

ANATOMICAL RESEARCHES AT THE SPECIES *EPILOBIUM COLLINUM* (ONAGRACEAE)

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Abstract: In this paper the authors presents the anatomical structure of the vegetative organs from the plant *Epilobium collinum* C. C. Gmelin. The root has a secondary structure, with suber at the external, 2-4 layers of parenchyma and uniseriated rays. The stem has a secondary structure, at the epidermis level with more unicellular long tector hairs. The medullar parenchyma cells contain starch granules and rafides. The leaf has a bifacial-heterofacial structure, with bi-stratified palisadic parenchyma and lacunose parenchyma made from five cellular layers.

Key words: *Epilobium collinum* C. C. Gmelin, anatomy, root, stem, leaf

Introduction

Epilobium collinum C. C. Gmelin, hill willow-herb, is a European species common in sunny places, detrituses, steep slopes, edges of roads, and sunny edges on the rivers from the hills and mountain regions (Ciocârlan 2001).

At the zones where it is common, the hill willow-herb is used in phytotherapy. For this, the aerial parts of the plant (*Epilobii collinii herba*) are utilized in the treatment of hepato-biliary and digestive affections, prostatitis, prostate adenoma (Ciulei et al. 1993, Istudor 1998).

The analysis of the anatomical structure of the vegetative organs is the first step for the pharmacognostic research, following the identification of the vegetal products *Epilobii collinii herba* and *Epilobii collinii radix*. For the good of our research we used the papers of the recognized authors (Andrei 1978, Toma & Rugină 1998, Toma & Gostin 2000, Strasburger 1998).

The motivation of this work consists in the absence of the histoanatomical researches on the vegetative organs of the species *Epilobium collinum* C. C. Gmelin, this fact being established through the consultation of speciality references.

Material and methods

The biological material was obtained from *Epilobium collinum* C. C. Gmelin plants, during the flowering period, in August 2002, recolted from Lainici village, Gorj County.

The preservation of the vegetal material (roots, stems, leaves) was made using a mixture of ethylic alcohol, glycerol and distilled water, in equal quantities.

Transversal cuttings were made helping with an anatomic razor, at the root, stem and leaf of this plant (Andrei et al. 1972, Andrei 1978, Toma & Gostin 2000).

The cuttings were washed with distilled water, then passed through the clarifying process using a natrium hipochlorite 10% solution (Javel water). The successive washing of the sections was made for the elimination of the clarifying agent. The colouring of the cuttings was made with Genovese reagent, which results by the combination of a two solutions: Congo red and crisoidine (Andrei et al. 1972, Andrei 1978, Toma & Gostin 2000).

The coloured and fixed cuttings were studied using a binocular microscope type Krüss (objectives 10x, 20x, 40x), then taking microphotos using a Nikon system with photoadapter.

Results and discussions

The root structure

In cross section, the root presents a circular contour and a secondary structure (Fig. 1). The suber is made by 4-5 layers from flattened cells, with suberine impregnated walls. The phellogenium is unistratified, with flattened cells.

The phelloderm is made from 2-3 layers of big cells, with thin cellulose walls.

The cortical parenchyma is made from 2-4 layers of big cells, with thin cellulose walls and intercellular spaces.

The libero-ligneous cambium generates an external ring of secondary phloem, and one internal ring from secondary xylem with good development.

The liberian tissue is made from sieving tubes, annexe cells and liberian parenchyma.

The ligneous tissue presents a few secondary xylem vessels dispersed in the libriform tissue, the primary xylem vessels being pushed to the root center. The medullar rays are unseriated.

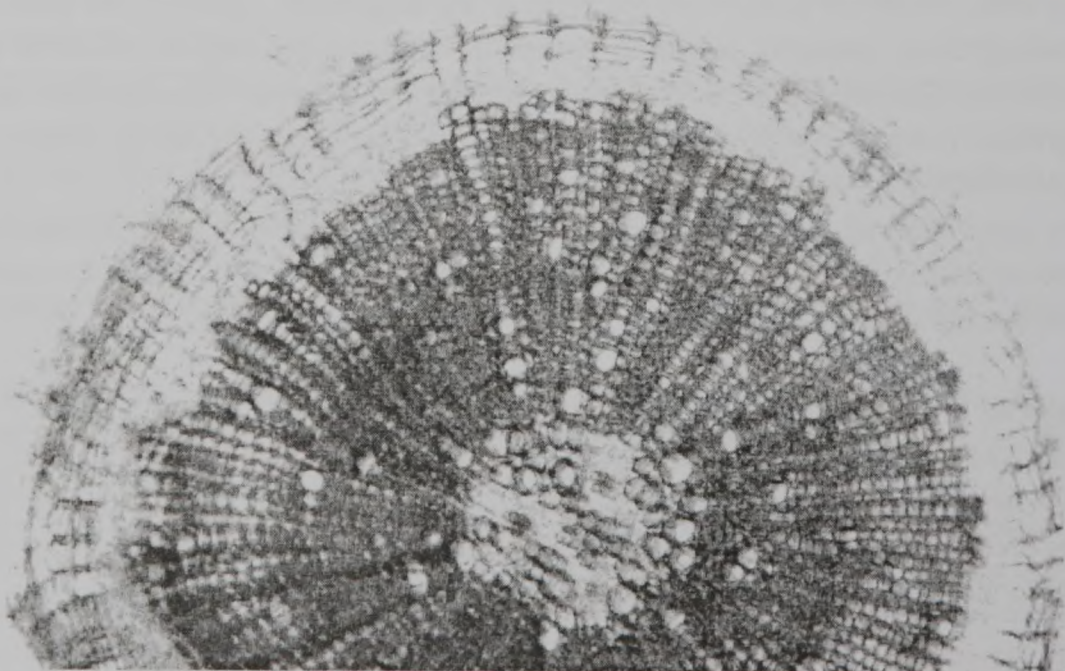


Fig. 1 Cross section through the *Epilobium collinum* C. C. Gmelin root

The stem structure

On the cross section, the stem has a circular contour and a secondary structure (Fig. 2, Fig. 3).

The epidermis is unstratified, made by isodiametric cells with the external walls bulged and covered by a cuticle layer. At the epidermis level we find more long unicellular tector hairs.

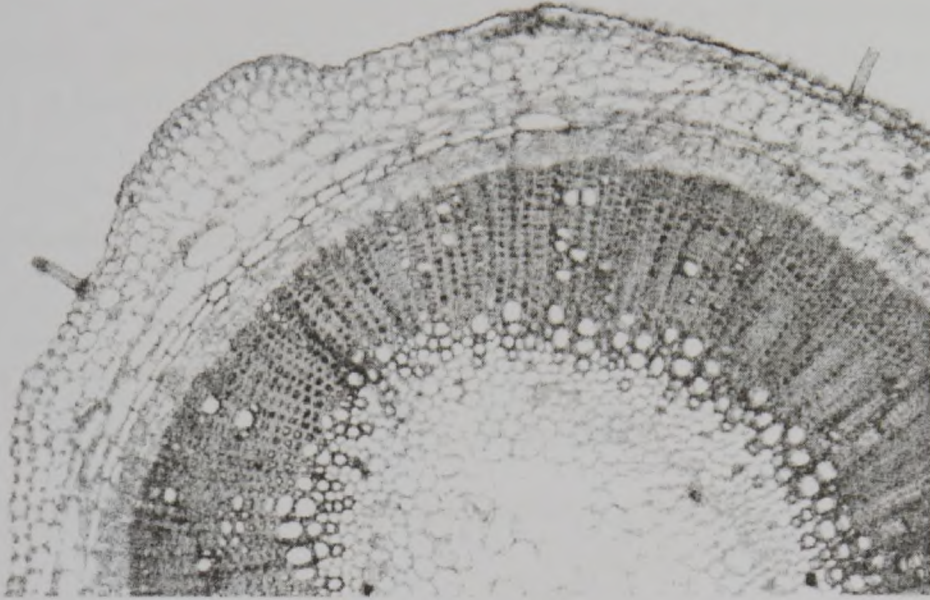


Fig. 2 Cross section through the *Epilobium collinum* C. C. Gmelin stem

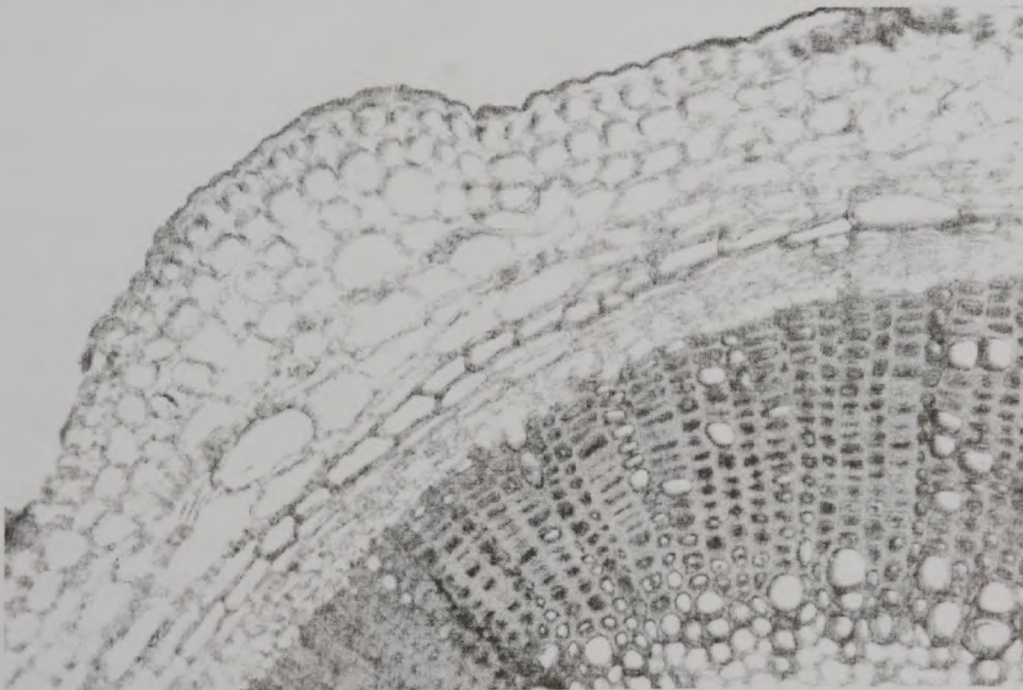


Fig. 3 Cross section through the *Epilobium collinum* C. C. Gmelin stem

The cortical parenchyma has 5-6 cellular layers. The first 2-3 cellular layers are isodiametric, disposed ordonately, and with starch granules. The following cellular layers of the cortical parenchyma are made from big cells, with a disorderly disposition and thin cellulose walls.

The endodermis is unistratified, and made from big cells with thin cellulose walls. Under the endodermis we find cellulose fibers.

The conducting tissues are disposed under the form of concentric rings. The first ring is represented by the phloem. This is made from sieving tubes, annexe cells, and liberian parenchyma accumulating starch granules.

The xylem has a good development, being made from secondary ligneous vessels, dispersed in the libriform tissue, which pushed the primary xylem vessels to the medullar parenchyma.

The medullar rays are uniseriated.

The medullar parenchyma had a good development, having big cells with intercellular spaces. These cells contains starch granules and rafides.

The leaf structure

On the transversal cutting the leaf has a bifacial-heterofacial structure, with the following tissues succession (Fig. 4, Fig. 5).

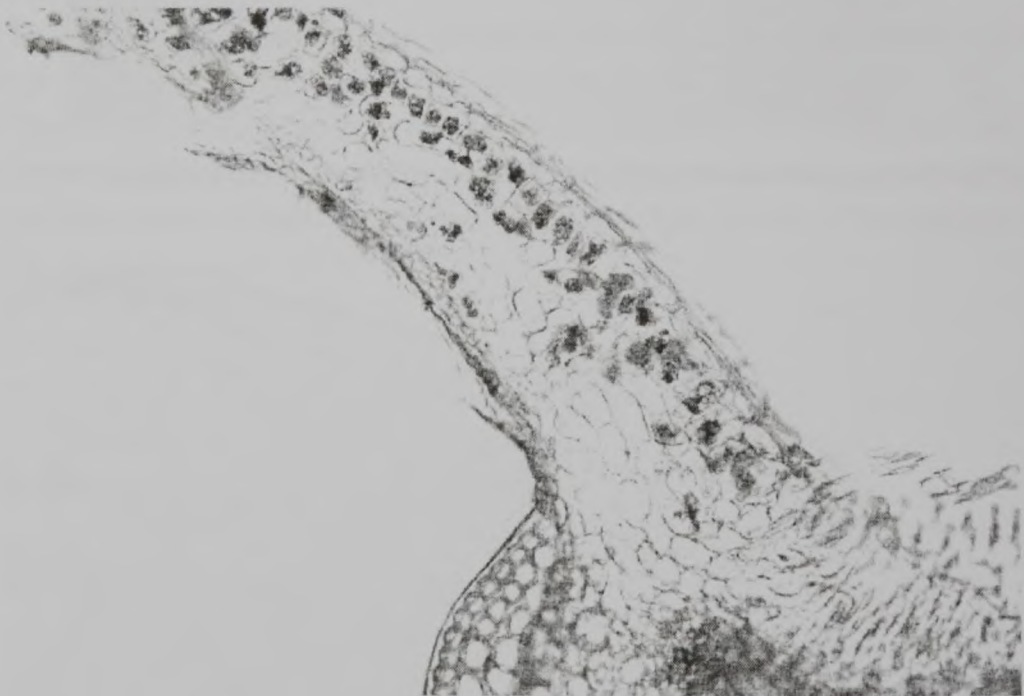


Fig. 4 Cross section through the *Epilobium collinum* C. C. Gmelin leaf

The superior epidermis is made from transversal cells, with external walls bulged and covered by a cuticle. Here and there we find unicellular tector hairs.

The mesophyll is made from bistratificated palisadic parenchyma, and lacunose parenchyma from five cellular layers.

The inferior epidermis is unicellular, with small cells and more unicellular tector hairs.

At the median nervure level we find a central disposed libero-ligneous bundle, protected at the inferior by a cellulose theca.

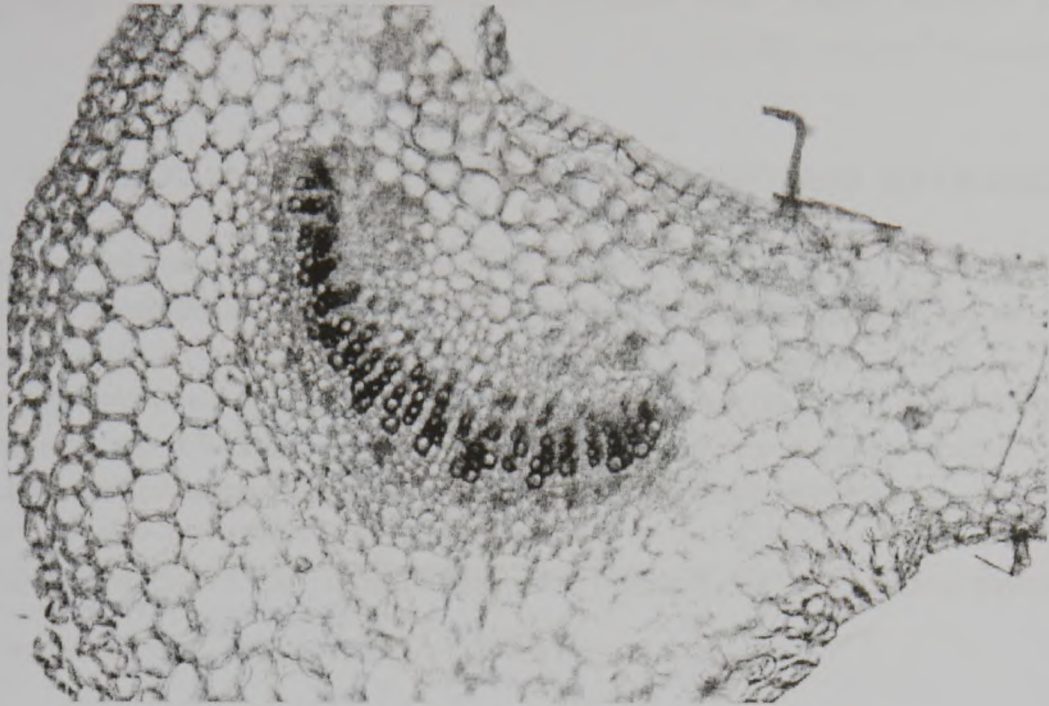


Fig. 5 Cross section through the *Epilobium collinum* C. C. Gmelin leaf

Conclusions

1. The contributions at the microscopic study of the species *Epilobium collinum* C. C. Gmelin were consisted in the evidentiating of the anatomic structures at the root, stem and leaf.
2. The root had a secondary structure, with suber at the external, 2-4 layers of parenchyma and uniseriated rays.
3. The stem had a secondary structure, at the epidermis level with more unicellular long tector hairs. The medullar parenchyma cells contain starch granules and rafides.
4. The leaf had a bifacial-heterofacial structure, with bistratified palisadic parenchyma and lacunose parenchyma made from five cellular layers.

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CERCETĂRI ANATOMICE ASUPRA SPECIEI *EPILOBIUM COLLINUM*

Rezumat: În această lucrare autorii prezintă structura anatomică a organelor vegetative de la *Epilobium collinum* C. C. Gmelin. La nivelul analizat rădăcina are structură secundară, cu suber la exterior. Tulpina prezintă structură secundară la nivelul analizat și numeroși peri tectori unicelulari lungi la nivelul epidermei. Celulele parenchimului medular din ambele organe axiale conțin grăuncioare de amidon și rafidii. Frunza este bifacială-heterofacială, cu parenchim palisadic bistratificat și parenchim lacunar constituit din 5 straturi de celule.

Cuvinte cheie: *Epilobium collinum* C. C. Gmelin, anatomie, rădăcină, tulpină, frunză