EXCURSION TO PRO SILVA EXEMPLARY FOREST, MEXIKÓ-PUSZTA

Uneven-aged close-to-nature forestry at Pilis Park Forestry Company

This programme presents the practical methods and experiences gained from the large-scale implementation of uneven-aged CTNF in the beech and oak forests managed by the Visegrád and Pilisszentkereszt Forestry Units of Pilis Park Forestry Company.

Site Characteristics

The region is characterized by a moderately cool, moderately humid to moderately dry climate. The mean annual temperature is 9.3°C, while the average temperature during the growing season is 15.8°C. Winters are moderately cold and summers moderately cool.

The average annual precipitation is 593 mm, of which only 57% (338 mm) falls during the growing season.

Most forests occur at elevations between 200 and 600 m above sea level. Depending on altitude and site conditions, they consist partly of oak forests, predominantly oak–hornbeam forests, and to a lesser extent beech forests. Only 5% of the forests are situated above 550 m a.s.l., while 23% occur above 450 m. Approximately 62% of the forests occupy slopes with various aspects between 250 and 450 m above sea level.

Visegrád Mountains

Approximately 97% of the forest soils have a loamy texture and are generally unaffected by excess soil water. The dominant forest soils are Rankers and brown forest soils developed on andesite. The formation of deeper brown forest soils has largely been prevented by periglacial slope movements and solifluction processes occurring on the steeper slopes.

Pilis Mountains

Approximately 86% of the forest soils are loamy, developing primarily on limestone and dolomite parent material, also largely unaffected by excess soil water. Reflecting the calcareous bedrock, the dominant soil types are Rendzinas and brown forest soils.

1. **Plot: Forest compartment: Pilismarót 126C**

Area: 25.69 ha; Protection status: Protected forest; sylvicultural system: uneven-aged CTNF; Naturalness category: Near-natural; Site type: Deep loamy brown forest soil unaffected by excess water (Beech); Stand type: Asperulo-Fagetum beech forest; Tree species composition: beech 74%, hornbeam 15%, sessile oak 11%; Stand age: 38 years; Basal area (BA): 24.4 m^2/ha; Mean annual increment (MAI): 7.9 m^3/ha/year; Standing volume (V): 181 m^3/ha; Most recent intervention: 2023 – Improvement cutting (stock-tending operation); Cutting cycle(return interval): 7 years

During management interventions, the primary focus is on the selected future-trees (target-tree), which are expected to produce timber of exceptional quality. Trees located in the spaces between future-trees fulfil a different function. If they do not compete directly with a future-tree, they are left standing. Consequently, they retain relatively small crowns, allowing them to provide a finely graduated dosage in light availability and growing space when they are removed step by step as

the future-tree's crown gradually expands. With each successive crown release of the future-tree, the remaining intermediate space becomes progressively smaller.

Areas where no suitable future-tree has been selected are retained as reserve areas, where, for example, canopy gaps may also be created when appropriate.

Why are the intermediate areas left largely undisturbed? Thinning these areas unnecessarily reduces the structural stability of the stand and allows excessive light to reach the lower portions of the stems, which is detrimental to the development of high-quality timber because it promotes epicormic shoots, knot formation, and branch development. Such interventions provide only limited benefit to all trees and, at the same time, fail to sufficiently support the selected crop trees. They also encourage excessive crown expansion of the intermediate trees, making it impossible to maintain the gradual and continuous crown release that is essential for the optimal development of the future-trees.

Where future-trees are not expected to require additional growing space before the next management cycle, the intermediate trees are deliberately retained in a denser, more closed stand structure. During the later stages of stand development, these intermediate trees may also be harvested when appropriate for example creating gaps.

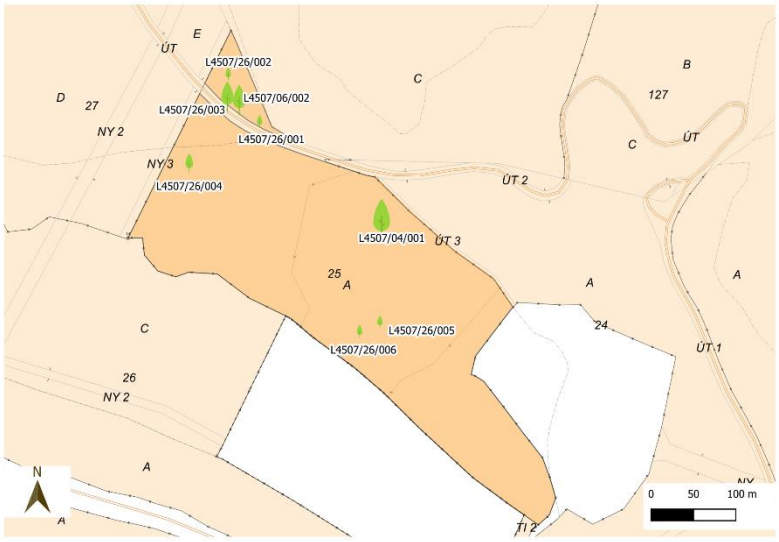
2. Plot: Mexikó-puszta Pro Silva Exemplary Forest: Esztergom-Pilisszentlélek 25 A

Forest compartment: Esztergom–Pilisszentlélek 25A; Area: 9.73 ha; Protection status: Protected forest; Silvicultural system: uneven-aged CTNF; Naturalness category: Near-natural; Site type: Deep loamy pseudogleyic brown forest soil influenced by hillside seepage water; Stand type: Beech–Hornbeam–Sessile Oak; Tree species composition (overstorey only): beech 52%, oak 26%, hornbeam 13%, common ash 9%; Age: 116 years (overstorey only); Basal area (G): 21,9 m^2/ha (overstorey only); Mean annual increment (whole stand): 9.2 m^3/ha/year; Standing volume (whole stand): 434 m^3/ha; Most recent intervention: 2023 – Improvement cutting (stock-tending operation); Cutting cycle (return interval): 3 years

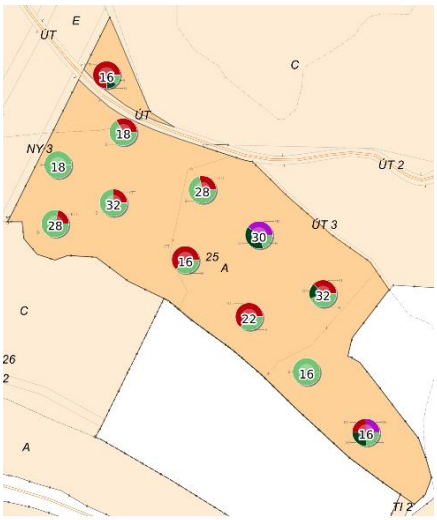
Key Professional Achievements of the Mexikó-puszta Pro Silva Exemplary Forest

- This Exemplary Forest was the first site in Hungary where the principles of Pro Silva and the experience gained during international study tours were systematically applied in operational forest management.
- It demonstrated that continuous cover forestry in Hungarian broadleaved forests is economically viable and can be as profitable as conventional even-aged management over the long term. The project provided the practical and economic evidence needed to challenge the widespread belief that close-to-nature forestry is less profitable than traditional forestry.
- Operational methods for planning, silviculture, harvesting, and monitoring continuous cover forestry were developed and refined under Hungarian conditions.
- Successful regeneration of sessile oak in small canopy gaps was demonstrated, even within predominantly shade-tolerant beech forests, with relatively low management input. Results showed that careful gap design and gradual gap expansion provide suitable light conditions for high-quality oak regeneration.
- The project confirmed that future-tree-oriented management produces larger, higher-value timber while maintaining continuous forest cover.

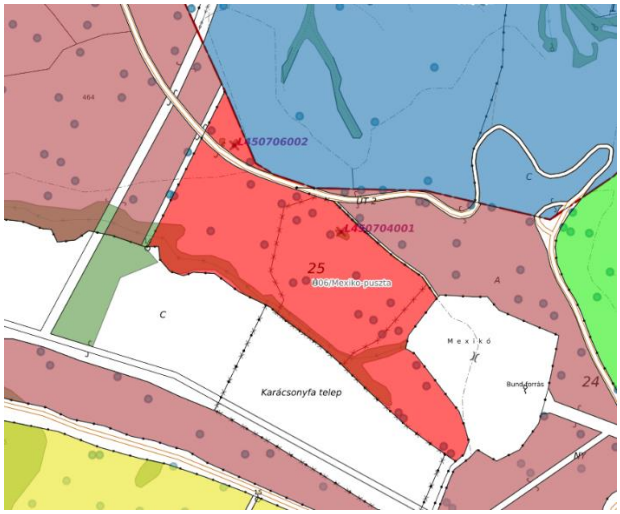
- Specialized low-impact harvesting techniques, including crown dismantling and directional felling, proved effective in minimizing damage to the residual stand and regeneration.
- The forest has become an important long-term experimental site supporting ecological research and the development of evidence-based continuous cover forestry.
- The experience gained contributed directly to the legal framework, management guidelines, and digital decision-support tools for continuous cover forestry in Hungary.
- Management based on Pro Silva principles has increased the forest's structural diversity, species diversity, resilience, and adaptive capacity to climate change.
- The Exemplary Forest has become one of Hungary's leading training and demonstration sites, providing practical education to thousands of forestry professionals, researchers, and students from Hungary and abroad.



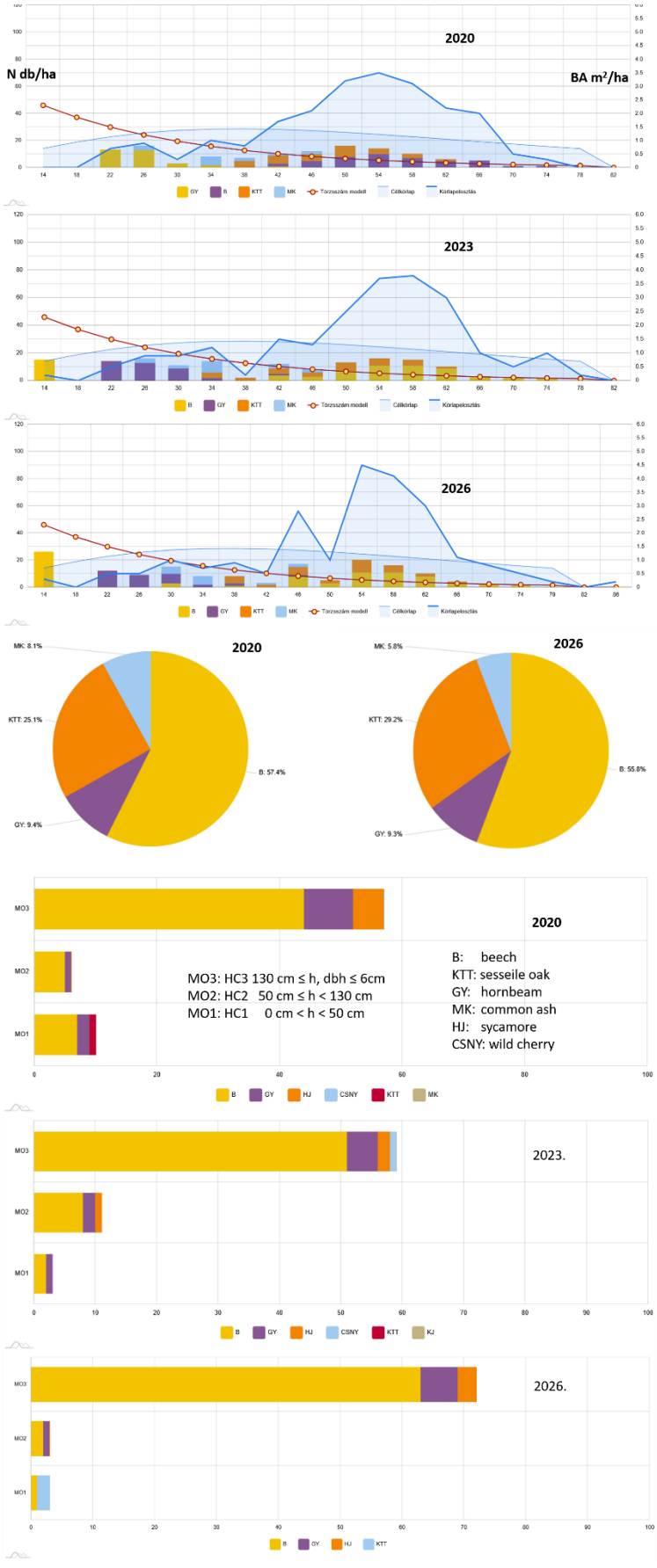
1. Figure The position, the target tree species of the gaps and the height of the target species



2. Figure. The basal area in the self-control plots



3. Figure. The habitat-trees and the stepping stones


2020
N db/ha
BA m²/ha
2023
2026
2020
MK: 8.1%
KTT: 25.1%
B: 57.4%
GY: 9.4%
2026
MK: 5.8%
KTT: 29.2%
B: 55.8%
GY: 9.3%
MO3
MO2
MO1
2020
MO3: HC3 130 cm ≤ h, dbh ≤ 6cm
MO2: HC2 50 cm ≤ h < 130 cm
MO1: HC1 0 cm < h < 50 cm
B: beech
KTT: sesseile oak
GY: hornbeam
MK: common ash
HJ: sycamore
CSNY: wild cherry
B GY HJ CSNY KTT MK
2023.
B GY HJ CSNY KTT KJ
2026.
B GY HJ KTT