

THE EFFECT OF DIFFERENT FOREST MANAGEMENT TYPES ON THE SURVIVAL RATE OF EPIXYLIC AND EPIPHYTIC BRYOPHYTES

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GOAL

How do different forest management types influence the survival rate of specialist epixylic, and generalist epiphytic bryophytes

QUESTIONS

- Which management types have unfavorable effect on the bryophytes?
- Which bryophytes is more sensitive to forest managements?

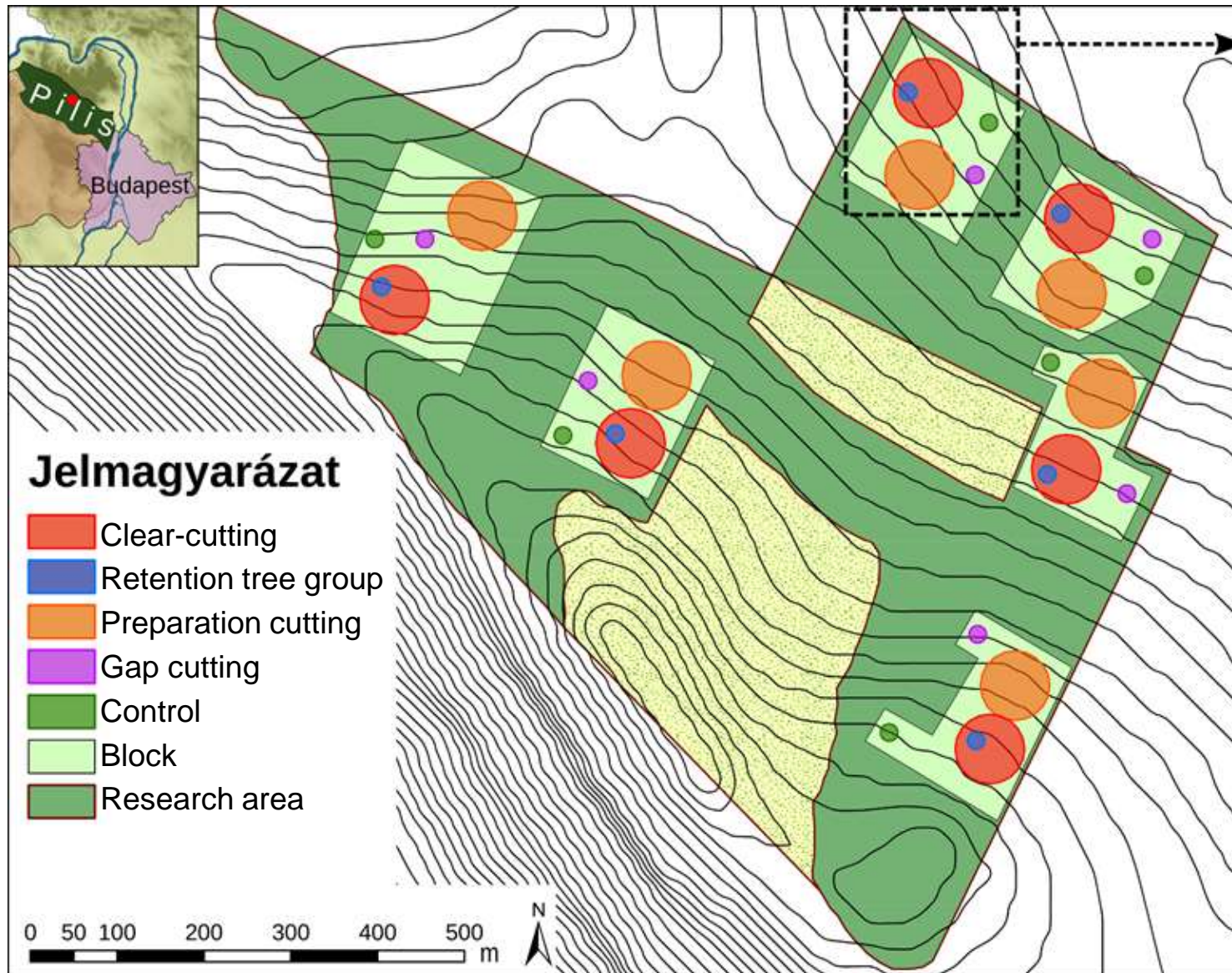
THE RESEARCH AREA

Five different management types were applied in an 80-year old oak-hornbeam forest, in the Pilis Mountains:

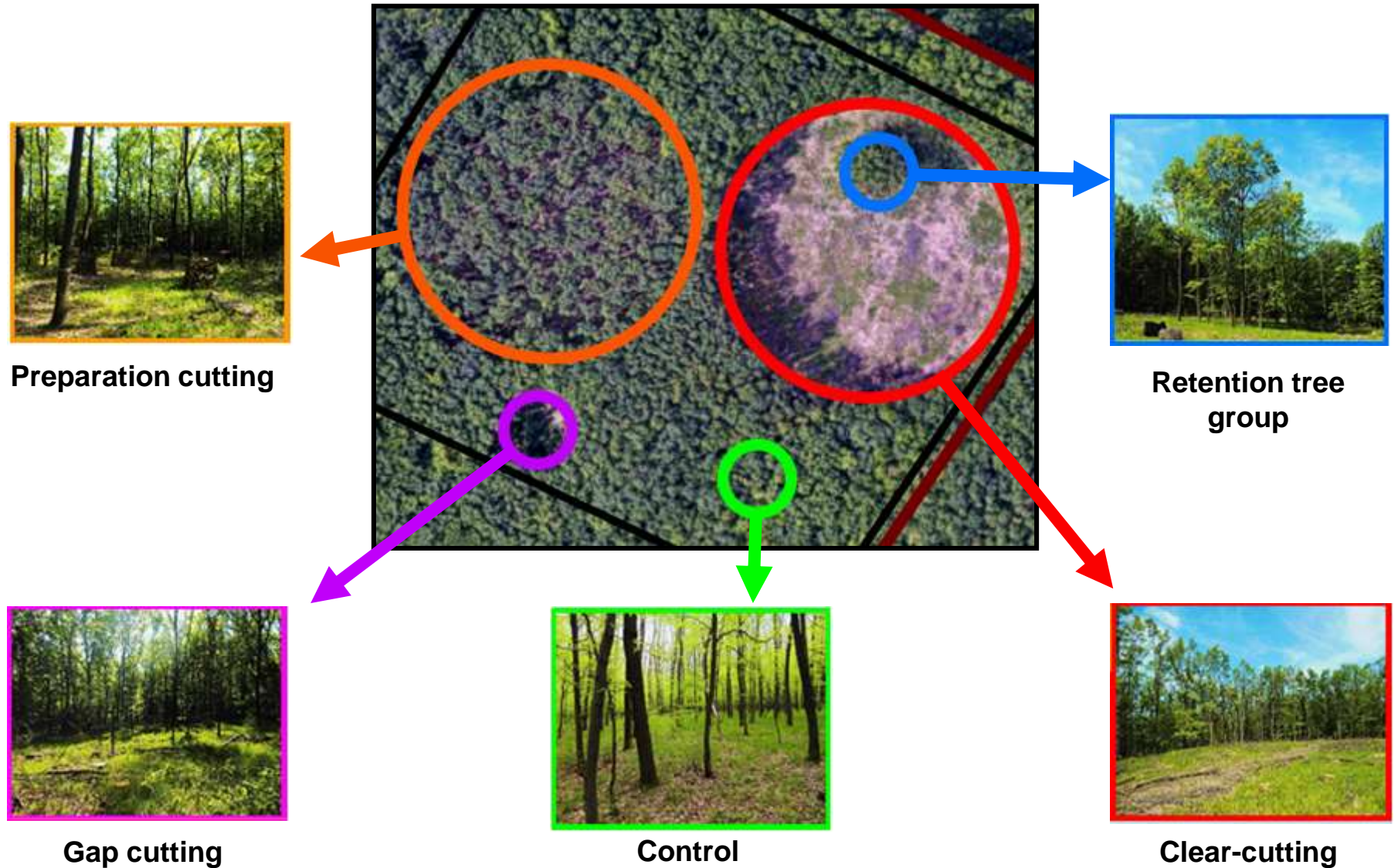
The 5 management types are:

- 1. Clear-cutting:** $d = 80\text{m}$
- 2. Retention tree group:** (in the clear-cutting) $d = 20\text{m}$
- 3. Preparation cutting:** $d = 80\text{m}$, 30% removal
- 4. Gap cutting:** $d = 20\text{m}$
- 5. Control**

THE RESEARCH AREA



THE RESEARCH AREA



THE EXAMINED SPECIES

Hypnum cupressiforme

- Generalist for substrates
- Can better tolerate dehydration
- Can be found in many habitats
- Indifferent to wood decay stages



- **Hypothesis:**

- *Hypnum* will survive better in the treatments than the specialist epixylic *Lophocolea*

THE EXAMINED SPECIES

Lophocolea heterophylla

- Specialist epixylic liverwort
- Sensitive to dehydration
- Common in humid habitats
- Prefers dead wood in late decay stages
- **Hypothesis:**
 - *Lophocolea* will show a more drastic response to treatments than the generalist *Hypnum*



METHODS

- 5-5 Bryophyte patches were fixed onto stumps in each treatment (→ 150-150 patches from each species)
- **Survival:** percentage estimation of the green cover area compared to the original area size
- Recorded in ever month from March to November
 - *Lophocolea*: since 15. May 2015
 - *Hypnum*: since 1. April 2016
- (+ Microclimatic measurments in every month)



METHODS

Time lapse of a stump in the **gap** cutting:

June 2016



November 2016



July 2017

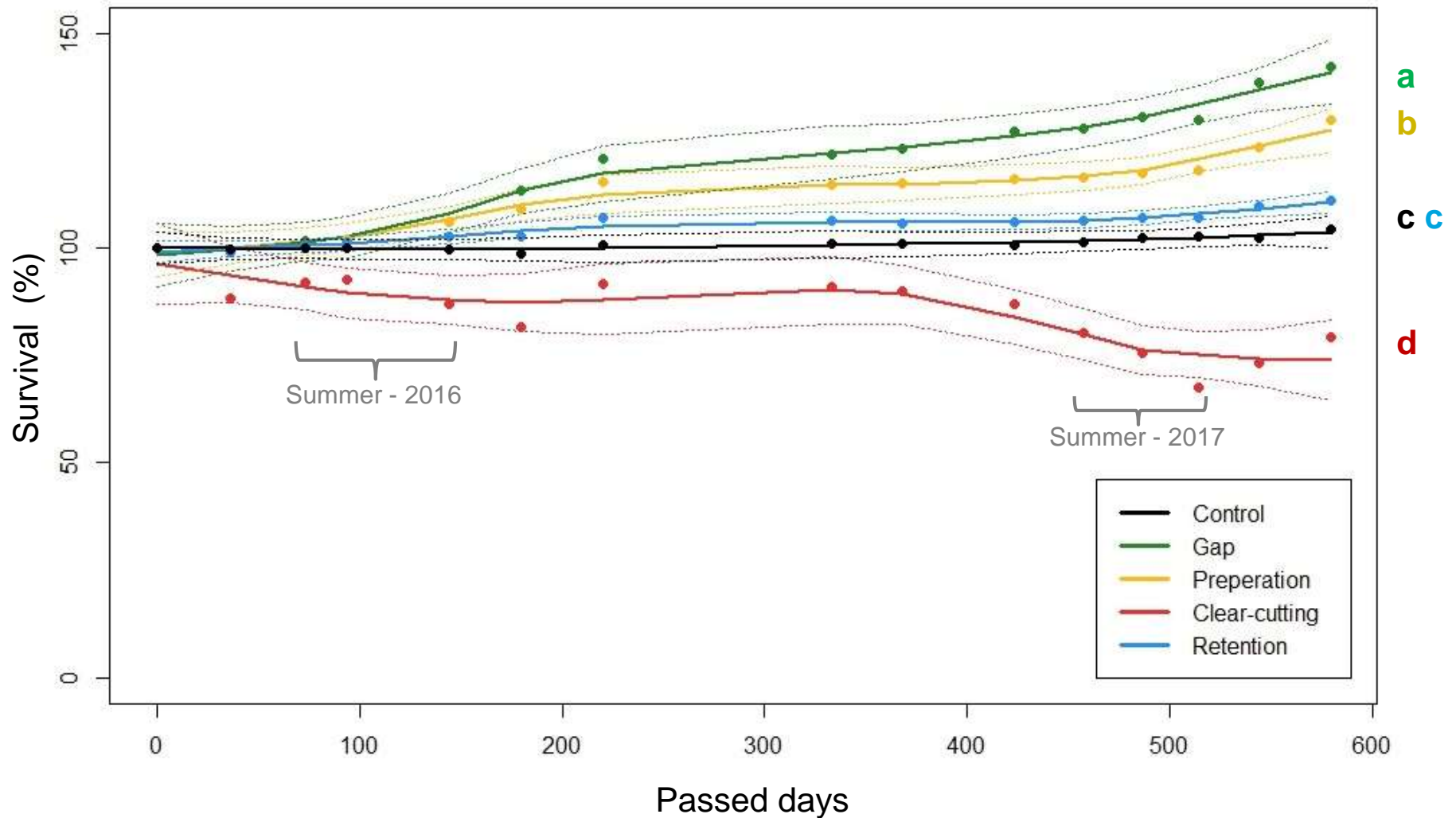


November 2017



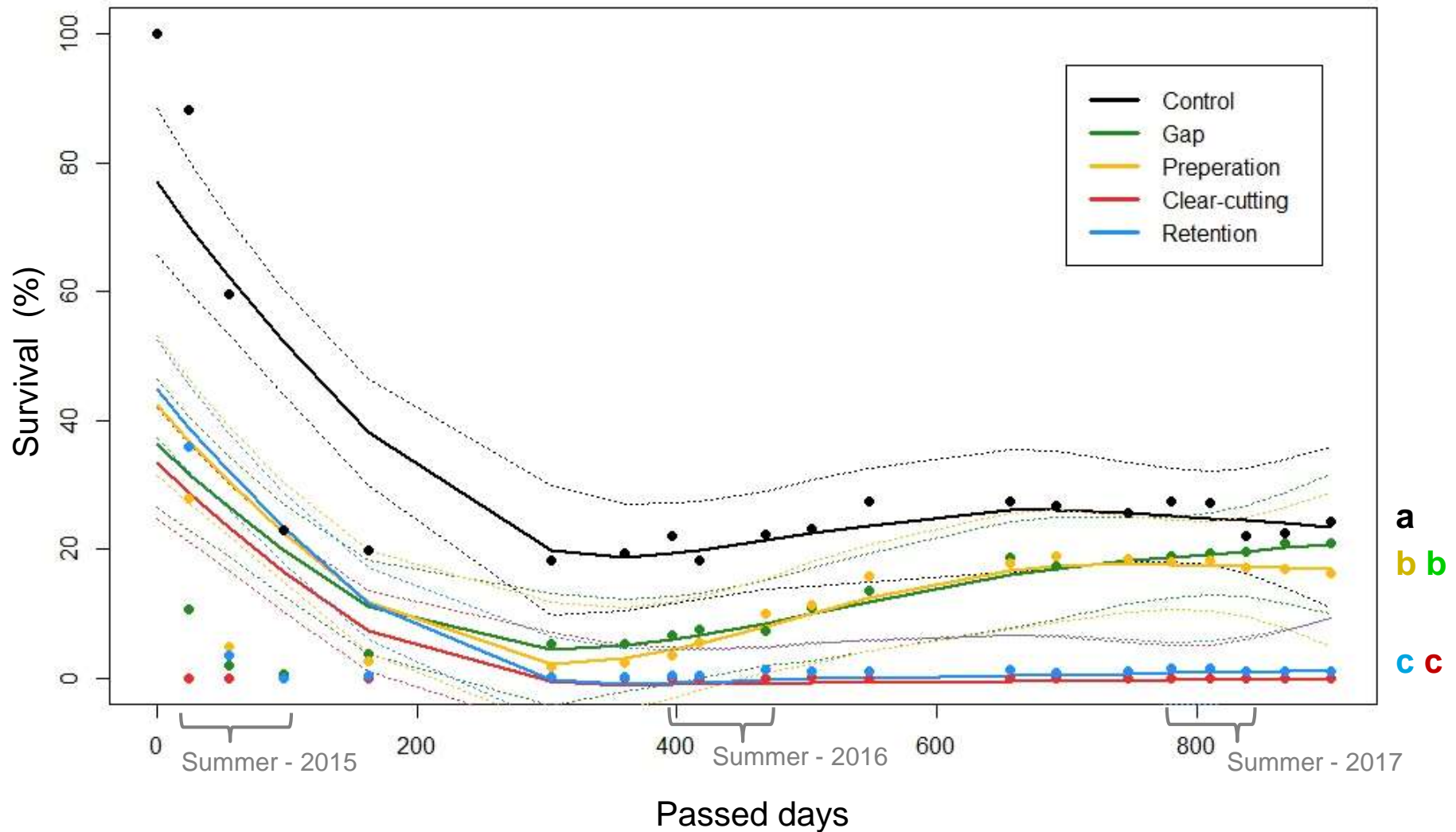
RESULTS - HYPNUM

GAM: $F = 105.517$ ***



RESULTS - LOPHOCOLEA

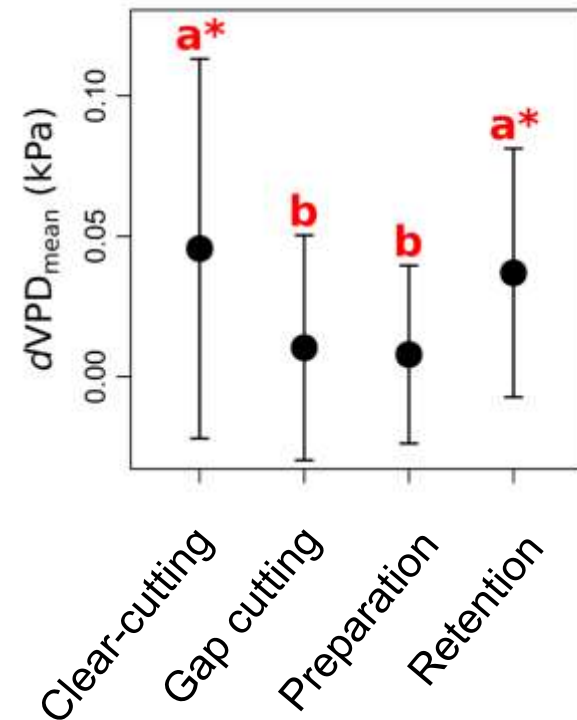
GAM: $F = 31.881$ ***



MICROCLIMATIC CONDITIONS (2015)

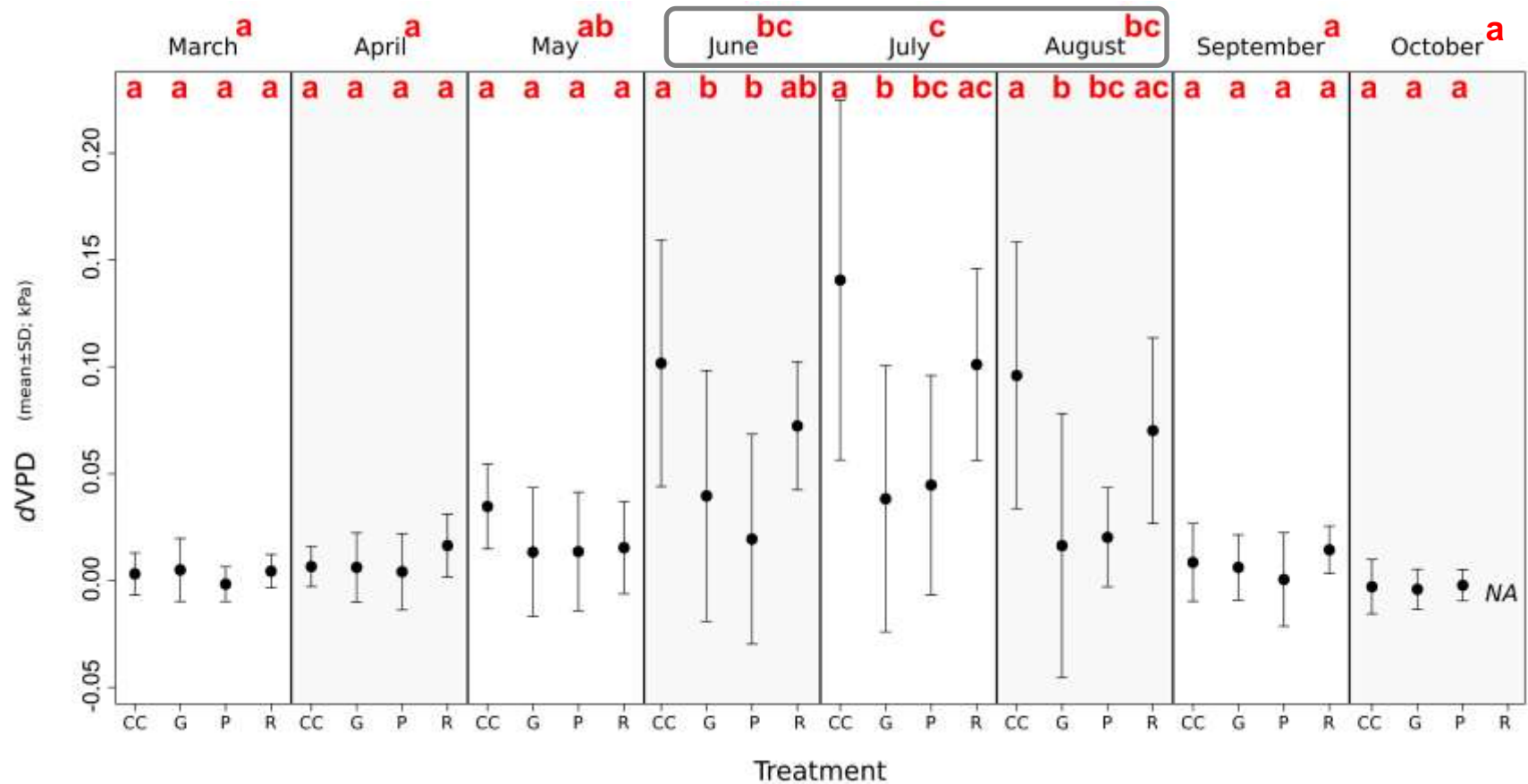
- Forest managements change the microclimate
- Vapour pressure deficit (**VPD**):
The ratio of the saturated and actual vapour pressure
Function of air humidity and temperature

VPD difference from control



ANOVA (F=4.78; p=0,017)

MICROCLIMATIC CONDITIONS (2015)



CONCLUSION

- *Hypnum* survived in all treatments, only the clear-cutting had a negative effect
 - **Generalist epiphytes** like *Hypnum* are **not endangered** by forest managements
- *Lophocolea* died out in the clear-cutting and retention tree group, it showed limited survival in other treatments
 - The survival of **specialist epixylic liverworts** like *Lophocolea* **require a continuous forest canopy**. It can survive only under continuous cover forestry

THANK YOU FOR YOUR ATTENTION!

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