We invite you to partnership and cooperation in the revitalization of trees.

HERBAFERTIL
LET IT GROW

HERBAFERTIL®

Tree Revitalization with Ecological Irrigation

Data extracted from research conducted by the 'Faculty of Forestry and Wood Technology', University of Zagreb, Department of Ecology and Forest Cultivation, ref. Prof. Ivica Tikvić.

www.herbafertil.com

A scientifically and professionally proven approach assuring healthy and thriving trees

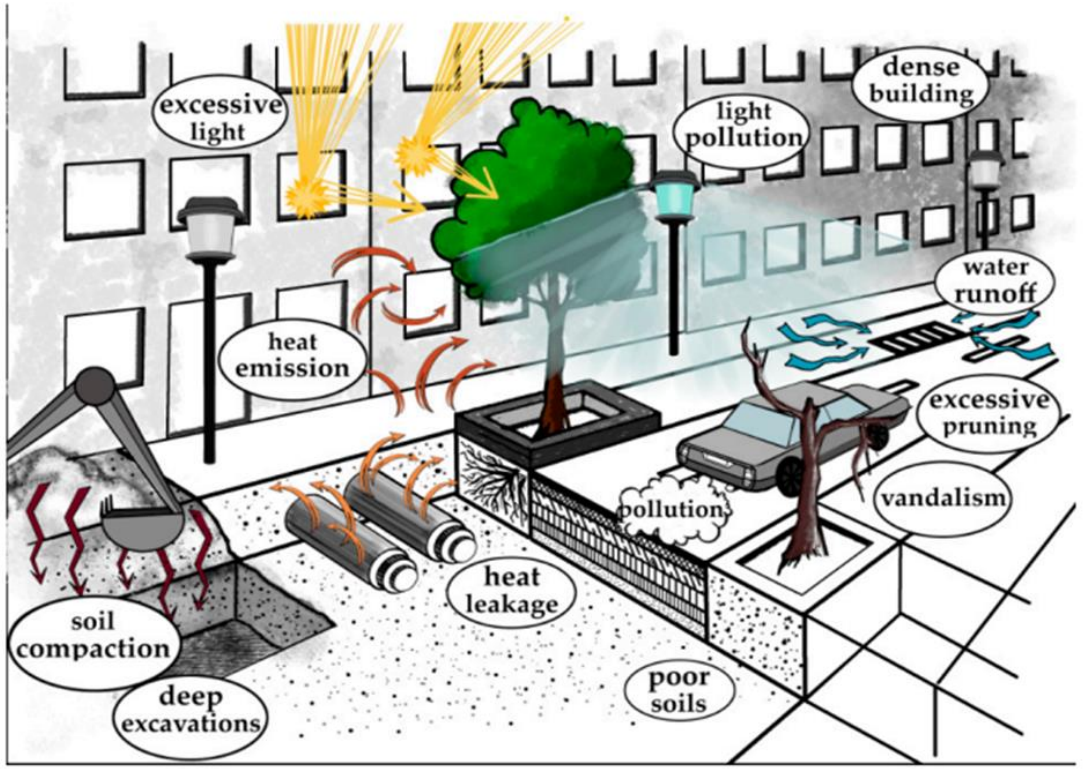
‘Herbafertil’ was patented in 2017. The product is a proven soil improver applied through the use of biodegradable cylindrical jute bags inserted within the tree's root system. ‘Herbafertil’ assists trees that are struggling to thrive by promoting root growth and development leading to improved canopy cover and crown definition. The product enhances soil conditions and helps to restore the compromised vitality of new and established trees.

‘Herbafertil - *Mouth of the Tree*’ was patented in 2022.

Since 2015 ‘Herbafertil has been introduced to the root plate structure of numerous urban trees and tree-lined avenues in cities across **Croatia, Slovenia, Serbia, and Denmark,** yielding exceptional results.

From 2021 to 2023, the ‘Faculty of Forestry and Wood Technology’ at the University of Zagreb**,** Department of Ecology and Forest Cultivation, carried out research into the **"Revitalization of Urban Trees through the use of ‘Herbafertil’ and Ecological Irrigation."** In 2023, they published their professional research paper findings demonstrating the effectiveness of ‘Herbafertil’.

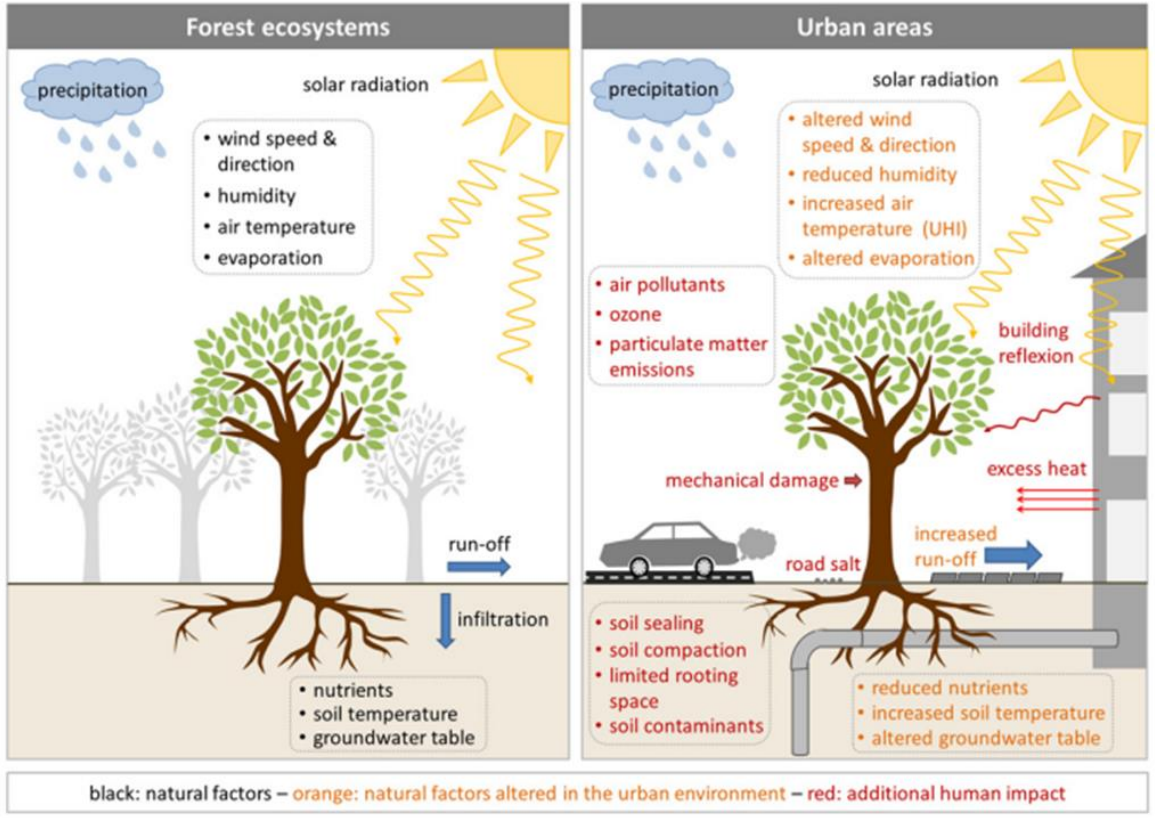
Problems associated with Urban Trees



Izvor: Czaja, M., et al., 2020. The Complex Issue of Urban Trees-Stress Factor Accumulation and Ecological Service Possibilities. Forests, 11, 932.

- Limited space for urban tree growth due to urban infrastructure (e.g. sub-surface interventions)
- Insufficient space for tree root-system development
- Mechanical damage to tree trunks (e.g. vehicular traffic, etc.)
- Increasing air temperatures, precipitation pollution, and insufficient rainfall – climate change modifications
- High levels of salt and polluted water – surface water run-off
- Changes in ecological factors – climate change modifications
- **The most common morphological indicators of reduced tree vitality include (*but not limited to*)**: branch damage and dieback; crown tip dieback; thinning of the entire canopy or upper parts of the crown; leaf and needle drop; which leads to weakened trees susceptible to various pests, fungi, and other diseases.

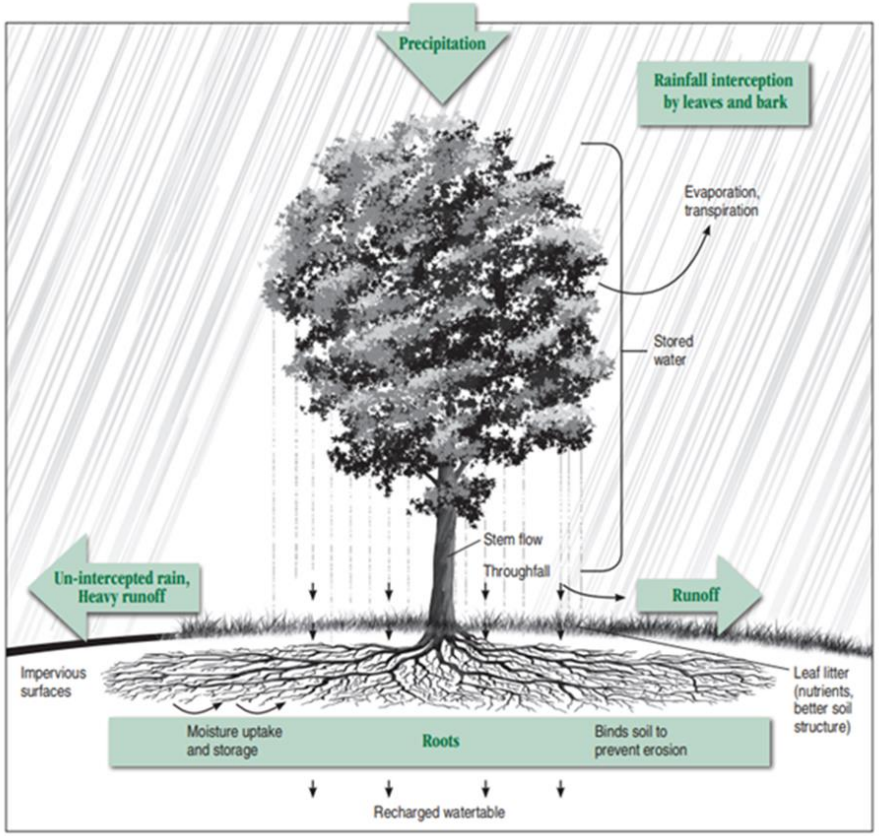
How to Re-establish or Achieve Vitality in Urban Trees?
Our Solution: HERBAFERTIL® + Ecological Irrigation



Izvor: Brune, M., 2016. Urban trees under Climate change. Potential impacts of dry spells and heat waves in three german regions in the 2050's. Report 24, Climate Service Center Germany, Hamburg.

- **Restoration of the natural composition of dead organic matter and nutrients in the soil around the root plate**
- Improvement of the physical, chemical, and biological properties of the soil structure and composition
- **Ecological irrigation introduced for urban tree pits**
- Introduction of '**HERBAFERTIL®'** nutrients to the tree pit
- **Creation of a favourable microclimate in and around urban tree locations**
- Preservation of the optimal space for urban trees in appropriately prepared tree pits

Ecological Irrigation of Urban Tree Pits



Trees help reduce stormwater runoff in several ways. One is to intercept falling rain and hold a portion of it on the leaves and bark. Part of this intercepted water will evaporate and part will be gradually released into the soil below. At the surface of the soil, fallen tree leaves help form a spongy layer that moderates soil temperature, helps retain soil moisture, and harbors organisms that break down organic matter and recycle elements for use in plant growth. This important layer also allows rain water to percolate into the soil rather than rushing off carrying with it oil, metal particles and other pollutants. Below ground, roots hold the soil in place and absorb water that will eventually be released into the atmosphere by transpiration.

Source: How Trees Can Retain Stormwater Runoff. Tree City USA Bulletin, No. 55, 2010, Arbor Day Foundation

Principles of ecological irrigation for urban trees:

- The urban tree ecosystem is irrigated during periods of insufficient natural rainfall.
- Irrigation targets the soil surface beneath the rhizosphere of urban trees.
- The amount of water applied for irrigation purposes is equivalent to the natural precipitation per unit area.
- Soil is irrigated to the depth of optimal root development.
- A specific volume of soil is irrigated to the depth of optimal root development (limiting wastage and over-watering).
- Soil is irrigated in accordance with the optimal soil moisture-air conditions.
- Harvested rainwater is used for irrigation purposes.

HERBAFERTIL®

REPUBLIKA HRVATSKA
DRŽAVNI ZAVOD ZA INTELEKTUALNO VLASNIŠTVO

SEKTOR ZA PATENTE

KLASA: UP/I-381-03/14-010/0358
URBROJ: 559-03/2-17-026/SŠ
Broj konsenzualnog patenta: PK20140358

Zagreb, 18. siječnja 2017.

Državni zavod za intelektualno vlasništvo na temelju članka 15. stavka 1. Zakona o patentu ("Narodne novine", broj 173/03., 87/05., 76/07., 30/09., 128/10., 49/11. i 76/13.), povodom prijave patenta podnositelja: HERBAFARM-MAGNOLIJA d.o.o., Trnsko 23, 10000 Zagreb, radi priznanja konsenzualnog patenta, donosi

R J E Š E N J E

1. Usvaja se zahtjev za priznanje konsenzualnog patenta po prijavi broj P20140358A, podnesenoj dana 16. travnja 2014. godine, za izum pod nazivom: MJEŠAVINA ZA KOMBINIRANU ORGANSKU-ANORGANSKU PRIHRANU I BIOLOŠKU SANACIJU STABLAŠICA, GRMOVA I PENJAČICA I POSTUPAK KORIŠTENJA MJEŠAVINE, prema opisu, crtežima i patentnim zahtjevima navedenim u spisu konsenzualnog patenta broj PK20140358.

Priznato pravo upisuje se u Registar patenata Državnog zavoda za intelektualno vlasništvo pod brojem

PK20140358

nositelj konsenzualnog patenta: **HERBAFARM-MAGNOLIJA d.o.o.,** Trnsko 23, 10000 Zagreb, HR

s oznakom MKP: ***C05G 3/04*** (2006.01)
C05G 3/06 (2006.01)
A01C 21/00 (2006.01)

izumitelji naznačeni u prijavi: **Darija Breitenberger,** Knežija 9, 10000 Zagreb, HR;
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PK20140358

HERBAFERTIL
LET IT GROW

- **'Herbafertil' is a patented soil improver with proven effectiveness**, developed and refined through years of practical experience in tree and shrub planting and successful horticultural preparation, planting, and maintenance.
- **'Herbafertil'** is created by blending a variety of nutrient-rich organo-mineral components (natural humus-peat-minerals) known for their rapid, targeted, and efficient impact on tree vitality.
- **The results of 'Herbafertil' applications have been demonstrated through scientific research and the publication of findings by scientists from the 'Faculty of Forestry and Wood Technology' at the University of Zagreb, Department of Ecology and Forest Cultivation.**
- The application of '**Herbafertil**' has produced positive, evidenced results that have surpassed all previously available commercial planting substrates.

HERBAFERTIL®

HERBAFERTIL
LET IT GROW

Application of Herbafertil:

- A cylindrical jute bag filled with a blend of natural substrates is installed in the area **where the tree roots are most dense, specifically around the margins of the canopy projection.**
- The nutrients are absorbed by the intricate network of fibrous roots with minimal damage to the thicker root structure.
- **The resultant 'Herbafertil' application produces a cluster of young roots known as:** ⇨ ***'MOUTH OF THE TREE®'***

Function and Application of 'Herbafertil':

- **'Herbafertil'** improves the health and vitality of trees via the root structure and surrounding soil, restoring natural relationships and conditions that are optimal for tree growth, development, and recovery, and improving the soil microbiome.
- **'Herbafertil'** assists the development of the root mass under optimised aerobic conditions, strengthening the root plate and resulting in a visible reinvigoration of the tree canopy.
- **'Herbafertil'** can be applied for both preventative and curative purposes. This is essential when existing trees are not thriving or when they begin to show signs of reduced vitality, poor growth, and dieback.

‘HERBAFERTIL’®
‘MOUTH OF THE TREE’®, Healthy Growth and Water Savings

HERBAFERTIL
LET IT GROW

A single ‘Herbafertil’ jute sack produces **6-7 kg** of young roots (‘*Mouth of the Tree*’) stimulating healthy tree growth

Average increase in the circumference of treated trees compared to untreated ones is **35%**

Ecological Irrigation - Water Savings with ‘Herbafertil’: **84 m3** or **€241.16** per one hundred trees per week

‘*Mouth of the Tree*’® → Anchoring tree roots in the soil and resist potential wind damage.

www.herbafertil.com

Results of the Scientific Research Project of the 'FACULTY OF FORESTRY and WOOD', University of Zagreb*:

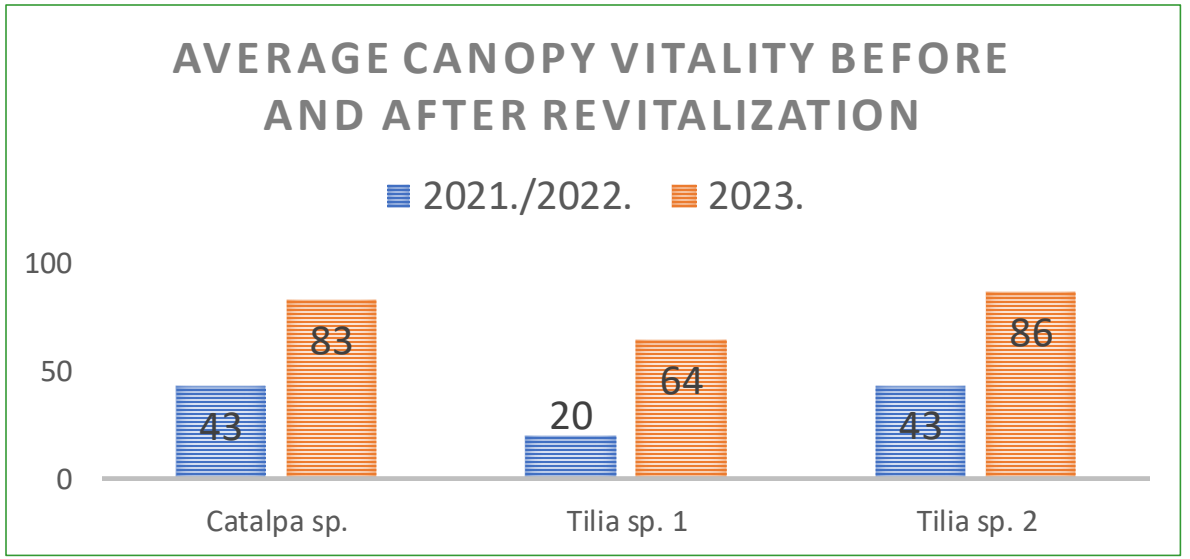
'HERBAFERTIL'® INCREASES TREE VITALITY >40%

The research found an increase in tree vitality of approximately 40% during the first year of the experiment using 'Herbafertil' and ecological irrigation.

In 2023 the research assessment of tree vitality after the application of '**Herbafertil**' and ecological irrigation evidenced an increase in tree vitality ranging from **64% to 86%**.

(The core research images of *Catalpa* spp. and *Tilia* spp. trees from 2021 and 2022 recorded a low to moderate vitality range from 20% to 43%.)

This highlights that stressed or damaged trees in urban environments can be assisted and their vitality increased with an appropriate intervention of 'Herbafertil', rather than merely monitoring their decline and ultimate failure.

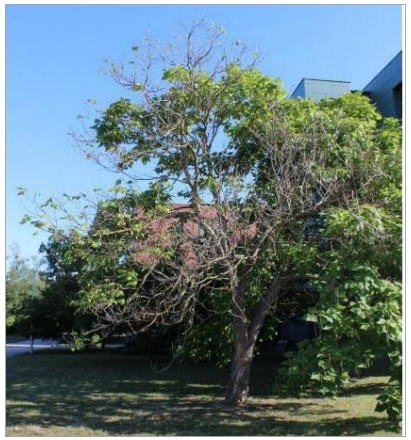


* 5th Croatian Scientific and Professional Conference on Urban Forestry Karlovac, 2023: THE ROLE OF URBAN FORESTRY IN CREATING SUSTAINABLE CITIES: Maks Udov, Tin Udovč, Ivica Tikvić, Lucija Kunić, Petra Perković "Revitalization of Urban Trees through Herbafertil and Ecological Irrigation."

‘HERBAFERTIL’®
BEFORE AND AFTER…

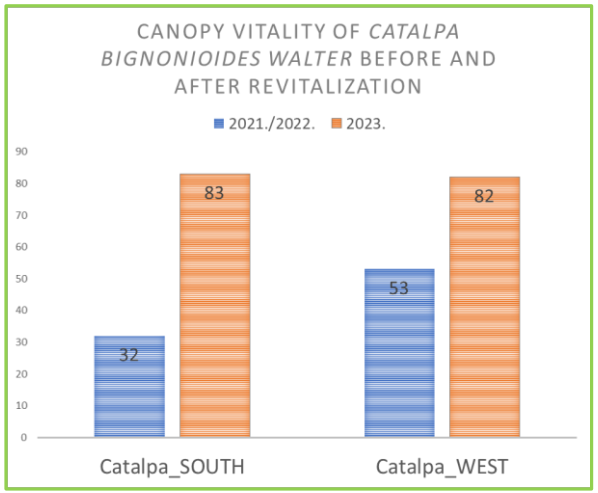
Revitalisation of *Catalpa bignonioides* ‘Walter’ (SOUTH side)

In front of the Faculty of Forestry and Wood Technology, University of Zagreb



19.07.2022.

14.07.2023.



Revitalisation of *Catalpa bignonioides* ‘Walter’ (WEST side)

In front of the Faculty of Forestry and Wood Technology, University of Zagreb

19.07.2022.

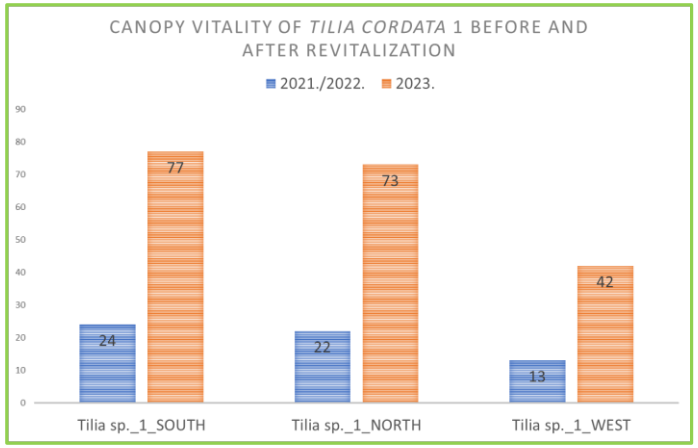
14.07.2023.

‘HERBAFERTIL’®
BEFORE AND AFTER…

Revitalisation of *Tilia cordata 1* (SOUTH side)
In front of the Faculty of Agriculture, University of Zagreb

13.07.2022.

14.07.2023.



Revitalisation of *Tilia cordata 1* (NORTH side)
In front of the Faculty of Agriculture, University of Zagreb

13.07.2022.

14. 07.2023.

Revitalisation of *Tilia cordata 1* (WEST side)
In front of the Faculty of Agriculture, University of Zagreb

13.07.2022.

14.07.2023.

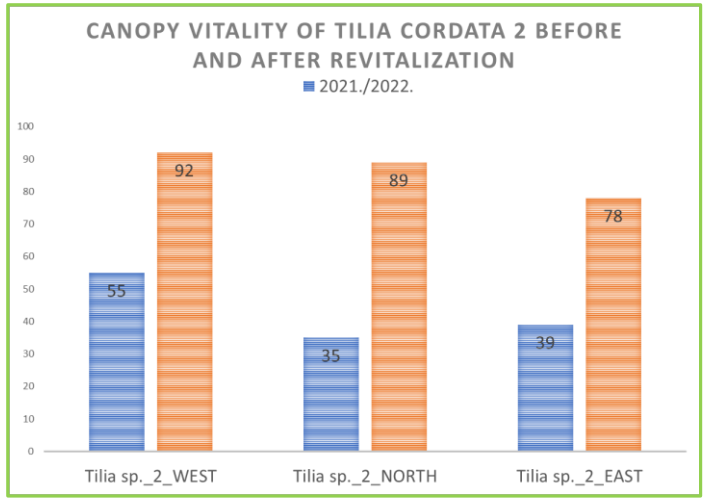
‘HERBAFERTIL’®
BEFORE AND AFTER…

Revitalisation of *Tilia cordata 2* (WEST side)

In front of the Faculty of Agriculture, University of Zagreb

20.10.2021.

14.07.2023.



Revitalisation of *Tilia cordata 2* (NORTH side)

In front of the Faculty of Agriculture, University of Zagreb

24.06.2022.

30.06.2023.

Revitalisation of *Tilia cordata 2* (EAST side)

In front of the Faculty of Agriculture, University of Zagreb

20.10.2021.

01.09.2023.

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‘HERBAFERTIL’®
BEFORE AND AFTER…

HERBAFERTIL
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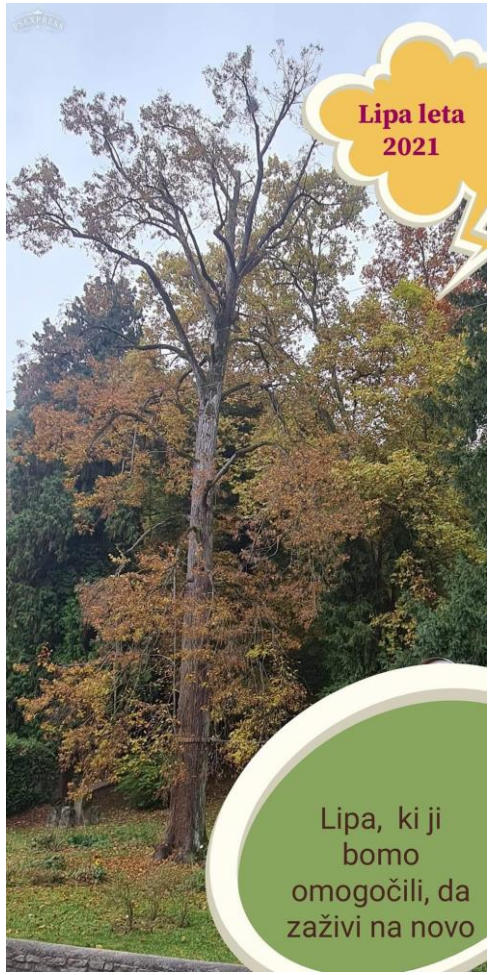
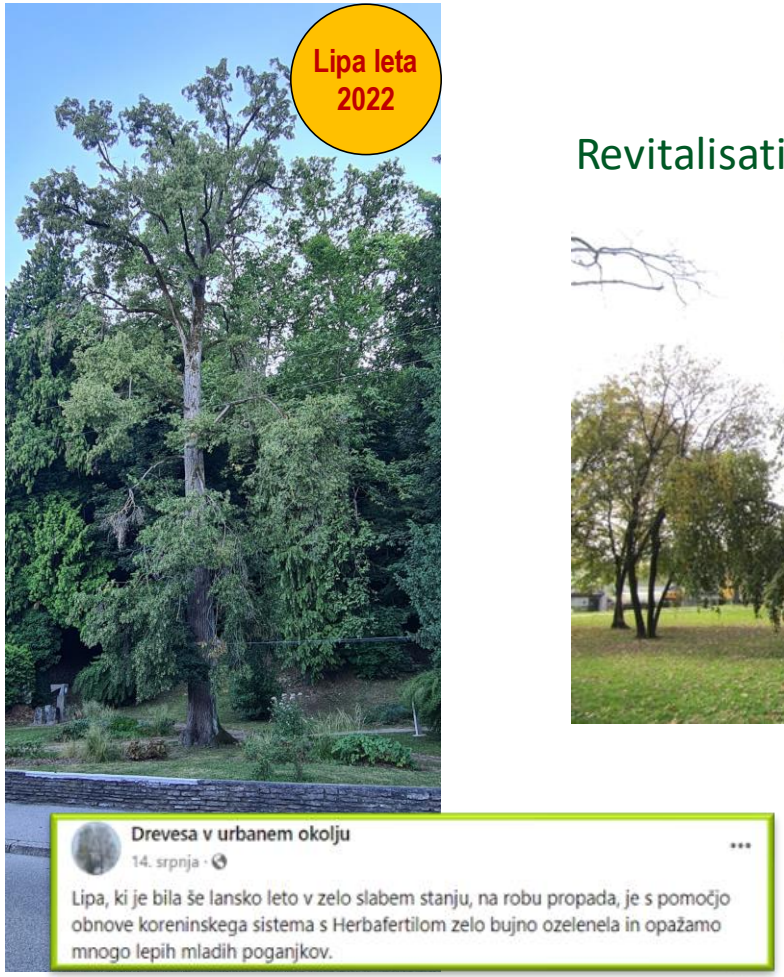
Revitalisation of *Tilia cordata,* Krško, **Slovenia,** 2021-2022





Revitalisation of *Fagus sylvatica pendula*, Belgrade, **Serbia** 2015-2018

www.herbafertil.com

‘HERBAFERTIL’®
Examples of potential future interventions and uses...

‘Herbafertil’ is also successfully used for:

- **Revitalising trees with root damage caused during construction work** (due to its ability to encourage trees to regenerate roots).


- **Revitalising valuable, vintage historical/heritage trees** (e.g. with tree stability challenges) **–** successful ‘Herbafertil’ implementation examples: Zagreb, "Dedek" Oak, **600+** years-old; Split, “*Morus ‘*Hajdukova’" **120+** years-old.

- **Revitalising trees in tree-lined avenues.**


www.herbafertil.com

Will we work together on projects to revitalize trees?

ABOUT US:

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We would like to take this opportunity to thank **Prof. Dr. Ivica Tikvić** from the Faculty of Forestry and Wood Technology at the University of Zagreb, Department of Ecology and Forest Cultivation, for his significant scientific and professional support.

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We are Maks and Tin, father and son.

Our company, **Herbafarm - magnolija Ltd.,** was founded in Zagreb in 1994. Since then, we have been successfully resolving problems and introducing **innovations in the field of urban forestry and horticulture for almost 30 years.**