

# The BELTREES database – a wealth of information about trees in Belgium

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*Summary – The BELTREES database – a wealth of information about trees in Belgium* – The BELTREES database, created by members of the Belgian Dendrological Society, collects information on remarkable trees in Belgium and the collections in which they grow. It contains almost 30 000 records and for some entries measures have been taken repeatedly over the last thirty years. This inventory wants to contribute to the conservation and survival of remarkable trees of Belgium. It gives an indication of the richness in species and varieties planted in Belgium and of the regional distribution of certain taxa. The database puts emphasis on the value of trees, sometimes neglected by its owners or surveyors. The ranking of the trees is done according to their identity and their girth at 1.5 m above ground level.

*Samenvatting – De BELTREES databank – een schat aan informatie over bomen in België* – De BELTREES databank, opgestart door leden van de Belgische Dendrologische Vereniging, verzamelt informatie over merkwaardige bomen in België en de parken, tuinen en andere locaties waar ze groeien. De databank bevat bijna 30 000 bomen waarvan sommige regelmatig opnieuw gemeten werden gedurende de laatste 30 jaar. Deze inventaris wil een bijdrage leveren aan het behoud en het voortbestaan van merkwaardige bomen in België. Het geeft een indicatie van de rijkdom aan soorten en variëteiten aangeplant in België en van de regionale verdeling van bepaalde taxa. De databank legt de nadruk op het waardevolle karakter van bomen, iets waar eigenaars en collectietoezichters soms aan voorbij gaan. Het klasseren van de bomen binnen hun taxon is gebaseerd op hun stamomtrek op 1,5 m boven het maaiveld.

*Sommaire – La base de données BELTREES – une mine d’informations sur les arbres en Belgique* – La base de données BELTREES, créée par des membres de la Société Belge de Dendrologie, recueille des informations sur les arbres remarquables en Belgique et les collections dans lesquelles ils grandissent. Elle mentionne près de 30 000 arbres et pour certaines entrées, les mesures ont été effectuées à plusieurs reprises au cours des trente dernières années. Cet inventaire veut contribuer à la conservation et à la survie des arbres remarquables de Belgique. Il donne une indication de la richesse des espèces et variétés plantées en Belgique et de la répartition régionale de certains taxons. La base de données met l’accent sur la valeur des arbres, parfois négligés par les propriétaires ou les responsables de collections. Le classement des arbres se fait en fonction de leur identité et de leur circonférence à 1,5 m au-dessus du niveau du sol.

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## THE BELGIAN DENDROLOGICAL SOCIETY

The Belgian Dendrological Society was founded in 1953 by Robert and Jelena De Belder and Robert Lenoir amongst others. Its purpose is to promote and enlarge the knowledge and cultivation of trees and shrubs. The Society encourages the collaboration between scientific institutions, professionals, plant lovers and those responsible for botanical or dendrological collections. As a result of these objectives it unites amateurs and professionals interested in trees and shrubs. Moreover, it is the society's ambition to actively contribute to the adequate management and conservation of trees and shrubs, both in their natural environment as in parks and botanical collections (public as well as private). This is stimulated by the organization of a variety of scientifically oriented activities (lectures, excursions and study tours abroad, publications).

Starting in 1985 the database has attempted to list all known tree collections in Belgium (BELGARD) and its remarkable and/or biggest trees (BELTREES). It was based initially on the work of Jean-Claude Baudouin, Michel Decalut, Philippe de Spoelberch and Arthur De Haeck. The data accumulated without being really available to the public. Philippe de Spoelberch developed the BELTREES database and with the help of assistants has introduced all these measurements in a single database. This made it possible to present a clear picture of the situation in Belgium. In 1992 Jean-Claude Baudouin, Philippe de Spoelberch, Jef Van Meulder and photographer Roel Jacobs, published the book "Arbres de Belgique" – "Bomen in België". This book described about 1 000 species and varieties found in our country and presented in an appendix a list of about 4 600 big or rare trees. Members of the Belgian Dendrology Society have continued to accumulate data ever since.

Since 2001 the Belgian Dendrology Society has mandated the Foundation Arboretum Wespelaar to organize the management of the BELTREES database and to assure the publication of appropriate measurements carried out by many enthusiasts and volunteers. The BELTREES database<sup>2)</sup> can be consulted via the website [www.dendrologie.be](http://www.dendrologie.be) and via [www.arboretumwespelaar.be](http://www.arboretumwespelaar.be) (these versions are updated once a year). The BELTREES inventory can also be consulted as a PDF-file on the latter website (sorted by park or sorted by name and circumference). The database contains almost 30 000 records (dead and alive), and for some entries measures have been taken repeatedly over the last thirty years.

## THE AIM OF BELTREES AND THE GATHERED INFORMATION

This inventory wants to contribute to the public awareness and conservation of the remarkable and rare trees of Belgium. The aim of the BELTREES database is to list as much interesting trees in Belgium as possible. There are no limitations on the identity: every species or cultivar is welcome. Over time some of the trees will have died or been cut for whatever reason; this information is retained in the database, as this may have a historical interest.

For the most common species in the database, a minimum girth is required for inclusion in the database. This minimum girth will often differ per region. *Abies nordmanniana* for example is often measured in Wallonia

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<sup>2)</sup> This database is owned by the ASBL/VZW Belgische Dendrologie Belge (respecting the rights of the individual measurers and other suppliers). It is managed by the Foundation Arboretum Wespelaar. Usage of this data without mentioning of the source or for commercial goals is not authorized.

(134 times) but not that often in Flanders (51 times) and not at all in Brussels. That's why it only has a minimum girth in Wallonia, which is 200 cm. *Liriodendron tulipifera* is measured 259 times in Wallonia, 122 times in Flanders and 33 times in Brussels. The minimum girth therefore differs in each region: 300 cm in Wallonia, 250 cm in Flanders and no minimum girth in Brussels. Important collections which are visited frequently, may list small but promising common trees as these may contribute to growth statistics.

The girth is measured, the height is estimated and the location mentioned. Often a few specific comments about the location or the tree are added. A tree can be remarkable because of its monumentality, rareness, aesthetic or historical value.

### THE VALUE OF BELTREES

While measuring trees in each collection, it is important to be able to identify the trees, verify their health status and, if possible, locate them on a map. The owner or manager of the collection is provided with a copy of the measurements and sometimes also a few recommendations (e.g. suggestions about which new trees to plant or which trees to remove to create more space for the remaining trees). The database emphasizes the value of trees, sometimes unknown to its owners or surveyors. Hopefully, once the owners are advised about the richness of their collection they may start to appreciate it and take on an active care of the collection; this should contribute to the longevity of the trees and the collection. It always helps if there is a "champion" among the trees. Such trees are always singled out and most owners will be proud and preserve these special trees.

The database also has a historical value. It gives an idea of species planted in the past and

helps to locate specimens of rarely planted cultivars or species. This can be helpful to preserve such cultural heritage. It also gives an indication of the regional distribution (as a result of climatic conditions) and use of certain species and of course of the diversity in species planted in Belgium.

### THE METHOD OF RANKING

Only healthy trees with a single stem are retained for the tree ranking. This ranking is done on the base of their identity and their girth at 1.5 m above ground level without taking into account the crown size, height or habitus of the tree. Even a minuscule tree can be a champion if it is the biggest of a rarely planted taxon in our country.

The twenty thickest trees per taxon are subdivided into four categories. The biggest tree or champion of a specific taxon in Belgium gets a "\*\*\*" symbol in the database. The next three are given a "\*\*", de six following a "°" and the ten following a "." symbol. Dead or dying trees are excluded from the classification.

The ranking does not take into account the year of measurement. Of two trees, one with 355 cm circumference measured in 2012, and the other with 350 cm measured in 2005, the first will be our champion. The tree measured in 2005 will probably be bigger at a specific time but since nobody verified this, we can't take this into consideration. If for a taxon an identical measurement occurs, then the oldest measurement will take priority as this specimen will most probably have the biggest circumference as of today.

### NOT RANKED REMARKABLE TREES

Some interesting and big trees are excluded from the ranking by our strict rule (a single

stem and measurement at 1.5 m). They are nevertheless singled out as remarkable trees by the “-” symbol. These giants usually start branching at the base or have produced multiple stems. Other deformed trees may be difficult to measure and will also receive the “-” symbol if remarkable.

## MEASURING METHOD

To compare specimens correctly a consensus about the measurement method is necessary. In standard situations the girth is measured at a height of 1.5 m above ground level with a tightened tape. The measurement is done at a right angle to the axis of the stem. A leaning tree or a tree on a slope should always be recorded on the average level (theoretical, historical center of the stem).

If it is not possible to determine the girth at 1.5 m (for example due to the presence at that height of a hump, branch, if a multi-trunked tree, etc.) the circumference is measured at the narrowest point below 1.5 m. The exact height of girth measurement and the reason why it couldn't be measured at 1.5 m has to be mentioned in the data. For trees with multiple stems it can be interesting to measure the various stems on 1.5 m. The girth of the thickest stem will be used for the ranking; the other measures may be mentioned as extra data. When a tree was grafted, the height of

the graft scar (if visible) has to be mentioned in the data as well.

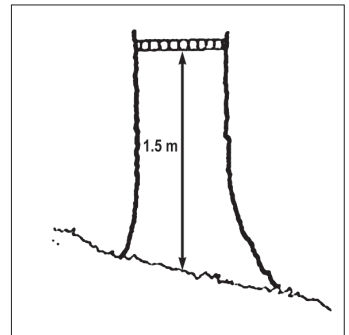
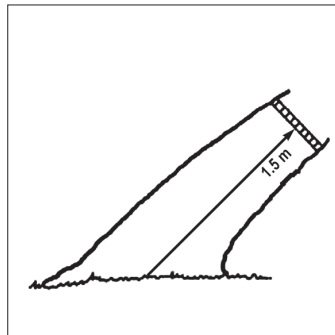
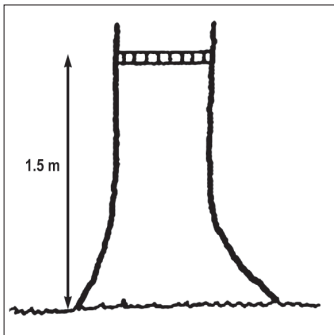
## HEIGHT

The height of a tree has been given less importance in the BELTREES database. Other countries rely on the height for rankings of champion trees, but this is difficult to standardize and the accuracy is less sure. Girth is easy and more factual. Further height can also fluctuate throughout a tree's life: a tree may be damaged physically by storms or reduced by tree surgery. The height of a tree is also more influenced by abiotic factors such as sea breeze.

Of course it remains interesting to provide a height measurement if possible. People like to know where the tallest trees grow or which is the tallest of all. With the basics of trigonometry the height can be estimated with a simple stick. Instruments called hypsometers and clinometers can record height to a greater degree of accuracy, however, even these can be misleading if used incorrectly or in certain circumstances (top of tree not visible, tree in a dense forest, etc.).

## IDENTIFICATION

More important than girth or height is the correct identification of the specimen. A



measurer with good tree knowledge will notice and recognize the most important trees in a collection at glance. Also a pocket guide or cell phone application at hand is a must. Overall and detailed pictures and herbarium material of the specimen trees are always useful for further confirmation of doubtful identification.

### STATE OF HEALTH

The database also mentions the state of health of a tree.

The codes are:

- 5: plant very luxuriant, extraordinary dimensions
- 4: plant in perfect health
- 3: plant not in perfect health: inadequate, weak growth, stress situation, etc.
- 2: plant damaged by storm, frost or other physical damage
- 1: plant is dying
- 0: plant is dead (possible cause can be mentioned)

The database counts 28 097 living trees (December 2015). An overview per state of health is given in Table 1:

*Table 1. Overview of living trees in the BELTREES database per state of health.*

STATE	QUANTITY	% OF LIVING TREES
5	691	2.5
4	24 811	88.3
3	1 663	5.9
2	694	2.5
1	238	0.8

The database contains 1 712 dead trees (5.7 %) which were cut or died of illness or age since the start of the measurements. Many large and high trees have disappeared following bad gales.

### TREE LOCALIZATION

In order to be able to trace back a measured tree at a later time, an exact positioning on a map of each individual is necessary. Zoning the area into numbered plots – easily recognizable by natural boundary lines such as paths, ditches and land use – is useful.

Each specimen should be marked on a map with a unique local tree number. A good starting point is a topographic map of the NGI (National Geographical Institute). For Flanders and Brussels these are found via [www.geopunt.be](http://www.geopunt.be) and for Wallonia on [geoportail.wallonie.be](http://geoportail.wallonie.be).

If available, GPS coordinates are added. Besides the local number (if available) each tree is entered in the database with a unique accession number, “the BDB-number”. So in many cases the BELTREES database indicates two numbers for each tree. Extra information about the location mentioned in the DATA field often helps to find back the right tree on site (e.g.: “along wall, group of 3: easternmost tree measured”).

### ANALYSIS OF THE TAXA

Table 2 lists the most frequently measured trees in Belgium. There are 31 taxa for which more than 200 trees are measured, with *Fagus sylvatica* f. *purpurea* [Ill. 1] being the most popular (1 082 specimens), followed by *Quercus robur* (859).

The database contains 1 859 different living taxa. Half of these are botanical species and half are hybrids or cultivars. About 800 taxa are represented by only one specimen! These are rare and seldom planted species or cultivars. Collections with a lot of trees could check if they have some extra trees of those 800 single member taxa in their possession.

Table 2. List of most frequently measured trees in Belgium (girth >2 m)  
with number of specimens per taxon.

NAME	QUANTITY	NAME	QUANTITY
<i>Fagus sylvatica</i> f. <i>purpurea</i>	1 082	<i>Fagus sylvatica</i> 'Pendula'	312
<i>Quercus robur</i>	859	<i>Taxus baccata</i>	304
<i>Aesculus hippocastanum</i>	748	<i>Acer platanoides</i>	303
<i>Platanus ×hispanica</i>	727	<i>Tilia</i> 'Petiolaris'	292
<i>Fagus sylvatica</i>	689	<i>Ginkgo biloba</i>	281
<i>Castanea sativa</i>	579	<i>Acer pseudoplatanus</i> 'Leopoldii'	274
<i>Sequoiadendron giganteum</i>	515	<i>Tilia cordata</i>	265
<i>Tilia platyphyllos</i>	464	<i>Juglans nigra</i>	255
<i>Fraxinus excelsior</i>	454	<i>Acer saccharinum</i>	251
<i>Liriodendron tulipifera</i>	399	<i>Cedrus atlantica</i> 'Glauca'	250
<i>Quercus rubra</i>	388	<i>Robinia pseudoacacia</i>	248
<i>Taxodium distichum</i>	369	<i>Juglans regia</i>	242
<i>Tilia tomentosa</i>	358	<i>Pseudotsuga menziesii</i>	219
<i>Carpinus betulus</i>	349	<i>Picea abies</i>	209
<i>Tilia ×europaea</i>	337	<i>Salix alba</i>	202
<i>Acer pseudoplatanus</i>	316		



1 – *Fagus sylvatica* f. *purpurea* (BDB 959). Outstanding specimen (840cm at 1m). Chateau de Beloeil [R. Jacobs, 4-05-2009]

About 90 taxa have disappeared from the BELTREES database since the beginning of the measurements in 1985. This means that the measured trees of these taxa are dead but there still can exist not yet measured trees of these taxa in other collections. After cleaning this list (synonyms, taxa with uncertainties about the identity and taxa with unresolved names) 66 missing taxa remain. They are listed in Table 3. Some of them are not very interesting (questionable cultivars as *Acer saccharinum* ‘Wagneri’) obscure or not even trees (e.g. *Disanthus cercidifolius*). Others like *Cornus capitata* and *Drimys winteri* are not hardy enough

for our climate. And some are just annoying and difficult like *Acer caudatum* subsp. *ukurunduense* which is a suckering plant. But some taxa are interesting to access again if possible (e.g. *Magnolia acuminata* var. *subcordata*, *Catalpa fargesii* f. *duclouxii*, *Quercus gambelii*, *Sorbus mougeotii*).

### ANALYSIS OF THE GIRTH

Table 4 gives an overview of the amount of inventoried trees sorted by girth and by category.

Table 3. List of taxa disappeared in BELTREES.

<i>Acer caudatum</i> subsp. <i>ukurunduense</i>	<i>Cupressus macrocarpa</i>	<i>Prunus grayana</i>
<i>Acer</i> × <i>freemanii</i> ‘Elegant’	<i>Disanthus cercidifolius</i>	<i>Prunus mume</i>
<i>Acer caesium</i> subsp. <i>giraldii</i>	<i>Drimys winteri</i>	<i>Quercus gambelii</i>
<i>Acer pseudoplatanus</i> ‘Tricolor’	<i>Eucalyptus pauciflora</i> subsp. <i>niphophila</i>	<i>Quercus petraea</i> ‘Cochleata’
<i>Acer saccharinum</i> ‘Wagneri’	<i>Gleditsia japonica</i>	<i>Quercus robur</i> ‘Purpurascens’
<i>Alnus incana</i> ‘Laciniata’	<i>Ilex</i> × <i>altaclerensis</i> ‘Camelliifolia’	<i>Quercus robur</i> f. <i>variegata</i> ‘Fürst Schwarzenburg’
<i>Alnus maritima</i>	<i>Ilex</i> × <i>koehneana</i>	<i>Rhamnus cathartica</i>
× <i>Amelastorbus jackii</i>	<i>Larix kaempferi</i> ‘Pendula’	<i>Salix arbutifolia</i>
<i>Aralia spinosa</i>	<i>Ligustrum ovalifolium</i>	<i>Salix magnifica</i>
<i>Betula corylifolia</i>	<i>Magnolia acuminata</i> var. <i>subcordata</i>	<i>Sorbus americana</i> ‘Belmonte’
<i>Betula ermanii</i> ‘Grayswood Hill’	<i>Magnolia sinensis</i>	<i>Sorbus aria</i> ‘Gigantea’
<i>Betula utilis</i> var. <i>jacquemontii</i> ‘Silver Shadow’	<i>Magnolia</i> × <i>thompsoniana</i> ‘Olmenhof’	<i>Sorbus aucuparia</i> ‘Fastigiata’
<i>Caragana arborescens</i>	<i>Malus kansuensis</i> var. <i>calva</i>	<i>Sorbus cashmiriana</i>
<i>Carpinus betulus</i> ‘Variegata’	<i>Picea abies</i> Columnaris Group	<i>Sorbus mougeotii</i>
<i>Catalpa bungei</i>	<i>Picea brachytyla</i> var. <i>rhombisquamea</i>	<i>Sorbus vilmorinii</i>
<i>Catalpa fargesii</i> f. <i>duclouxii</i>	<i>Pinus aristata</i>	<i>Stewartia sinensis</i>
<i>Celtis occidentalis</i> var. <i>pumila</i>	<i>Pinus cembra</i> ‘Compacta Glauca’	<i>Thuja occidentalis</i> ‘Gracilis’
<i>Cercis canadensis</i> var. <i>texasensis</i>	<i>Pinus flexilis</i> var. <i>reflexa</i>	<i>Thuja occidentalis</i> ‘Wareana Lutescens’
<i>Chamaecyparis obtusa</i> ‘Ericoides’	<i>Pinus parviflora</i> ‘Blue Giant’	<i>Ulmus crassifolia</i>
<i>Chamaecyparis thyoides</i> ‘Andelyensis’	<i>Populus</i> × <i>canadensis</i> ‘Raverdeau’	<i>Ulmus glabra</i> ‘Lutescens’
<i>Cornus capitata</i>	<i>Populus</i> × <i>canescens</i> ‘Macrophylla’	<i>Ulmus minor</i> ‘Louis Van Houtte’
<i>Cupressus bakeri</i>	<i>Prinsepia sinensis</i>	<i>Ulmus procera</i> ‘Argenteovariegata’

Table 4. Inventoried trees sorted by girth and by category.

GIRTH	TOTAL QUANTITY	QUANTITIES PER CHAMPION CATEGORY					
		**	*	°	.	-	OTHER
> 7 m	81	13	19	9	6	25	9
6-7 m	235	13	23	46	42	21	90
5-6 m	1 004	25	45	63	86	93	692
4-5 m	3 004	69	108	133	126	214	2 354
3-4 m	6 056	112	217	276	384	249	4 818
2-3 m	7 558	175	363	472	539	252	5 757
1-2 m	6 409	298	600	622	630	178	4 081
< 1 m	3 467	250	708	562	365	62	1 520
<b>Total</b>	<b>28 097</b>	<b>960</b>	<b>2 089</b>	<b>2 196</b>	<b>2 185</b>	<b>1 105</b>	<b>19 562</b>

Table 5. Most frequently measured trees with girth &gt; 6 m.

NAME	NUMBER PER TAXON
<i>Sequoiadendron giganteum</i>	74
<i>Fagus sylvatica</i> f. <i>purpurea</i>	37
<i>Castanea sativa</i>	28
<i>Quercus robur</i>	27
<i>Tilia platyphyllos</i>	26
<i>Platanus ×hispanica</i>	23
<i>Fagus sylvatica</i>	19
<i>Salix alba</i>	11
<i>Cedrus libani</i>	9
<i>Tilia ×europaea</i>	9
<i>Tilia cordata</i>	8
<i>Platanus orientalis</i>	6
<i>Liriodendron tulipifera</i>	5
<i>Populus ×canadensis</i>	5
<i>Fraxinus excelsior</i>	3
<i>Acer pseudoplatanus</i> , <i>Carpinus betulus</i> , <i>Populus ×canadensis</i> 'Marilandica', <i>Taxodium distichum</i> , <i>Tilia tomentosa</i>	2
<i>Acer pseudoplatanus</i> f. <i>purpureum</i> , <i>Aesculus hippocastanum</i> , <i>Ailanthus altissima</i> , <i>Catalpa bignonioides</i> , <i>Cedrus atlantica</i> , <i>Fraxinus excelsior</i> 'Pendula', <i>Ginkgo biloba</i> , <i>Pinus nigra</i> subsp. <i>nigra</i> , <i>Pterocarya fraxinifolia</i> , <i>Quercus petraea</i> , <i>Quercus ×rosacea</i> , <i>Quercus rubra</i> , <i>Salix ×rubens</i> , <i>Taxodium distichum</i> 'Pendens', <i>Thuja plicata</i> , <i>Ulmus procera</i>	1

There are 316 trees with a girth of more than 6 m. They belong to a limited quantity of taxa with *Sequoiadendron giganteum* unsurprisingly as the most frequent (74 specimens > 6 m) followed by *Fagus sylvatica* f. *purpurea*: see Table 5.

From the trees listed in Table 5, 81 trees measure more than 7 m and 22 trees even more than 8 m. Those are listed in Table 6.

On analysing Table 6 one will notice differences in the measuring dates of these trees. As a consequence the real actual sequence of some trees in this list can be different. This is an inherent disadvantage of the ranking methodology, but it can be a motivation to locate and revisit the trees which have measurements dating back to previous century.

Surprisingly, the thickest tree in this list isn't a champion. The data mentions an old fused hedge base, measured at the base but very beautiful. So it is listed as a remarkable tree and can't join the ranking since it does not have a single stem and couldn't be measured at 1.5 m. The latter is the case for most of the trees in this list mentioned as remarkable or without rank symbol.

Over the years a few of those biggest trees were measured several times. Table 7 gives an overview of their average yearly growth rates:



Table 6. Thickest trees (>8 m girth).

NAME + BDB NUMBER	RANK	GIRTH (CM) @ 1.5 M	YEAR LAST MEASURE	LOCATION
<i>Fagus sylvatica</i> (BDB 28293)	-	1 200 (@base)	1999	Stoumont, Liège
<i>Quercus robur</i> (BDB 326) [Ill. 2]	**	995	2006	Eghezee (Liernu), Namur
<i>Fraxinus excelsior</i> 'Pendula' (BDB 27467)	-	980	1994	Chateau de la Catoire, Leuze-en-Hainaut (Blicquy), Hainaut
<i>Platanus ×hispanica</i> (BDB 2060)	-	940 (@0.5m)	1987	Chateau du Saulchoy, Soignies, Hainaut
<i>Platanus ×hispanica</i> (BDB 13138)	-	923 (@1m)	2008	Gemeentepark De Kwabeek, Boutersem, Vlaams-Brabant
<i>Sequoiadendron giganteum</i> (BDB 2092) [Ill. 3]	**	922	2013	Domaine du Rond-Chêne, Esneux, Liège
<i>Castanea sativa</i> (BDB 8383)	**	919	2014	Schoubroek Kasteel, Lovendegem (Vinderhoute), Oost-Vlaanderen
<i>Tilia platyphyllos</i> (BDB 7766)	-	918 (@base)	2004	Vordenstein, Schoten, Antwerpen
<i>Cedrus libani</i> (BDB 7595)		909 (@base)	2004	Ommerstein, Dilsen (Rotem), Limburg
<i>Platanus ×hispanica</i> (BDB 963)		903 (@0.7m)	2007	Chateau de Beloeil, Beloeil, Hainaut
<i>Castanea sativa</i> (BDB 28769)		900 (@base)	1995	Chateau de Franc Waret, Fernelmont (Franc-Waret), Namur
<i>Taxodium distichum</i> (BDB 2419)	**	897	2012	Chateau de Marchienne, Mons (Harveng), Hainaut
<i>Tilia platyphyllos</i> (BDB 726)	**	885	2007	Ciney (Conneux), Namur
<i>Platanus orientalis</i> (BDB 4324)	-	860 (@0.5m)	2001	Chateau d'Agbiermont, Beauvechain (Nodebais), Brabant Wallon
<i>Populus ×canadensis</i> 'Marilandica' (BDB 4917)	-	850	1989	Geraardsbergen, Oost-Vlaanderen
<i>Fagus sylvatica</i> f. <i>purpurea</i> (BDB 959)	-	840 (@1m)	2015	Chateau de Beloeil, Beloeil, Hainaut
<i>Fagus sylvatica</i> (BDB 5630)	**	837	1996	Houffalize (Mabompre), Luxembourg
<i>Quercus robur</i> (BDB 28464)	-	825 (@base)	1997	Bastogne (Noville), Luxembourg
<i>Tilia cordata</i> (BDB 21809)	-	820	1997	Nannut (Petit-Hallet), Liège
<i>Quercus ×rosacea</i> (BDB 28974)	-	815	1992	Viroinval (Olloy-sur-Viroin), Namur
<i>Sequoiadendron giganteum</i> (BDB 2138)	*	814	2006	Arboretum Louis Empain, Esneux, Liège
<i>Fagus sylvatica</i> (BDB 4354)		810 (@base)	1989	Closerie du Rond-Chêne, Esneux, Liège



2 – *Quercus robur* (BDB 326). Champion tree (995cm in 2006) Eghezee (Liernu) [R. Jacobs, 22-11-2011]



3 – *Sequoiadendron giganteum* (BDB 2092). Champion tree (922cm in 2013). Domaine du Rond-Chêne, Esneux [R. Jacobs, 1-09-2013]

Table 7. Overview average growth rates of some of the biggest trees in BELTREES.

NAME + BDB NUMBER	GROWTH RATE (CM/YEAR)
<i>Taxodium distichum</i> (BDB 2419)	6.20
<i>Sequoiadendron giganteum</i> (BDB 2092)	5.83
<i>Cedrus libani</i> (BDB 7595)	4.43
<i>Tilia platyphyllos</i> (BDB 726)	3.44
<i>Fagus sylvatica</i> f. <i>purpurea</i> (BDB 959)	3.41
<i>Castanea sativa</i> (BDB 8383)	2.96
<i>Quercus robur</i> (BDB 326)	0.60

Obviously one cannot use these figures as general average growth rate for the species, but this gives an indication of the differences in growth rate according to the species. *Quercus robur* (BDB 326) with its growth rate of 0.6 cm/year is clearly not average for the species. It refers to our thickest champion tree in

Liernu “Gros Chêne de Liernu”, a tree of about 700 years old according to the literature (some even say 1000 years but that is surely an exaggeration). The tree is completely hollow so no measurement of growth rings is possible. Until the 1980’s, it still had a growth rate of 2 cm/year; but the tree has clearly been declining the last years. It should be noted however that thanks to the large number of measurements in the BELTREES database, it is possible to calculate an average and trustworthy growth rate per taxon. This could be the subject for a next article.

### MEASUREMENTS PER REGION

About 50 % of the trees listed in BELTREES grow in Wallonia which is less than you would expect by its total surface (55 % of Belgium)

Table 8. Measurements per region.

REGION	QUANTITY OF TREES	%	QUANTITY OF COLLECTIONS	%	AREA PER REGION (KM <sup>2</sup> )	%
Flanders	10 905	38.8	379	33.4	13 522	44.3
Wallonia	14 114	50.2	622	54.9	16 844	55.2
Brussels	3 078	11.0	132	11.7	162	0.5
<b>Total</b>	<b>28 097</b>		<b>1 133</b>		<b>30 528</b>	

and the important forested areas in the south of the country. The Brussels region counts for 11 % of all measures although it only counts for 0.5 % of the surface of Belgium.

This is explained by the high density of collections in this region (0.8 collections per km<sup>2</sup>) compared to Flanders (0.3) and Wallonia (0.35) and because its collections belong to the most inventoried in the context of BELTREES.

## THE DATABASE BELGARD

The BELGARD database is a part of BELTREES. It is the list of all participating collections (all parks, gardens, estates,... where trees have been measured). It contains all possible relevant information about each collection (code, address, owner and/or person in charge, public or private, surface, accessible or not or only by appointment...). It may also list such information as the date of foundation, historical and aesthetic value. Every important park or collection has received a unique 5 lettered code. Two extra codes are used: the code "ISOLE" for trees not located in a specific park and the code "VARIA" for smaller parks without their own code. In this case the address is given in the data field. The database lists 1 130 important collections.

The collections are also ranked by dendrological value. To formalize the ranking of the parks in BELGARD a number of quantifiable guidelines were developed:

D5: highest score: needs at least two points out of 3:

- ≥75 entries
- ≥ 5 champion trees (\*\*)<sup>3</sup> or 2 of \*
- ≥ 40 special trees (\*\*, \*, °, ., -, -)

D4: needs at least two points out of 3 or one point from D5:

- ≥40 entries
- >1 champion trees (\*\*) or 2 of \*
- ≥ 15 special trees (\*\*, \*, °, ., -, -)

D3: needs at least two points out of 3 or one point from D4:

- ≥20 entries
- 1 champion tree (\*\*) or 2 of \*
- ≥5 special trees (\*\*, \*, °, ., -, -)

D2: >at least one special trees (\*\*, \*, °, ., -, -)

D1: no special trees (\*\*, \*, °, ., -, -)

D4 and D5 are the collections which would be recommended to foreign visitors (comparable with the Michelin stars: merits a trip, deserves a detour).

This ranking was revised by a team of experts, tree measurers and members of the BDB board by region (Flanders, Brussels and Wallonia). In this evaluation extra criteria such as collection diversity, historical aspects, clear and correct labeling or young plantations of future interest (not yet in BELTREES) were taken into account which could overrule the theoretical ranking. This exercise was a good base to determine the priority collections to

<sup>3</sup>) (\*\*) the biggest of a specific taxon, (\*) the 3 next, (°) the 6 following, (.) the 10 following, (-) remarkable or well-known but not running in the ranking

revisit (to update the BELTREES data). Some parks have been visited many years ago and possibly not very thoroughly. For those the actual ranking might be unsatisfactory. Therefore, it is important to take the date of the last measurement into consideration. Often outdated inventories are incomplete. In order to actualize the database, the collections to be revisited have been identified and assigned to the various teams of measurers in each region. Again, it is hoped that following these updated measurements, the owners will be encouraged to give extra care to their collection.

At the moment 1 110 of the 1 130 collections in BELGARD have been evaluated and received a dendrological rating. The quantity per rating is listed in Table 9:

*Table 9. Quantity of collections per rating and per region.*

RANKING	QUANTITY	BRUSSELS	FLANDERS	WALLONIA
D5	28	3	13	12
D4	51	4	23	24
D3	210	24	89	97
D2	615	50	193	372
D1	206	49	47	110
unranked	20	3	9	8
<b>Total</b>	<b>1130</b>	<b>133</b>	<b>374</b>	<b>623</b>

Of the 1 130 collections in BELGARD 55 % are found in Wallonia, 33 % are in Flanders and about 12 % are in Brussels. Immediately noticeable is the big quantity of D2 and D1 collections in Wallonia compared to Flanders. It seems measurers in Wallonia took more effort in measuring small collections in the past. Especially via “Région Wallonne”, the Wallonian government a lot of trees have been measured.

Some unrated collections may have many interesting young plants but no measurements. The ranking isn't static or an indisputable fact. It only gives a first indication about the dendrological quality of the collection. This is work in progress.

Collections with a D5 rank at the moment are listed in Table 10.

The desire for a higher rating can be a stimulus for collection holders to carry out additional plantings in order to rejuvenate the collection, to ameliorate the labeling system and to provide space to champion trees by cutting less valuable trees in the immediate vicinity.

## CONCLUSION

The BELTREES database gathers a lot of interesting and valuable data about remarkable trees in Belgium and the collections in which they grow. The aim is to contribute to the public awareness and conservation of the remarkable and rare trees of Belgium. The database also has a historical value. It gives an idea of species planted in the past and of the regional distribution in Belgium. The ranking of the collections gives an impression about the dendrological value of those collections. Hopefully it can be a stimulus to visit them more often and keep them safe and sound for the next generations. The BELTREES database is a never ending team work which considers a lot of enthusiastic people spending a lot of time measuring and remeasuring trees. But by measuring trees we keep an eye on them, see how they evolve, learn more about their differences and peculiarities and appreciate their existence even more. So if you feel an urge to go and measure trees, join the BELTREES measurers. Your work will be very much appreciated.

*Table 10. Collections with rank D5 in 2015.*

NAME	CITY	PR
Arboretum de Bertrix	Bertrix	LX
Arboretum van Bokrijk	Genk	LM
Arboretum de la Citadelle	Namur	NM
Arboretum Groenendaal	Hoeilaart	VB
Arboretum Kalmthout	Kalmthout	AN
Arboretum Het Leen	Eeklo	OV
Arboretum Robert Lenoir	Rendeux	LX
Arboretum Saint Michel	Saint-Hubert	LX
Arboretum van Tervuren	Tervuren	VB
Arboretum de la Tessenire, Promenade Delsaux	Esneux	LG
Arboretum Wespelaar	Haacht (Wespelaar)	VB
Bois-Saint-Jean (Sambree)	La-Roche-en-Ardenne	LX
Botanische tuin, Universiteit Gent	Gent	OV
Chateau de Reux	Ciney (Conneux)	NM
Closerie du Rond Chêne	Esneux	LG
Domaine de Mariemont	Morlanwelz	HN
Esneux	Esneux	LG
Hemelrijk	Essen	AN
Herkenrode	Haacht (Wespelaar)	VB
Hof ter Saksen	Beveren	OV
Huizingen Provinciaal Domein	Beersel (Huizingen)	VB
Jardin Botanique de Bruxelles	St-Josse / St-Joost-ten-Node	BR
Jardin Botanique de Liège	Liège	LG
Kappelleberg	Herent (Winksele)	VB
Parc de Woluwe / Park van Woluwe	St-Pieters-Woluwe / Woluwe St-Pierre	BR
Parc Tenbosch / Park Tenbos	Ixelles / Elsene	BR
Pinetum Anthoine	Ham-sur-Heure-Nalinnes (Jamioulx)	HN
Plantentuin Meise	Meise	VB
Provinciaal Domein Rivierenhof	Antwerpen (Deurne)	AN
Royal Golf Club du Ravenstein	Tervuren	VB