Diversity and Ecological Drivers of Chironomidae Assemblages in Lakes of Papuk Mountain

Okolišni čimbenici koji oblikuju zajednice porodice Chironomidae (Diptera) i njihova primjena u procjeni ekološkog stanja jezera na Papuku

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KOPAČKI RIT
JUČER, DANAS, SUTRA

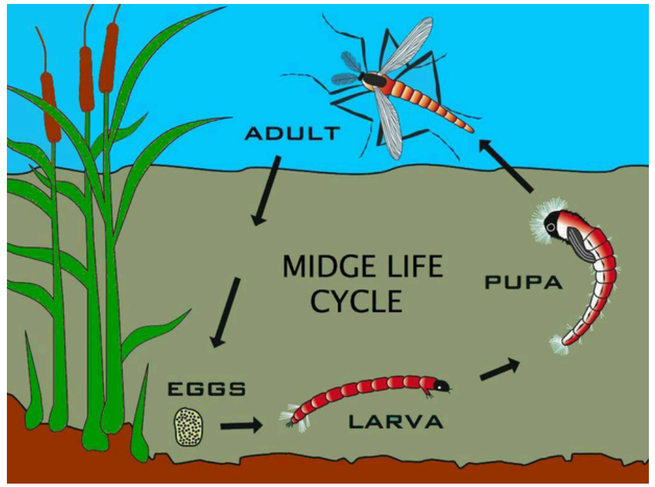
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INTRODUCTION

IMPORTANCE OF CHIRONOMIDAE IN LAKE ECOSYSTEMS

- Chironomidae larvae are an important component of aquatic food webs and represent a major food source for fish
- their abundance and community composition reflect the ecological characteristics of aquatic habitats
- Chironomidae communities can provide insights into fish feeding areas and interactions among ecological niches
- understanding their ecology is essential for assessing their distribution and relationship with environmental conditions



ROLE OF CHIRONOMIDAE IN LAKE ECOSYSTEMS

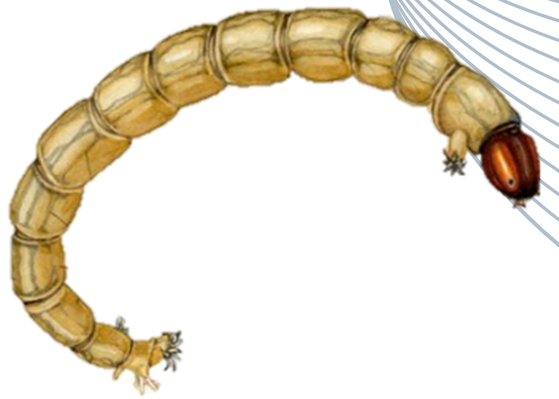
- freshwater ecosystems are increasingly exposed to environmental and anthropogenic pressures, including hydropower development, invasive species, and rising water temperatures → these pressures can alter the structure and composition of freshwater communities

- due to their ecological diversity and sensitivity to environmental changes, Chironomidae can provide valuable information on ecosystem conditions

- monitoring changes in their community structure can contribute to the assessment of ecological status and environmental changes in lake ecosystems







OBJECTIVES

01. To determine diversity and abundance of the Chironomidae (Diptera) family community in the littoral zone of ten lakes in Papuk Nature Park during the summer season.

02. To analyze the physical and chemical factors that shape their environmental differences.

03. To assess the influence of abiotic factors on the structure of the Chironomidae community and evaluate the potential of this group as a bioindicator of the ecological status of lakes.

METODHOLOGY

- sampling was conducted in July 2025, with macrozoobenthos collected from the littoral zones of the lakes using a hand-held benthic net (500 µm mesh size)









- after isolation, the samples were preserved in 70% ethanol and Chironomidae were identified to species level









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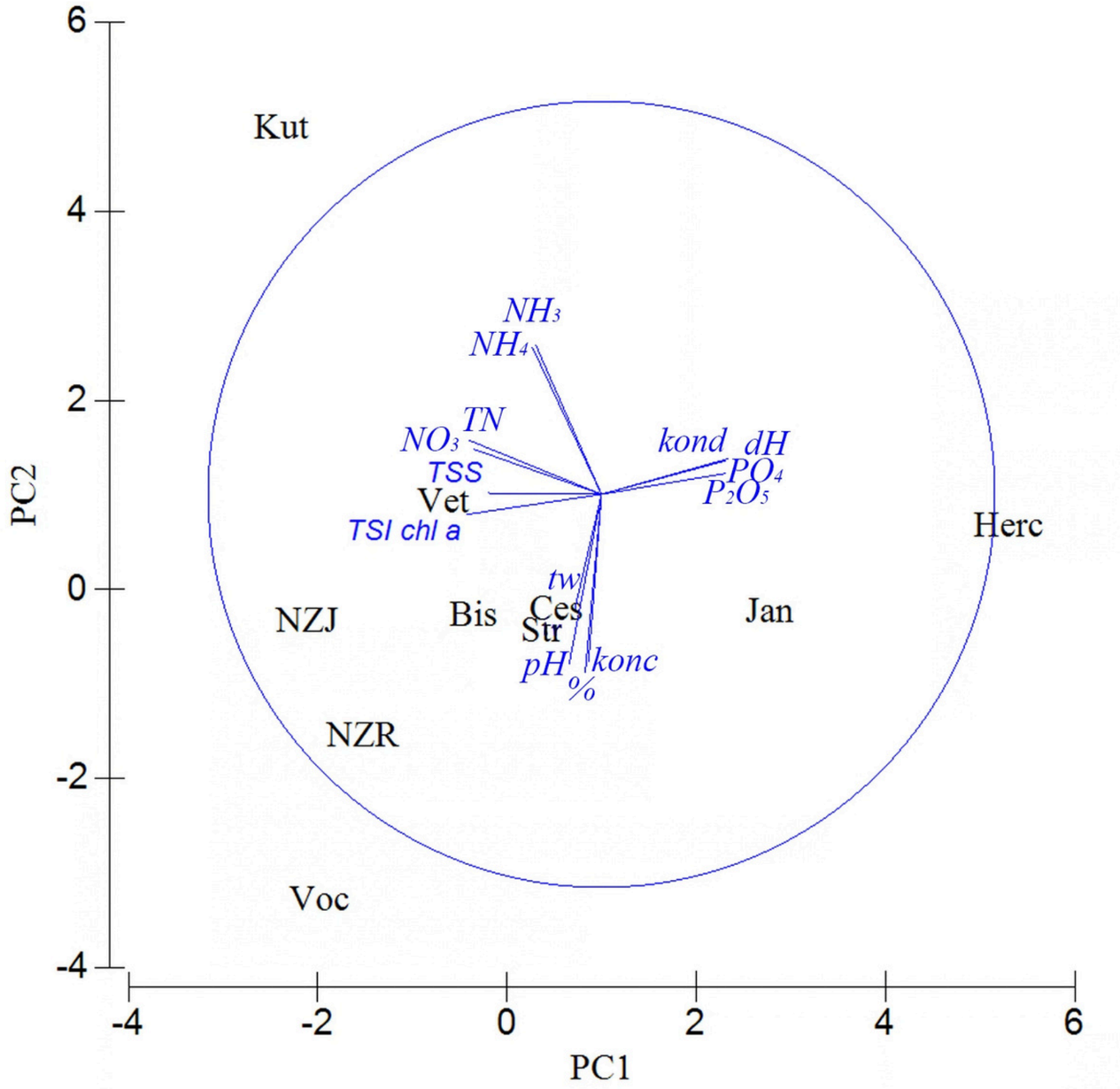
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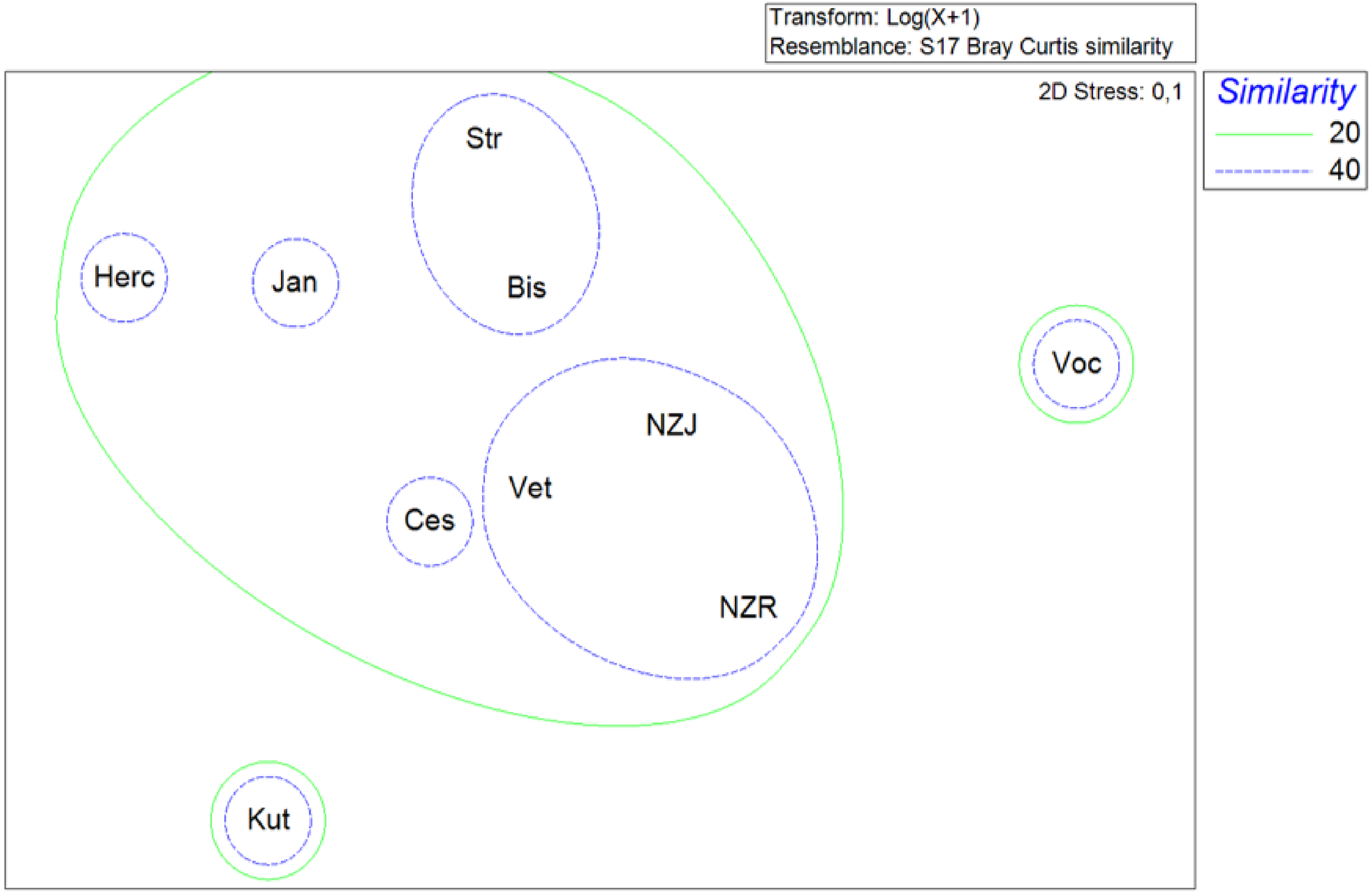
RESULTS

LAKE TROPHIC STATE

Summer	Češljakovci	Hercegovac	Jankovac	Bistra	Striježevica	Vetovo	Novo Zvečevo lake	Kutjevo	Novo Zvečevo pond	Voćin
TSIChl *a*	32.372	32.535	39.718	51.546	57.836	62.822	62.834	71.722	73.893	84.979
	oligotrophic	oligotrophic	oligotrophic	mezotrophic	eutrophic	eutrophic	eutrophic	hypertrophic	hypertrophic	hypertrophic

THE INFLUENCE OF ABIOTIC FACTORS IN THE LAKES





nMDS analysis of the Chironomidae community

RESULTS

Species (%)		Lake		
	NZR	Kut	Ces	Jan
Procladius sp.	**22**		**18**	
Cladopelma viridulum gr.	**23**			
Chironomus plumosus agg.		**25**		
Microtendipes pedellus agg.		**13**		**68**
Polypedilum nubeculosum		**10**		
Paratanytarsus sp.				**9**
Chironomus sp.			**39**	

CONCLUSION

01.

A total of 51 Chironomidae taxa (26 species) were recorded across the ten study lakes. The highest taxonomic richness was found at Češljakovci (17 taxa) and Kutjevo (15 taxa), while the highest abundance occurred at Bistra (11,768 ind./m²). Six taxa (Polypedilum nubeculosum, Cladotanytarsus sp., Procladius sp., Tanytarsus sp., Microtendipes pedellus agg. and Cricotopus pulchripes) accounted for 60.4% of total abundance, indicating dominance of a few widespread taxa within the community.

02.

The lakes spanned the full trophic gradient, from oligotrophic (Češljakovci, Hercegovac, Jankovac) to hypertrophic (Voćin, Novo Zvečevo ribnjak, Kutjevo). PCA showed that water hardness, total nitrogen and chlorophyll-a contributed most to PC1, while oxygen saturation and pH drove PC2, together explaining 68.2% of the environmental variability.

03.

It is necessary to take into account the influence of both abiotic and biotic factors on the composition of the chironomidae community and their relationships within the lake and how, in the end, the community of chironomidae would give a more comprehensive picture of the ecological state of the lake.

THANK YOU!