

# Plant ecological strategies, pollination and land use: a large-scale analysis

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## Introduction

Pollinator decline has been described worldwide and is generally mentioned to be related to human activities [1,2]. Over the last century, Belgium faced up notably a significant intensification of agriculture and large land use/cover changes [3].

These changes may have drastically changed the composition of plant communities. Responses are expected to be different depending on plant strategies. According to Grime's CSR ecological scheme [4], three principal strategies (competitors, stress tolerators and ruderals) represent viable trait combinations arising under particular conditions of competition, abiotic limitation to growth or periodic biomass destruction (Fig. 1).

In this context, we expected a higher proportion of competitive plant species in resource-rich environments [5]. We also supposed a link between strategies and mating systems, as mentioned by Munoz et al. [6] who found that competitors tend to be outcrossers and ruderals selfers. The recent compilation of large temporal and spatial scale data represents a unique opportunity to explore these hypotheses.

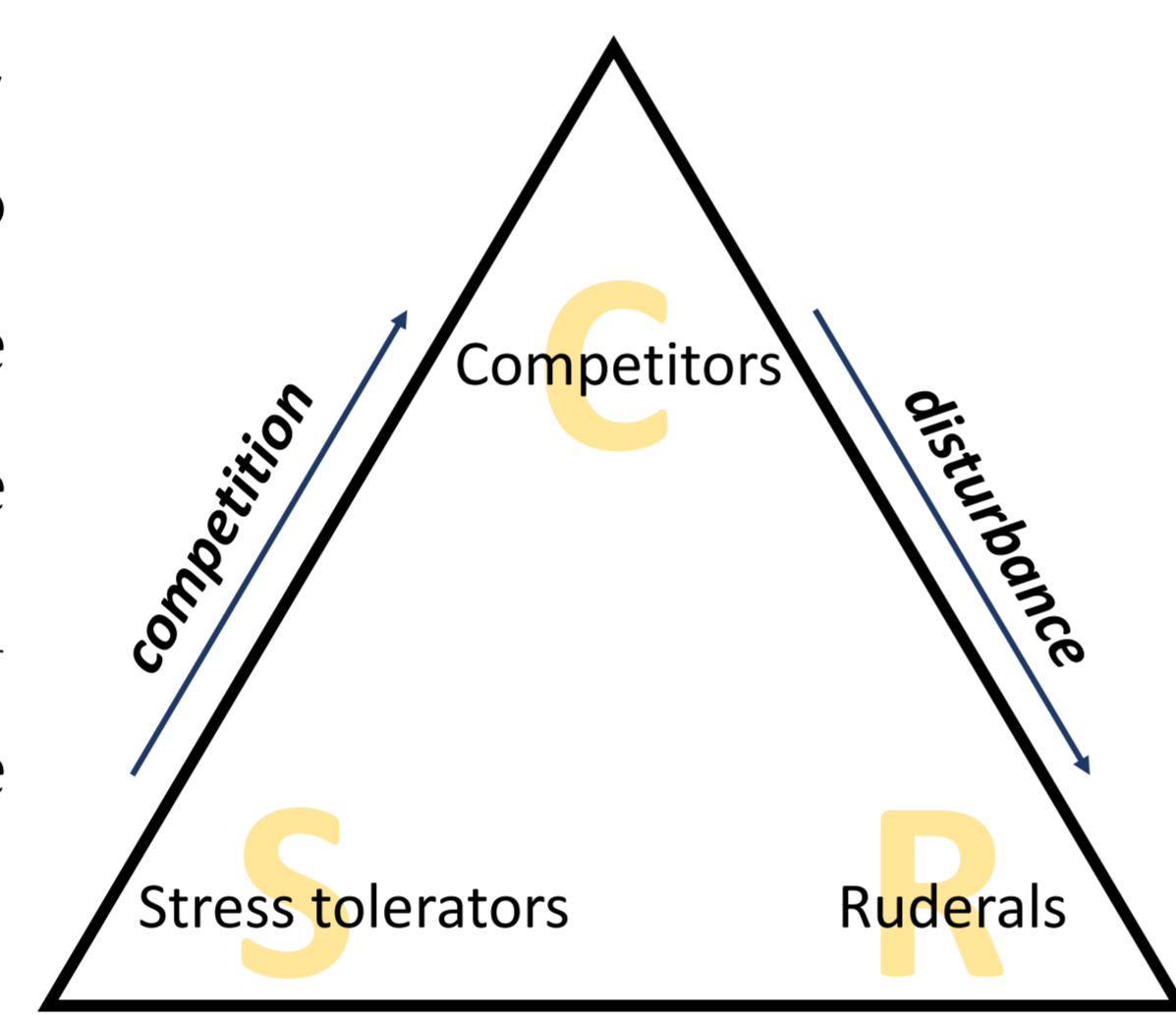
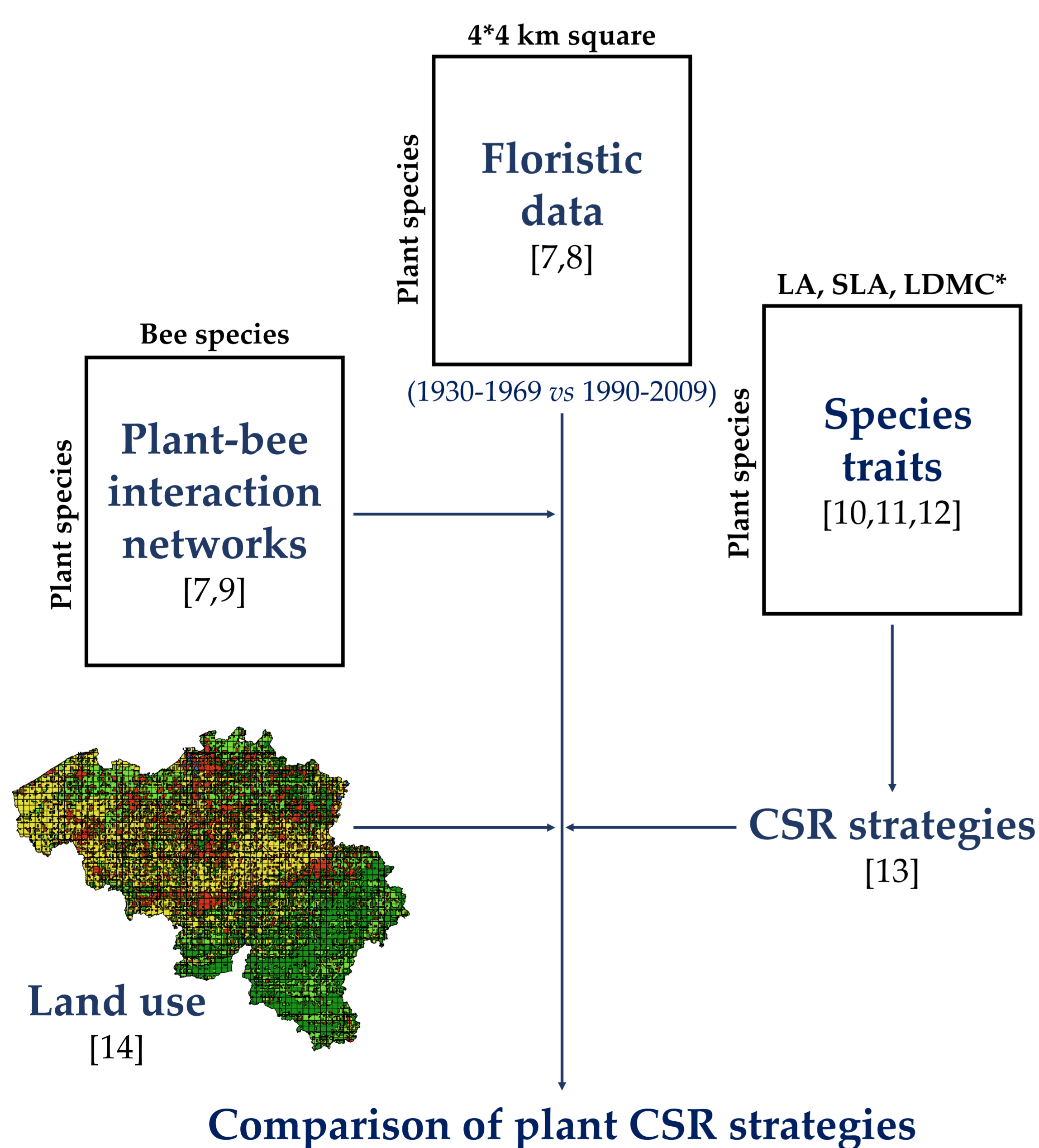


Fig. 1. Grime's scheme of plant strategies.

## Material and methods



### Comparison of plant CSR strategies

➤ Between periods of all plant community and for plants visited by wild bees (lm regr. and Kruskal-Wallis tests in R).

\*Leaf Area, Specific Leaf Area and Leaf Dry Matter Content.

## Results

- The global plant species diversity decreased with the increase of crop area in each period. The diversity of visited plants decreased in the first period only.
- The plant diversity (all plants and visited plants only) increased across time.
- Visited-plant species are more competitive than others (Fig. 2), confirming the link between C-strategy and cross-pollination (part. by insects).
- Competitiveness of visited species increased across time (Fig. 3). As competitor plant species are more generalists in terms of environmental conditions [5,15], these results could reflect a biotic homogenization. This ties with our previous work [7] in which we have highlighted a decrease of bee specialization in their interactions with plants.

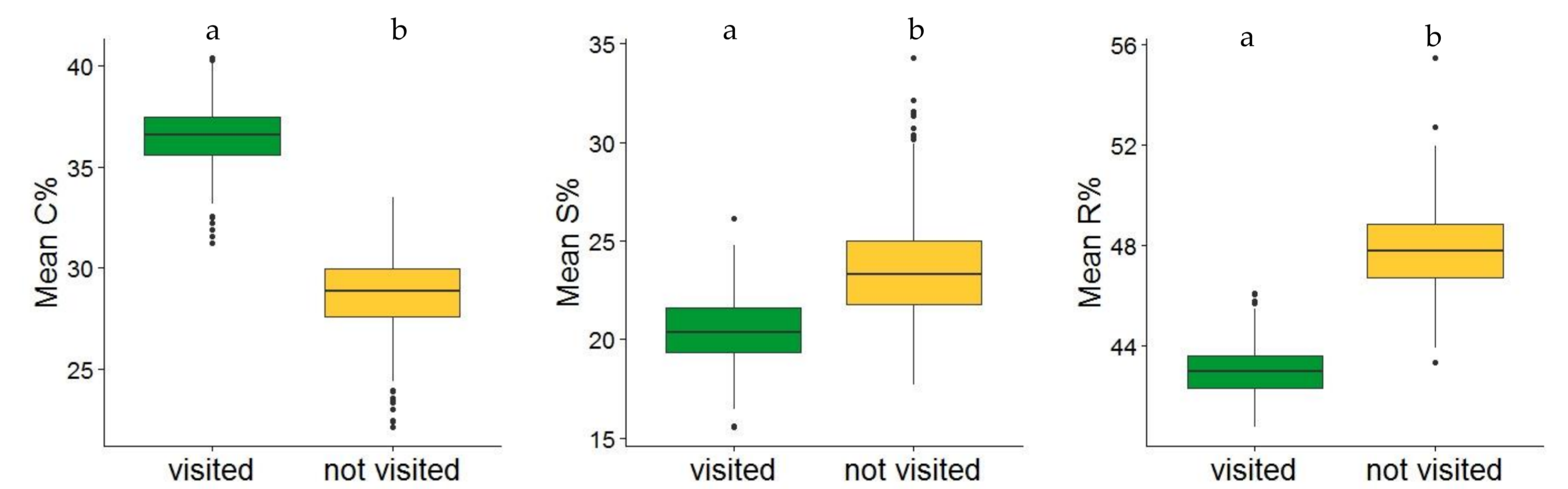


Fig. 2. Differences of mean C%, S%, R% per square between visited plant species and the others, all periods confounded.

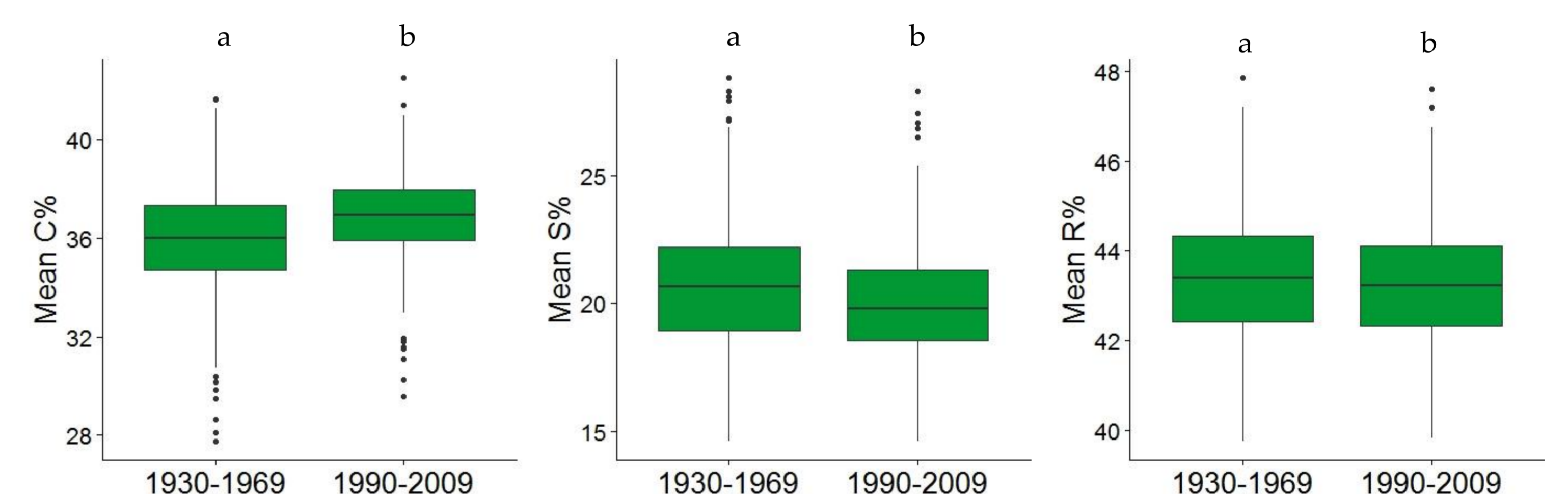


Fig. 3. Differences of mean C%, S% and R% of visited plants per square between periods.

## Conclusion and perspectives

Taking into account the CSR strategies illustrated the response of plant community to land use changes at a national-scale. In agro-ecosystems, visited plant species tend to be more competitive, highlighting an homogenization of plant communities.

Although the list of resource plants is probably not exhaustive, we confirm that CSR strategies are related to mating system since flora visited by bees have sign. different strategies and do not respond in the same way to environmental changes. To identify more precisely the factors responsible for these shifts, we suggest especially to integrate data about intensity of crop practices or landscape configuration.

## Literature cited

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