

## SOME ANATOMICAL FEATURES OF *BASELLA RUBRA*

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**Abstract.** *Basella rubra* L. is a tropical spinach used as a vegetable which belongs to *Basellaceae* family as well as *Basella alba* L. By some authors this is another species quite different as *Basella alba* L. Others authors uphold the idea as one of this plant is the species and the other is a cultivar. The physiological and biochemical study of *Basella rubra* L. plants under crop conditions of our country represents the subject of one PhD. Because of missing data about anatomy of these plants in special literature, it was necessary to study it, to establish the features of internal structure. It is certain that *Basella rubra* L. is a C<sub>4</sub> photosynthetic type plant.

**Key words:** anatomy features, rhizome structure, stem structure, *Basella rubra* L., *Basellaceae* family

### Introduction

*Basella rubra* L. is well known as “night shadow”, a vegetable with a nourishment values comparable to that of *Basella alba* L. and *Spinacia oleracea*. It is a tropical vegetable too from East India very much used from ancient times in nourishment of Indians and Chinese.

It was set up one *Basella rubra* L. crop in greenhouse and another in field conditions for an accurately comparison, both in the Botanical Garden from Iași.

### Materials and methods

Histo-anatomical analyses were made on cross-sections both for rhizome and stem on young and mature plants. They were fixed in 70% ethylic alcohol.

The sections prepared in this way were processed in accordance with the usually methods in the Morphological and Anatomical Vegetal Laboratory of Biology Faculty from “Al. I. Cuza” University Iași.

The sections were visualized by Amplival microscope and the drawings were made by MC<sub>1</sub>- IOR microscope.

We enjoyed every time in this study by professional assistance of Professor Constantin Toma (Toma 1977, Toma & Gostin 2000).

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## Results and discussions

*Basella rubra* L. has two types of stems, one underground and one over ground. The underground stem is a rhizome (Fig. 1).

The cover stratum of rhizome is composed by remnants of cells and it is desquamated generally. Under this stratum there are 4 - 5 cells strata prolonged in tangent position strictly arranged in radial succession, with thin walls that represent the phelloderma (Fig. 2).

Central cylinder has a huge volume and in its parenchyma there are 4 mixed vascular bundles. The phloem is less represented and composed by sieve tubes and companion cells. The xylem occupies a great part of central cylinder. A lot of vessels elements are agglomerated to the center of rhizome, and they have thickened walls but without lignin (Fig. 3).

In the center of cross section there are a pith tissue made by parenchymatous cells.

The overground stem is a herbaceous one and presents offshoots.

The form of cross section is oval (Fig. 4). Epidermis is composed by square and rectangular cells, which all walls are homogenous thickened, external wall being convex.

Hypodermis presents only one cells stratum easy collenchymatous (an angular collenchyme). The cells are polygonal being different sizes. It can observe the second stratum of collenchyme here and there in the structure of hypodermis.

The cortex is relatively composed by few parenchymatous cells strata (5 - 6), polygonal rounded, four times higher than those in hypodermis, with thin walls. The last cortex stratum is composed by cells tangent prolonged smaller than the others, and that's why it may be considered an endoderm (Fig. 5).

Central cylinder is surrounded by a pericycle composed by one stratum of square-polygonal cells with thin walls. Central cylinder contains 12 mixed vascular bundles collateral-open type one (Fig. 6).

The phloem is composed by sieve tubes and companion cells. To the external part it can be observed the parenchymatous bundle sheath.

3-4 cell strata arranged in radial rows compose the cambium between the vascular bundles.

The xylem is represented by 4-7 large vessels a lot of them in a differentiation process, which walls are less thickened and few lignin. Between the vessels there are some parenchymatous cells.

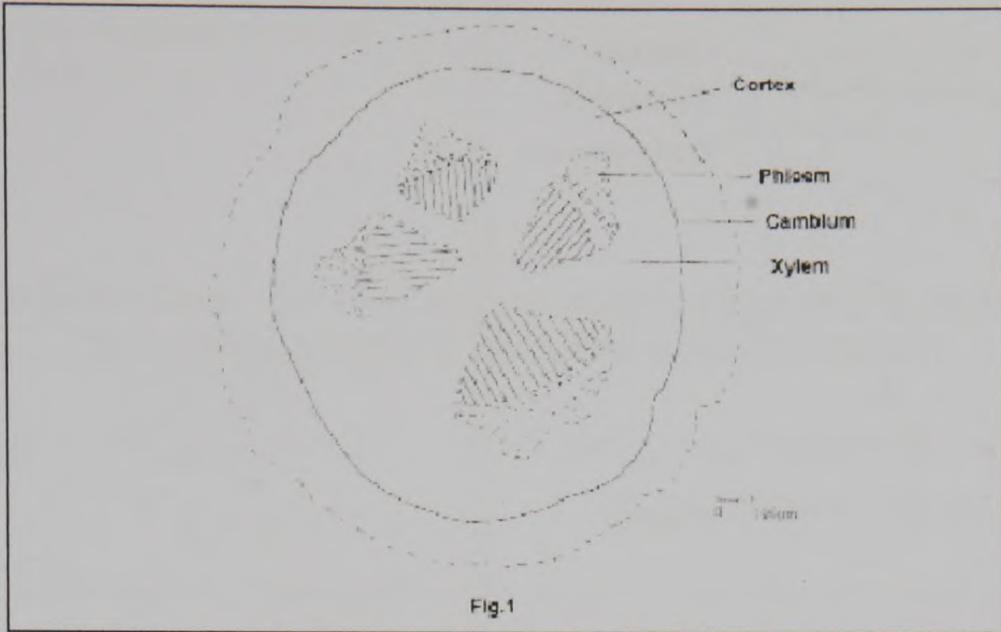
The center of stem is filled with parenchyma pith composed by great polygonal cells.

## Conclusions

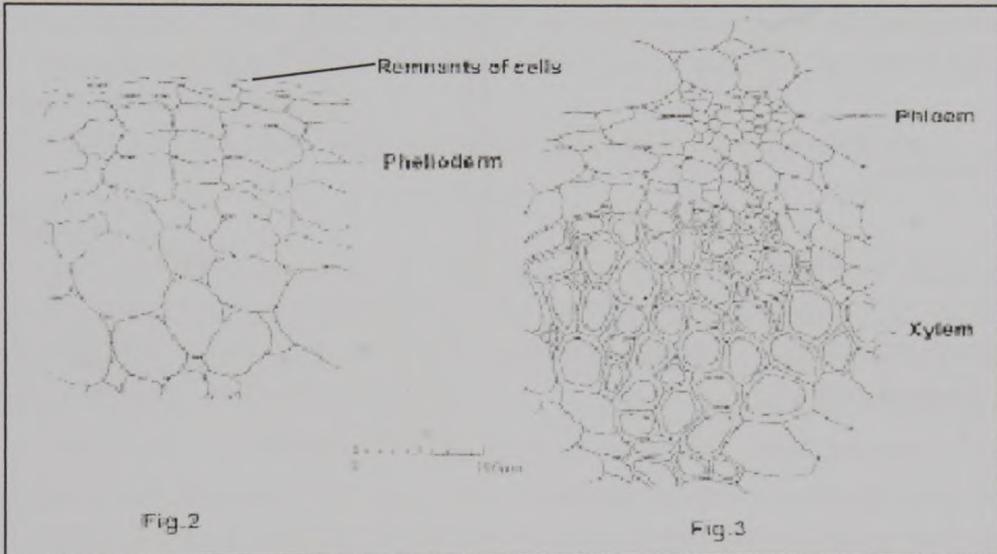
The conductive tissue of rhizome of *Basella rubra* L. is composed by 4 mixed vascular bundles. The mixed vascular bundles in rhizome structure are collateral-open type. The stem of plants of *Basella rubra* L. has 12 mixed vascular bundles in structure of central cylinder. In the structure of conductive tissue it can observe the parenchymatic bundle sheath, which are typical for C<sub>4</sub> plants.

## References

- TOMA C. 1977. *Anatomia plantelor*, vol. 2. Iași: Edit. Univ. "Al. I. Cuza".  
TOMA C. & GOSTIN Irina 2000. *Histologie vegetală*. Iași: Edit. Junimea.



In figure 1 is a cross section of rhizome of *Basella rubra* L.



In figures 2 and 3 there are details of rhizome structure of *Basella rubra* L.(cortex and vascular bundle)

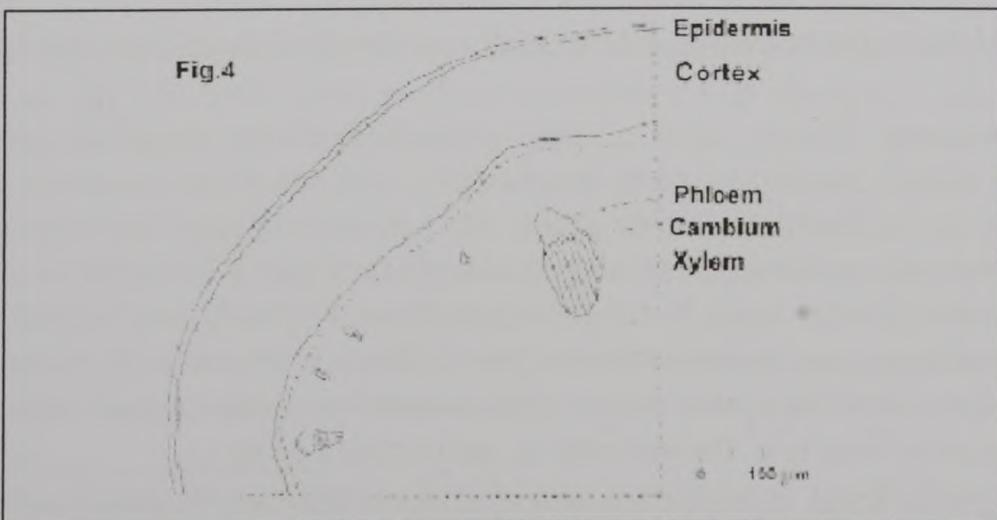


Figure 4 is part of cross section by stem of *Basella rubra* L.

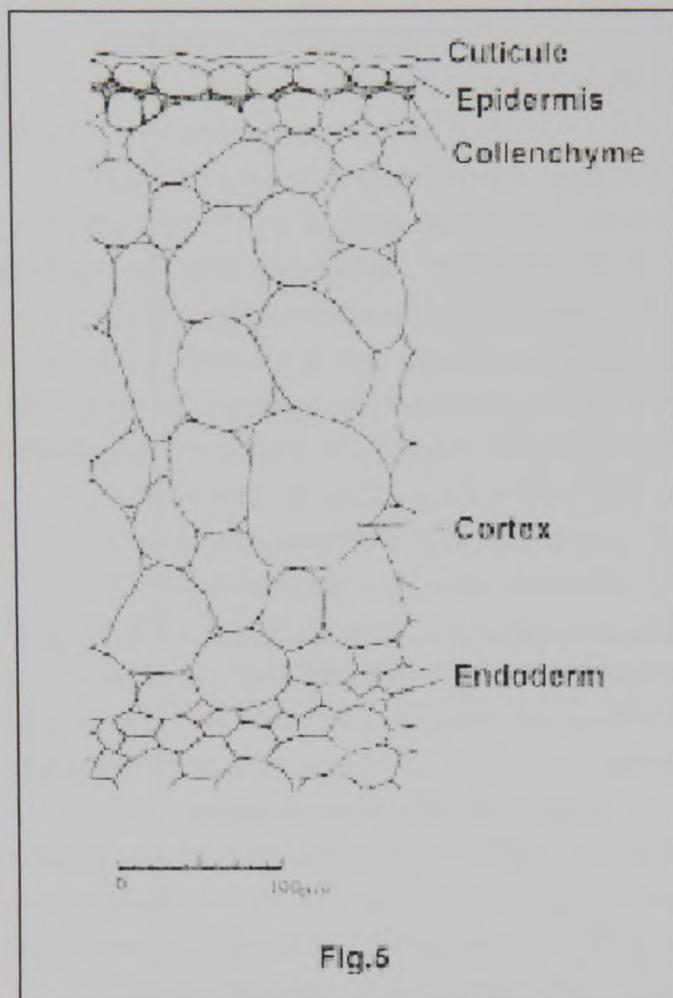


Figure 5 represents details of cortex structure in stem of *Basella rubra* L.

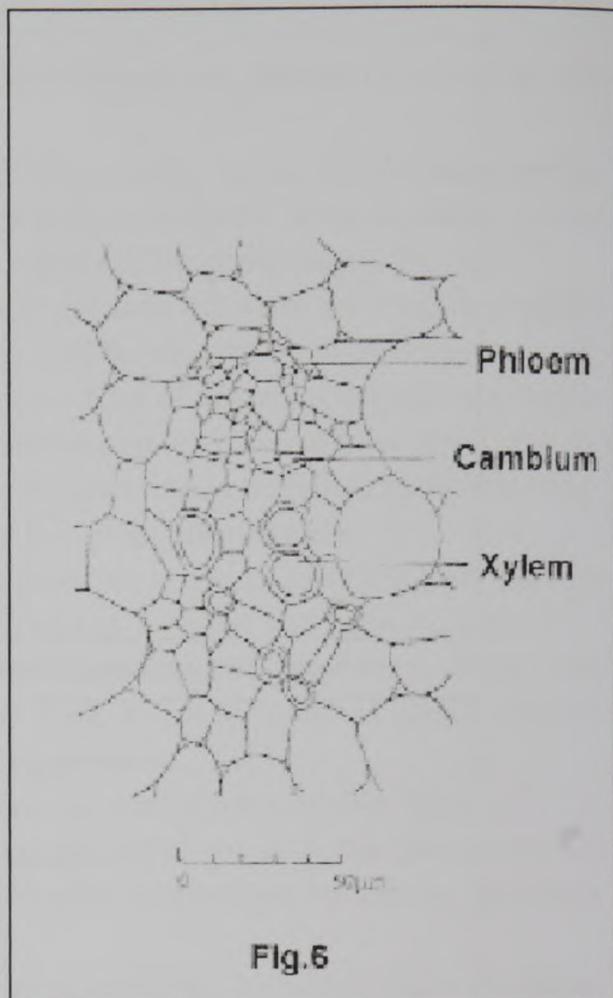


Figure 6 relieves the features of mixed vascular bundles in stem structure of *Basella rubra* L.

### CÂTEVA CARACTERE ANATOMICE ALE SPECIEI *BASELLA RUBRA*

**Rezumat:** *Basella rubra* L. este o specie tropicală utilizată în gastronomie, aparținând familiei *Basellaceae* ca și *Basella alba* L. Unii cercetători consideră că această specie este foarte diferită de *Basella alba* L. Alții consideră că una dintre ele este specia tipică, iar cealaltă reprezintă un cultivar. Studiile de fiziologie și biochimie care urmăresc comportamentul acestei specii în condițiile de cultivare oferite de țara noastră reprezintă tema de cercetare a unei teze de doctorat. Datorită lipsei de informații din literatura de specialitate despre anatomia acestei plante, a fost necesar un studiu care să urmărească evidențierea acestor caractere. *Basella rubra* L. este o plantă de tip  $C_4$ .

**Cuvinte cheie:** caractere anatomice, structura rizomului, structura tulpinii aeriene, *Basella rubra* L., familia *Basellaceae*