

# NEEDLE DISCOLORATION AND PREMATURE NEEDLE CAST IN PINUS PINEA IN URBAN GREEN SPACES

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## Introduction

*Pinus pinea* is a widely used ornamental conifer valued for its distinctive architectural form, longevity, and suitability for urban landscapes. Due to its aesthetic appearance and adaptability, the species is frequently planted in parks, gardens, and roadside green areas. However, successful establishment after transplantation may be affected by unfavorable environmental conditions, including drought, temperature fluctuations, soil compaction, and transplant shock. These stress factors can reduce tree vigor and lead to foliar decline, commonly expressed through needle discoloration, apical necrosis, and premature needle cast. In severe cases, prolonged stress may predispose trees to secondary infections caused by opportunistic pathogens.

## Material and methods

This study documents the occurrence and severity of foliar symptoms in *Pinus pinea* planted in urban green spaces of the Timișoara metropolitan area (Dumbrăvița locality) and examines factors associated with symptom development. Trees were transplanted in autumn 2025 and evaluated in March 2026 using comparative visual assessments of individuals displaying different levels of crown damage, interpreted in relation to transplant timing, tree size, and local site conditions.



Figure 1: Exploratory distribution of transplant stress symptoms

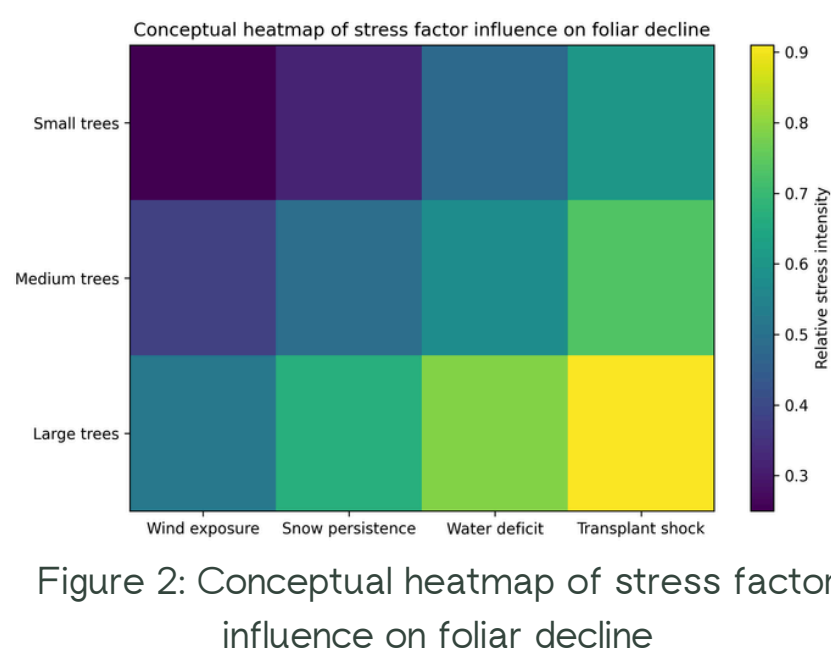
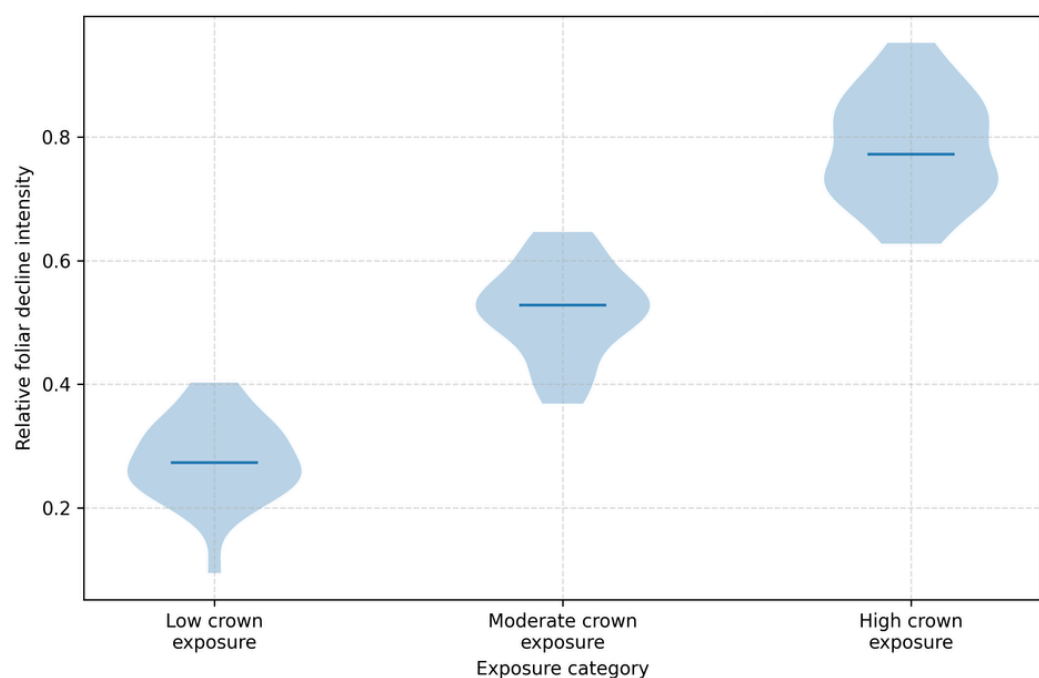


Figure 2: Conceptual heatmap of stress factor influence on foliar decline

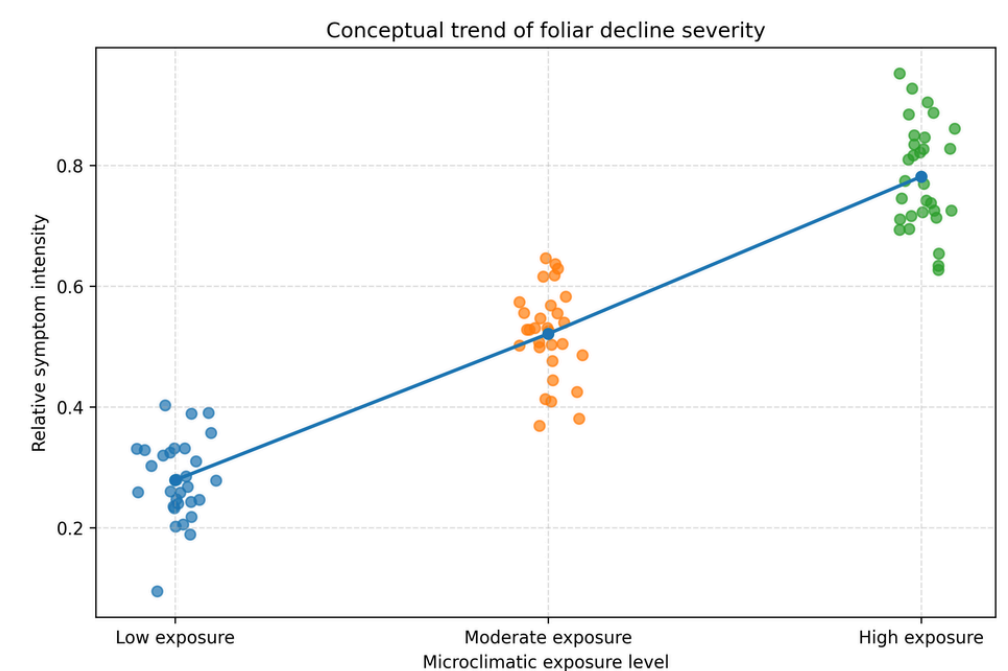


Figure 3: Conceptual trend of foliar decline severity

## Results

Results indicate a multifactorial origin of foliar decline. Late-autumn transplantation coincided with prolonged exposure to low winter temperatures and persistent snow cover, conditions likely to exacerbate transplant stress and delay post-planting physiological adjustment. These environmental factors were associated with visible symptoms including needle discoloration, progressive loss of needle turgor, reduced vigor, and accelerated needle cast. The persistence of low temperatures during the establishment period may have limited root activity and water uptake, further intensifying physiological stress.

Larger and more developed trees exhibited more severe symptoms compared with smaller individuals, suggesting a higher vulnerability related to increased crown exposure, greater transpiration demands, and more difficult post-transplant adaptation. Similar responses have been reported in transplanted ornamental conifers exposed to abiotic stress conditions, where transplant shock combined with unfavorable climatic factors reduced overall vitality. In addition, local microclimatic variability, particularly differences in exposure to wind, snow accumulation, and soil moisture, may have influenced the uneven distribution and severity of symptoms within the planting area. The occurrence of opportunistic foliar pathogens on weakened tissues likely contributed to the progression of needle necrosis and premature needle loss.

## Conclusion

The results highlight the importance of appropriate transplant timing, careful post-planting monitoring, and adaptive maintenance practices in reducing transplant stress and improving the long-term establishment and ornamental value of *Pinus pinea* in urban landscapes.

## References

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