Acta Horti Bot. Bucurest. **33**: 71-74
Bucureşti 2006

STRUCTURAL CHARACTERISTICS OF SOME *EUPHORBIA* SPECIES FROM THE ROMANIAN FLORA

ROTARI Ramona*, TOMA Constantin*

Abstract: Authors investigated the structure of vegetative organs of 4 *Euphorbia* species (*E. panonica* Host., *E. nicaeensis* ssp. *glareosa* Radel., *E. dobrogensis* Prod., *E. myrsinites* ssp. *litardierei* Font Quer & Garcias Font) occuring in the flora of Romania, considering especially histological features differentiating the species taken into study. Special attention has been given to the structure of the laticifers, mentioning the organs and tissues in which most of them are to be found, as well as the differences observed among the analyzed species as to the localization of laticifers.
Key words: *Euphorbia*, anatomy, laticifers, Romania.

Introduction

The literature concerning the *Euphorbiaceae* family anatomy is quite rich as evidenced by the review studies of L. Gaucher (1902), G. Bonnier & Leclerc du Sablon (1905), Metcalfe & Chalk (1950), K. Esau (1965), Napp-Zinn (1973, 1974) discussing the general structural characteristics of the family analyzing different species. The present work analyzed the structure of the rhizome, aerial stem and leaf of some *Euphorbia* species, an aspect never discussed in Romania until now as far as we know.

Material and methods

The plants have been collected on April 17, June 26, 2004 from Dobrogea, respectively *E. panonica* Host. from the Fântânița Murfatlar Reservation, Constanța district, *E. nicaeensis* ssp. *glareosa* Radel. from the Kel-Tepe Hill, Constanța district, *E. dobrogensis* Prod. from the Hagieni Reservation, Constanța district, *E. myrsinites* ssp. *litardierei* Font Quer & Garcias Font from the Enisala Hill, Heraclea Stronghold, Tulcea district.

The material subjected to analysis (rhizome, aerial stem and leafs) has been fixed and preserved in 70% ethylic alcohol and afterwards it has been cross-sectioned using a microtome, colored with iodine green and ruthenium red and inserted into glycero-gelatin, according to the currently applied methods in vegetal anatomy investigations. The preparations have been analyzed with a Novex microscope (Holland), the sketches being drawn using a Romanian MC1 microscope.

Results and discussions

The rhizome: The rhizome (belonging to *E. panonica*, *E. dobrogensis*, *E. nicaeensis* ssp. *glareosa*) evidences a secondary structure resulting from the activity of both secondary meristemes, i.e. the cambium and the phellogen.

The suber is thick and continuous (*E. dobrogensis* and *E. panonica*) or thin and desultory at *E. nicaeensis* ssp. *glareosa*.

* Universitatea "Al. I. Cuza" Iaşi, Facultatea de Biologie, bd. Carol I nr.11, 700506, Iaşi, România

The phellodermis is noncollenchymatous at *E. nicaeensis* ssp. *glareosa* or is represented by a tangentially collenchyma at the other analyzed species.

The primary bark is parenchymatous-cellulosic of meatic-type, with numerous laticifers seen as differing from the neighbouring cells by their polygonal contour in cross section and strongly thickned cellulosic walls. At *E. panonica* and *E. nicaeensis* ssp. *glareosa* some cells from the internal side of the bark, evidences ursines of calcium oxalate.

The conducting tissues are of inelary type and the phloem elements have collenchymatous walls. The secondary xylem includes annual rings, separated by tangential areas of xylem cellulosic parenchyma.

The libriformous fibers have very thick walls, but are weakly lignified, most of them being gelified. At *E. panonica* the first annual ring is totally lignified, formed by solitary or grouped vessels of different diameter, a rather large amount of libriform and lignified xylem parenchyma in small amounts.

The laticifers are numerous in the phloem medullary rays at all the species analyzed; however, at *E. dobrogensis*, they are present in the pith as well and in the thickness of secondary phloem.

The pith is parenchymatous-cellulosic and thick (some cells having calcium oxalate ursines) at *E. panonica*, or thin at the others species analyzed. At *E. dobrogensis*, in the thickness of the pith some groups of xylem vessels are present and are surrounded by parenchymatous cells disposed on more circles the periphery ones having the walls visible thickned.

The aerial stem: At all the species taken into study, in the upper third, the stem has a primary structure.

Some of the epidermis cells evidence a papila-shaped proeminence in the middle of the external wall (*E. dobrogensis* and *E. panonica*), others being very short prickle-shaped hairs (*E. myrsinites* ssp. *litardierei* and *E. nicaeensis* ssp. *glareosa*).

The bark is relatively thick and includes 3 areas: an external area (tangentially collenchyma), a middle area (parenchyma with laticifers and numerous large aeriferous cavities) and an internal area (relatively compact with numerous laticifers). Some laticifers are localized in the phloem medullary rays as well.

In pre-pericycle area the central cylinder evidences the cordons of incipient sclerenchymatous fibers at the periphery of vascular bundles.

The pith is parenchymatous cellulosic with numerous aeriferous cavities of irregular contour; at *E. dobrogensis* and *E. myrsinites* ssp. *litardierei* some cells contain latex.

In the middle third of the stem, the cordons of sclerenchymatous fibers still have weakly thickened and lignified walls (*E. dobrogensis*) or thickened and very weakly lignified walls (*E. panonica* and *E. nicaeensis* ssp. *glareosa*). At *E. dobrogensis* the vascular bundles still have a primary structure. The laticifers are frequent in the cortical parenchyma, in the medullary rays and in the pith as well. At the lower third, the stem evidences a secondary structure at all the species analyzed, resulting from the activity of both secondary meristemes (*E. myrsinites* ssp. *litardierei*) or of only the cambium activity at the other species. The libriformous fibers have very thick walls, but weakly lignified, most of them being gelified.

The laticifers are more frequently found in the bark and in the phloem and rarely in the xylem medullary rays (*E. myrsinites* ssp. *litardierei*), where they are of irregular shape, they have thick but cellulosic walls and they are surrounded by a layer of parenchymatous cells with thin walls and by some cells with moderate thickened and lignified walls, similarly disposed.

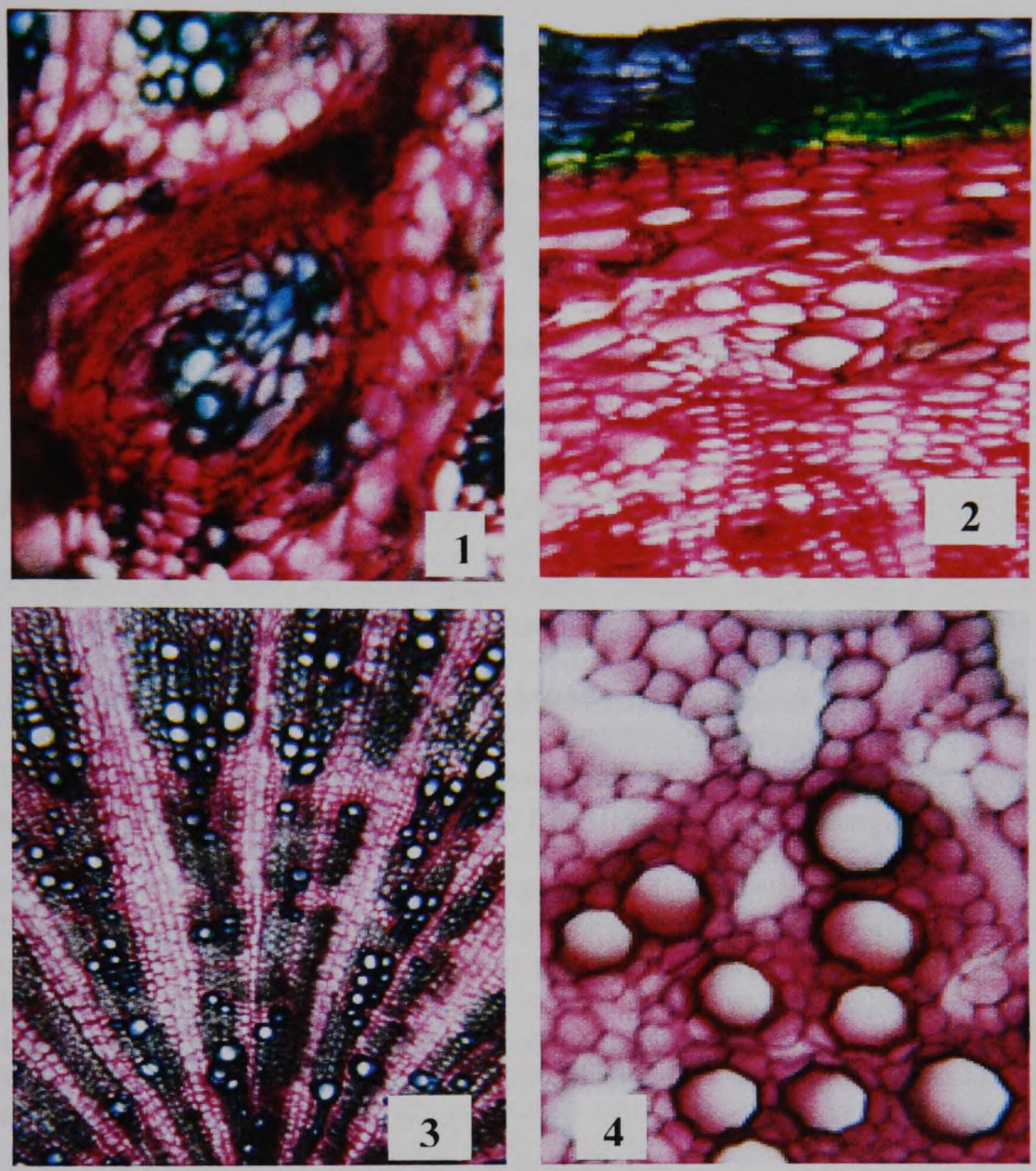

Photo 1 - Group of xylem vessels in the thickness of the pith of the rhizome at *E. dobrogensis* (Oc.10x, Obj.20)
Photo 2 - Cross-section of the rhizome at *E. dobrogensis* (Oc.10x, Obj.20)
Photo 3 - Cross-section of the rhizome at *E. myrsinites* ssp. *litardierei* (Oc.10x, Obj.10)
Photo 4 - Laticifers in the upper third of the aerial stem at *E. myrsinites* ssp. *litardierei* (Oc.10x, Obj.20) (Orig.)

The leaf: At all analyzed species, the foliar limb evidences a bifacial izofacial structure and is amphistomatic.

Between the phloem of the vascular bundles of the median nervure and the lower epidermis a thick cordone of mechanic elements with strongly thickned cellulosic walls is present. The laticifers are present in the thickened of the mesophyll and around the median vascular bundle. All the epidermis cells evidence a papilla-shaped prominence in the middle of the external wall, some of them having aspect of prickle-shaped hairs with thick walls (*E. nicaeensis* ssp. *glareosa* and E. *dobrogensis*). The stomata are only of anizocytic-type (*E. dobrogensis*), only of anomocytic-type (*E. nicaeensis* ssp. *glareosa*) or anomocytic and anizocytic-type at the other species.

Conclusions

At all the species analyzed laticifers are present in all the vegetative organs; in the rhizome and in the aerial stem they are localized in the bark and in the phloem, a little in the secondary xylem and in the pith; in the foliar limb they are present around the median vascular bundle and in the thickness of the mesophyll.

The epidermis cells of the aerial stem and of the foliar limb evidence a papilla-shaped proeminence in the middle of the external wall, some of them have the aspect of prickle-shaped hairs.

At all the species, the foliar limb evidences a bifacial izofacial structure, with homogenous mesophyll of lacunary-type.

References:

1. BONNIER G. & LECLERC DU SABLON. 1905. *Cours de Botanique*.T.I., Librairie générale de l'enseignement, Paris.
2. ESAU K. 1965. *Plant Anatomy*. John Wiley and Sons, New York, London, Sydney.
3. GAUCHER L. 1902. *Recherches anatomiques sur les Euphorbiacées*, Ann. des Sci. Nat., Bot., t XV, p.161-309.
4. METCALFE C. R. & CHALK L. 1950. *Anatomy of the Dycotiledons*. T II, Clarendon Press, Oxford.
5. NAPP-ZINN KL. 1973,1974. *Anatomie des Blattes II Angiospermen In Handbuch der Pflanzenanatomie*, Band.VIII, A 1-2, Gebruder Borntraeger, Berlin-Stuttgart.

PARTICULARITĂȚI DE STRUCTURĂ ALE UNOR SPECII DE *EUPHORBIA* DIN FLORA ROMÂNIEI

Rezumat: Autorii cercetează structura organelor vegetative (subterane şi aeriene) de la 4 specii de *Euphorbia* din flora României, subliniind trăsăturile histologice după care speciile luate în studiu pot fi deosebite. O atenție specială s-a acordat structurii laticiferelor, menționând organele şi țesuturile în care se găsesc pentru a evidenția deosebirile dintre specii în ceea ce priveşte localizarea lor.

Cuvinte cheie: anatomie, laticifere, *Euphorbia,* România.