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Laura Kergoat, Aymeric Dabrin, Matthieu Masson, T. Datry, Chloé Bonnineau

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

Laura Kergoat¹, Aymeric Dabrin¹, Matthieu Masson¹, Thibault Datry¹, Chloé Bonnineau¹
¹ INRAE, UR RiverLy, France

QUESTION 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 ?

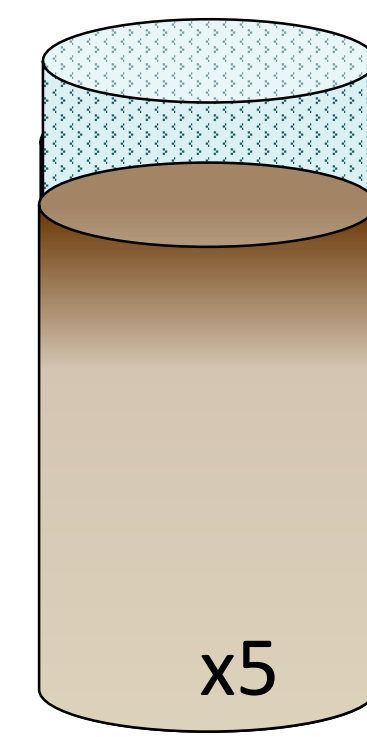
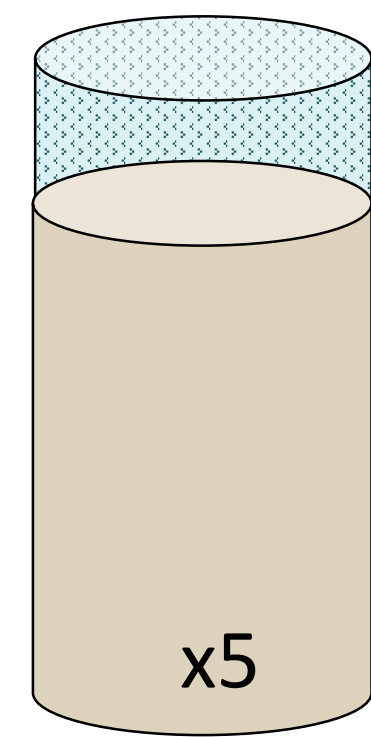
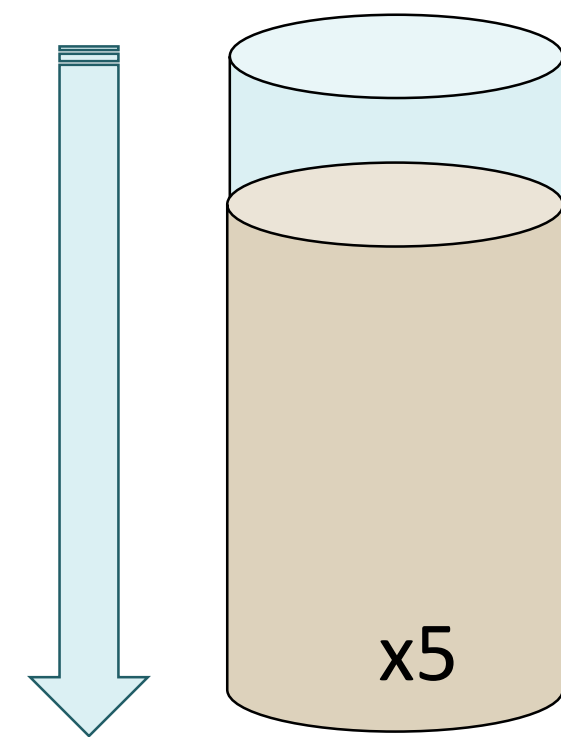
MATERIAL AND METHODS

Microcosms filled with sediment were exposed to 3 treatments

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



Water flow

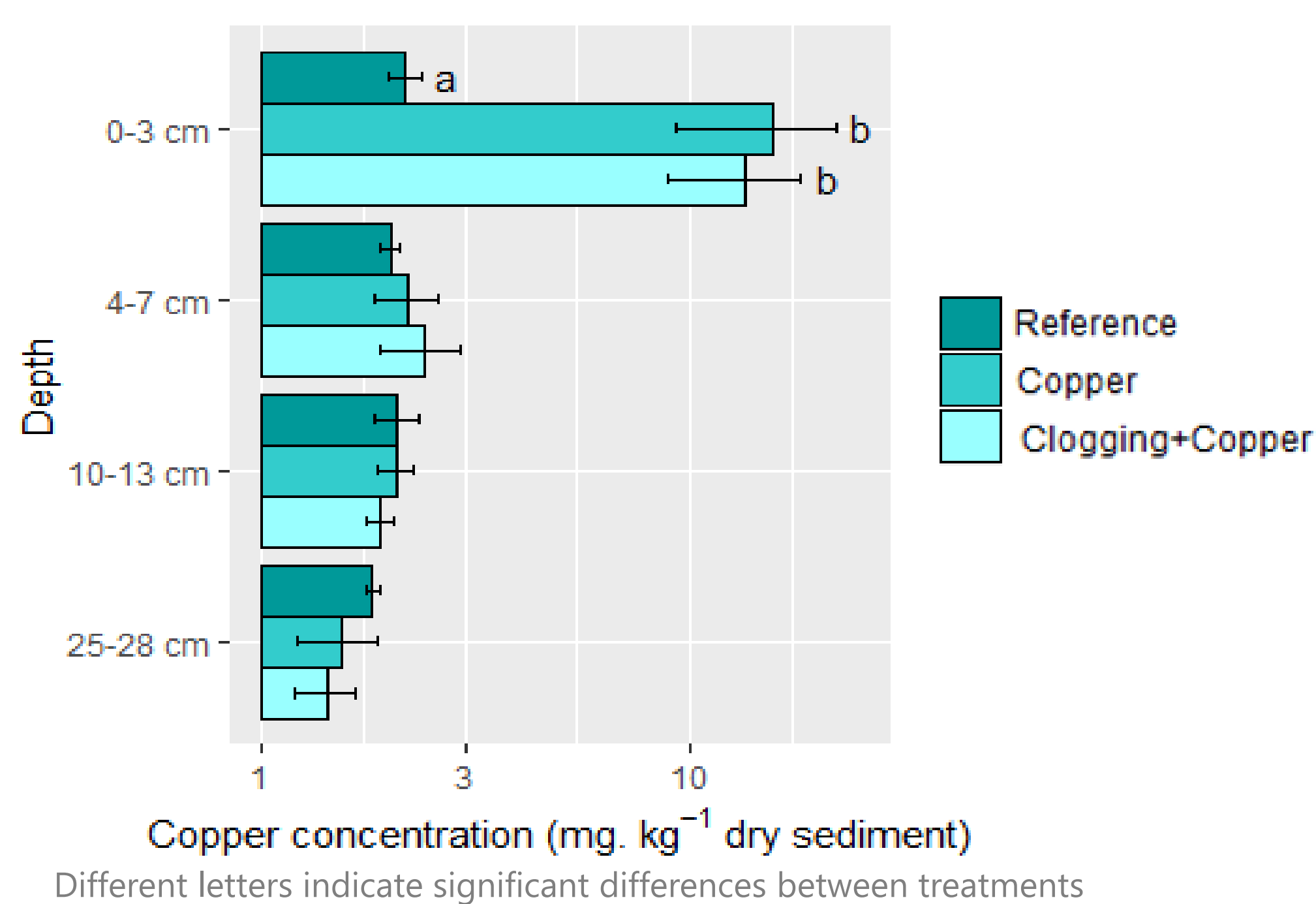


0-3 cm
4-7 cm
10-13 cm
25-28 cm

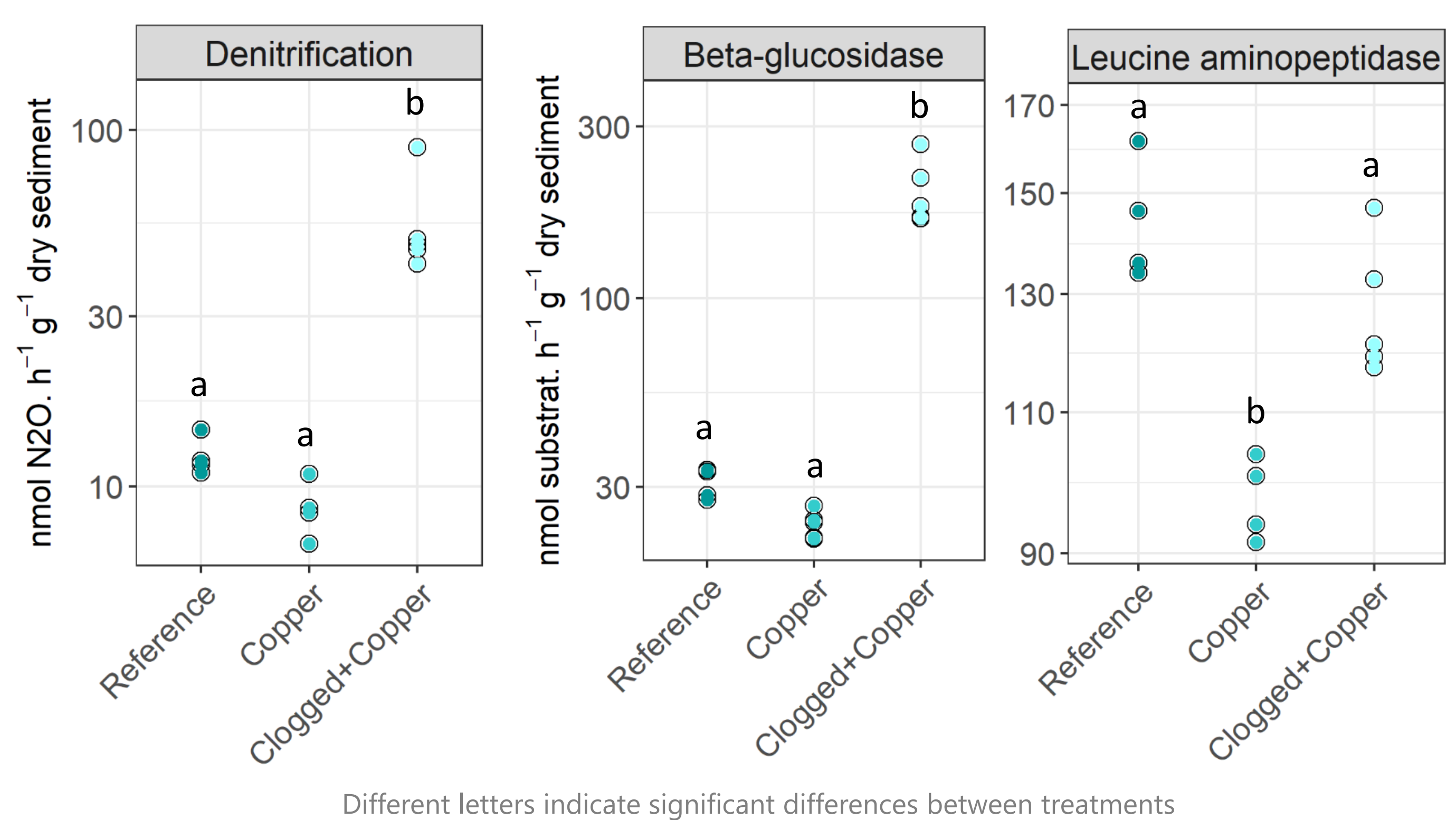
Sediment sampled at 4 depths

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

Copper gets trapped in the first few centimetres of hyporheic sediments

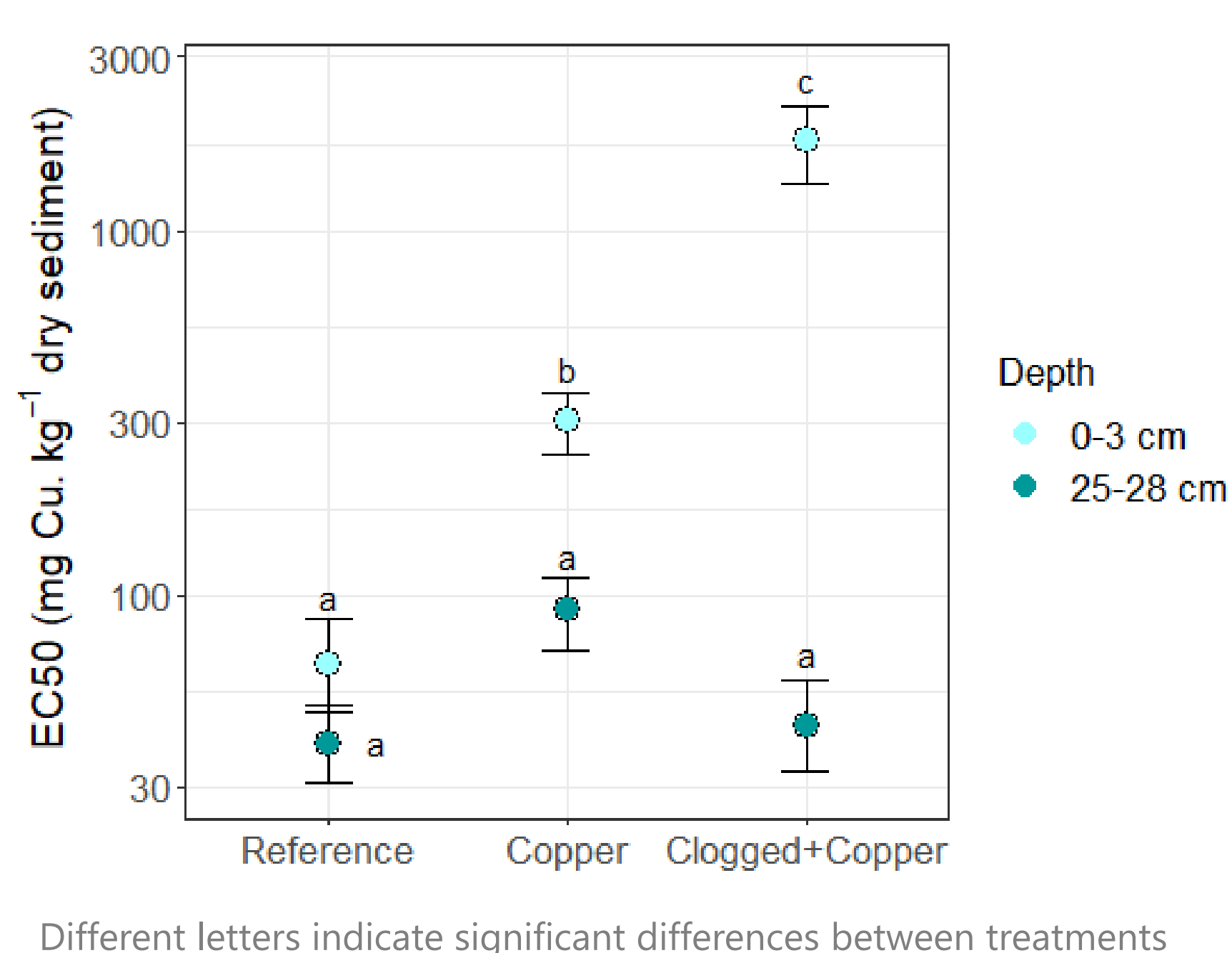


Clogging mitigates copper effects on microbial activities in the first hyporheic centimeters



RESULTS AND DISCUSSION

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



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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Contact : laura.kergoat@inrae.fr