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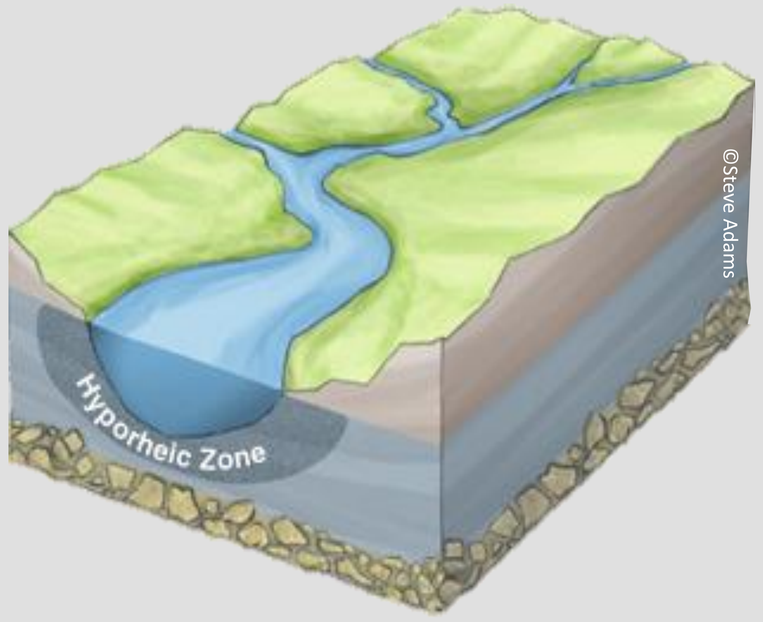
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CLOGGING AND ENVIRONMENTAL COPPER CONTAMINATION HAVE STRONGER EFFECTS ON HYPORHEIC MICROBIAL COMMUNITIES IN THE FIRST CENTIMETERS

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INTRODUCTION

- **Hyporheic microbial communities** ensure important **ecological functions**
- **Cumulative anthropogenic stressors** effects on microbial communities in hyporheic zone sediment have been **poorly investigated**
- **Copper contamination** and **clogging** are two major stressors in agricultural watershed context



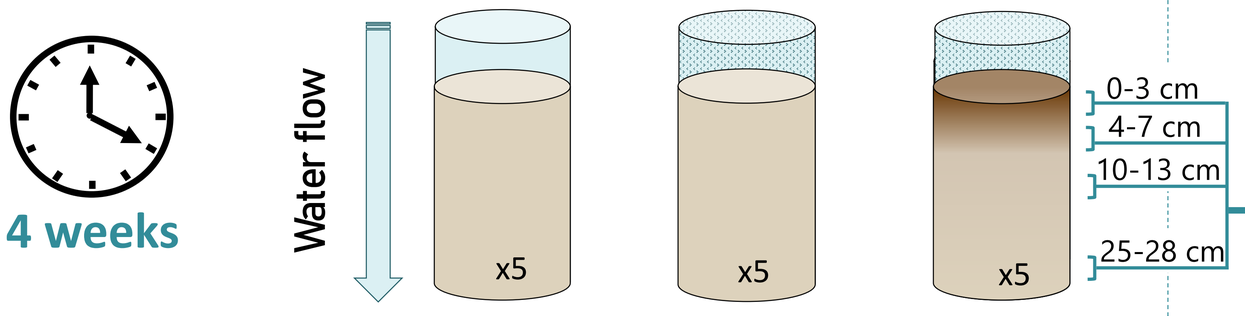
QUESTION

WHAT ARE THE CUMULATIVE EFFECTS OF CLOGGING AND COPPER CONTAMINATION ON HYPORHEIC MICROBIAL COMMUNITIES ?

MATERIAL AND METHODS

Microcosms filled with sediment were exposed to 3 treatments

	REFERENCE	COPPER	COPPER + CLOGGED
Copper contaminated water (191 µg.L^{-1})	-	+	+
Clogging	-	-	+

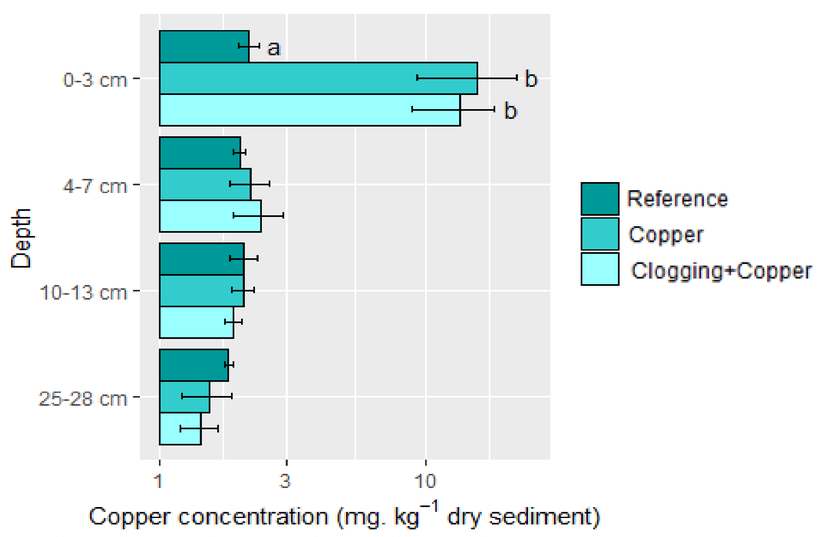


Sediment sampled at 4 depths

- Copper distribution in sediment (ICP-MS)
- Tolerance acquisition to copper (PICT)
- Functional microbial responses
  - Gas emission (gas chromatography)
  - Exo-enzymatic activities (fluorometry)

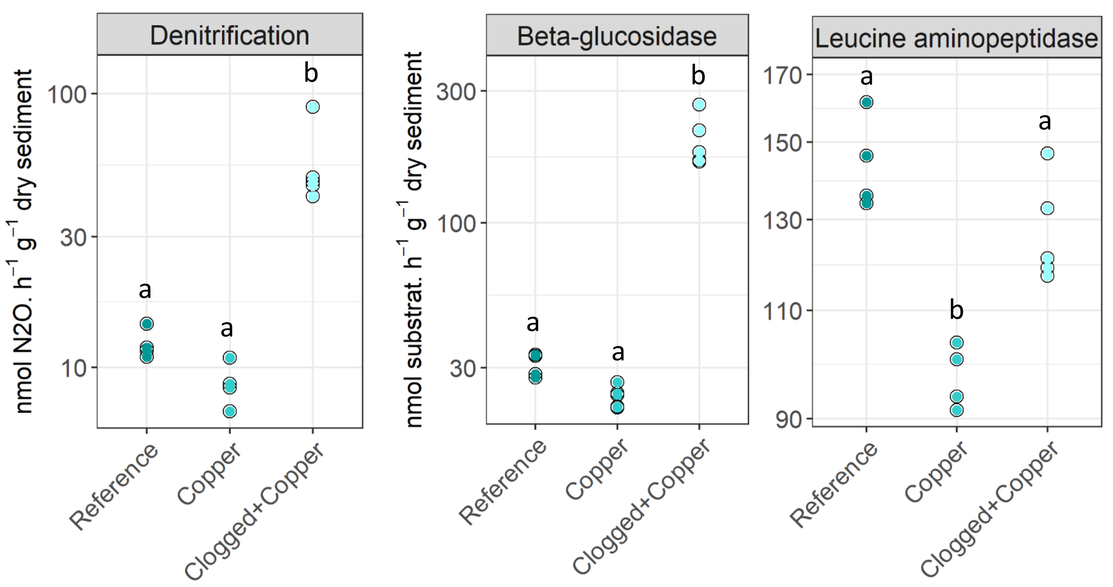
RESULTS AND DISCUSSION

Copper gets trapped in the first few centimetres of hyporheic sediments



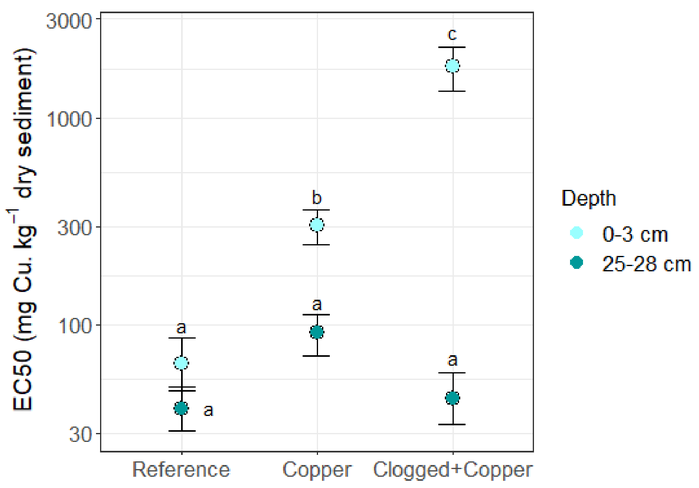
Different letters indicate significant differences between treatments

Clogging mitigates copper effects on microbial activities in the first hyporheic centimeters



Different letters indicate significant differences between treatments

Copper tolerance acquisition is found in the first centimeters in relation to copper exposure



Different letters indicate significant differences between treatments

CONCLUSION

- **First few centimetres** of hyporheic-zone sediment play an important role in response to clogging and copper contamination combined
- The capacity of **pollutant retention** and the effects on **microbial activities** found in the first centimeters of the hyporheic zone should be taken into account in **river monitoring** and **stream restoration**

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