

Effects of forest certification on shrub and grassland diversity of a cork oak woodland

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INTRODUCTION

- **Sustainable forest management** is essential for maintaining biodiversity and ecosystem services.
- **Forest certification**, a third party audited voluntary process which is expanding globally, aims to incentivize sustainable forest management
- Forest certification requires that land managers set up **conservation zones**, usually accounting for 10% of the property, where use is less intensive.

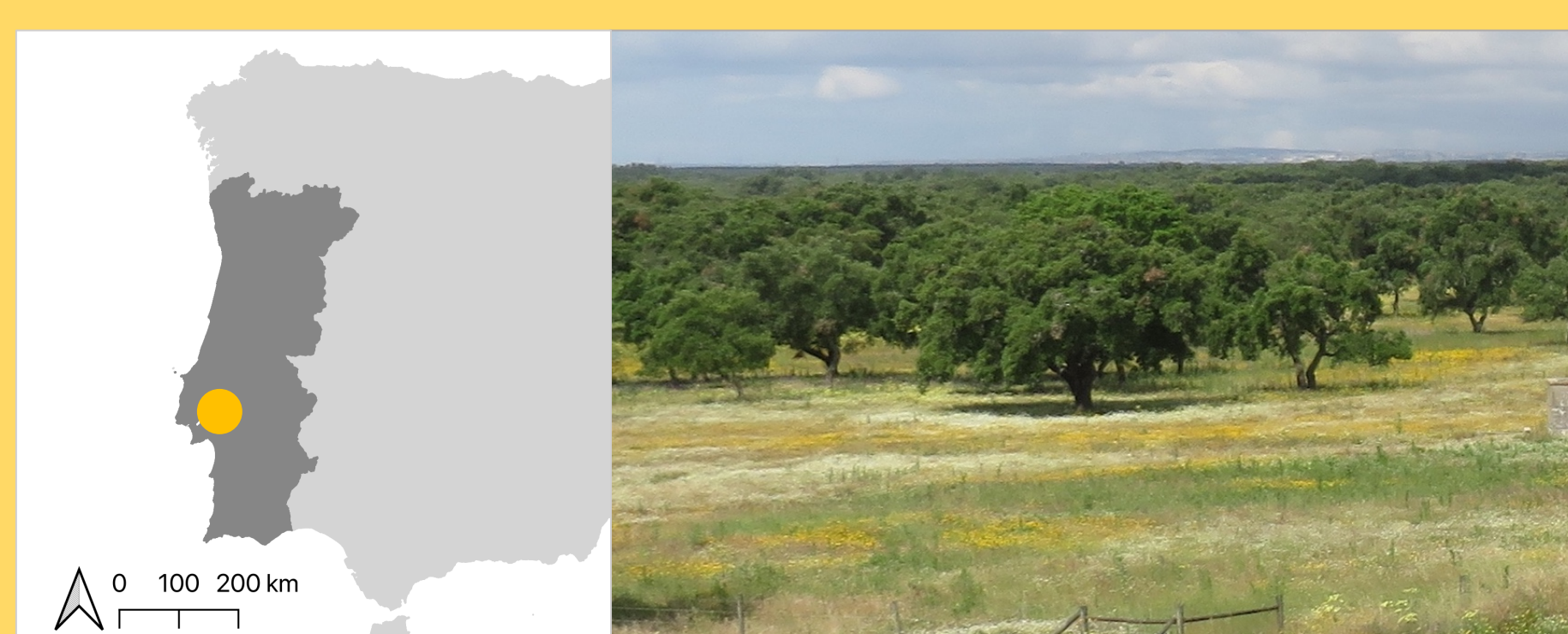
Questions:

- How does vegetation diversity and structure varies between conservation and non-conservation zones in certified oak woodlands?
- How does time since conservation zone establishment affects vegetation diversity and structure?

METHODS

Study area

Certified by the Forest Stewardship Council (FSC)



Certification conservation zones (CZ)

- Livestock exclusion
- Reduced shrub clearing
- Different time periods under conservation management (10, 14, 20 years)

VS.

Common managed areas

- Pasture
- Livestock grazing
- Shrub clearing

In each site:

- **six 20m long transects**
- herbs and shrubs cover, height and diversity
- **point- and line-intercept methods**



RESULTS

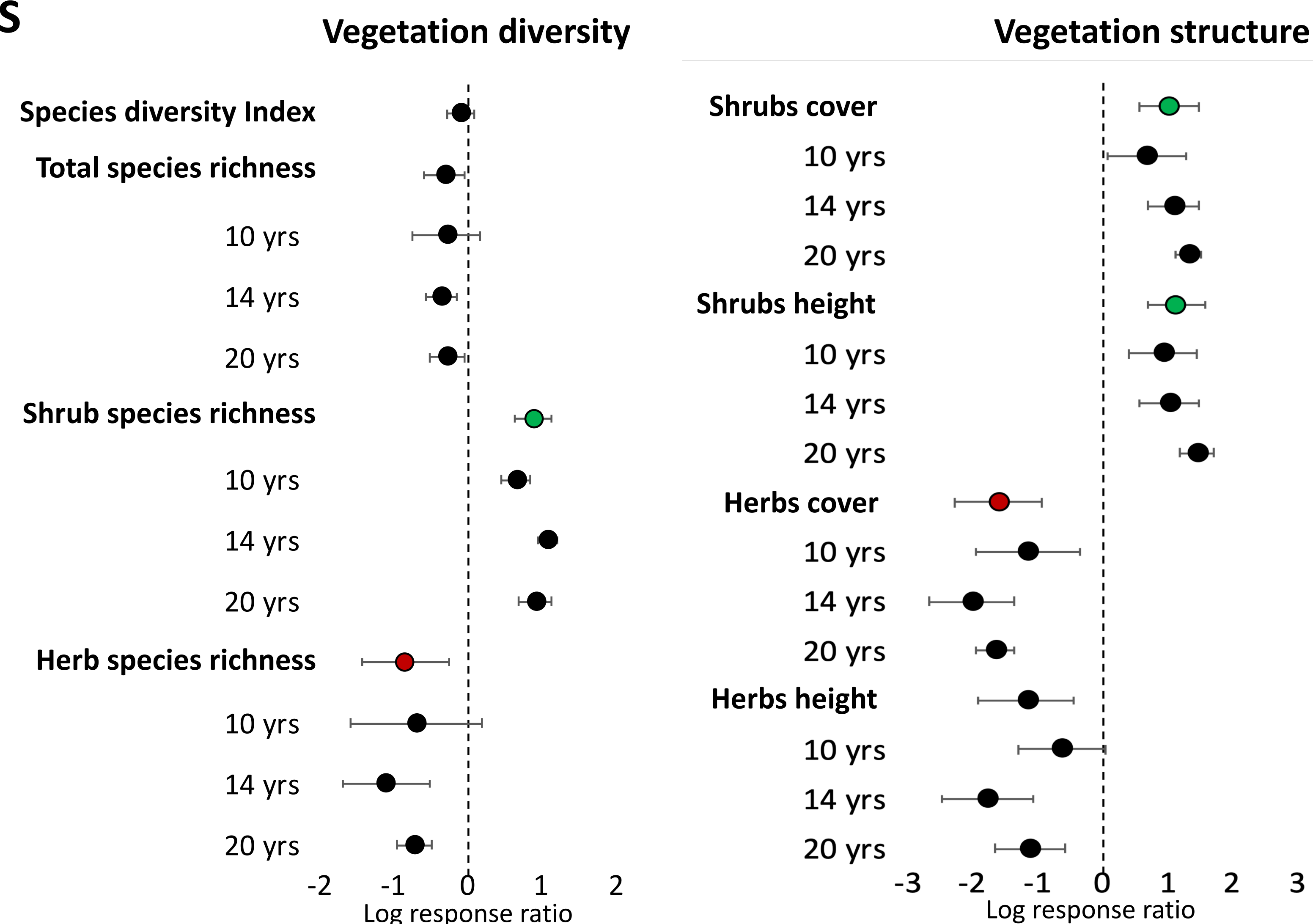


Figure 1 - **Mean effect size of vegetation diversity and structure response** (mean $\pm$ standard-deviation). Positive values mean an increase in the response variable and negative values a decrease in relation to the control value. Conservation zones have higher shrub cover, height and species richness ($p < 0.01$; in green) but lower herb cover and species richness ($p < 0.01$; in red).



Figure 2 – View of site under common management (left) and under certified conservation zone (14 years after establishment) (right).

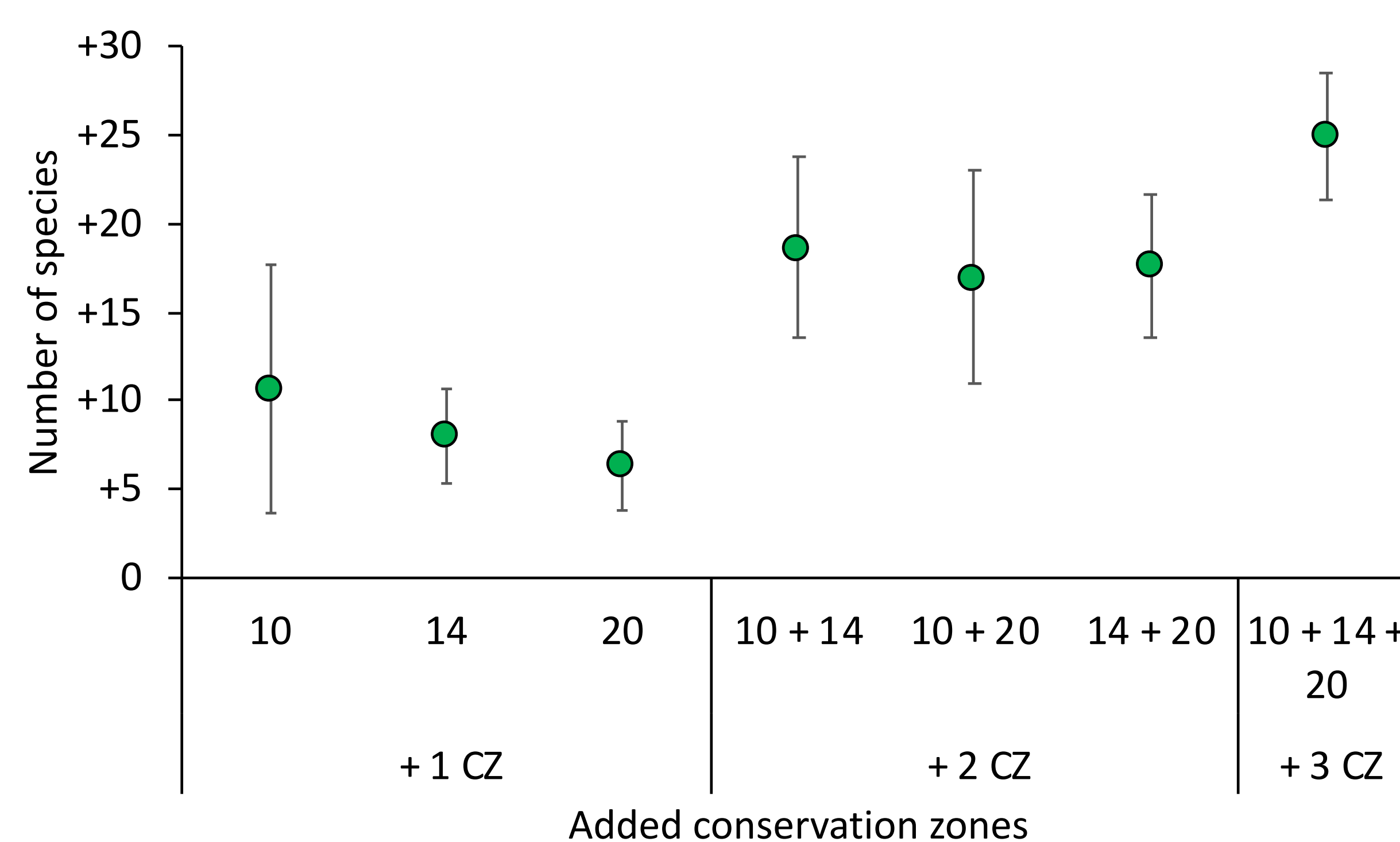


Figure 3 - **Number of species gained with increasing number or combinations of conservation zones** (mean $\pm$ standard-deviation). Establishing conservation zones with two different ages increases the property's species pool up to 19 species. CZ- conservation zones. Number in X axis are years since conservation zone establishment

CONCLUSIONS

- Conservation zones have taller shrubs and higher cover and number of shrub species.
- Conversely, these areas have lower herbs cover and number of species.
- Establishing conservation zones may promote habitat heterogeneity at the estate level and indirectly favour other species (e.g. vertebrates) and overall biodiversity.
- Conservation zones with different years since establishment may further increase such effects on biodiversity.

Acknowledgments

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