

# Introducing the "Pilis Gap Experiment": a new multi-taxa study focusing on the effects of continuous cover forestry



Bence KOVÁCS<sup>1</sup>, Flóra TINYA<sup>1</sup>, András BIDLÓ<sup>2</sup>, Gergely BOROS<sup>3</sup>, Péter CSÉPÁNYI<sup>4</sup>, Zoltán ELEK<sup>5</sup>, Csenge Veronika HORVÁTH<sup>6</sup>, Gábor ILLÉS<sup>7</sup>, Julia LOCATELLI<sup>6</sup>, Csaba NÉMETH<sup>1</sup>, Zoltán SOLTÉSZ<sup>1</sup>, Ferenc SAMU<sup>8</sup>, Vivien SASS<sup>2</sup>, Péter ÓDOR<sup>1</sup>

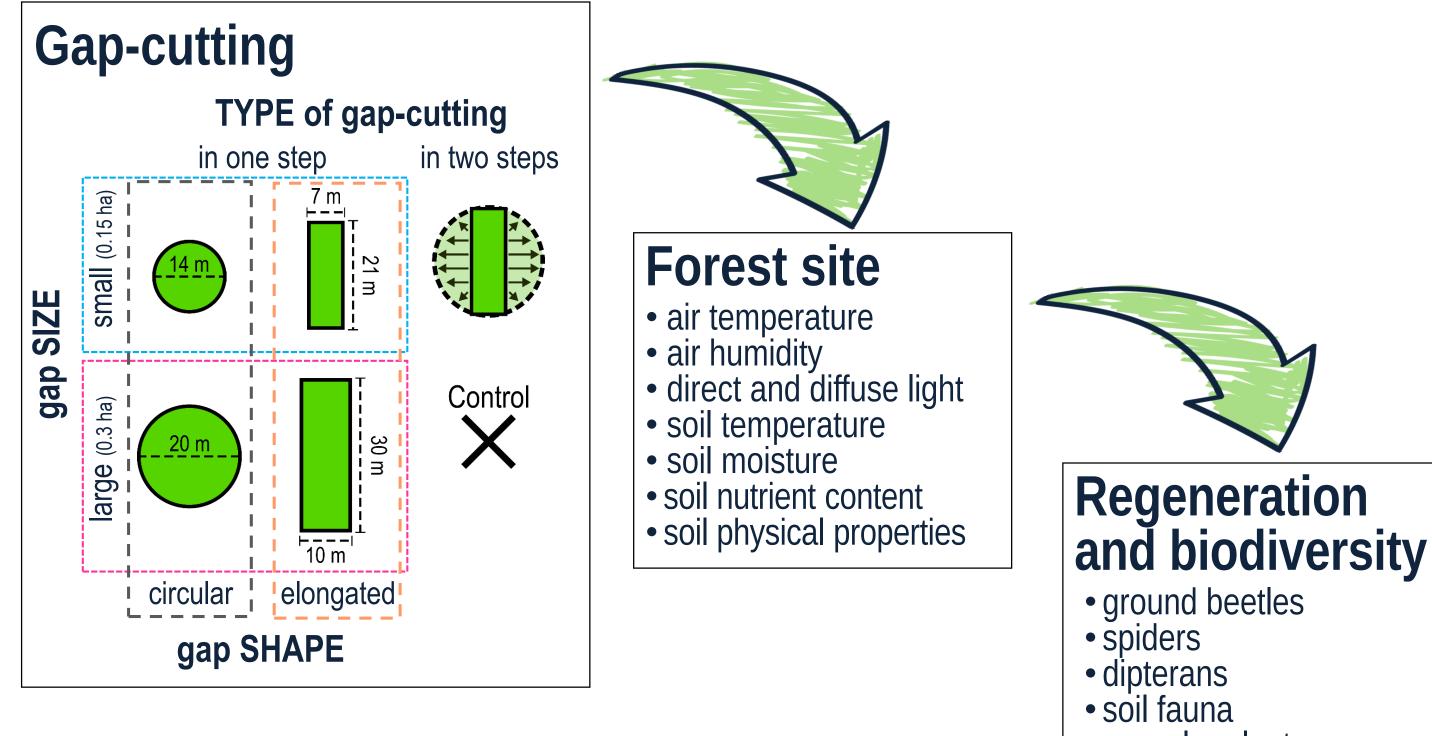
<sup>1</sup>Centre for Ecological Research, Institute of Ecology and Botany, Hungary <sup>2</sup> University of Sopron, Institute of Environmental and Earth Sciences, Hungary <sup>3</sup> Szent István University, Department of Zoology and Animal Ecology, Hungary <sup>4</sup> Pilisi Parkerdő Ltd., Hungary <sup>5</sup> MTA-ELTE-MTM Ecology Research Group, Hungary <sup>6</sup> Eötvös Loránd University, Faculty of Science, Hungary <sup>7</sup> National Agricultural Research and Innovation Centre, Forest Research Institute, Hungary <sup>8</sup> Centre for Agricultural Research, Plant Protection Institute, Hungary

## MOTIVATIONS

- multifunctionality of managed forests: profitability and economical sustainability, ecosystem functionality, social needs → simultaneous requirements
- paradigm shift in silviculture towards continuous cover forestry (CCF)

harmonization between the functions is essential

## FRAMEWORK OF THE EXPERIMENT



• vascular plants

E R T I

• in Central European broadleaved forests, the most widely applied tool is the creation of artificial gaps

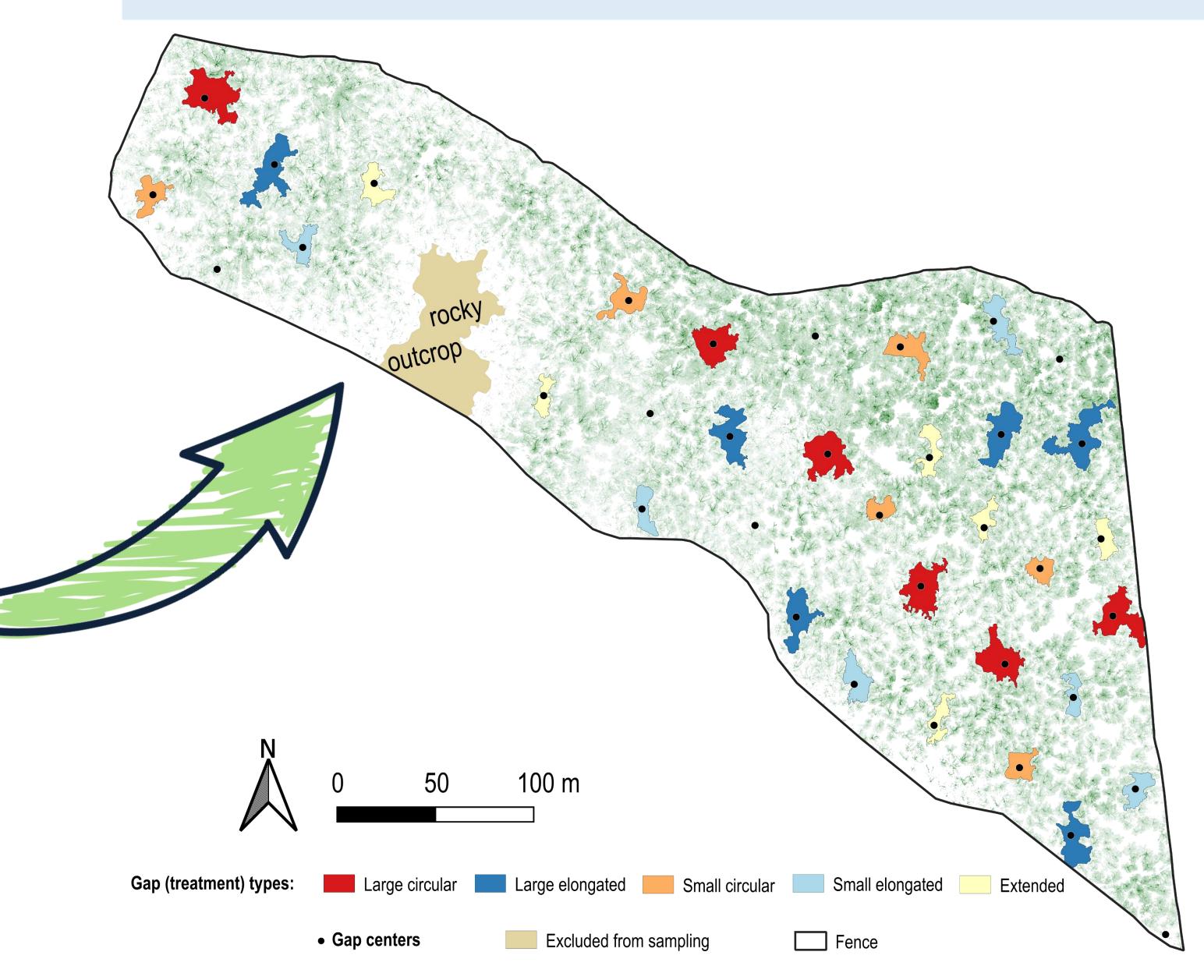
gap shapes, sizes and the methods of gap-cutting vary from region to region, from managers to
managers → lack of ultimate guidelines → numerous uncertainties: where, how and when to create gaps
finding best available practices to help practitioners

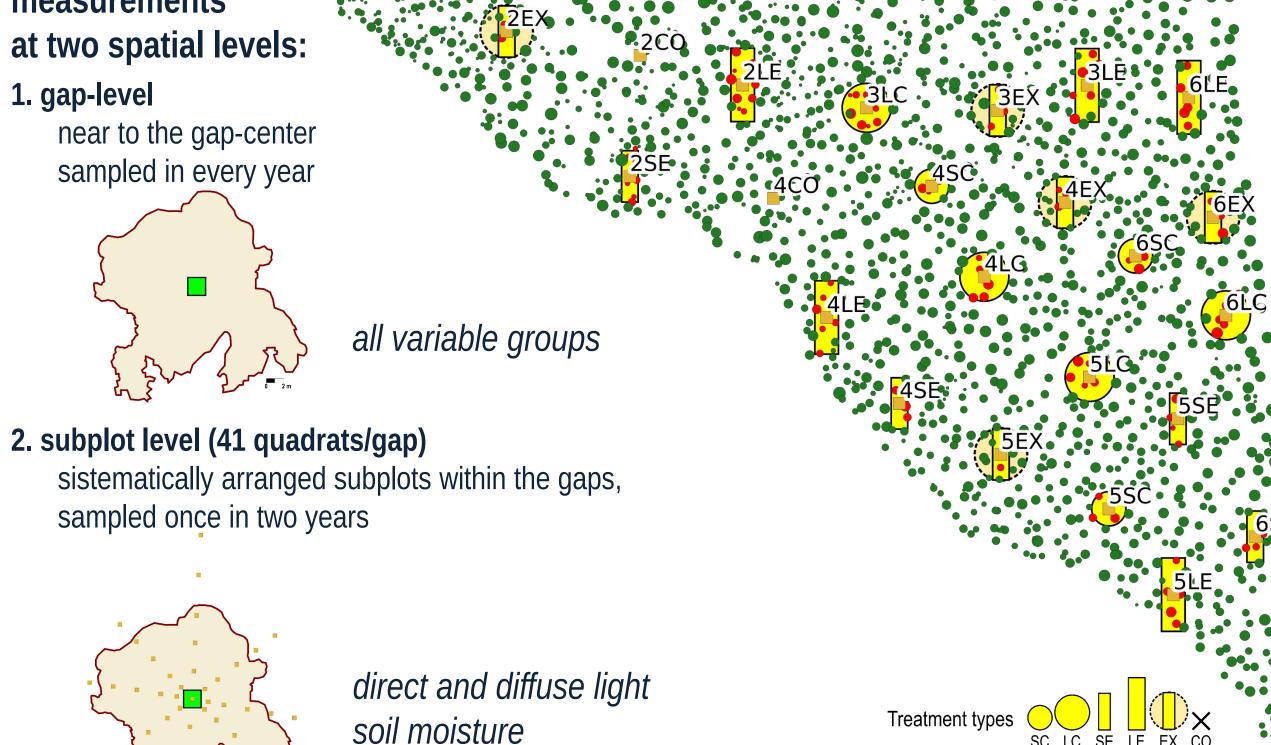
 the effects of the gap-cutting schemes and other aspects of the harvests on forest site conditions, natural regeneration and multi-taxa diversity are still poorly understood in the European oak-dominated forest well-designed, multi-taxa experiments are necessary

# STUDY DESIGN

10 ha, homogeneous stand
 Before-After Control-Impact design -> temporal control
 complete block design -> spatial control
 6 treatments in 6 blocks as replicates
 the whole area is fenced -> Ø effects of ungulates
 all tree individuals were mapped (DBH > 5 cm)

## **REALIZATION OF THE GAPS**





# **STUDY SITE**

- location: Pilis Mts., Northern Hungary (47°40' 13" N, 18°54' 55" E)
- **topography:** 390-460 m a.s.l., moderate (<10°), North-facing slopes

herbs and saplings

- **bedrock:** sandstone and limestone with loess
- soil type: Luvisols and Rendzic Leptosol, soil depth 0.5–1.5 m
- regional climate: humid continental ( 9.0–9.5°C; 650 mm/yr)



RS

Removed tree

HR

# **TECHNICAL DETAILS**

#### Stand structure

measuring the pre- and post-treatment state; focusing on the the gap-filling and regeneration patches detailed maps and stand models: Field-Map System (IFER Ltd.) and ground-based LiDAR (Trimble TX6)

#### Gap level variables – sampled in the gap centers

- vegetation type: sessile oak hornbeam forest (91G0)
- **stand type**: mature (~90 yrs old), managed stand
- upper canopy layer: *h*≈22 m, DBH≈37 cm
- secondary canopy layer:  $h\approx 14$  m, DBH $\approx 18$  cm
- dense herb layer (>100%): Carex pilosa and Melica uniflora



### CREDITS



**Notes:** This experiment belongs to Péter Ódor's Lab (Forest Ecological Research Group) at Centre for Ecological Research, Hungary. Contact: 🕾 +3628360-122/107 🖂 odor.peter@okologia.mta.hu; kovacs.bence@okologia.mta.hu. We are open to any collaborations!

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RO

#### Forest site conditions

#### total, diffuse and direct components of light (WinSCANOPY) – yearly, in July

air temperature and relative humidity at 130 cm (Voltcraft DL-210TH) – continuously with 15-min logging interval air, surface and soil temperature at 15, 0, -8 cm and soil moisture to -14 cm (TMS-4) – continuously, 15-min logging interval litter and soil samples – twice a year (May, September)

#### Understory vegetation

cover of all species in a permanent 2 m × 2 m plot at the center of the gaps – two samplings per year (April, July) **Regeneration of sessile oak (***Quercus petraea* agg.**)** 

growth, health status and survival of permanent seedlings in a 3 m × 3 m plot – one sampling per year (August) **Enchytraeid worms** 

abundance of all species; three soil cores per gap and wet funnel method – two samplings per year (May, September) **Dipterans** 

abundance of all species; one Malaise trap per gap – twice a year, two weeks sampling interval (May, September) **Groundbeetles and spiders** 

abundance of all species; three pitfall traps per gap – twice a year, one month sampling interval (May, September),

Subplot-level variables – sampled in sistematically arranged subplots within the gaps

total, diffuse and direct components of light (WinSCANOPY) – once in every second year (July) soil moisture (Fildscout TDR350) – four times (between June and September) in every second year cover of all vascular plant species within 41 quadrats (0.5 m × 0.5 m) – once in every second year (July)