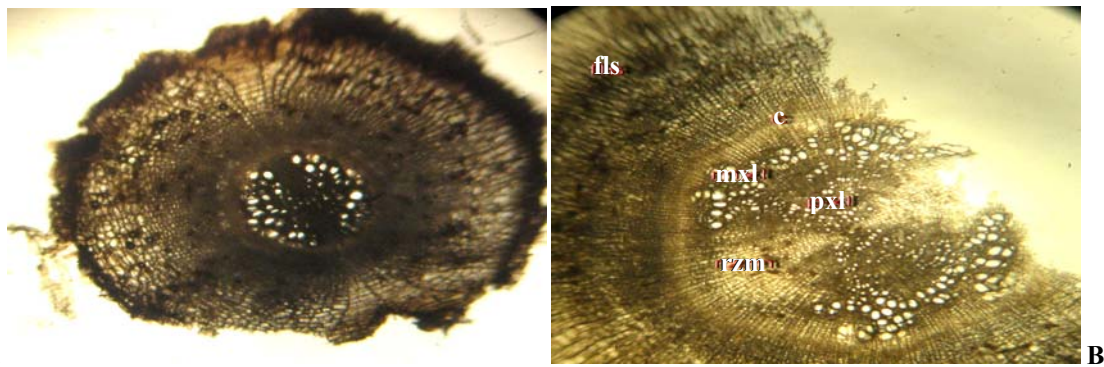


**Figure 2.** Anatomical structure of the mature stem of *Chelidonium majus* L. (coloration with iodate chloride of zinc) (ep – epidermis; h – hypoderma; sa – stratum of cells with amyloplasts; scl – sclerenchyma; l – laticifers; fl – primary phloem; c – fascicular cambium (procambium); xl – primary xylem; pd – parenchyma with amyloplasts; lm – medullary lacuna) (A: 40x; B: 100x)

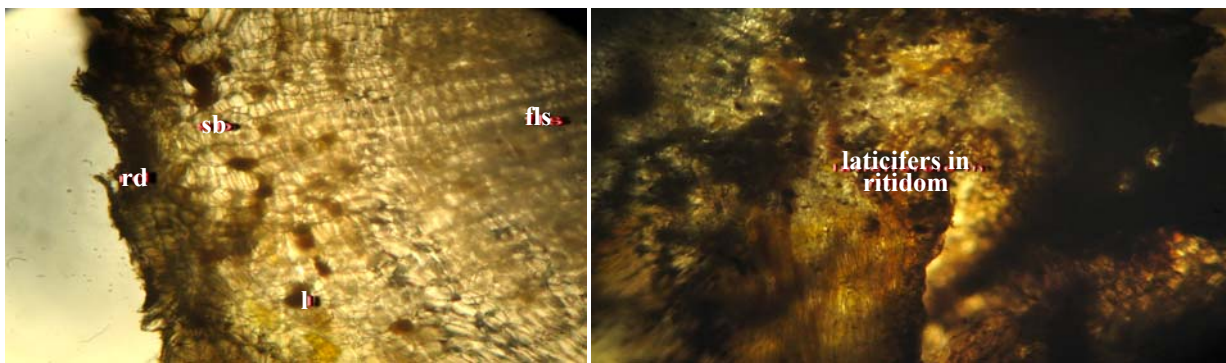




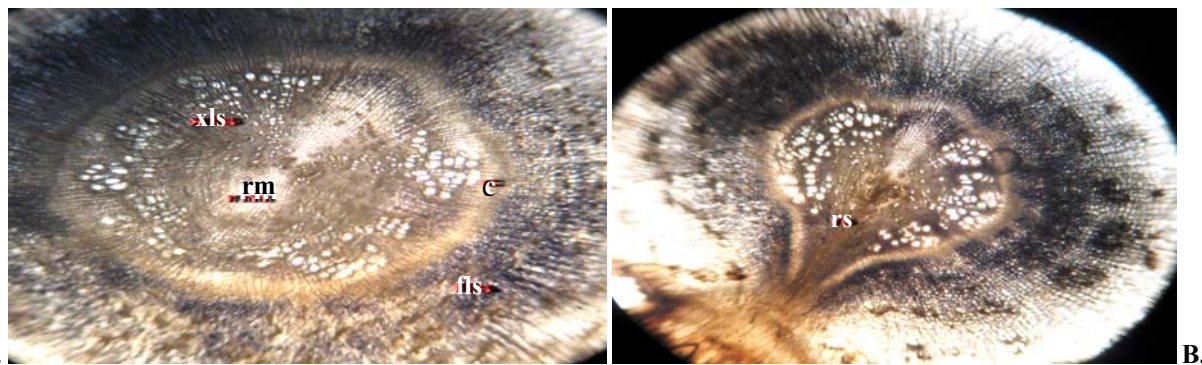
**Figure 3.** Anatomical structure of the mature stem of *Chelidonium majus* L. (coloration with Congo red) (ep – epidermis; h – hypoderma; sa – stratum of cells with starch grains; scl – sclerenchym; l – laticifere; fl – primary floem; xl – primar xilem; lm – medullary lacuna) (A: 40x; B: 100x)



**Figure 4.** Anatomical structure of the primary perennial root of *Chelidonium majus* L. (non-coloured) (mxl – metaxylem; pxl – protoxylem; c – cambial ring; fls – secondary phloem; rzm – medullary rays) (A: 40x; B: 100x)



**Figure 5.** Anatomical structure of the primary root of *Chelidonium majus* L. (non-coloured) (fls – secondary phloem; sb – suber; rd – ritidoma; l – laticifers) (A: 100x; B: 100x)



**Figure 6.** Anatomical structure of the primary root of *Chelidonium majus* L. (coloration with iodate chloride of zinc) (xls – secondary xylem; c – cambial ring; fls – secondary floem with amyloplasts; rm – medullary rays; rs – secondary root) (A: 100x; B: 100x)

The young stem has a circular contour. In its internal structure there can be observed: the epidermis; cortex represented by a chlorenchyma; the central cylinder which is not well individualized by an endoderma and a perycicle. The central cylinder is an eustel with the larger vascular collateral bundles and with smaller vascular bundles at the level of which the phloem only was differentiated. The cells of the medullary ray, but especially those of the parenchyma around the vascular bundles are rich in chloroplasts. The sclerenchyma that protects the vascular bundles is not differentiated (**Fig. 1**).

The mature stem of the common celandine has a pentangular contour [4]; at the level of the angular border the sclerenchyma is better represented (**Fig. 2** and **3A**).

The epidermis is made up of izodiametric cells. The cells that make up the stratum beneath the epidermis - hypoderma – have the cellular walls strongly thickened (**Fig. 2B**). There follows a layer of cells very rich in amyloplasts (**Fig. 2** and **3B**), stratum which is discontinued where the sclerenchyma is better developed (**Fig. 2** and **3A**). The following 4 layers of cells make up the sclerenchyma (**Fig. 2** and **3B**).

In the central cylinder, both the larger fascicles and the smaller ones subsequently differentiated in a collaterally opened type (**Fig. 2** and **3**), are protected by sclerenchyma. The laticifers are presented in the primary phloem [4], but it is interesting to be observed the secretory tissue in the near vicinity of the primary phloem (**Fig. 3 A** and **B**). The parenchyma around the conducting fascicles and from within the medullar rays is rich in amyloplasts (**Fig. 2A** and **B**). The pith was disorganised in its central portion, thus resulting an aerial cavity with an irregular contour [4] (**Fig. 2** and **3A**).

The contour of the cross section by the primary root is circular (**Fig. 4A**). In the secondary diarcha structure of this perennial root there can be observed the wood separated by two medullar rays; as well as by the cambial ring generating them (**Fig. 4B** and **Fig. 6A**, and **B**). To be noticed the origin of the secondary roots in the medullar parenchyma and their penetration in the direction of the medullar rays; this fact shall lead to the disticha disposition of the secondary roots (**Fig. 6B**).

The colouring with iodate chloride of zinc has allowed for the distinguishing of the amyloplasts in the parenchyma of the secondary phloem (**Fig. 6A** and **B**); this contains at the same time many laticifers.

Further to the activity at the level of the cortex of the other secondary meristem – the phellogen – a black colour ritidoma is formed. Both in the suber distinguished and in the ritidoma there exist laticifers (**Fig. 5A** and **B**).

## CONCLUSIONS

- The stem having a primary structure is annual. To be noticed is the depositing parenchyma from within the medullar rays . The secretory tissue from the near vicinity of the primary phloem is part of the composition of the collateral vascular bundles opened (with procambium). The chlorenchyma initially present in the structure of the stem of common celandine shall be replaced subsequently by depositing and mechanic tissues.
- The primary root is perennial, it has a secondary diarcha structure. The secondary phloem is a deposit for the amyloplasts, here being present altogether several laticifers. The ritidoma is well represented, black in colour, also rich in laticifers. This structure is due to the functioning of the cambium and the phellogen. The secondary roots have a medullar origin and disticha distribution.

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