



COMPARATIVE STUDY ON SOIL CHARACTERISTICS IN SOUTH-WEST ROMANIA IN THE CONTEXT OF CLIMATE CHANGE

PANICI P.A.¹, BORA MARINELA², PANICI CRISTINA GABRIELA¹, SÎNGEORZAN STELUȚA-MARIA³, CAMEN D.D.¹

¹Faculty of Engineering and Applied Technologies, University of Life Sciences "King Mihai I" from Timișoara, 119 Calea Aradului, 300645 Timișoara, Romania

²Faculty of Bioengineering of Animal Resources, University of Life Sciences "King Mihai I" from Timișoara, 119 Calea Aradului, 300645 Timișoara, Romania

³Faculty of Forestry and Cadastre, University of Agricultural Sciences and Veterinary Medicine from Cluj-Napoca, Romania

Abstract:

This study compares soil characteristics in two contrasting ecosystems in south-west Romania—'Iron Gates' Natural Park and the peri-urban Green Forest of Timișoara—to assess their influence on forest ecosystem responses to climate change. Key pedological factors (texture, pH, water retention, organic matter) reveal higher resilience in brown-eumezobasic and rendzina soils under extreme climatic events, compared to the more erosion- and drought-prone alluvial and chernozem soils. The results underscore the critical role of soil in forest adaptation and support sustainable resource management under changing climate conditions.

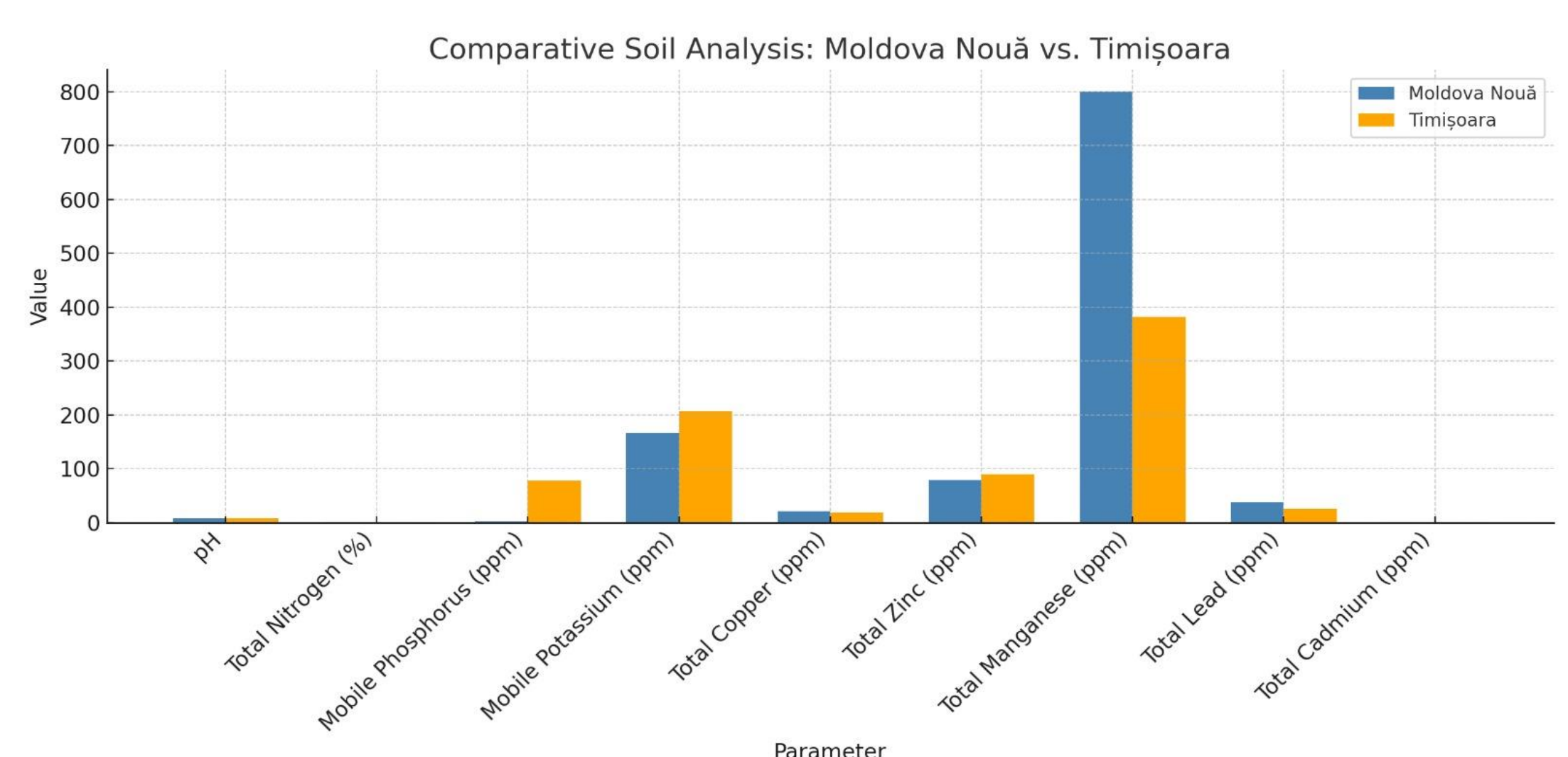
• Introduction

Within the current context of global climate change, forest ecosystems face significant challenges. Understanding the ecophysiological mechanisms of native tree species is crucial for elucidating their adaptive capacity and for substantiating effective silvicultural strategies. Ecophysiology offers an essential interdisciplinary methodological framework for evaluating the functional responses of plants to modifications in environmental factors.

• Material and method

The study was based on the analysis of two soil samples collected from southwestern Romania: "Moldova Nouă Sample 1 A" and "Timișoara Sample 2 B." Laboratory determinations included particle size distribution, soil pH in water suspension (1:2.5), calcium and magnesium carbonate content, total and mobile nitrogen, mobile phosphorus (P_2O_5) and potassium (K_2O), as well as the content of microelements (Cu, Zn, Mn) and heavy metals (Pb, Cd). The analyses were performed according to standard methods used in soil science.

• Results and discussions



The analysis highlights significant differences between the two soil types. Timișoara shows a much higher content of mobile phosphorus, indicating greater fertility. Moldova Nouă exhibits higher concentrations of manganese and lead, which may reflect geological conditions or anthropogenic influences.

• Conclusions

The results emphasize the importance of soil characteristics in assessing fertility and the agricultural or ecological potential of a region, supporting informed decisions for the sustainable management of natural resources.