Case Studies in Veteran Tree Management

Examples from across Europe

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Case Studies in Veteran Tree Management 1

Oak of Tronjoy – Bulat Pestivien - France
Fostering the resilience of an veteran oak

Photos : *Mickaël Jézégou*
Croquis *: Christophe Drénou et Pierre Bazin (Aubépine)*

Foster the resilience of an veteran oak
Oak of Tronjoy – Bulat Pestivien - France

The millenium oak of Tronc Joly in Brittany (France) is one of the oldest and largest oaks in Europe. It is a private tree, growing behind an old farm, near a water spring. This veteran oak is a probable pollard. The cultural, scientific and social values of this tree are indisputable. It is associated with several Celtic legends. One of them tell of a monk who would establish a library inside its hollow trunk during the 18th century.

Recently, Christophe Drénou, a French researcher, used this tree to develop a thesis on the aging of trees in relation to their architecture.

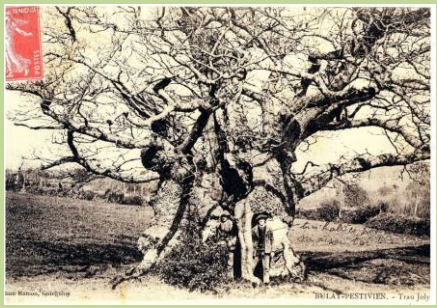
Tree details

Species	Quercus robur
Age	1000 ans +/- 200 years
Girth	12,5 m
Height	22 m
Diameter of the crown	15 m

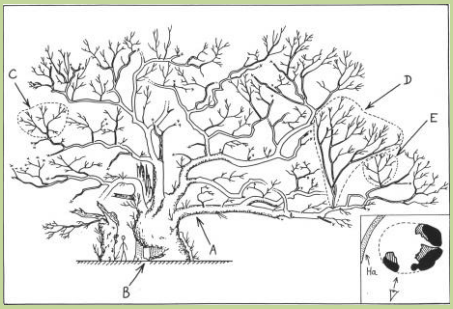
Photos : *Mickaël Jézégou*
Croquis *: Christophe Drénou et Pierre Bazin (Aubépine)*

Foster the resilience of an veteran oak
Oak of Tronjoy – Bulat Pestivien - France

Understanding the aging phenomenon of a veteran tree: an essential step



The oak at the beginning of 1900's

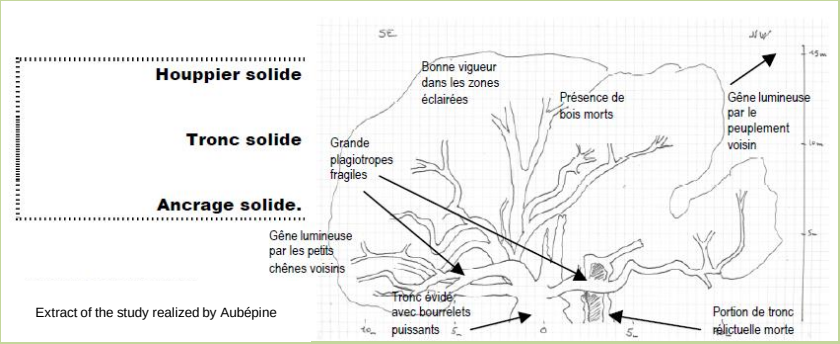


The oak in 1992 - Extract of the thesis of Christophe Drénou

Before managing a veteran tree, it is necessary to understand how the tree is growing and aging. In this case, the study of the researcher Christophe Drénou proposed a crown without hierarchical units. There is no single, dominant trunk, but a colony of complex reiterations. We can compare this subject to a colony tree.

Foster the resilience of an veteran oak
Oak of Tronjoy – Bulat Pestivien - France

Identify and specify suitable management options



Extract of the study realized by Aubépine

In 2009, with the agreement of the owner, this tree of national interest was the subject of a study funded by a local authority (Conseil départemental des Côtes d'Armor) and carried out by a consultant (Aubépine).

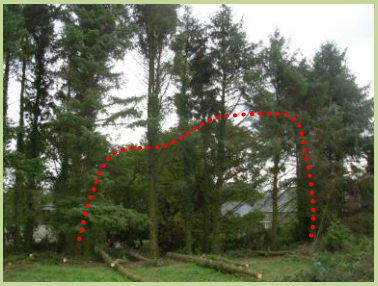
Foster the resilience of an veteran oak
Oak of Tronjoy – Bulat Pestivien - France

The study provides a set of potential objectives and identifies management options. The main problem identified was the neighboring trees, more than 20m in height (*Picea stichensis*), shading the oak. The lack of light causes the weakening of the colony of reiterations. To foster the resilience, the consultant proposed to bring light in, by cutting the spruces gradually.

In addition, two other problems were identified:
- mechanical fragility of several main branches,
- slight compaction of the soil by pedestrian visits

Foster the resilience of an veteran oak
Oak of Tronjoy – Bulat Pestivien - France

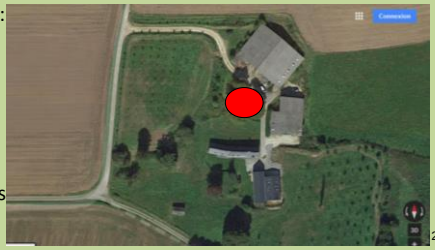
The management of a veteran tree must necessarily be progressive



2010

2015

The works were done in phases, funded by the owner:
- 2010: cut of half of the spruces allowing more light to reach the oak.
- 2012: planting of an apple orchard behind the spruce, in advance of felling, to protect the oak in the future.
- 2014: cut of the second half of the spruces,
- 2015: construction of props on three main branches and mulching at the base of the tree.



2015

Foster the resilience of an veteran oak
Oak of Tronjoy – Bulat Pestivien - France

2016: appearance of new reiterations on the trunk and branches = The future of this veteran tree

Case Studies
Veteran Tree Management
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Old oak with a large branch at risk of failure

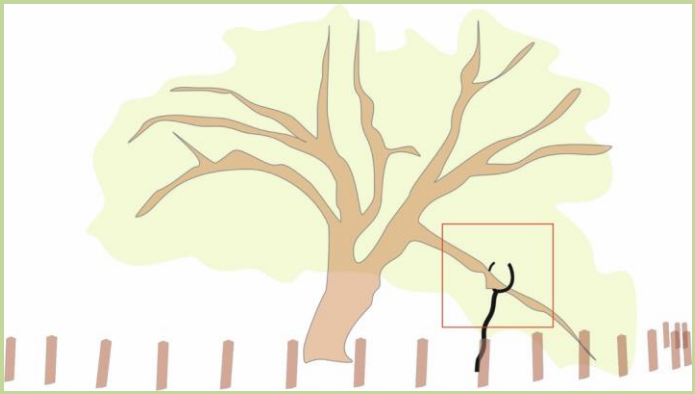
Urban environment, Spain

Old oak with a large branch at risk of failure

Description of the tree: Oak of ”Can Farga”. Old Oak, located in a urban environment. Spain.

Description of the problem: Some of the lower branches are bending low and there concerns that they will break

Old oak with a large branch at risk of failure



Sketch of the proposed intervention and the possible location of a prop.

Solution: Placing a dynamic support to avoid breakage of the lower branches. It is planned to make other 4 supports in the future for other branches.

Solutution: Sketch of the mechanism devised to prevent the branch from failing while still allowing the tree to move

Old oak with a large branch at risk of failure

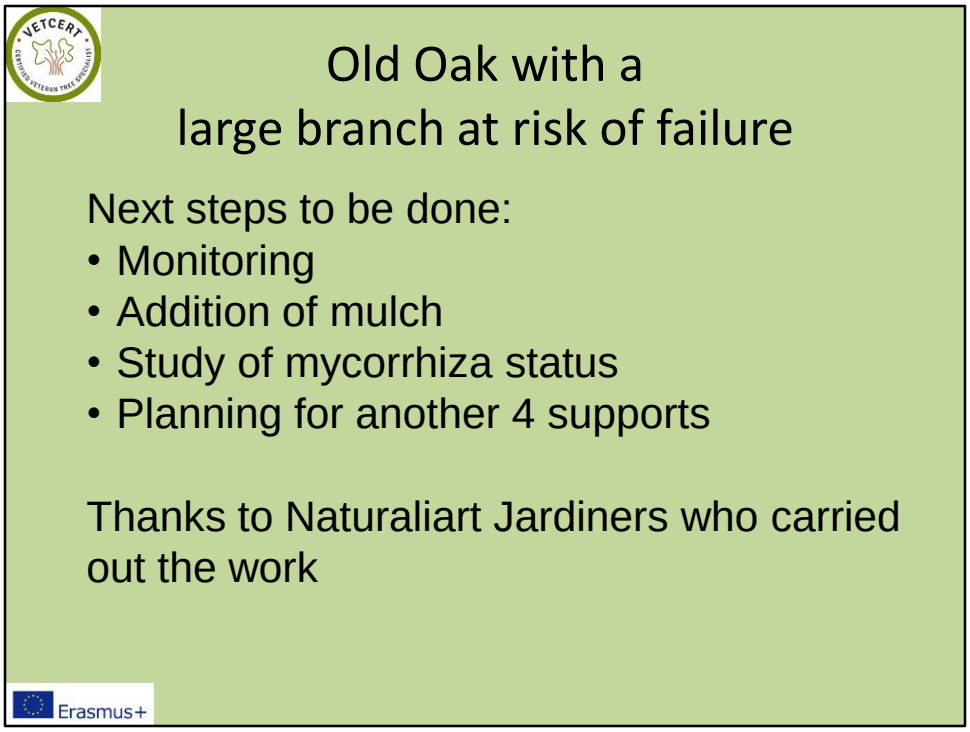
Solution: Manufacture of the support structure, and installation.

Old oak with a large branch at risk of failure

Solution: Detail of the first dynamic support for a lower branch

Small area at base of tree protected to prevent the accumulation of rubbish in the hollow trunk.

It’s planned to make other 4 supports to add to the existing one.



Next steps: Monitoring, addition of mulch, study of the mycorrhiza status

Planing for 4 more supports

Case Studies in Veteran Tree Management 3

Reduced horse-chestnut near house

Lipové Lázně, Czech Republic

Reduced horse-chestnut near house

Photos: Irena Vágnerová, 2004

- *Aesculus hippocastanum* L.
- Between a **busy road and house**.
- Repeatedly reduced in the past.
- **Trunk and branch decay**

Photos after the treatment 2004.

Description of the tree:

Lipové Lázně, house no. 179.
Height: 15 m, Trunk height: 3.5 m, Crown diameter: 10 m, Trunk diameter: 105 cm.

Tree protected by law as a Significant Landscape Element for aesthetic reasons.

Description of the problem:

The tree is placed in stressful environment with a high frequency of pedestrian and vehicles.

In the past the tree has been reduced repeatedly.

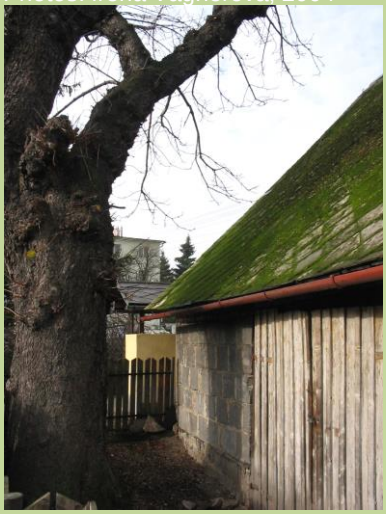
In 1996 – pruning of secondary crown, installation of static cabling system to three main axis.

In 2004 – new secondary shoots damaged the roof, the cabling system was revised together with pruning and reduction of secondary shoots above the roof (see photos).

Reduced horse-chestnut near house

Photos: Irena Vágnerová, 2004

Photos after the treatment 2004.
Cabling system of three main branches.



Photos after the treatment 2004.
Reduced secondary shoots under the roof.

Erasmus+

Description of the problem:

The previous (1996) cabling system was a combination of steel rope, metal components and synthetic straps. When checked in 2004 it was considered to be in good condition. However, according to current knowledge it should be replaced with static cabling and slip plates so as not to combine static and dynamic material properties and have smaller probability of ingrowth.

Reduced horse-chestnut near house

Photos: Irena Vágnerová, 2007.

Tree was assessed again in 2007 and 2009.

In 2009 further treatment (pruning) was recommended.

Tree assessment being carried out in 2007.

Tree was considered to be in good condition in 2007 and 2009 and further treatment was recommended – to prune the tree

Shoot reduction - pollarding

Photos: Irena Vágnerová, 2010

Pruning carried out in 2010. Reduction is now planned for every 3 years

Solutions (work carried out in 2010):

Tree reduction on 6 years of growth - the beginning of regular pollard management.

Discussion/Alternative options:

The plan to prune the tree every 3 years is based on the recommendation in the Czech standard for regular pollarding of (younger) trees. Is this the best option for a veteran tree? What is the most appropriate time to leave between pruning?

Cabling reinstallation

Photos: Irena Vágnerová, 2010

Cabling reinstallation in 2010.

Solution:

The cabling system was reinstalled – a combination of steel ropes and textile case was used. According to the current standard this combination would be considered inappropriate but the arborist probably did not consider that this was a problem and replaced the original system. The shape of installation in the triangle is however considered to be appropriate.

Discussion/alternative options:

As the tree was pruned and the crown has been reduced was it necessary to brace it?

Is the use of three cables an over reaction? Perhaps fewer cables would be sufficient?

However, because a static cable system has been installed since 1996 the tree may be 'relying' on the cabling and this could be why they were all replaced.

Case Studies in Veteran Tree Management 4

Translocating bat habitat in the UK

Dead tree with habitat feature

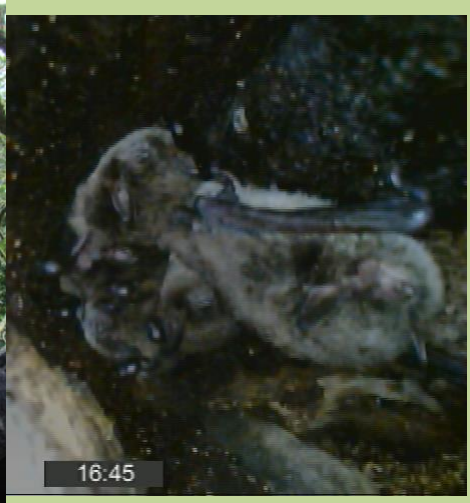
Description of the tree:

A beech tree standing within the grounds of a children's outdoor education centre died within a short period of time.

Description of the problem:

Concerns over the safety of the tree lead to a recommendation to remove it. Prior to removal the tree was subject to an aerial inspection for bats, during which bats were found in a wound on a branch.

Dead tree with habitat feature



Erasmus+

Description of the problem:

Picture of wound and bats in residence. Two species of bats were recorded using the hole at different times of the year.

Sectional dismantle

Solution:

The branch with the hollow was removed and lowered to the ground. The work was carried out under a protected species licence.

Solution:

The section of the branch with the hollow was resurrected on a nearby tree. During monitoring visits afterwards a bat was found roosting in it. Only one of the two bat species originally recorded in the feature have been recorded since it was moved.

Case Study
Veteran Tree Management
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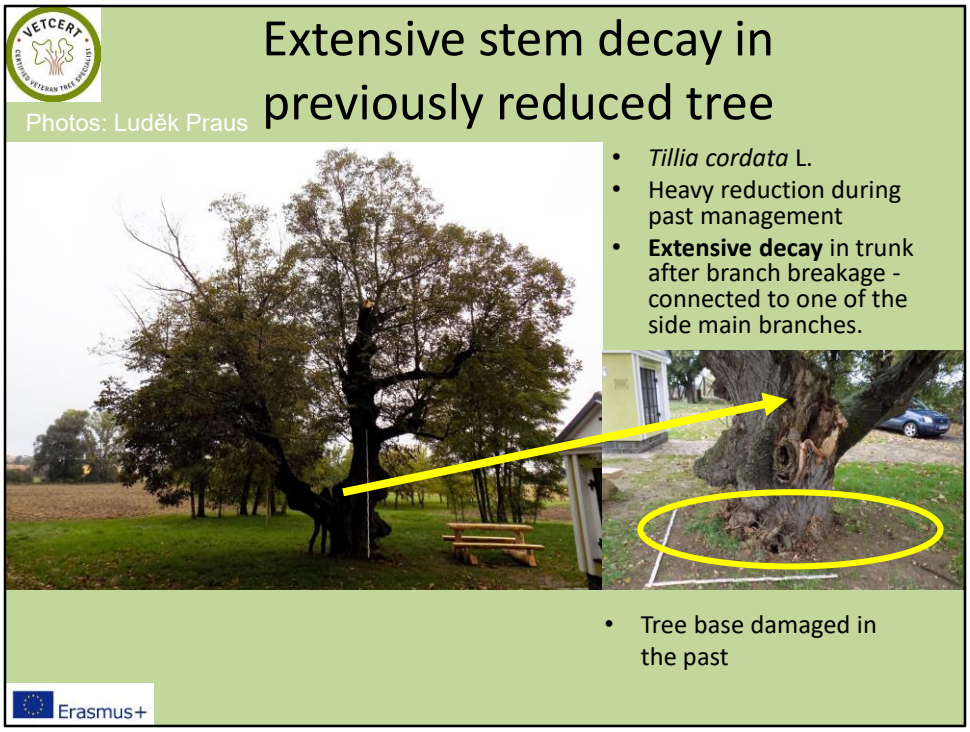
Extensive stem decay in a *Tilia cordata*

Vnorovy, Czech Republic



Description of the tree:

Vnorovy, 48°56'14.567"N, 17°20'45.547"E

Height: 10.5 m, Trunk height: 1 m, Crown diameter: 8 m, Trunk diameter: 105 cm.

Description of the problem:

The area has small chapel, much visited by tourists, and a bench and table under the tree.

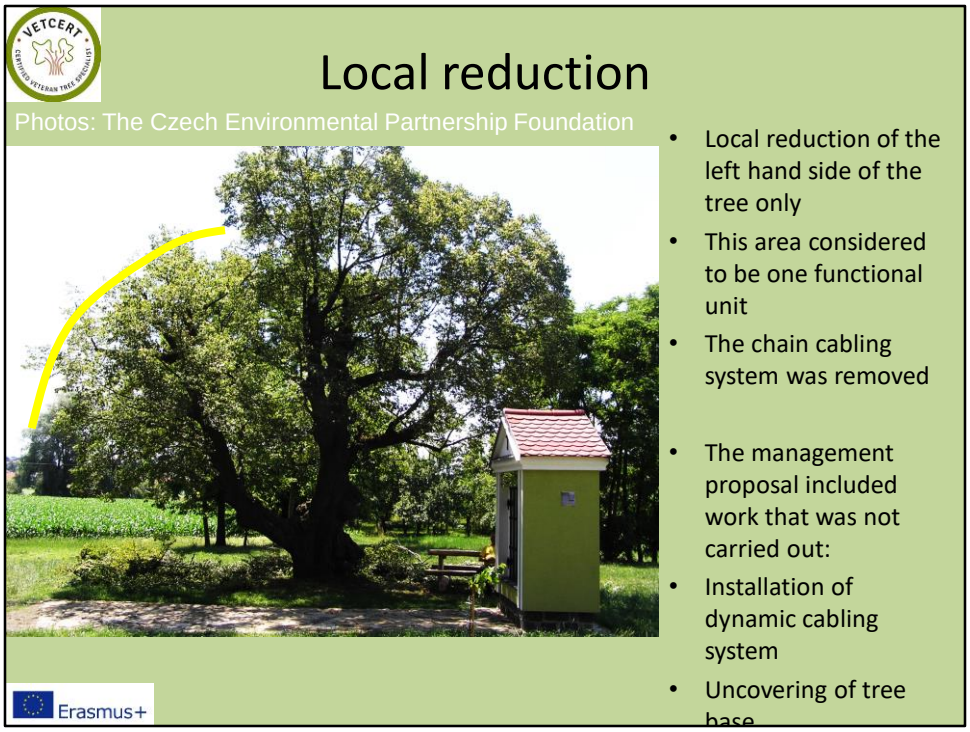
The base of the tree has been damaged and had material piled against it

Extensive stem decay in previously reduced tree

Photos: Luděk Praus

Extensive decay is a valuable part of tree habitat, but it may increase the risk of failure of a side branch.

Old static cabling system – The chain (in a textile protective case) is not functional as it is loose. It does not stabilize the weak forks.



Solution/Management recommendation: The tree responded well to a previous heavy reduction on the left hand branch which was pruned to reduce the load on the decaying stem and reduce the torsion effect. The chain cabling was removed because it was not functional and was damaging the branches.

Discussion/Alternative options:

1. One management proposal was not carried out, which was to remove the material at the base of the tree.
2. It was also proposed to install a dynamic bracing system but it is unknown why this was not done
3. The main trunk could also have been reduced. The tree reacted well to previous management and is in good light. The decision may have been influenced by the extent of decay and shoot size. If there is long-term plan to manage this tree some shoot reduction could be carried out in the next phase.

Case Studies in Veteran Tree Management 6

Hollowing oak trees in public park, UK.

Hollowing trees – concerns over safety

Description of trees:

Two large oak trees in a public park in the UK. Report of a man living in the tree who had been excavating at the base.

Description of the problem:

• One tree was found to have an opening and cavity that several people could climb into, the extent of the hollowing was assesed, the t/R ratio was found to be approximately 1/5.

• The second tree had *Cerioporus squamosus* (syn. *Polyporus squamosus)* fruting bodies evident at top of stem near a bifurcation. A tomograph was undertaken at base the of the stem and it was found to be hollow.

• The ground around the trees was compacted due to footfall and use of ride-on grass mowers.

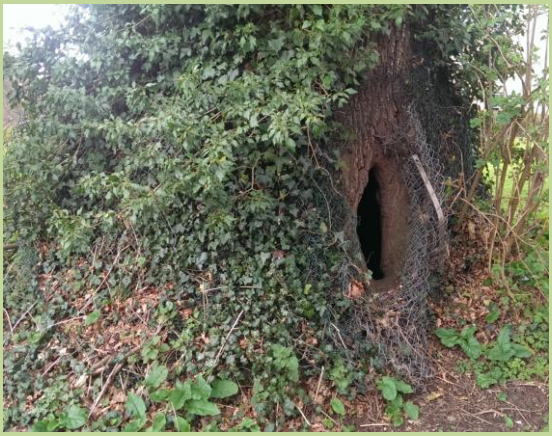
• There was a well used footpath next to the first tree.

Hollowing trees – concerns over safety

Description of problem:

Footpath beneath tree

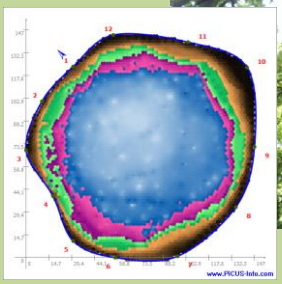
Hollowing trees – concerns over safety



Details of problem: Tree 1

- Tree cavity at base could be climbed into.
- This tree was the focus of some anti-social behaviour.
- The t/R ratio was approximately 1/5

Hollowing trees – concerns over safety



(@ 50cm above ground level)

Erasmus+

Details of problem: Tree 2

The tomograph undertaken near the base of the tree showed that the tree was mostly hollow. A column of decay extended to where the stem bifurcated at approximately 3.5m. *Cerioporus squamosus* (syn. *Polyporus squamosus)* fruting bodies evident in a cavity at top (see photo) .

Fencing tree and move footpath

Solution:

Trees were fenced and the footpath moved to reduce the likelihood of people walking underneath and therefore reduce the risk posed by these trees.

The fencing also restricted the use of ride-on grass mowers beneath the trees, removing a source of compaction.

Crown reduction

Solution:

Both trees were crown reduced with approximately 2m removed from the top to reduce the biomechanical forces acting on the trees.

Planting of flowering species

Solution:

Local volunteer groups planted a range of flowering plants to improve nectar resource for adult stage of saproxylic invertebrates

Case Studies in Veteran Tree Management 6

Protecting the roots of a veteran tree and its soil environment during the urban development process

Roubaix - France

Source : *Vincent Coomans Ville de Roubaix*

Protection of roots of a veteran tree and soil environment
Treatment of a veteran tree during an urban development process
Roubaix - France

In Roubaix, a veteran purple beech, planted in 1840 in the center of an old farm, was the subject of special care for root protection by local authorities. In 2014, the farm was bought by the Conseil departemental du Nord for the construction of a new school. This local authority in connection with the city of Roubaix decided to make this veteran tree the central element of the new school. For this, drastic measures have been taken to protect the root system of the old beech. This example describes the necessity of protection of the soil environment around veteran trees. Protection should not involve any change in the level of its soil or compaction. Any modification of the soil environment would result the death of the tree.

Beech before works in the old farm

Personal record form

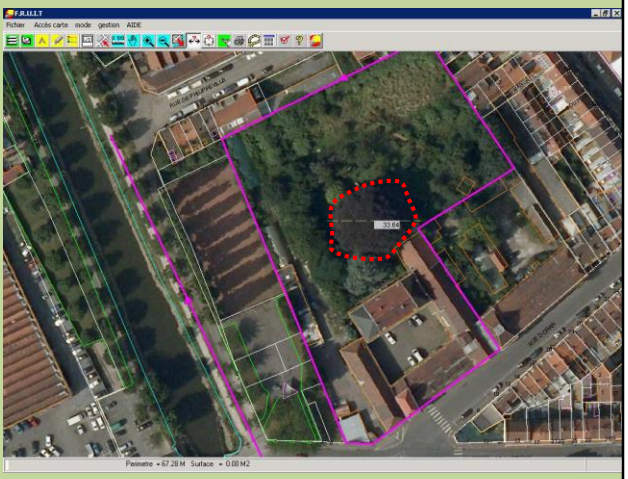
Specie	Fagus sylvatica var Purpurea
Date of plantation	1840
Girth	4,60 m
Height	30 m
Diameter of the crown	30 m

Protection of roots of a veteran tree and soil environment
Treatment of a veteran tree during an urban development process
Roubaix - France

First step: Make a diagnosis of the tree and the soil environment

The veteran beech was planted in a natural area in the old farm. This tree is in a good physiological state (A - very good) and mechanical state (A - very good) and exceptional for its age.

The diagnosis revealed that the soil around the tree was not compacted or disturbed in any way, but it was important to ensure no damage occurred while the building work was carried out.

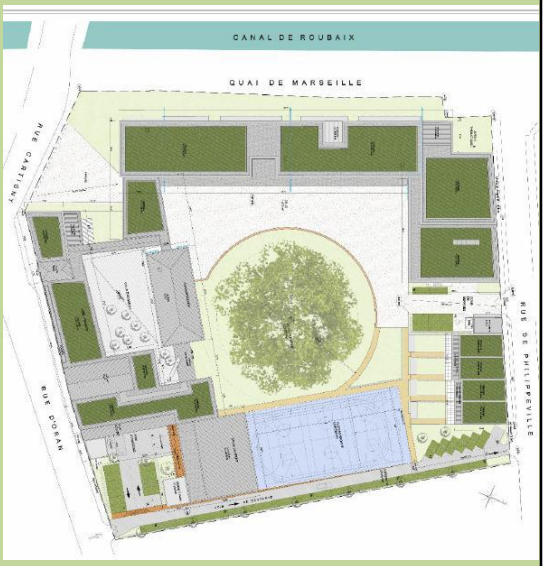


Aerial view of the area before work

Protection of roots of a veteran tree and soil environment
Treatment of a veteran tree during an urban development process
Roubaix - France

Second step: management recommendation

For this project, the work would last several months. Specific protection under the crown was required. It was recommended to set up a wooden palisade with a height of 2 meters around the tree. The purpose of this protection was to avoid the repeated passage of construction machinery and the storage of materials (earth, sand, stones, rubble, cement bags, etc.) near the tree causing soil compaction, thus causing the asphyxiation of the superficial roots and reducing water absorption of the soil. Compaction is a problem that can cause the decline of many trees. Therefore, the movement of machinery and the storage of materials in the rooting area corresponding to the extent of the crown to the ground was prohibited.



Plan of the new school with the protection area around the veteran tree

Protection of roots of a veteran tree and soil environment
Treatment of a veteran tree during an urban development process
Roubaix - France

Third step: monitoring the protection of the veteran tree during the work

Erasmus+

The veteran purple beech after the construction

Case Studies in
Veteran Tree Management
7

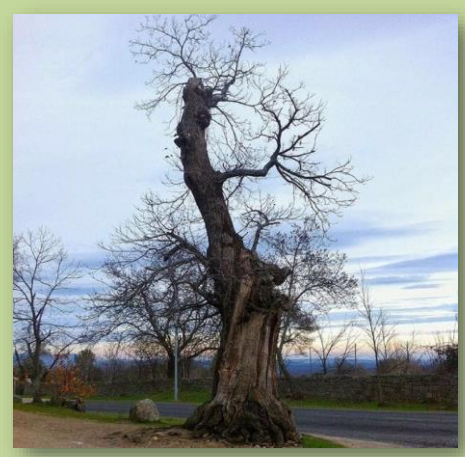
Treatment and ground decompactation in a 200 year old *Castanea sativa* in San Lorenzo de El Escorial, Madrid, Spain

Castanea sativa

2009: Two crowns could be seen on the chestnut. The upper part was from the original crown and was completely dead but had no tears or splits.

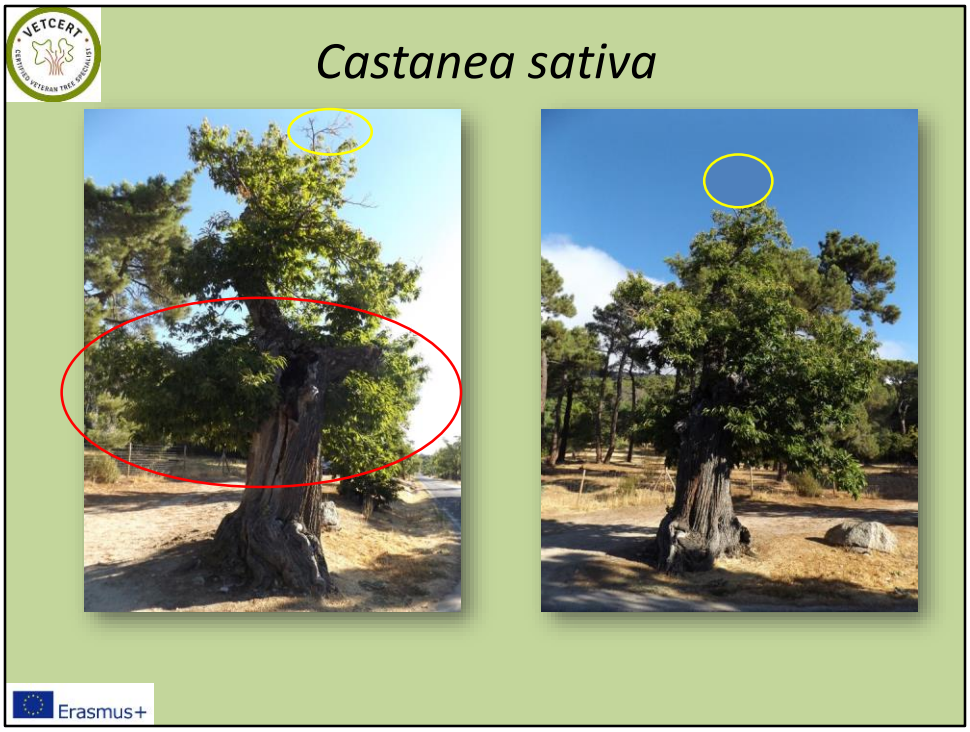
Description of the tree:

Castanea sativa



Around the year 2011, the tree prioritises a lower Crown, although a few shoots in the upper part of the crown are still alive.

Description of the problem/issue:
2015: Serious problems of compaction and the destruction of basal anchoring roots due to the use of the land around the tree for vehicle parking. Some of this occurred decades ago.



2015: The lower crown increases in size while branches are progressively lost in the upper part of the crown.

Castanea sativa

2015: Lower crown in development phase (red) and ancient exploratory roots dead and damaged by trampling (yellow).

Castanea sativa

August 2016: Further improvement of the branching structure and the lower crown develops properly

Castanea sativa

Beginning of the work (December 2016)

"Area to be improved" is clearly marked with sleepers (steralised in an autoclave) and signs erected to explain the work to the public

Erasmus+

Solution:
"Area to be improved" is clearly marked with sleepers (steralised in an autoclave) and signs erected to explain the work to the public

Castanea sativa

Start on 12/19/2016 an air spade was used to break up the Surface soil compacted after years of vehicles passing and people trampling.

Solution:

Starting on 12/19/2016 an air spade was used to break up the surface soil compacted after years of vehicles passing and people trampling.

Castanea sativa

Protection of the road

Under the surface the soil had the consistency of stone. When using the air spade, rock-like pieces jumped out.

Castanea sativa

In this picture you can see how the hard pieces of ‘soil’ jump out

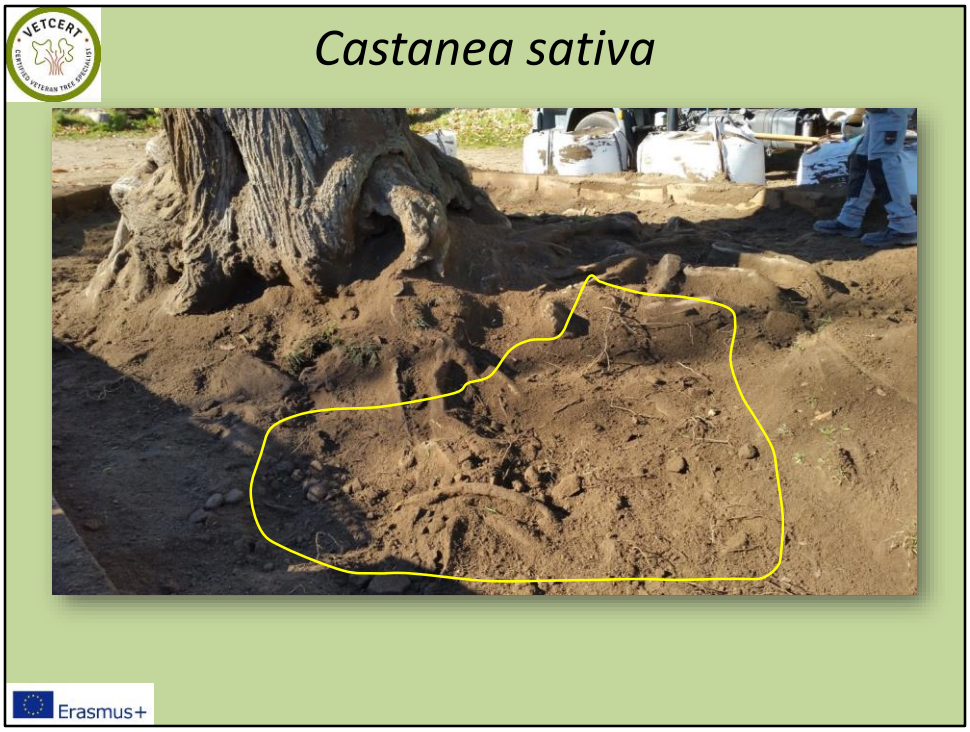
Castanea sativa

Observations during the airspade works:
Ancient anchoring, exploration and colonization root systems on the ground are totally dead.

Castanea sativa

Obsevations:

Small diameter roots for colonization and absorption were found in the area next to the road, just where we imagined they would be, where the vehicles did not pass and where the rainwater accumulated.



Observations:

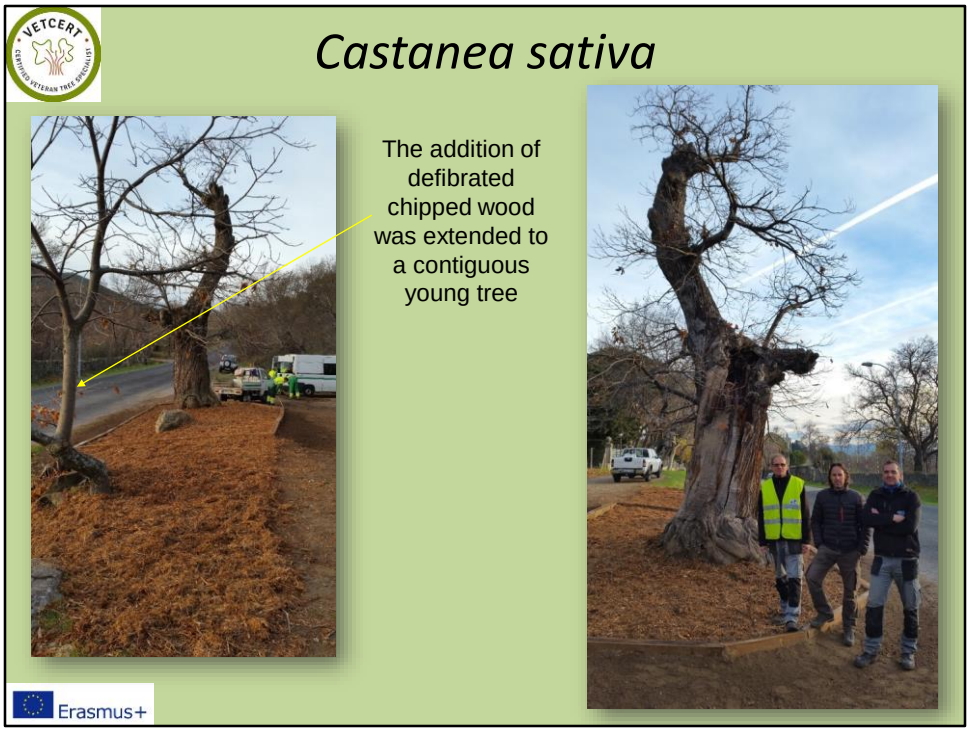
The main area of rootlets discovered (at an incredible 25 cm deep). Digging with the air spade did not go lowered to avoid changing the characteristics of the soil and damaging the roots. From this point, the new layer of topsoil would begin to be added.

Castanea sativa

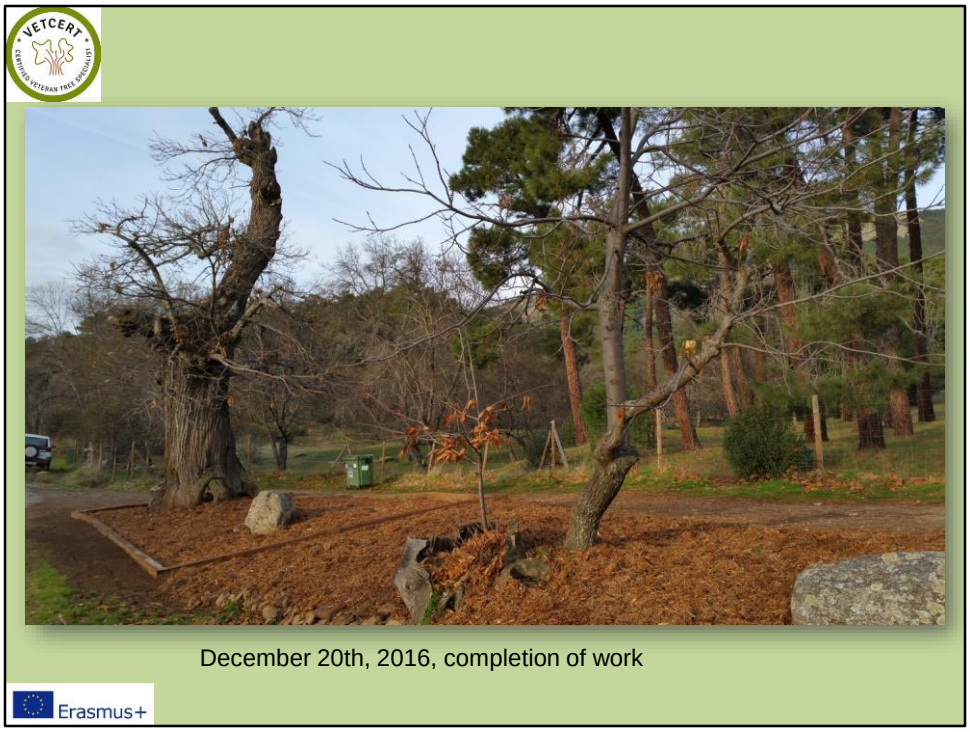
Addition of 8 m^3 of high quality topsoil

Second step:
Addition of 8 m3 of high quality topsoil

Third step:
Addition of mulch



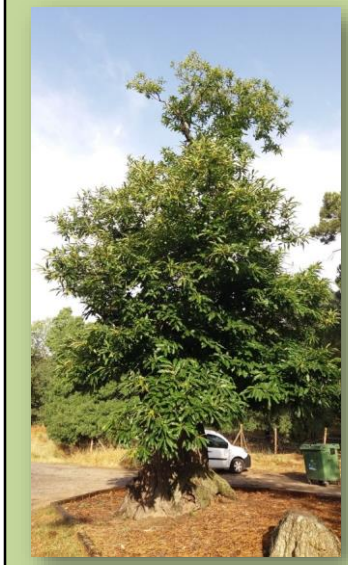
Third step:
The addition of defibrated chipped wood was extended to a young tree next to the veteran



December 20th, 2016, completion of work

After works:

Less than a month after the completion of the work, vandalism was observed with breakage of the sign and disturbance of the mulch.



Sprouting of the year 2017 (July), the lower crown consolidates and increases in size little by little.

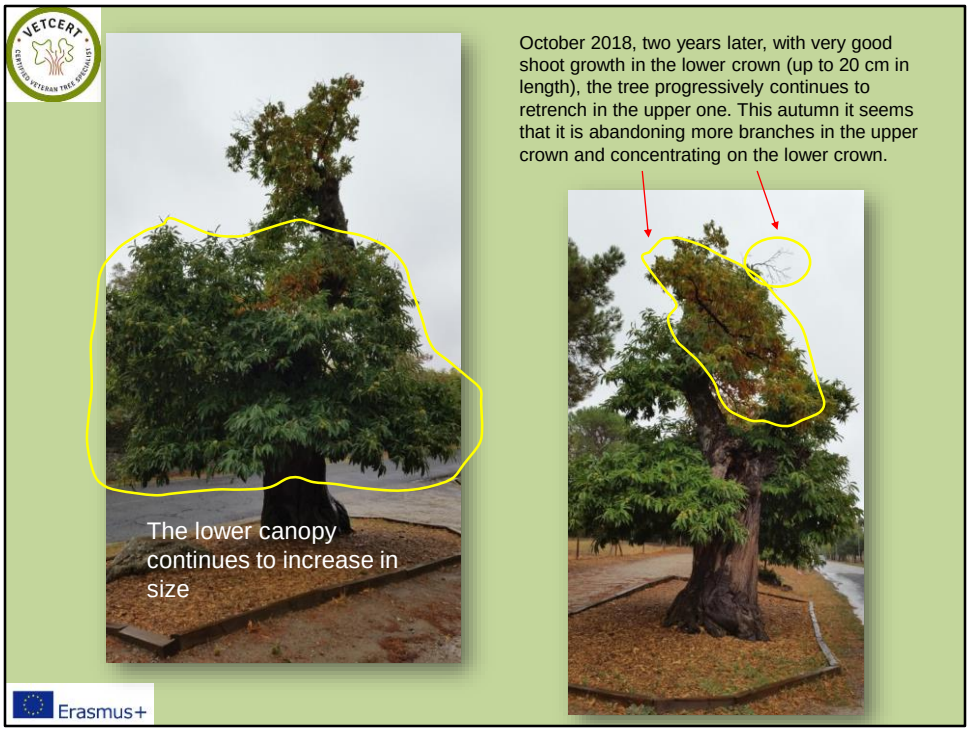
Monitoring. After works remarks:

Sprouting in 2017 (July), the lower crown is consolidated and increases in size little by little.

Year 2018 (June), some branch is lost from the top but the lower cup is still working very well.

Monitoring. After works remarks:

Year 2018 (June), some branches are lost from the top but the lower canopy is still growing very well.



Monitoring. After works remarks:

October 2018, two years later, with very good shoot growth in the lower crown (up to 20 cm in length), the tree progressively continues to retrench in the upper one. This autumn it seems that it is abandoning more branches in the upper crown and concentrating on the lower crown.

Powerpoint made by Alejandro Ruiz Rolle

Agricultural Technical Engineer

ETT (European Tree Technician)

Head of Service at FCC

Work management: Alejandro Ruiz Rolle,Pablo Delgado, Oscar Rodríguez

Thanks to the company FCC, S.A. (Fomento de Construcciones y Contratas, S.A.) for the financing of the works.

Case Studies in Veteran Tree Management 8

Old pine tree that developers had attempted to fell

Pi d'En Xandri, Spain

Rescuing an old pine tree that developers had attempted to fell

Description of the tree: The Pi d'En Xandri pine tree is a symbol of the city of Sant Cugat (Spain)
Description of the problem/issue: Real estate speculators attempted to cut the tree down by cutting the trunk at 80 cm from the ground.

Rescuing an old pine tree that developers had attempted to fell

Description of the problem/issue: Detail of chainsaw cuts.

Rescuing an old pine tree that developers had attempted to fell

Solution: It was decided to place some supports to reinforce the weakened structure, cover the wound with metal net to prevent the entry of small mammals and plan an exhaustive follow-up of the evolution of the tree in the next 20 years.

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Thanks to the City Council of Sant Cugat.

http://www.rtve.es/alacarta/videos/el-escarabajo-verde/escarabajo-verde-torre-negra-novela-gotica/743435/