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MONITORING URBAN HABITAT QUALITY BY DETERMINING CHLOROPHYLL AND ANTHOCYANIN PIGMENT CONTENTS IN PRUNUS CERASIFERA VAR. PISSARDII AND CATALPA BIGNONIOIDES IN URBAN AND URBAN GREEN AREAS OF TIMISOARA

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Abstract: Urban air pollution significantly affects plant health, and biomonitoring is an effective way to assess these effects. Changes in plant pigment content reflect environmental conditions and offer key insights into urban habitat quality. This study used non-invasive measurements of chlorophyll and anthocyanin in the leaves of Prunus cerasifera var. pissardii and Catalpa bignonioides, collected with two portable pigment meters: the OPTI-SCIENCES CCM-300 for chlorophyll content and the OPTI-SCIENCES ACM-200plus for anthocyanin content. The goal was to compare pigment levels between trees in traffic-exposed urban areas and those in green urban parks in Timișoara, Romania. Statistical analysis showed that Prunus cerasifera var. pissardii responds adaptively to pollution with increased chlorophyll and anthocyanin levels, while Catalpa bignonioides shows reduced chlorophyll under the same conditions, suggesting lower resistance.

Introduction

This study aims to non-invasively measure and compare the content of chlorophyll and anthocyanin pigments in 2 species of ornamental trees from Timişoara, both in polluted urban (U) and urban green (UG) environments, to determine the influence of urban habitat quality on the 2 species, *Prunus cerasifera var. pissardii* and *Catalpa bignonioides*.

Material and method

The data were collected in June 2022, during the summer season, in several abiotic stress conditions.

- total of **480 measurements**: 240 readings for each tree species – 120 for each parameter, with 60 measurements taken in U areas and 60 in the UG ones.

- portable pigment meters: the **OPTI-SCIENCES CCM-300** for chlorophyll content and the **OPTI-SCIENCES ACM-200plus** for anthocyanin content. Values were expressed in mg/m^2 .



• Results and discussions

Values for foliar anthocyanin pigment (ACI)



• The t-test showed highly significant ACI differences between species: p = 9.144E-07 overall, p = 0.00029 in urban areas, and p = 0.0018 in green areas - all indicating consistently higher anthocyanin content in *Prunus cerasifera var. pissardii*.

Values for foliar chlorophyll pigment (CHL)

The area where data from the 2 species were collected: 1 – Corneliu Coposu Park and Blvd. (red); 2 – "Parcul Copiilor Ion Creangă" Park (yellow); 3 – Rozelor Park and Michelangelo Passage (purple); 4 – Vasile Pârvan Blvd. (orange)



Data were statistically processed using the Student's t-test and the averages of pigment contents were calculated for each species, depending on the area – U/UG.

Acknowledgement



• The t-test showed no significant overall CHL difference between species (p = 0.43), but significant differences in both environments: p = 0.00135 in urban areas (higher in *Prunus cerasifera var. pissardii*) and p = 0.00014 in green areas (higher in *Catalpa bignonioides*)

Conclusions

- *Catalpa bignonioides* is less resilient, as the content of anthocyanin pigments in its leaves remains almost unchanged under the influence of the polluted urban environment and chlorophyll is affected.
- *Prunus cerasifera var. pissardii* demonstrates greater resilience, displaying two adaptive mechanisms: an increase in both chlorophyll and anthocyanin foliar content. These findings justify the use of this resilient species for street alignments in urban settings.

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