

# Large, old and impressive lime trees in Romania

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## 1. Introduction

*Tilia* L. (lime or linden), family Malvaceae (formerly Tiliaceae), is a deciduous genus with large and tall specimens (*T. platyphyllos* come to 30–40 m, while *T. cordata* does not exceed 25 m), with a shadowy canopy.

The genus *Tilia* is all-around in Europe, thus, its present distribution includes almost all of Central Europe up to the southern parts of Great Britain and of Fennoscandia at its northern limit (Caudullo et al. 2017, De Benedetti et al. 2022).

At present three species of *Tilia* are growing in our country, *T. cordata* Miller (small-leaved lime) and *T. tomentosa* Moench (European white lime) are the most widespread species, while *T. platyphyllos* Scopol (large-leaved lime-tree), has a smaller area (Şofletea & Curtu 2007).

Specimens of monumental linden trees in Romania represent very important nature values, even if they are in forests, alignments or in other landscapes.

All the tallest linden trees, with the biggest girth, secular or with aesthetic and spiritual values are considered to be important genetic materials for the future (Lonsdale 2013). They contribute to a lot of ecosystem services and hold various category of microhabitats (Pietrzak 2010, Symonides 2014, Seibold et al. 2018, Wu 2019, Nolan et al. 2020, Gallego-Valadés et al. 2020, Pietraszko et al. 2022).

These trees, in addition to their size and age, maintain a lot of memories, they are linked of folklore, mythological beliefs, historical legends, crowned heads, writers and poets. The lime trees were surrounded by a cult, in Central Europe they were the most important honey plants (Takács & Malatinszky 2021), so that in many European countries they can be seen in alignments, alleys and very often in parks and historic domains (Couch 2012).

In history of Luxemburg, Ukraine and Hungary, there are legend about lime tree, so that King Sigismund has

lime leaves on his helmet, the emblem of Kyiv City had a linden leaf and King Mathias Corvinus often took a repose under the linden tree (Olah 2000, Takács & Malatinszky 2021).

The shadowy canopy of the lime trees was extremely appropriate to be planted along the alleyways. The first linden alley was designed in Hungary, in Visegrád, later, through the 17th and 18th centuries, some alleys were created, in Köpcsény (Austria) and at the end of 1750s a 1000 m-long alley was planted in Romania (Bontida) (Takács & Malatinszky 2009, 2021).

Due to their high cultural and aesthetic values, all the monumental trees have received worldwide interest (Blicharska & Mikusiński 2014, Lindenmayer & Laurance 2017) and currently, in our country, they are the object of scientific researches and starting from 2023 are protected by law no. 97 (the law regarding the protection of remarkable trees). The aim of the present article is to measure the height, the girth, the coordinate and the health status of the monumental linden trees and to identify their location.

## 2. Materials and Methods

The field research has been carried on the entire surface of the country, in the growing season between the years 2019 and 2022.

Based on the methodology of the identification of monumental trees (Nolan et al. 2020) the height was measured with a hypsometer Vertex Laser Geo High-precision, the girth was measured with a tape at the height of 1.3 metres above the ground.

Age was only estimated, because using the Pressler drill for core extraction may damage the tree, particularly the secular trees.

The trees were also localized with Avenza maps mobile devices (their GPS coordinates).

Based on the criteria of monumentality (Vasile et al. 2022) the identified linden trees were considered monumental as follows:

- for **dimensional** trees: European white lime (*T. tomentosa*): height  $\geq$  35 m, girth  $>$  4.0 m and age  $>$ 150

years; small-leaved lime (*T. cordata*): height >25 m, girth > 4.0 m and age >150 years; large-leaved lime-tree (*T. platyphyllos*): Height > 35 m, girth > 4.0 m and age >150 years;

- for **symbolic** monumental trees: lime trees connected with special historical, mystics, folkloric events, with certain personalities of our culture and trees with special shapes.

The health status was determined on a 3-level scale, based on the presence (visual observation) of the rot, dried or broken branches, the condition of the canopy, insect attack (Table 1).

Table 1. Health status type for the measured lime trees

Name of health status type	Description
Very good	No infections, no rot, abundant fruiting, a few dried thin branches in the canopy.
Good	Some scars on the trunk, dried thin branches in the canopy, normal fruiting.
Bad	Top broken, dried and broken branches in the canopy, decay in trunk or branches, infection or insect attack on the bark or leaves, weak or absent fruiting.

We also aimed to specify local habitat of the trees, historic or folkloric name (if there exist) and image of each identified specimen.

### 3. Results and discussion

The monumental linden trees were identified in 30 localities within 17 counties (Fig.1).

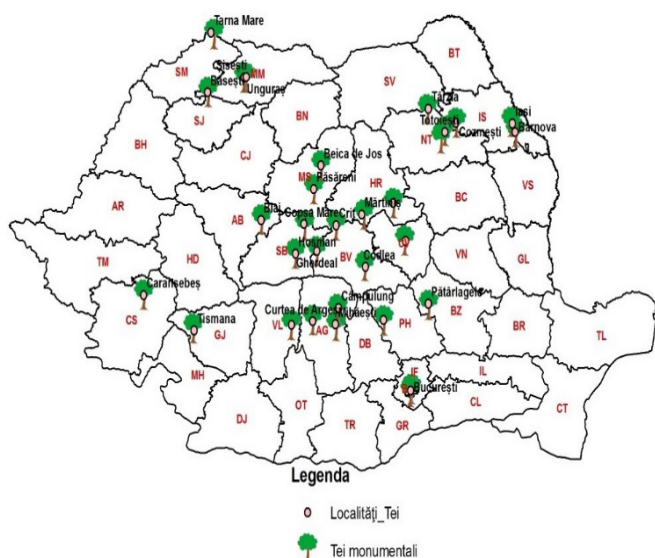


Fig. 1. The spread of monumental linden trees across the country (Coman S.)

According to the results of the four years of research (2019-2022), in all, 33 monumental lime trees belonging to the following three species: *Tilia cordata* (18 trees, 55%), *T. tomentosa* (14, 44%) and *T. platyphyllos* (only a single tree), were identified on the entire surface of the country (Table 2).

The most frequent monumental specimens are represented by the highest and the thickest trees (21) and by historical trees (8), while mystical, secular, folkloric and special shaped trees have only one specimen (Fig.2).

Tabel 2. Monumental lime trees, their location and dendrometric data

Sp	Location	Co	Latitude	Longitude	H (m)	G (m)	CD (m)	AE (yr)
Tc	Mărtiniș	HR	46.230651	25.421068	16.7	3.71	14.5	200
Tc	Leliceni	HR	46.349175	25.851507	16.7	3.99	17.75	300
Tc	Cernat	CV	45.966314	26.016509	19.5	2.92	13.2	136
Tc	Păsăreni	MS	46.491570	24.693971	23.1	6.28	24.5	158
Tc	Codlea	BV	45.707138	25.433667	26.1	4.49	18.75	200
Tt	Blaj	AB	46.181360	23.930470	17.5	3.8	18.55	200
Tc	Hoșman	SB	45.831792	24.426704	20.5	4.08	20.1	150
Tc	Gherdeal	SB	45.859440	24.736770	19.5	3.58	19.35	100
Tc	Beica de Jos	MS	46.733821	24.796695	20	5.87	22.4	150
Tc	Criș	BV	46.122740	25.016100	22.4	4.46	13.75	200
Tt	Caransebeș	CS	45.414927	22.215733	15.9	4.58	11.11	100
Tc	Tarna Mare	SM	48.075120	23.240970	13.1	3.58	11.2	100
Tc	Tarna Mare	SM	48.075330	23.240790	13.4	3.33	10.5	101
Tt	Șeșești	MM	47.629640	23.701560	27.8	4.4	22.9	150
Tc	Unguraș	MM	47.628550	23.676530	26.5	3.99	20.35	100
Tt	Băsești	MM	47.484520	23.156860	24.5	5.09	22.5	200
Tc	Totoești	NT	47.084130	26.602880	14.2	4.68	11.95	100
Tc	Ștefan cel Mare	NT	47.008260	26.542610	19.5	4.68	13.35	100
Tc	Târzia	NT	47.308760	26.346380	19.8	7.1	20.55	200
Tt	Bărnova	IS	47.074344	27.627326	18.5	6.5	18.75	600
Tc	Cozmești	IS	47.171174	26.764773	22.2	3.99	16.4	200
Tt	Iași	IS	47.178343	27.566753	13.7	3.83	15.8	400
Tt	Cornu	PH	45.149093	25.712504	24.3	4.71	17.5	130
Tt	Pătărlagele	BZ	45.311504	26.363975	22.4	4.05	15.1	150
Tt	București	IF	44.449492	26.114120	21.6	4.14	13	150
Tp	București	IF	44.421320	26.095430	27.5	3.71	19.65	150
Tt	Tismana	GJ	45.070739	22.936729	31.8	5.31	18.05	200
Tt	Râmnicul Vâlcea	VL	45.106038	24.362200	14.5	5.02	15.25	200
Tt	Curtea de Argeș	AG	45.156382	24.675735	19.2	6.09	21.35	200
Tt	Mihăești	AG	45.097342	25.014106	30.3	4.02	16	150
Tt	Câmpulung	AG	45.265851	25.038818	31.7	4.11	19.95	200
Tc	Curtea de Argeș	AG	45.263880	25.039301	24.6	4.58	21.9	250
Tc	Copșa Mare	SB	46.122222	24.561030	18.5	6.6	22.15	300

Note: Sp: species; Tc: *T. cordata*; Tt: *T. tomentosa*; Tp: *T. platyphyllos*; Co: County; H: height; G: girth on breast height (1.3m); CD: Canopy diameter; Ae: Estimated age

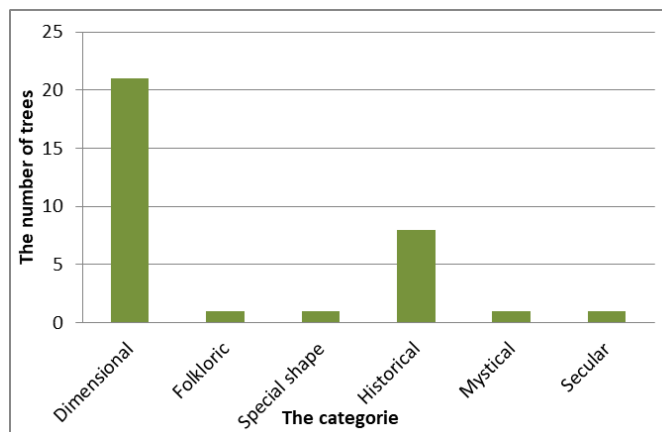


Fig. 2. The categories of monumental lime trees

The small-leaved lime (*T.cordata*) from Târzia (Neamț county)(Foto 3) is the thickest from the country with the girth of **7.10 m**, but comparing with the champion linden trees from other European states, it is only in fourth place. Thus, on the first place is the small-leaved lime from Hungary, location: Szökedencs (Somogy County) with 11.48 m in circumference (Takács & Malatinszky 2021); on the second place is the small-leaved lime from Poland, then can be found in Cielętniki (Dąbrowa Zielona commune, in Silesian Voivodeship). Its circumference measures 9.92 m, being the oldest lime tree in Poland, with an age of 520 years (Szczepański et al. 2013) and on the third place is *T. cordata* from Czech Republic, Ústí nad Labem District, with a girth of 9.25 m (Uradnicek et al. 2017).

The European white lime (*T. tomentosa*) from Tismana (Gorj county) (Foto 4) is the tallest from the country with **31.80 m** height, but also than the one from Czech Republic, Svitavy District, which has a height of 25 m (Uradnicek et al. 2017). In Bârnova (Iași county) is another European white lime, which is the oldest lime tree in Romania with an age of about **600 years** (Foto 5).

The only large-leaved lime-tree (*T. platyphyllos*) from Bucharest (Ilfov county), is much smaller (with a girth of **3.71 m**) than the lime tree from Germany which measured 15.39 m in circumference, and from Czech Republic (Pastviny) with a girth of 13.05 m (Uradnicek et al. 2017). It is also smaller than large-leaved lime-tree from Hungary,

from the Ötvöskónyi locality (Somogy County) which has a thickness of 10.57 m (Takács & Malatinszky 2021) and then the oldest (480 years of age) *T. platyphyllos* from Poland with 8.51 m circumference, which is growing in the village of Czarny Potok (Łącko commune, Małopolska Voivodeship) (Szczepański et al. 2013).

From the mystical category, small-leaved lime from Leliceni (Harghita county) (Foto 6), with 16.7 m height, with a girth of 3.99 m and about 300 years old, which grows in the yard of the Catholic church, is an important symbol of the region, being declared in 1992 as remarkable tree, as stated in the Registry of the Harghita County monuments (Țenche-Constantinescu et al. 2015).

The lime tree (*T. tomentosa*) of Eminescu in the Copou park in Iași (Foto 7), is a monumental tree from the category of folklore trees. It has the height of 13.70 m, the circumference of 3.80 m and with an age of about 400 years, which in the Mihai Eminescu poems represent life, in which every end is a new birth, linden tree being the tree that contemplates the grave of the poet (Rusu 2005).

A historical lime tree is the tree from Cernat village (Covasna County) (Foto 8), under its canopy writer Jókai Mór (a Hungarian novelist, dramatist and revolutionary) and his wife used to take a rest. This small-leaved lime measure 19.50 m height and 2.90 m in circumference, with an impressive canopy, very large (with a diameter of 13.20 m), whose branches touch the ground.



Foto 3. The small-leaved lime from Târzia (Neamț County) (Foto: Mihalache E.)

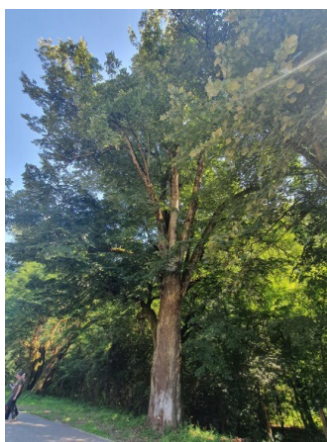


Foto 4. The European white lime from Tismana (Gorj County) (Foto: Enescu R.)



Foto 5. European white lime from Bârnova (Iași County) (Foto: Scărlătescu V.)



Foto 6. Small-leaved lime from Leliceni (Harghita County) (Foto: Enescu R.)



Foto 7. The lime tree of Eminescu in the Copou park in Iași (Foto: Scărlătescu V.)



Foto 8. Historical lime tree from Cernat (Covasna County) (Foto: Mihalache E.)

The small-leaved lime from Copșa Mare (Sibiu County) (Foto 9) is part of the category of monumental trees with special shapes. It is 18.50 m height and a girth of **6.60 m**, and with an age of about 300 years old. It has a huge canopy with a diameter of 22.15 m, dominating the trees around it with its spectacular shape.



Foto 9. The small-leaved lime from Copșa Mare (Sibiu County)  
(Foto: Enescu R.)

Most monumental linden trees were found inside the churchyards and house yards, in the parks, in the forests and few of them were found growing on hill, alignments and one on the cropland (Fig.10).

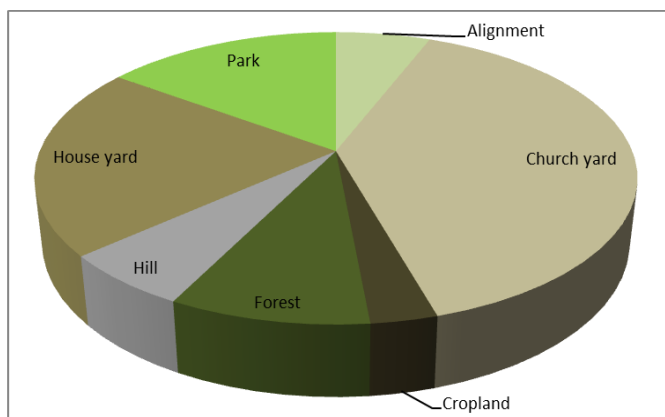


Fig. 10. Location of the monumental linden trees

More than half (52%) of the measured linden trees were in very good status of health with abundant fruiting, no infections, no rot, only a few dried thin branches in the canopy.

In good status of health were 39% of the trees, with normal fruiting, some scars on the trunk and dried branches in the canopy and 9% were found in a bad status of health, with weak or absent fruiting, with dried and broken branches in the canopy, decay in trunk or branches, infection or insect attack on the bark or leaves.

## 4. Conclusions

The results of this research revealed that in Romania there are very old (European white lime from Bârnova, Iași county), large (small-leaved lime from Târzia, Neamț county) and impressive historical and folkloric (linden

tree of Eminescu) linden trees, and as regards to their shape, much more spectacular (see the linden tree from Copșa Mare).

Most of the monumental lime trees throughout the country are predominantly in the courtyards of churches or in the courtyards of private houses and they are in good to very good status of health. They represent an important treasure which must be protected and monitored and the communities in the localities where they were identified, must be conscious of their value as natural heritage or as a tourist attraction.

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## Abstract

### Large, old and impressive lime trees in Romania

The monumental lime trees from Romania were inventoried during the interval 2019 and 2022. They are components of green areas of parks, courtyards of churches and houses. The researches involved determining dendrometric data (tree height and diameter at breast height), age estimation and evaluating the health status of monumental trees. A total of 33 linden trees (*Tilia* spp.) were recorded. The most frequent monumental specimens are represented by the highest and the thickest trees (21) and by historical trees (8), while mystical, secular, folkloric and special shaped trees have only one specimen. The remaining trees were 39% in good and very good (52%) health condition. They represent an important treasure and a tourist attraction which must be protected and monitored in the future.

**Keywords:** linden trees, monumental trees, location, size, health status.

## Rezumat

### Tei mari, bătrâni și impresionanți din România

Teii monumentali din România au fost inventariați în intervalul 2019 și 2022. Cei mai mulți tei monumentali au fost identificați în zonelor verzi ale parcurilor, în curțile bisericilor și ale caselor. Cercetările au implicat determinarea datelor dendrometrice (înălțimea arborelui și diametrul la înălțimea de 1,30 m), estimarea vârstei și evaluarea stării de sănătate a arborilor monumentali. Un total de 33 de tei (*Tilia* sp.) au fost identificați de la începutul anului 2019. Cele mai frecvente exemplare monumentale sunt reprezentate de arborii cei mai înalți și cei mai groși (21) și de arborii istorici (8), cei mistici, seculari, folclorici și cu forme speciale au doar un singur exemplar. Teii monumentali reprezintă o atracție turistică și o comoară pentru comunitatea unde au fost identificați, și pe viitor trebuie protejați și monitorizați.

**Cuvinte cheie:** arbori monumentali, tei, loc, dimensiuni, stare de sănătate.