

# The effect of different forestry treatments on multi-taxon biodiversity in a sessile oak–hornbeam forests: Pilis Forestry System Experiment

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**Aims:** Exploration the effect of different forestry treatments on the community structure and biodiversity of many organism groups.

**More information:** <https://piliskiserlet.ecolres.hu>

**Methods:** Pilis Forestry Systems Experiment

-80 yr old managed sessile oak (*Q. petraea*) and hornbeam (*Carpinus betulus*) forest

-Implemented in 2015 January

-Treatments:

**C:** control (mature stand)

**CC:** clear-cutting (d=80 m)

**G:** gap cutting (d=20 m)

**P:** preparation cutting, 30% partial cutting, (d=80 m)

**R:** retention tree group (d=20 m)

**Vascular plants**

2014-2022, fenced (solid) and unfenced (empty) plots

**CC:** cover increase, first two years annuals after perennials, non-forest species (*Solidago*, *Calamagrostis*), fast regeneration

**G:** fast cover increase, light flexible forest species, moist conditions, fast regeneration

**R:** cover similar than in control, high species richness, species of forest edges

**P:** moderate, continuous cover increase, similar composition to the control

Ref.: Tinya et al. 2019. *Eu. J. For. Res.* <https://doi.org/10.1007/s10342-018-1154-8>

**Carabid beetles**

2014-2018, pitfall traps

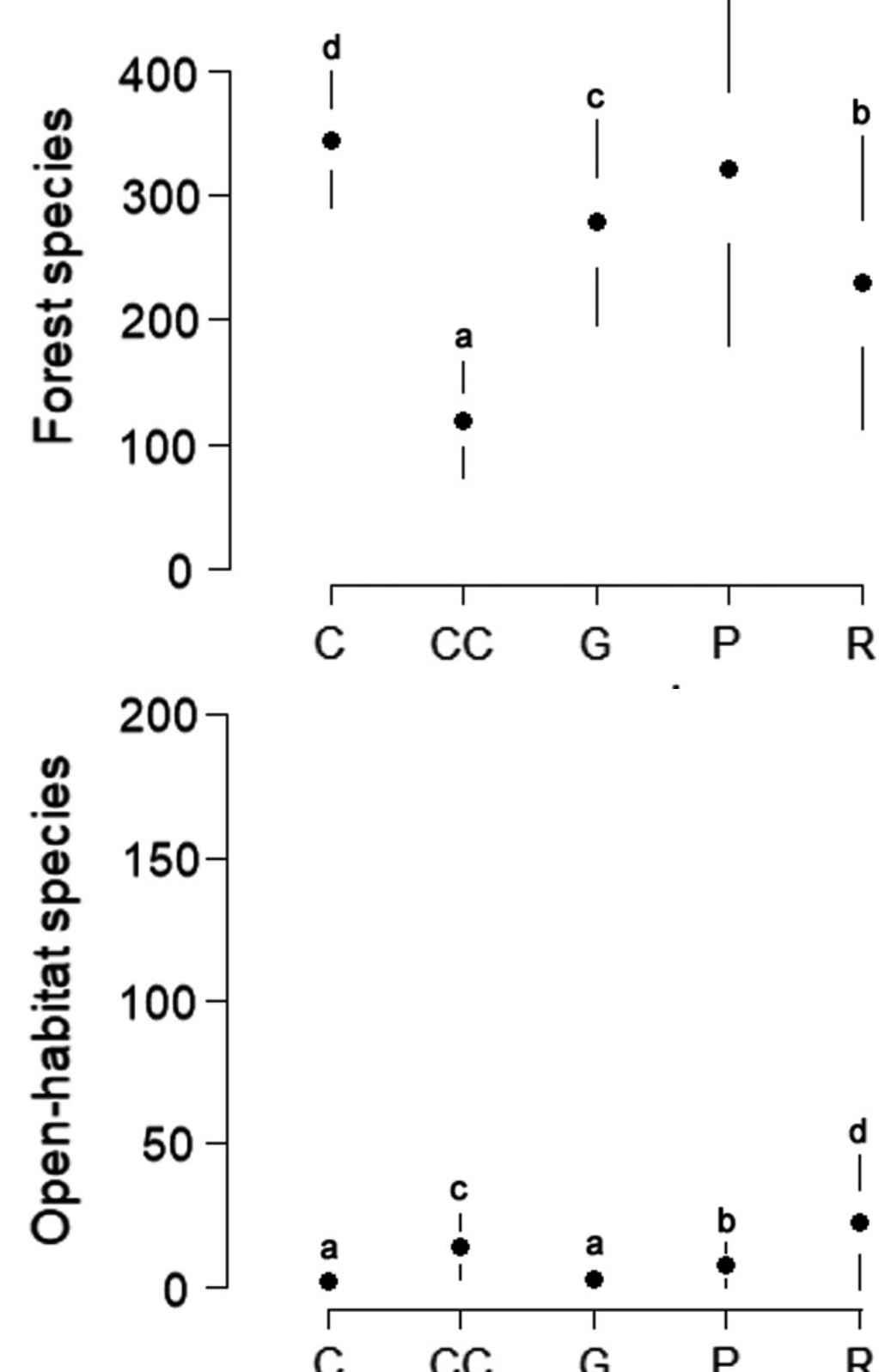
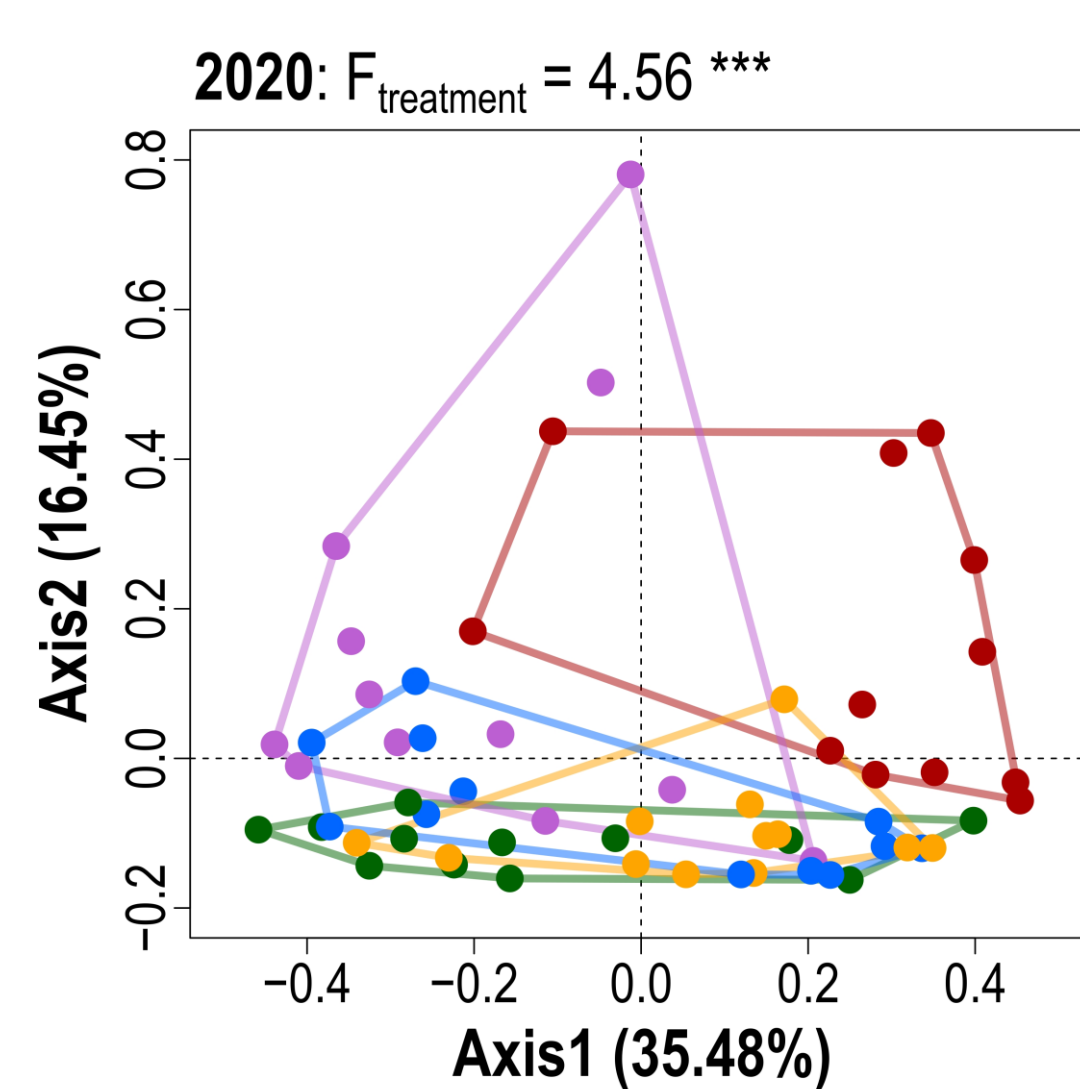
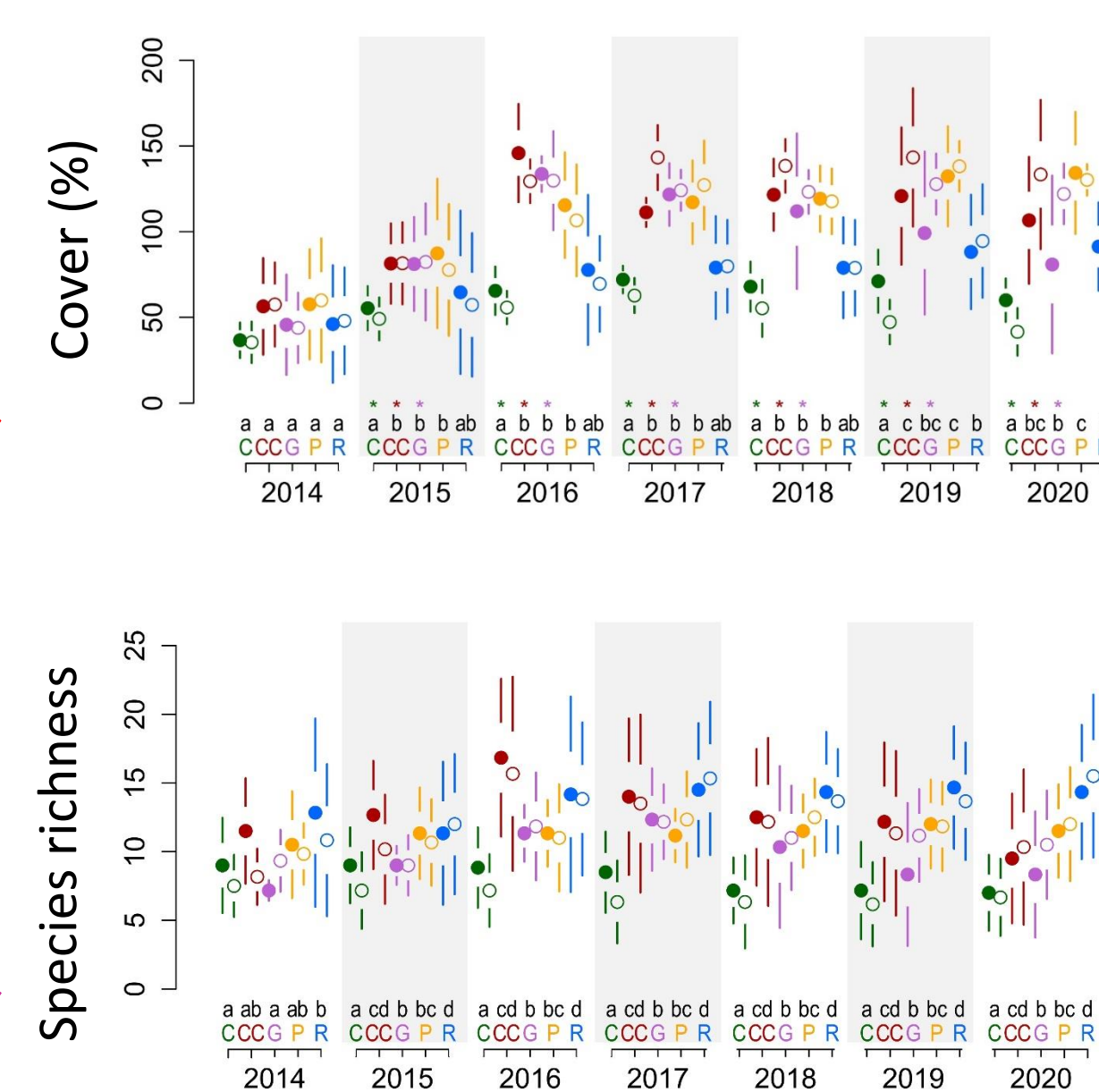
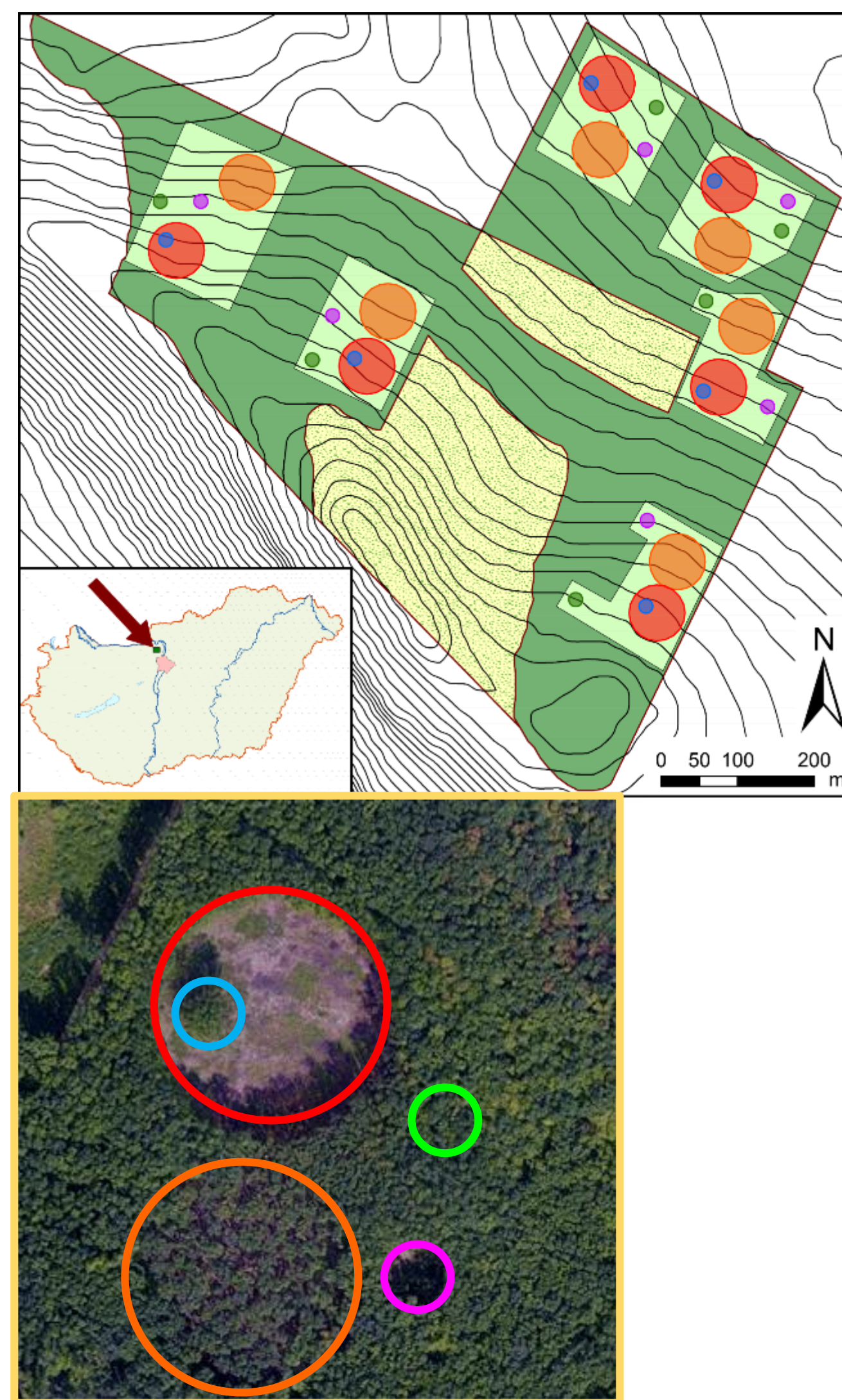
Composition of **CC** and **C** separated, functional responses

**CC, R:** Generalist and open area species

**C, G, P:** Forest species

Ref.: Elek et al. 2022. *Ecol. Appl.* <https://doi.org/10.1002/eap.2460>

Found: NKFIA K 128441



**Spiders**

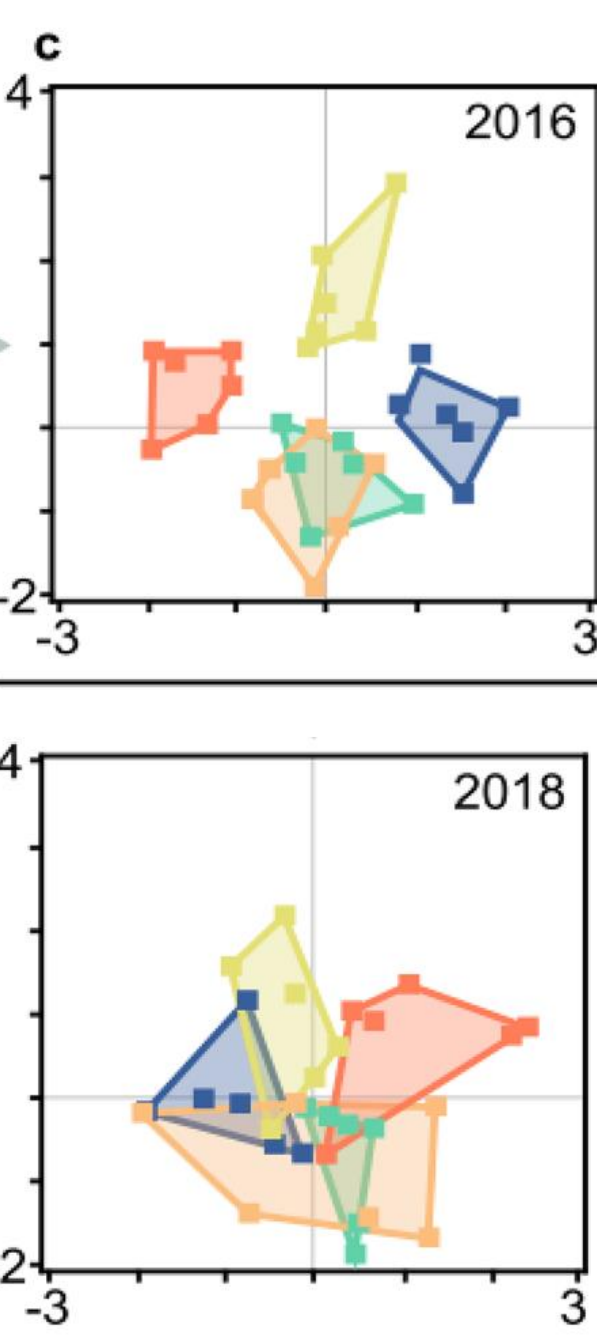
2014-2018, pitfall traps

Composition: fast treatment effect, after fast rearrangement

Low effect on species richness and abundance

Many indicator species of **CC** and **R**.

Ref.: Samu et al. 2021. *Sci. Rep.* <https://doi.org/10.1038/s41598-021-99884-8>



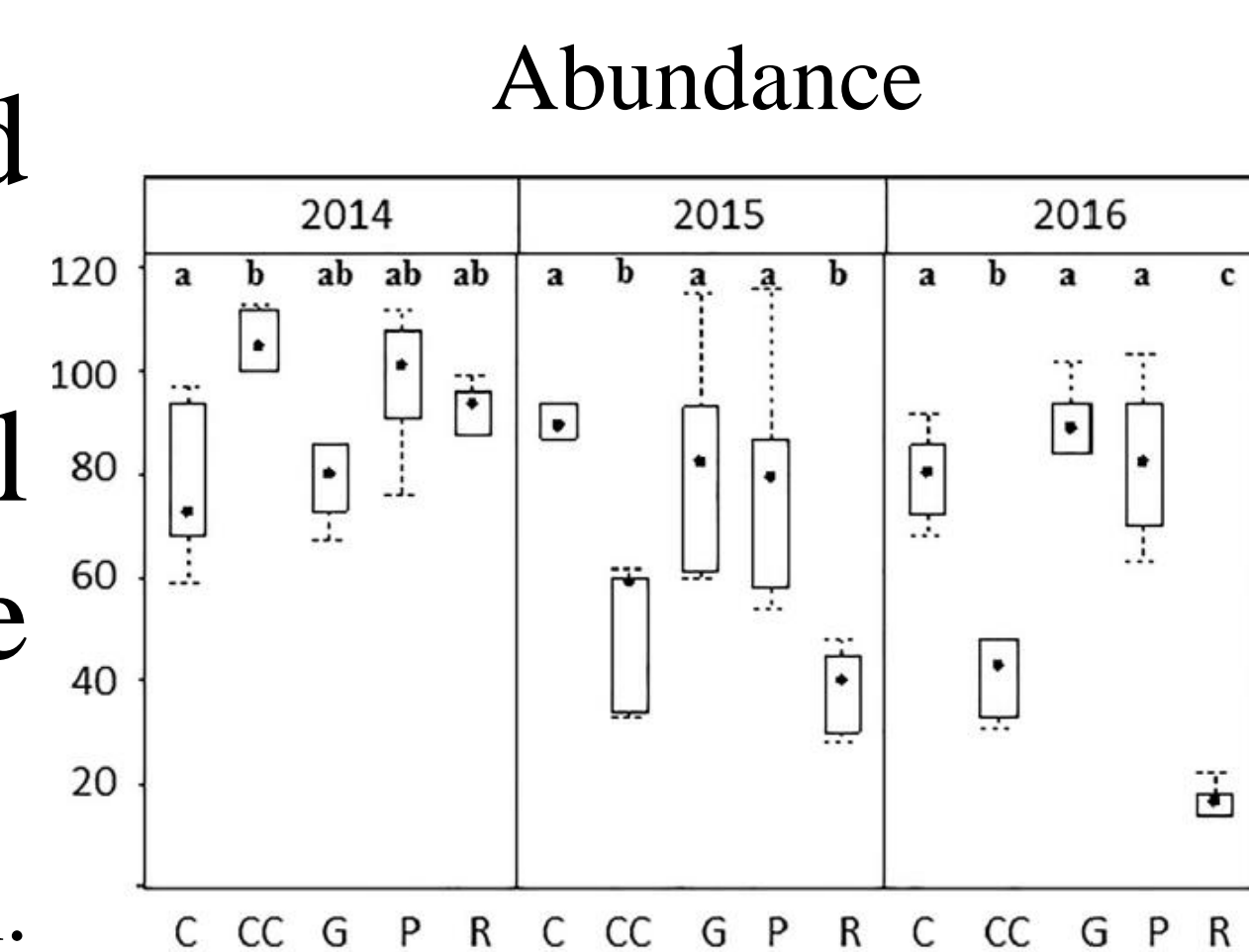
**Enchytraeid worms**

2014-2016, soil samples

Very low abundance and diversity in **CC** and **R**.

Strong sensitivity on soil temperature and soil moisture conditions

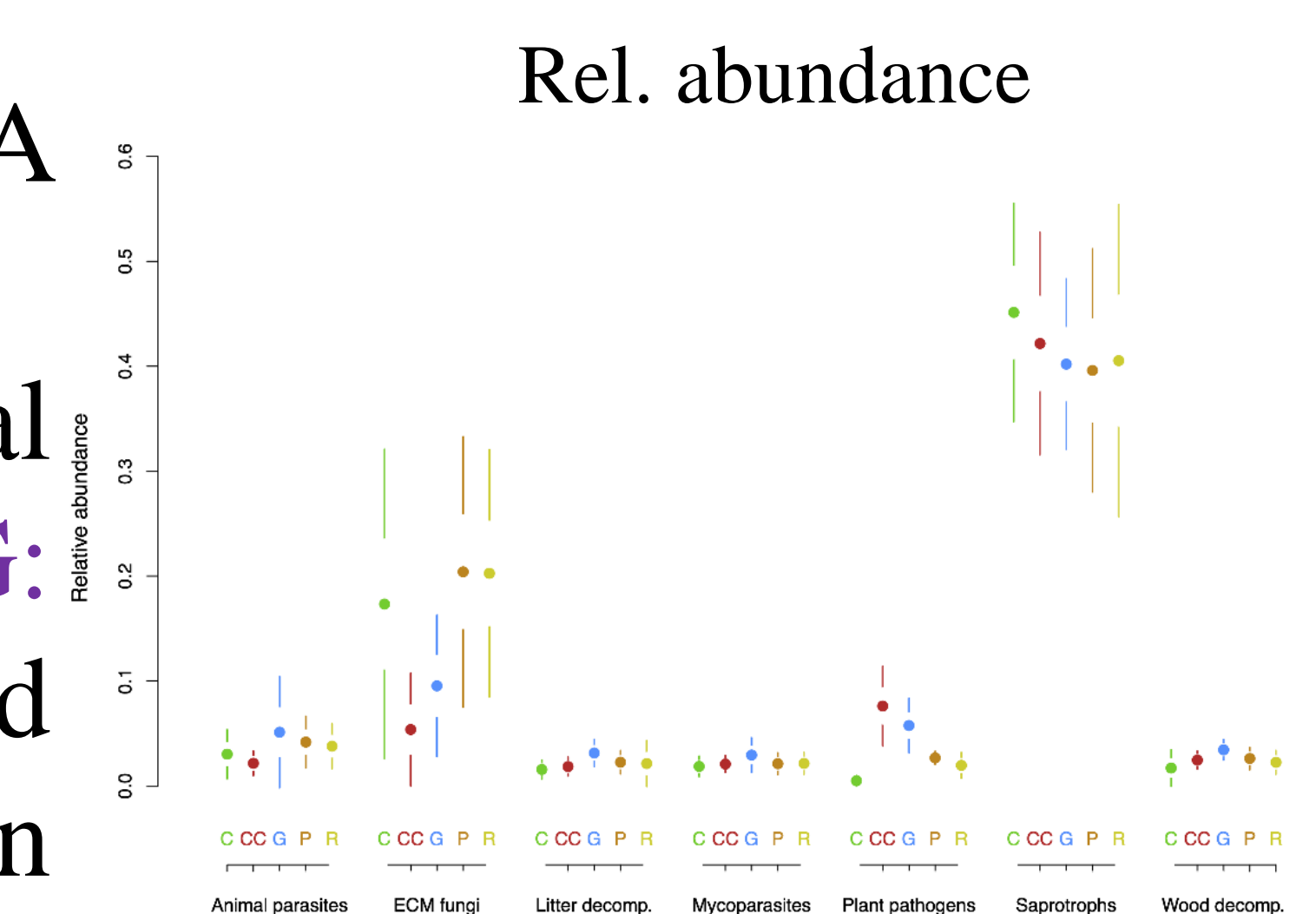
Ref.: Boros et al. 2019. *Appl. Soil Ecol.* <https://doi.org/10.1016/j.apsoil.2018.12.018>



**Fungi**

Soil samples, DNA sequestration, 2020

Stronger compositional change in **CC** and **G**: less ectomycorrhiza and more plant pathogen species..



**Conclusions**

**CC:** Extreme temperature, understory of non-forest species, good regeneration, changed composition of many organism groups.

**G:** Forest microclimate, high soil moisture, increased understory cover, light-flexible forest species, good regeneration, community structure of most organism groups kept the forest characteristics.

**R:** Dry and warm conditions, understory similar to control, species richness increased, no regeneration, many animal organism groups changed.

**P:** Small compositional changes, slight understory cover increase, moderate regeneration

Treatments of continuous cover forestry (gaps) and partial cutting preserve more the forest communities than rotation forestry, in which case large retention tree groups are necessary.