Telephragmoxylon transsylvanicum sp. nov. (Cheirolepidiaceae), in Latest Cretaceous from Oarda – Lancrăm and Râpa Roşie, Romania

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ABSTRACT. *Telephragmoxylon transsylvanicum*, a new morphospecies of cheirolepidiaceous conifer wood, typical for the Latest Cretaceous from Sebeş Valley in Oarda-Sebeş sector (Alba district), coeval with the latest dinosaurs, is described. Geological and palaeobotanical settings for South Apuseni Mts. area are sketched and paleoclimatical remarks are suggested.

Key words: Latest Maastrichtian, fluvio-lacustrine environments, fossil wood, resin ducts, protopinoid pitting, late-wood septate tracheids, araucarioid cross-fields.

INTRODUCTION AND GEOLOGICAL SETTING

The fossil wood samples originate from a region located at the boundary of the South Apuseni Mts. and the Transylvanian Depression (Mureş Valley), where Late Cretaceous continental fluvio-lacustrine formations occur, belonging to the sedimentary post-Laramian cover of the Transylvanides from Apuseni Mts. The fossils were found within several sites in Oarda–Lancrăm–Sebeş area, on the right bank and even in the Sebeş Valley riverbed. The host deposits are typical for fluvio-lacustrine environments and seem to belong to a distinct formation (Codrea et al., 2003), underlying the continental deposits from Râpa Roşie (Codrea & Dica, *in press*).

The Late Cretaceous sedimentation in the South sector of the Apuseni Mts. (Bobâlna, Geoagiu and Bozeş Formations, *sensu* Bleahu et al., 1981), begun in Turonian-Coniacian, with typical marine environment in littoral facies, according Marincaş (1972).

Santonian-Campanian turbiditic flysh facies followed (Schuller, 2004), ending by aleurolitic fossil-bearing sandstones and conglomerates at the end of Early Maastrichtian (Codrea et al., 2001). The above molass deposits probably have to be included in distinct formations (Codrea et al., 2003) - different of the lithostratigraphic pattern of Bozeş Formation *sensu* Bleahu et al. (1981) - an adequate nomenclature has already been proposed (Codrea & Dica, *in press*).

Fossil vegetal remains have been rarely found within these deposits, probably originating from the emerged neighboring areas. Few taxa have been identified till now (for example a lauraceous fossil wood from Crişcior, *Perseoxylon antiquum* FELIX, 1887, or an araucariaceous

one from Geoagiu, *Dammaroxylon formosum* IAMANDEI & IAMANDEI, 2004).

Since the depocenter of Bozeş Formation basin moved across time more and more South-Eastward, on its southern flank within the Pianu-Sebeş area it transgressed over the Sebeş metamorphic basement realm, the sedimentation beginning with conglomerate and sandy argillaceous marl with coal levels, bearing plant remains. Petrescu & Huică (1972) and Petrescu (1973) have identified at Săsciori some fern remains (*Asplenium*, *Gleichenia*, *Hymenophyllum*, *Pteris*), Conifers (*Brachyphyllum*, *Araucarioxylon*, *Cunninghamia*, *Sequoia*), and Angiosperms (*Quercus*, *Platanus*, *Credneria*, *Pterospermites*, *Aralia*, *Delwaquea*, *Euonymus*, *Zizyphus*). New wood remains collected from there showed us poor preserved conifer structure, unidentifiable.

The Bozeş Formation top belongs to the lowermost Maastrichtian, according to nannoplankton studies (Bâlc & Chira, 2002). On the other hand, in Pâclişa sector, Antonescu (1973) outlined a spore-pollen association of *Normapolles*-type (with *Suemegipollis*, *Interporopollenites*, *Emscheripollis*). It was marked by the extinction of some species of *Oculopollis* and the occurrence of some new forms of *Hungaropollis*, *Pseudopapillopollis*, *Tripoporopollenites*, as well as several species of *Longannulipollis*, *Semioculopollis* and other species of tricolpate pollen. This assemblage locally confirmed the presence of the last part of the Early Maastrichtian within the basal part of the succession from Pâclişa (the right bank of Mureş Valley).

The red continental and fluvio-lacustrine deposits of the Latest Maastrichtian are well exposed at Pâclişa and Sebeş Valley areas, sometimes yielding Dinosaur remains. These formations can be followed on the Mureş Valley, on an

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extended area from Galda to Șard-Pâclișa-Vurpăr-Vinț on right river bank and from Bărăbanț to Oarda-Lancrăm-Sebeș, and perhaps even further, at Pianu-Vinerea, on the left bank. In an analysis of these red deposits Codrea et al. (2001) showed that over the Bozeș Formation flysh follows a continental succession comprising the Latest Maastrichtian and perhaps, the Danian. These red deposits have various invalid names, because none of them have been described according to the standard rules: "Pâclișa Formation", "Vurpăr Formation", "Râpa Roșie Formation", however, all equivalent with "Fața Băii Formation" described within Zlatna Area (Borcoș et al., 1986). At Vurpăr, these formations seems to reach wide thickness, comprising red beds of fluvial or alluvial origin (Therrien, 2005), sometimes developing fluvio-lacustrine tendencies (Codrea et al., 2001). Near Lancrăm, such deposits have preserved even large tridactyle footprints of Ornithopod dinosaurs (Vremir & Codrea, 2003), as well as Sauropod (*Magyarosaurus*), Crocodylian (*Allodaposuchus*) and Chelonians bones (Codrea et al., 2001, 2002 a).

We just remember the presence equivalent red deposits, within similar depositional environments, in all the southern side of the Mureș couloir, close to Southern Carpathians, from Sebeș to Pianu and Vinerea, continuing far away, to Hațeg Basin. There, these deposits have been described by Nopcsa (1905), Mamulea (1957), Dincă et al. (1972) as "Sânpetru Sandstones", or "Sânpetru Beds", subsequently converted into "Sânpetru Formation" (Grigorescu et al., 1990). It worth to be remembered that in Hațeg Basin occurs the isochronous Ciula-Densuș Formation, (Grigorescu, 1992) with similar lithology with Sânpetru Fm., both belonging to Maastrichtian, due to the fossil macrofaunal content – dinosaur, crocodylian, chelonian or even bird bones, as well as eggs or egg fragments (Nopcsa, 1901-1923 and Grigorescu et al., 1983-1999, all in Grigorescu et al., 2003; Codrea et al., 2002 b; Smith et al., 2002; Folie & Codrea 2005). The sedimentology of Sânpetru Formation has been recently described and detailed by Van Itterbeek et al. (2004) and Therrien (2005). Antonescu (1973) and Antonescu et al. (1983), evidenced a microfloristic assemblage of *Normapolles*-type (with *Plicapollis* cf. *conserta*, *Oculopollis* cf. *baculotrudens*, *O. sibiricus*, *Papilopollis* sp., *Pseudopapilopollis praesubhercynicus*, *Convexipollis* cf. *convexigerminalis*) indicating the Late Maastrichtian. Very recent contributions on palynology come from Van Itterbeek et al. (2005), adding a lot of other new taxa for this region.

Antonescu also quote a wood remain found at Pâclișa (1973, p.152) identified by Petrescu as *Podocarpus*-type wood. Other fossil wood fragments found in Vurpăr-Vinț area have been recently identified as lauraceous and icacinaceous (Iamandei, 2004). And from Densuș Valley (Hațeg area), Petrescu et al. (1978) described euphorbiaceous wood (*Paraphyllanthoxylon romanicum* PETRESCU).

Between Oarda and Sebeș, on the right bank of Sebeș river, fossil seeds of *Mastixia amigdalaeformis* (SCHLOTHEIM) KIRCHHEIMER (Givulescu et al., 1995) have been described, originating from paleosol levels with root marks (Codrea et al., 2001). At the top of the red formation bearing *Mastixia* seeds, the Early Paleocene could exist too, at Bărăbanț. Initially, these deposits have been wrong considered as Oligocene in age (Bleahu et al., 1967; Ianovici et al., 1976). According to Codrea et al. (2001,

2003), this pile of red beds is covered by Upper Eocene and Lower Oligocene marine deposits (Priabonian-Merian).

Deposits of similar age and facies have been recognized in South Apuseni, a lot of fossil woods found within outlining interesting Neophytic arboreal assemblage with important Mesophytic elements. Once considered all Miocene, the volcanic rocks related to Fața Băii Formation (Zlatna area) exposed at Roșia Montană and Bacea-Gurasada areas seem now to belong, on absolute age analyses, rather to Laramian magmatism (Lemne et al., 1983; Borcoș et al., 1986, Roșu et al., 1997).

This conclusion perfectly agrees with the features of the fossil flora associated with the volcano-sedimentary synchronous deposits usually interbedded with the red deposits.

In Techereu-Almașu Mare area, where Fața Băii Formation occurs, many silicified woods have been found and identified: *Plataninium porosum* FELIX, *Platanoxylon porosum* (FELIX) PETRESCU, *Cornoxyylon romanicum* PETRESCU, *Laurinoxylon* sp.1, 2 and 3 (in Petrescu & Nuțu, 1970, 1971), *Laurinoxylon neagui* IAMANDEI & IAMANDEI, *Icacinoxylon tyleradiatum* IAMANDEI & IAMANDEI 1998, then *Palmoxylon techerense* IAMANDEI & IAMANDEI (in press) and a yet unpublished new species of *Castanoxylon* (Iamandei, 2004).

Within more complex geological conditions in Roșia Montană area, where a system of eruptive breccias is present, probably piercing some fluvio-lacustrine deposits of Fața Băii type, many fossil wood samples usually silicified have been found and identified as *Palmoxylon cottae* var. *transsylvanicum* LINGELSHEIM 1917, *P. loczyanum* LINGELSHEIM 1917 (Lingelsheim, 1917), *Quercoxylon auriferum* PETRESCU 1969 (in Petrescu & Liskay, 1969), and some yet unpublished forms of Conifers and Angiosperms (Iamandei, 2004).

In Mureș Valley, west of Deva, where volcano-sedimentary deposits belonging to the 1st banatitic eruptive cycle are present, they were developed in obvious fluvio-lacustrine environments with dominance of coarse sand levels, pebbles and aleurolithic conglomerates), with a wide volcanic input, consequently similar in lithology and facies with Fața Băii Formation. It is exposed on a large area around the Sârbi-Bacea-Gurasada localities, preserving numerous fossil vegetal remains. From Boiu de Jos: *Araucarioxylon* sp., *Pinuxylon* sp. and *Platanoxylon porosum* (FELIX) PETRESCU have been identified (Petrescu & Nuțu, 1971), and from Bacea and Gurasada-Țiganului Valley, Iamandei & Iamandei (1997, 1999 a, b, c 2000 a, b, 2004) had identified: *Mastixioxylon microporosum* GOTTWALD, *Platanoxylon catenatum* SÜSS & MULLER STOL, *Paraphyllanthoxylon bacense* IAMANDEI & IAMANDEI, *Securinegoxylon bacense* IAMANDEI & IAMANDEI, *Agathoxylon ultimus* IAMANDEI & IAMANDEI and *Prototaxodioxylon marisii* IAMANDEI & IAMANDEI.

Many other fossil woods collected from this region (Bacea - Băcișoara Valley, Gurasada - Țiganului Valley, Runceșor - Vica Valley, Câmpuri-Surduc, Tătăraști) have been studied and identified as gymnosperms and angiosperms from Lauraceae, Platanaceae, Fagaceae, Icacinaceae, comprises in a recent monographic work (Iamandei, 2004).

Some fossil wood from Oarda - Râpa Roșie area here studied allowed the identification of a typical Mesophytic

conifer and the description of a new species for science named by us *Telephragmoxylon transsylvanicum* is presented.

PALEOXYLOTOMY

Family **Cheirolepidiaceae** HIRMER & HÖRHHAMMER

Genus *Telephragmoxylon* TORREY 1921

Telephragmoxylon transsylvanicum sp. nov.

Plate 1, figs. 1–9; Plate 2, figs. 1–9; Plate 3, figs. 1–9; Plate 4, figs. 1–9.

The studied material

Seven fragments of fossil wood, some of them originating from large trunks, have been found and collected by one of us from Sebeş-Lancrăm and Oarda Area, two samples from Râpa Roşie and five from Oarda, from the right bank of Sebeş river.

Such plant remains were hosted by fluvio-lacustrine detritic deposits with greenish or pink levels bearing dinosaurian remains as bone fragments and eggs attributed to Late Maastrichtian (Codrea et al., 2001).

Large mineralized trunk fragments collected by Prof. V. Codrea, Prof. I. Petrescu and Assist. M. Vremir from „Babeş-Bolyai” University of Cluj-Napoca have been sampled by their courtesy, in order to realize oriented thin sections for the paleoxylotomic study.

Most part of original material, including the holotype, is found in the Collection of the Faculty of Biology and Geology of the University „Babeş-Bolyai” from Cluj-Napoca.

The designated holotype is found in UBB-Cluj Collection under the Inv.no. 773. Small fragments from the original samples remained from the slides execution and from the two smaler pieces donated to the National Geological Museum by Prof. Petrescu I. have been deposited in the G.I.R. Collection from Bucharest.

The designated paratype is found in the G.I.R. Collection under the Inv. no. 26,653 (See Table 1).

Macroscopic description

The studied fossil wood shows complex processes, due to calcium carbonate or silica solutions that have mineralized, often deficiently, a wood in various stages of rotting or coalification (carbonization?). The original trunk fragments have various sizes (see the upward table) presenting a dark gray to black color and a fibrous texture. By magnifying glass or even by naked eye, annual rings and regular fibrous structure without vessels can be seen, typical for a coniferous wood.

Microscopic description

The holotype specimen has the most xylotomical details preserved, also found at all the other studied specimens, paratype included. We observed a typical tracheidoxyllic structure in the secondary wood that has faint **growth rings** of unequal as width, with 8-16 to 62-88 or up to 170 rows of tracheids. Sometimes a slight diminution of the tracheid diameters in the late wood is observed. The late wood is represented by some rows of radially compressed thick-walled cells. The early wood starts with some rows of wide tracheids, obviously wider than the late wood ones. Numerous axial **resin ducts** are found at the rim of the growth rings, within the late wood, possibly of traumatic origin as some rings have very few of them or are even devoid of such. Usually, these not too thick walled ducts form a single canal between two rays, with variable-sized lumina, some adjacent canals probably fusing and occupying the room of 3-6 tracheids. Their cross section is usually oval and radially elongated, rarely circular, with radial / tangential diameters of 40-120(150) / 30-60(75) µm. The ducts have uniseriate sheath constituted from septate tracheids (like strands of unequal short epithelial parenchyma cells), thick-walled and small bordered pitted (textfigs. 2). Here and there on the duct trajectory, wide round to oval windows, obviously outlined, appear, probably because some irregularities of the canal were sectioned. Radial ducts haven't been observed. Sometimes, in cross section, large hypertrophied cells appear, suggesting resiniferous cysts, but these have not longitudinal equivalent.

The tracheids in cross section are polygonal, slightly deformed, oval, rarely round, determining meats (intercellular spaces), are mean-sized and thick-walled: 5-7 µm the double wall. Sometimes the primary and the secondary walls are obviously different colored: light brown in the outer part and dark-brown to the inner part. Tracheid lumina are polygonal to rounded or oval, and the radial / tangential diameters vary: 25-40(60) / 20-30(40) µm in early wood and 15-23 / 15-18 µm in late wood that is represented by 3-6(9) tangential rows of smaller radially compressed cells. The woody bundles between two rays have (1)2-5 radial rows of normal tracheids and among them rows of small round cells with point like lumina intermingled. Tracheid density is 900-1400 cells on sq. mm. The tangential walls of the tracheids are unpitted. The radial walls have mixed (protopinoid) pitting: bordered, circular, with 16-20 µm in diameter, slightly bigger on the early-wood tracheids, not occupying all the cellular wall, having circular to elliptic apertures of 5-7 µm in diameter. The pits are more or less spaced when uniseriate, usually without touching one another but often contiguous when biseriate or triseriate arranged, opposite and with crassulae (Fig. 2b) or

Table 1. Size of original and sampled studied material, holotype and paratype of *Telephramoxylon transsylvanicum* sp. nov. included.

Nr. crt.	Original material in UBB-Cluj Coll. - Inv. no.	Size	Samples from the original material in GIR Coll. - Inv. no.	Size of samples	Type
1	769	20/10/10 cm	26,651	-3 pieces: 5/1.5/4; 4.3/1/2.5; 4.5/2/3 cm	Material
2	770	17/8/10 cm	26,652	-3 pieces: 11/4/6; 10/2/6; 5/2/2.5 cm	Material
3	-	-	26,653	-2 pieces: 3.2/3.5/2.8; 4/2.3/2.4 cm	Paratype
4	-	-	26,654	-1 piece: 5/2.3/4 cm	Material
3	771	22/22/10 cm	26,655	-2 pieces: 5/2/3; 3.8/2/2.5 cm	Material
6	772	40/16/30 cm	26,656	-2 pieces: 3.5/2/6; 2.5/3/6.5 cm	Material
7	773	30/17/5 cm	26,657	-2 pieces: 5/1/3.5; 2.5/1/5 cm	Holotype

alternate. On some tracheids the pits sometimes are locally missing and when uniseriate, the borders are contiguous, frequently compressed and are touching by a horizontal line. On other tracheids, when biseriate or triseriate alternate, the pits are hexagonal, slightly smaller (of 15-18 μm), with small circular apertures of 4-6 μm and sometimes turn to uniseriate disposition. To the ray-cells the pitting is similar and smaller. Usually the tracheidal walls present coarse striations that can be confused with helical thickenings, even sometimes, spaced helical thickenings anastomosed by perpendicular bars giving an aspect of bricks in a wall appear (Fig. 2b). Inside the tracheids often granular dark-red resin content is present, rarely agglutinated or with fungi remains. Surrounding the resin ducts, sheaths constituted by septate and pitted tracheids are present. They can easily be confused with a thick-walled parenchyma like that in strands. Disperse septate tracheids in the late wood are also present.

The wood parenchyma dispersed, rarely appear in cross section, but in longitudinal sections they are visible as strands of high rectangular and pitted cells, separated by unpitted horizontal walls, thin and smooth or few knotted (1-3 small nodules). Inside the cells some granular resin content, rarely compact, may be present.

The medullary rays, in cross section seen, are dominantly uniseriate, constituted by radial elongate polygonal cells, with smooth horizontal walls small bordered pitted (Fig. 1a).

Fig. 1. Tracheids and pitted ray cells seen in cross section (a) and ray types seen in tangential section (b) of the holotype of *Telephramoxylon transsylvanicum* sp. nov.

The pits have wide apertures reaching the border rim, very similar to axial parenchyma pitted cells. Tangentially the uniseriate rays are most frequent (more than 96%), usually having 1-18 cells in height, but up to 28 i.e. (up to 653 μm), with 1-3 biseriate stories. Within the uniseriate rays biseriate stories were observed, tending to biseriate rays. Biseriate rays are rarer (2-3%) and of 10-35 cells in height. Very rarely short triseriate rays appear bearing, like the biseriates, taller hypertrophied cells, usually terminally. The normal ray cells appear thick-walled, round to oval in section, unequal in height, sometimes deformed, usually empty and they do not determine lateral intercellular spaces. The density is rather high: 16-20(23) rays on tangential horizontal millimeter. Radially the rays are usually homocellular, made from cells all procumbent rather thick-walled (7-9 μm the double wall) even sometimes vertical simple pitted ray cells not too high intermingled among the

procumbent ones appear (Fig. 2a). The tangential walls are oblique or arcuate, sometimes branched, rather thick (3-4 μm), smooth, dentate or knotted, with 3-5 nodules that can appear at the crossing with the horizontal wall. The indentures are absent. The procumbent cells from the ray body have 54-66 μm in length and 15-19 μm in height, the marginals are slightly taller: 20-25 μm . Some ray-cells appear to be hypertrophied suggesting secretory cells but having no content. Within the normal cross-fields 1-3(5) pits horizontally disposed or solitary or in one vertical pair or in rossette, having round borders and apertures in the early wood to oval, inclined, with elliptic included apertures (of cupressoid type), in the late wood. Within the wider cross-fields 3-6 (10) cupressoid pits alternate arranged in two rows or more numerous as typical araucarioid pitting, especially in the marginal fields, often occupying all the cross field. The borders have (6) 8-12 μm in diameters and the apertures 5-9 μm . Sometimes the pits seem to be simple and smaller and the marginal ray cells may have outer walls slightly sinuous or irregular suggesting incipient ray tracheids. The cross fields with axial parenchyma present simple smaller pitting.

Fig. 2. Radial section through holotype (a), and paratype (b) of *Telephramoxylon transsylvanicum* sp. nov. Mixed (protopinoid) pitting on tracheids can be seen, or opposite, sometimes with crassulae, crossed apertures, septate tracheids, axial parenchyma, windows on canal trajectory, cross fields with cupressoid to araucarioid pitting, tangential walls of ray cells smooth, knotted or dentate.

AFFINITIES AND DISCUSSIONS

The tracheidoxylic structure of all the studied material coming from Latest Cretaceous (Late Maastrichtian) deposits from Oarda-Lancrăm-Sebeș agrees with *Brachyoxylon* type, having protopinoid pitted tracheids and araucarioid cross-fields. However there is something special in our tracheidoxylic structure, i.e. the occurrence of series of axial resin ducts at the edge of the growth rings. Also, in the late wood, septate tracheids appear, often making sheaths around the resin ducts and suggesting epithelial thick-walled parenchyma. Philippe (1993) reported such structures within the diagnosis of *Telephragmoxylon* TORREY. Initially, Torrey (1921) describing the species *T. brachyphyloides* figured for this some samples and admitted it as generotype. After two years a part of this mixed illustration was re-used again by Torrey, under the name *T. comanchense* (see Machhour & Pons, 1992; Philippe, 1993). Later this genus was integrated with *Brachyoxylon* (Kräusel, 1949, p. 112), a genus based on *Brachyoxylon notabile* HOLLICK & JEFFREY 1909 as

generotype with a structure devoid of normal secretory ducts but sometimes with traumatic ones, with mixed radial pitting and araucarioid cross-field pitting. It is Philippe (1993) that reestablished the legitimacy of *Telephragmoxylon* genus, defined especially by the occurrence of septate tracheids in the late wood, not excluding the presence of the secretory ducts and proposed a provisional key for a generic identification of these tracheidoxyls.

After an analysis of the taxonomical situation of this genus we have attributed it to the great mesozoic family Cheirolepidiaceae, a family with only fossil members, xylotomically showing protopinaceous features, probably unified, after Watson, by the *Classopollis* type pollen (in Taylor & Taylor, 1993).

In some cases vegetative parts of *Pseudofrenelopsis* were found in connection with wood of *Protopodocarpoxylon* type (Alvin, in Taylor & Taylor, 1993). Also, wood of *Protocupressinoxylon* type was found in connection with *Cupressinocladus valdensis* (Francis, in Taylor & Taylor, 1993). Other vegetative parts (foliage, cones) of taxodiaceous affinities, coming from late Triassic or Early Jurassic, also have been attributed to this family, maybe as «transitory Taxodiaceae» as *Metataxodioxylon*, *Prototaxodioxylon*, *Taxodioxylon*, *Protosciadopityoxylon*, *Sciadopityoxylon*, *Brachyoxylon*, *Xenoxylon*, *Turkestanioxylon*. Other typical Cheirolepidiaceae as *Elatides wialliamsoni*, *E. bommeri*, *Sphenolepis kurriana*, *Palyssia sternbergi*, *Cheirolepis muensteri* connected with wood have been described (in Philippe, 1994, p.72). Found in connection with foliage of *Brachyphyllum* type (Cheirolepidiaceae), wood of *Brachyoxylon* type was described (Machhour & Pons, 1992, quoting Alvin et al., Laujervat & Pons, Zhou Zhian, Shilkina & Doludenko, Stopes & Fujii). Taylor & Taylor (1993) admitted that many other genera described on vegetative fossil remains, like *Brachyphyllum*, *Pagiophyllum*, *Tomaxellia*, *Frenelopsis*, *Androvettia*, *Glenrosa*, *Tarphyderma*, *Hirmeriella*, *Classostrobus*, as Cheirolepidiaceae, can represent the ancestors of the extant conifers. However the affinities with the extant Conifers remain only speculative and even this group was divers and dominant in Mesozoic, the descendants are yet equivocal (Taylor & Taylor, 1993, p. 693).

After Kräusel (1949) established the genera of the Protopinaceae, Boureau (1952) described a *Brachyoxylon* (*Telephragmoxylon*) *brachyphylloides* from Jurassic. Machhour & Pons (1992) also attributed a French Early Cretaceous material to *B. brachyphylloides* and to *Brachyoxylon* sp. According them, many other forms described by other quoted contributors like Veillet-Bartoszewska, Serra, Gazeau & Koeniguer, Laudouéneix have to be related to *Brachyoxylon brachyphylloides* (TORREY) KRÄUSEL. Machhour & Pons observed that the presence or the absence of the septate tracheids do not seem to be essential to discriminate the two species, because the secretory ducts can induce these modifications. The resin ducts tend to mark the boundary between the late wood and the early wood, and sometimes it is not very clear if they are situated within the late wood or at the boundary of the growth ring.

In a last partial revision of the Mesozoic fossil tracheidoxyls with araucarioid cross fields, proposing “a provisional key of generic identification”, Philippe (1993) has discriminated the two genera: *Telephragmoxylon*

TORREY 1921 and *Brachyoxylon* HOLLICK & JEFFREY 1909, just by this feature, “presence or absence of septate tracheids in the final wood”.

Since our here studied specimens present septate tracheids in the final wood and tangential series of resin ducts with a special construction, after this comparative discussion we attribute them to the genus *Telephragmoxylon* TORREY.

Some authors consider that *Brachyoxylon* (and probably *Telephragmoxylon* also, as a close genus), had foliage of the *Brachyphyllum*-type (Philippe, 1993). Foliage of *Brachyphyllum*-type has been previously described in the same region where, from the Late Cretaceous of Săsciori (Petrescu & Huică, 1972).

Few specimens of *Brachyoxylon brachyphylloides* (TORREY) KRÄUSEL 1949, (identified with *Telephragmoxylon brachyphylloides* TORREY 1921, after Philippe), have been described by Boureau (1952), Serra (1966), Machhour & Pons, 1992, having sometimes traumatic canals at the boundary of some growth rings, septed tracheids, mixed radial pitting and cross fields with 2-8(12) small oculipores in 2-3 horizontal superposed rows, alternate or in rosette. A quoted Tunisian form previously described by Boureau has numerous tangential pitting, 1-2-seriate rays and septate late-wood tracheids.

Our studied specimens presents many similitudes with these forms, but must be remarked the tangential series of numerous axial canals in the late wood, maybe traumatic are accompanied by typical septate and pitted tracheids forming sheaths, the radial protopinoid pitting, sometimes with crassulae, the presence parenchyma cells, the knotted or dentate tangential walls in ray cells and the araucarioid cross fields with 1-6(10) cupressoid oculipores.

After this comparative discussion on the xylotomical features of our material and of the already described similar taxa we attribute it to a first new species of *Telephragmoxylon*, named after the name of the Romanian region where it was found: *Telephragmoxylon transsylvanicum*, well represented by the specimen designated holotype (found in UBB – Cluj Coll., Inv.no. 773) and by the paratype also (found in G.I.R. Coll, Inv. no. 26,653).

Diagnosis of *Telephragmoxylon transsylvanicum* sp. nov.:

Tracheidoxylic secondary wood with unequal growth rings, sometimes marked at the rim by series of axial resin ducts, probably traumatic, one per bundle, round to oval, variably sized (rd/tgd = 40-150 / 30-75 µm). Tracheids polygonal in cross section with meats, thick-walled, polygonal-rounded lumina with rd/tgd = 25-40(60) / 20-30(40) µm, smaller in late-wood, in (1)2-5 interradian regular rows, 900-1400 cells on sq. mm. Tangential pitting absent, radial pitting protopinoid, 1-2(3)-seriate, with circular borders, d = 16-20 µm, sometimes compressed, spaced or contiguous disposed, opposite with crassulae or alternate and hexagonal shaped, with circular to elliptic apertures of 5-7 µm in diameter. Septate tracheids in the late wood, usually forming a sheath around the resin ducts. Parenchyma scarce, as rectangular, high, thick-walled pitted cells with horizontal thinner walls, unpitted, smooth or few knotted. Rays 1(2-3)-seriate, uniseriate dominant and of 1-18(28) cells high, bi- and triseriate rarer. Ray cells unequal in height oval to round, deformed, thick-walled, without lateral intercellular spaces. The density is of 16-20(23) rays

on tangential mm. Radially-homocellular, rarely short upright ray cells, thick-walled, with pitted horizontal walls and thinner, knotted, oblique or arcuate tangential walls, without indentures. Cross-fields with 1-3(6-10) cupressoid pits solitary or in one vertical pair, in rossete, or alternate disposed in 1-2 horizontal rows or more numerous, as typical araucarioid pitting.

CONCLUSIONS

The continental deposits in fluvio-lacustrine environments of the Latest Cretaceous (Late Maastrichtian) from Mureş Couloir, but from other areas exposed on South Apuseni, proved to be fossil-bearing: besides the land fossil vertebrates, frequent vegetal micro- and macro remains, sometimes identifiable, can be found.

It is remarkable the abundance within these formations of some specific gymnospermic elements of the Mesophytic Flora. But many angiosperms specific to the tropical climate, like icacinaceae, lauraceae, mastixiaceae, euphorbiaceae or palmae were identified, that seem to indicate a corresponding paleoclimate, quasi-tropical for the Latest Cretaceous, evolving to a very arid episodes in the Late Maastrichtian.

In this paper a paleoxylotomic study of a relatively rich material (7 big-sized samples) found within fluvio-lacustrine Latest Maastrichtian deposits, a cheirolepidiaceae taxon with a particular structure has been firstly described within Romanian paleoflora. It is a new species for science named *Telephragmoxydon transsylvanicum*, a tree involved probably into the forestry assemblages on the emerged areas of the Maastrichtian from Transylvania.

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PLATE I

Plate 1. *Telephragmoxylon transsylvanicum* sp. nov., holotype

Figs. 1-3. Cross section: tracheids, rays, resin ducts, detail.

Figs. 4-6. Tangential section: tracheids, 1-2-seriate rays, details;

Figs. 7-9. Radial section: septate tracheids with round window pitting on tracheids, cross fields.

PLATE II

Plate 2. *Telephragmoxylon transsylvanicum* sp. nov., paratype
Figs. 1-3. Cross section: thick-walled tracheids, rays, traumatic resin ducts.
Figs. 4-6. Tangential section: tracheids, uniseriate short rays, details;
Figs. 7-9. Radial section: pitting and septate tracheids, cross fields

PLATE III

Plate 3. *Telephragmoxylon transsylvanicum* sp. nov., material

Figs. 1-3. Cross section: thick-walled tracheids, rays, traumatic resin ducts.

Figs. 4-6. Tangential section: tracheids, 1-2-seriate rays, details;

Figs. 7-9. Radial section: pitted and septate tracheids, cross fields, oval window to a traumatic duct

PLATE IV

Plate 4. *Telephragmoxylon transsylvanicum* sp. nov., material

Figs. 1-3. Cross section: thick-walled tracheids, rays, numerous resin ducts.

Figs. 4-6. Tangential section: tracheids, uniseriate, rays, details;

Figs. 7-9. Radial section: pitting on tracheids, cross fields