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WEED SPECIES SHIFTS DUE TO CLIMATE CHANGE: A CASE STUDY OF ROW CROPS IN THE NORTHEASTERN CROATIA

Marin Lukačević¹, Edita Štefanić²

¹Ph.D. student, Josip Juraj Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek

²Ph.D., full professor, Josip Juraj Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek

Abstract: The phytocoenological investigations conducted in the summer period of 2004 and 2023 determined qualitative and quantitative changes in row crop's weed communities. Maize, soybean, sunflower, and sugar beet fields were visited each time in June. All occurring weed species within the randomly selected 10 m x 10 m quadrants per 30 and 29 fields in 2004 and 2023, respectively, were evaluated for analysis.

• Introduction

The main objectives of this research was to analyze the floristic composition and diversity of the weeds recorded in the northeastern Croatian row crops' as well as to reveal how climate change influences the weed species' population dynamic shifts.

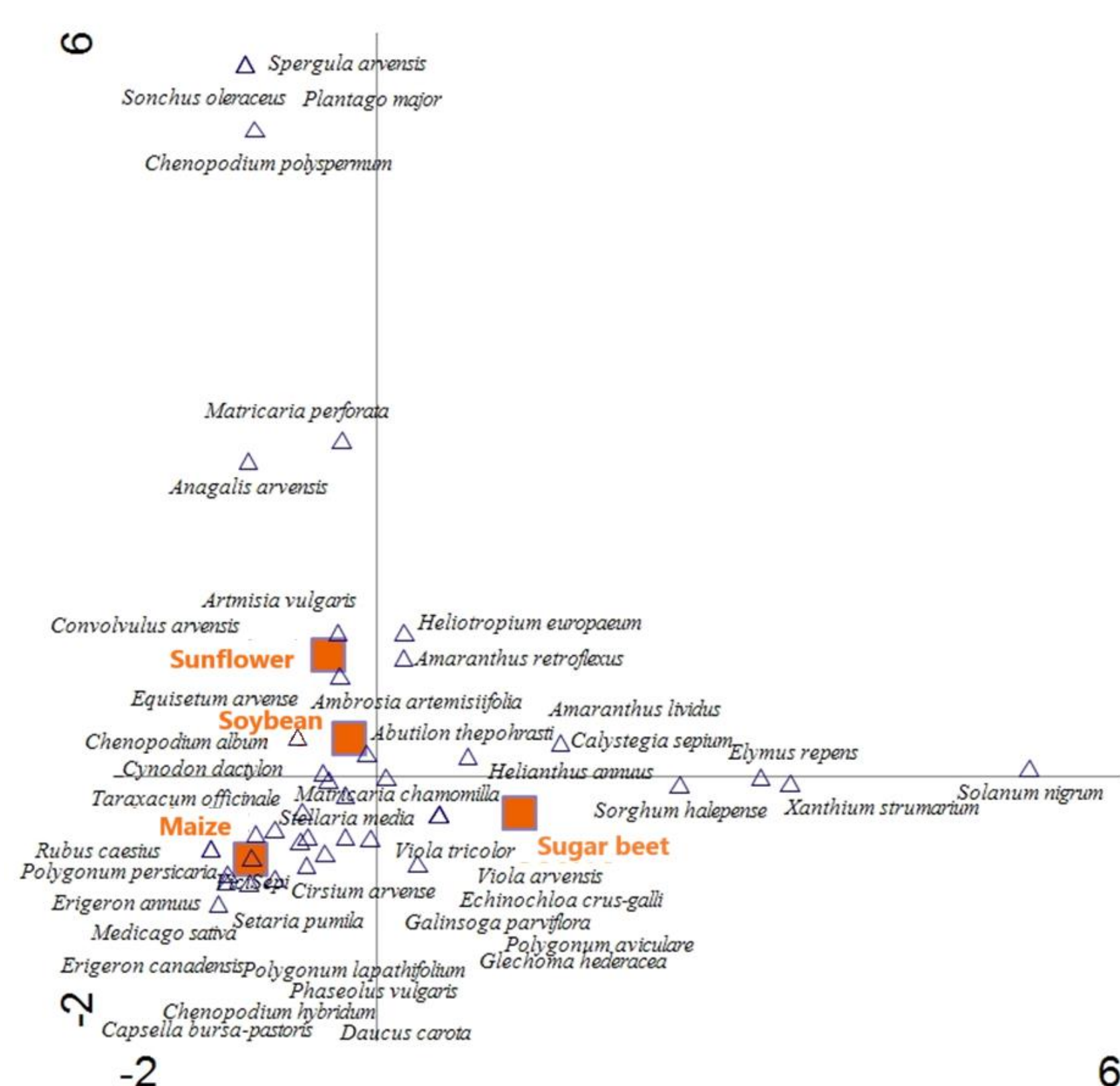
• Materials and methods

Weeds were evaluated using the Braun-Blanquet scale and the Canonical Discriminant Analysis was followed to determine the statistically significant differences between the weed communities. Lastly, the weed flora was assessed in terms of the photosynthetic pathway ratios' changes.

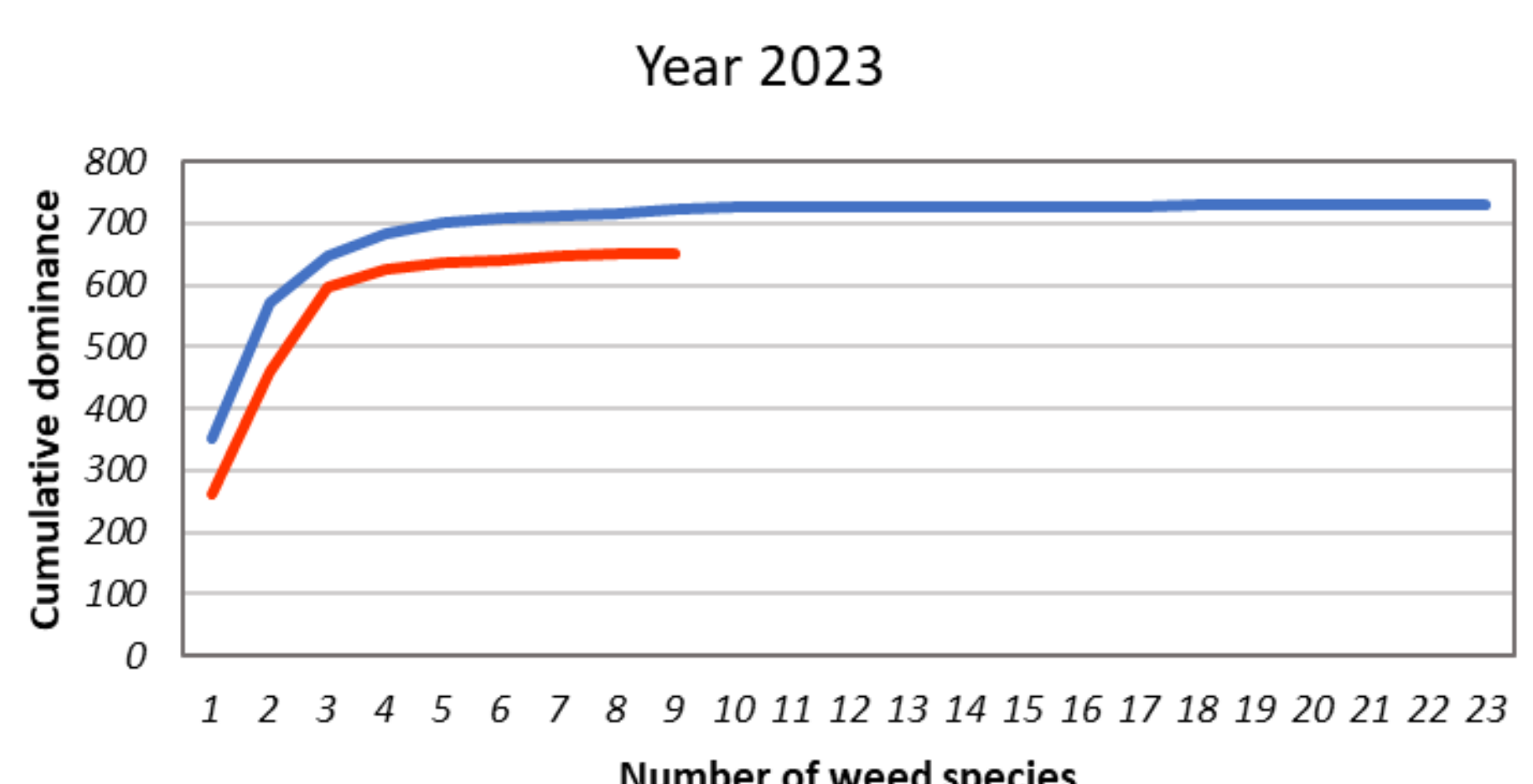
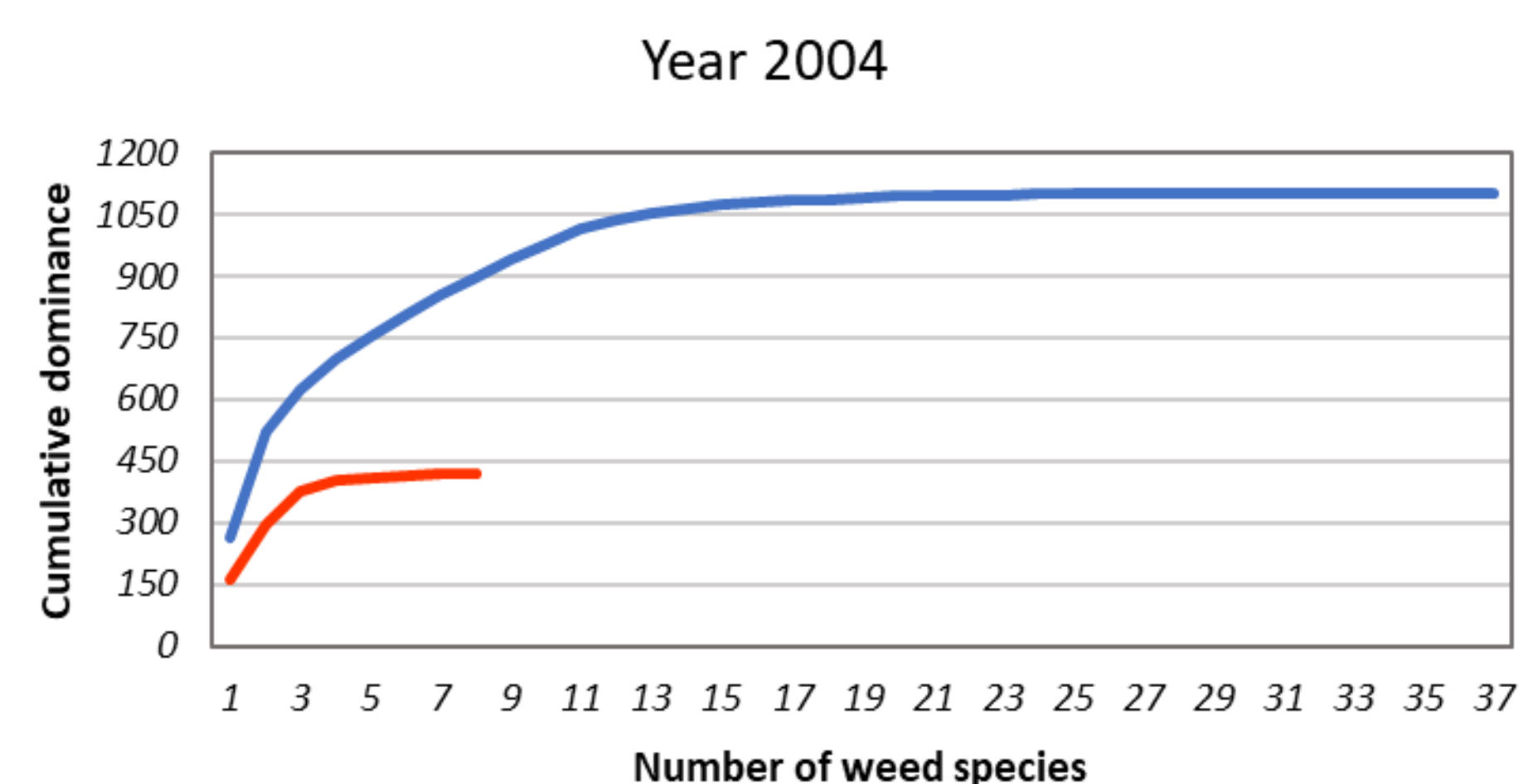
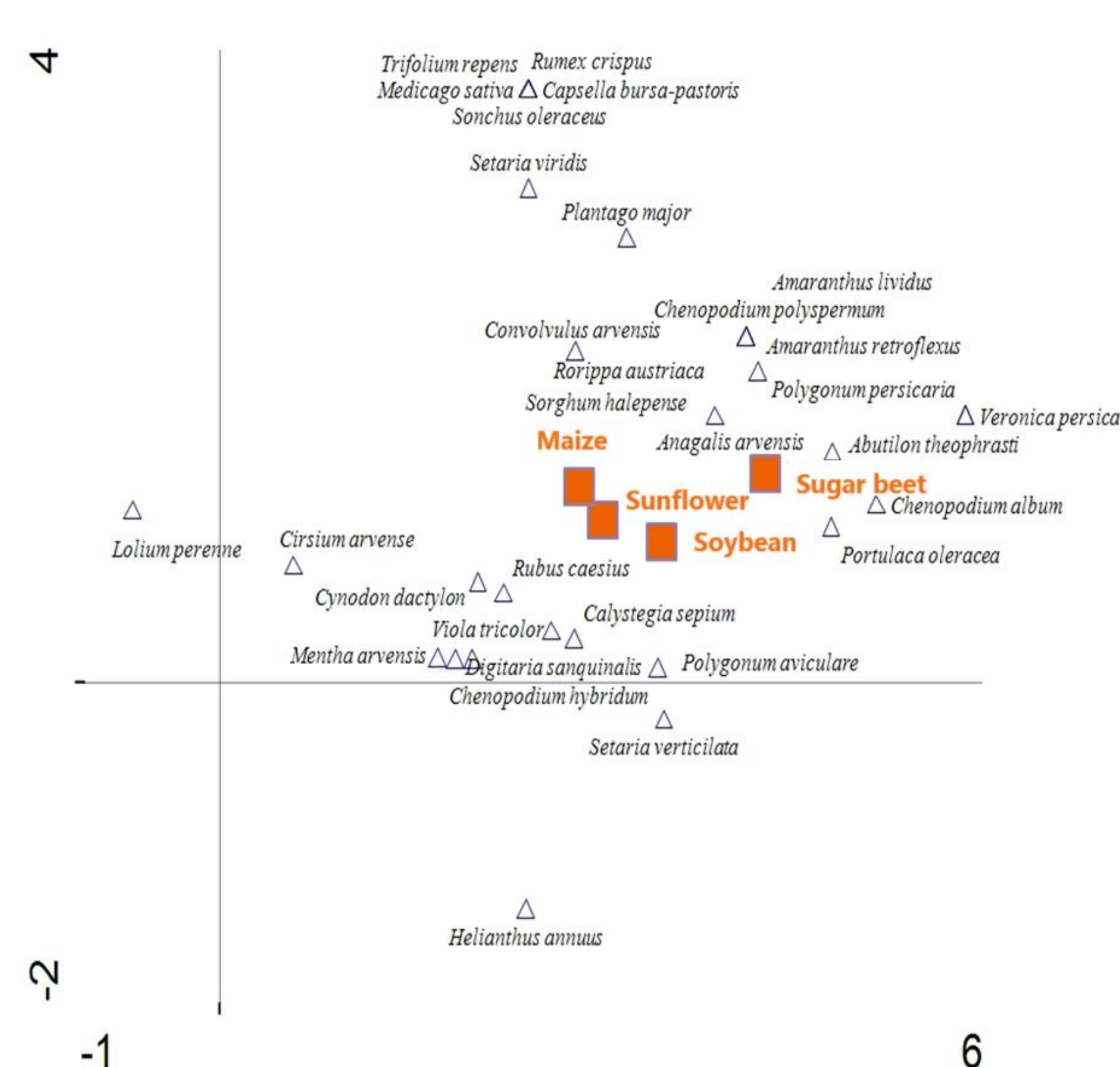
• Results and discussion

The heterogeneous and floristically rich weed community surveyed in 2004 was replaced with a less diverse one but with few abundant and dominant weed species in 2023. In the year 2004, the C₃ weeds dominated the community, whereas the C₄ weeds were significantly underrepresented. However, the recent survey (2023) indicated the C₄ weeds' growing abundance and species richness.

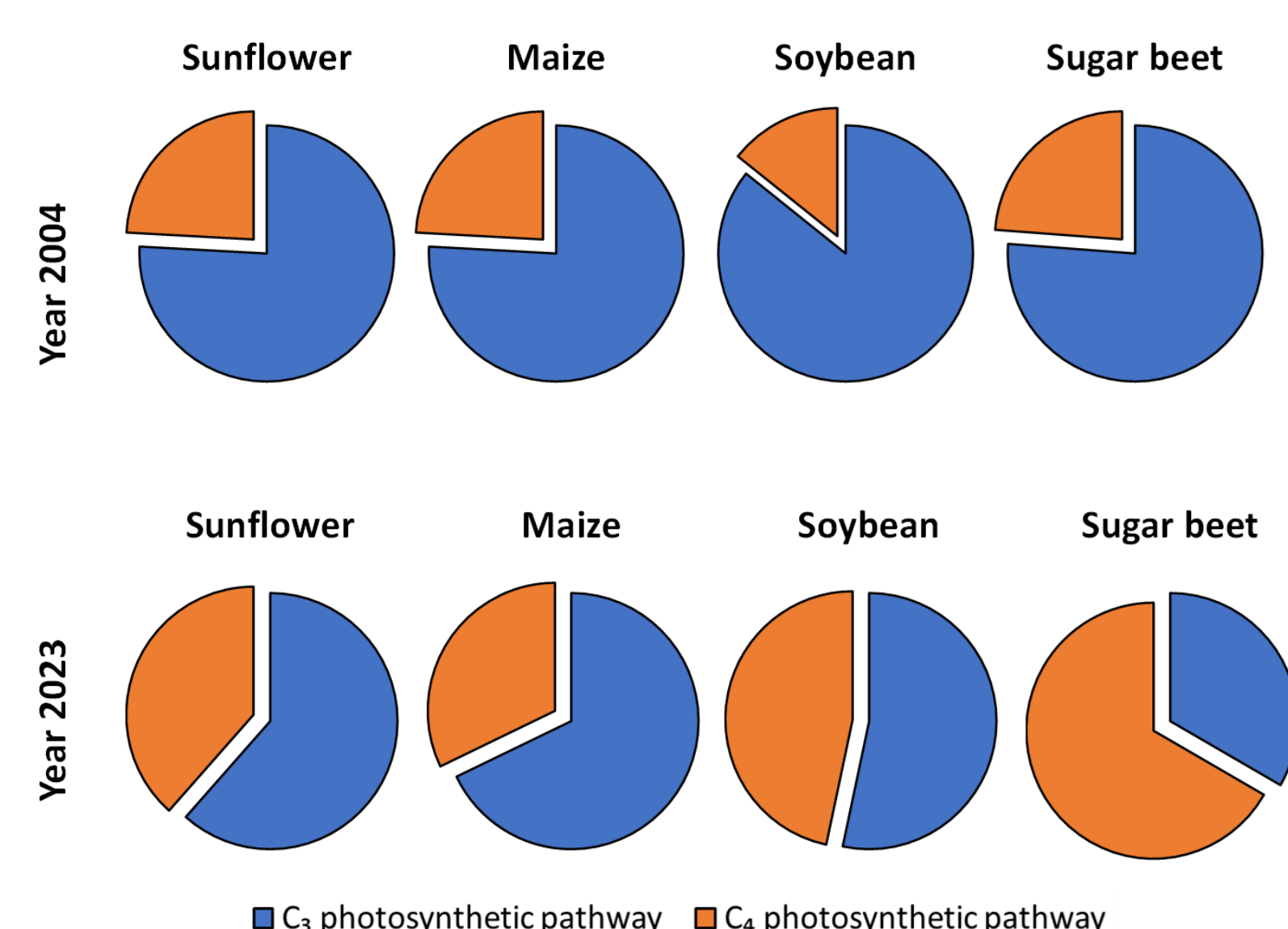
The CCA analysis of row crops' weed flora in the year 2004



The CCA analysis of row crops' weed flora in the year 2023



The dominance-diversity curves of row crops' weed species



The photosynthetic pathways' share of recorded weed species

• Conclusion

This research concludes that global climate change exerts a significant influence on the weed species' spread, population dynamics, and infestation pressure in studied row crops.