

Suitability of fen plants as growing media constituent in terms of chloride content

Introduction

Peat is the most widely used growing media constituent due to its beneficial chemical, physical and biological properties. However, the use of peat is being criticized for environmental reasons and ongoing efforts are being made to find alternative growing media constituents. Fen plant biomass might be suitable as peat substitute but sometimes has high chloride contents which can be phytotoxic.

The aims of this study were (1) to investigate how the chloride content of different fen plant species is influenced by harvest date, water level and cutting frequency and (2) to evaluate under which conditions the chloride content is low enough to use the plant biomass as growing media constituent.

Material and Methods

plant species: *Typha latifolia*, *Phragmites australis*, *Phalaris arundinacea* and *Carex acutiformis*; cultivated on a rewetted fen peatland in Freisinger Moos 30 km northeast of Munich (Germany)

water level regimes: 10 cm (high), 20 cm (medium) and 35 cm (low) below ground level

time of harvest:

- first cut: plots of all plant species in June 2017, October 2017 and January 2018
- second cut: plots of *Typha*, *Phalaris* and *Carex* harvested in June 2017 were cut a second time either in October 2017 or in January 2018

additional samples: collected during the period 2016 – 2019 from nine sites

analysis and statistics:

- plant materials were dried and milled < 4 mm
- chloride was extracted with water and measured by potentiometric titration
- nonlinear regression was done by using R

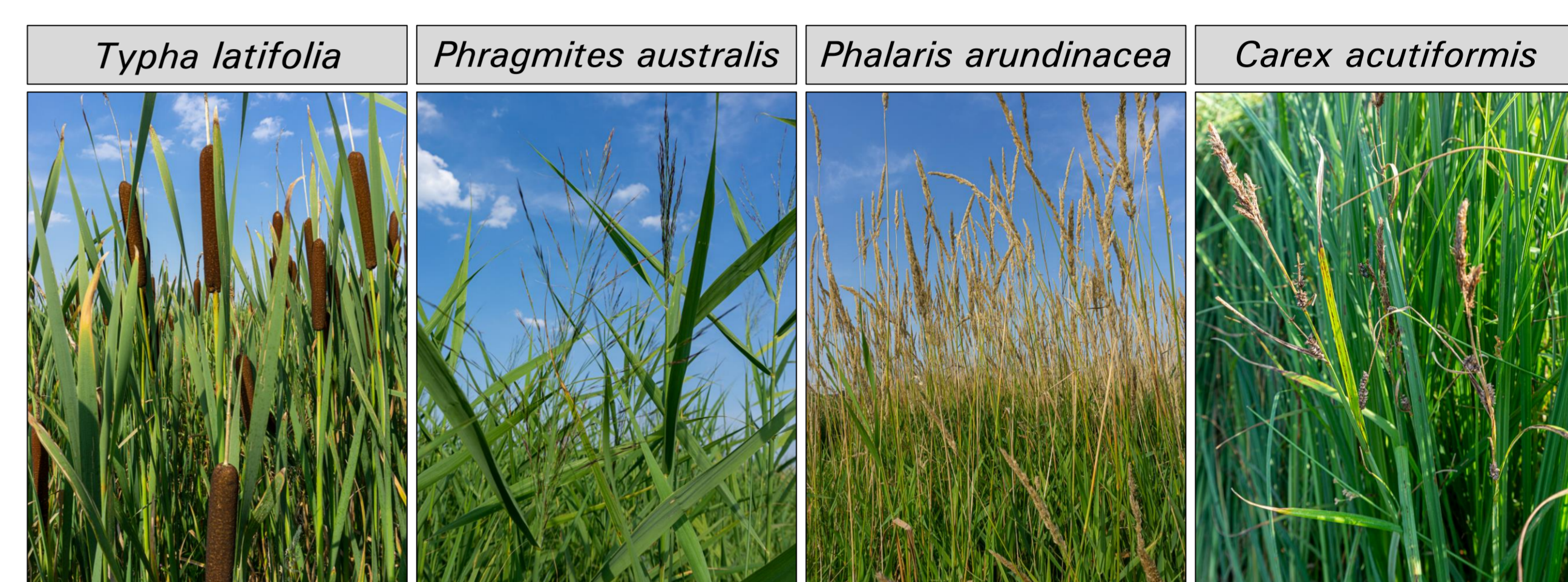


Fig. 1: Tested fen plant species.

Results and Discussion

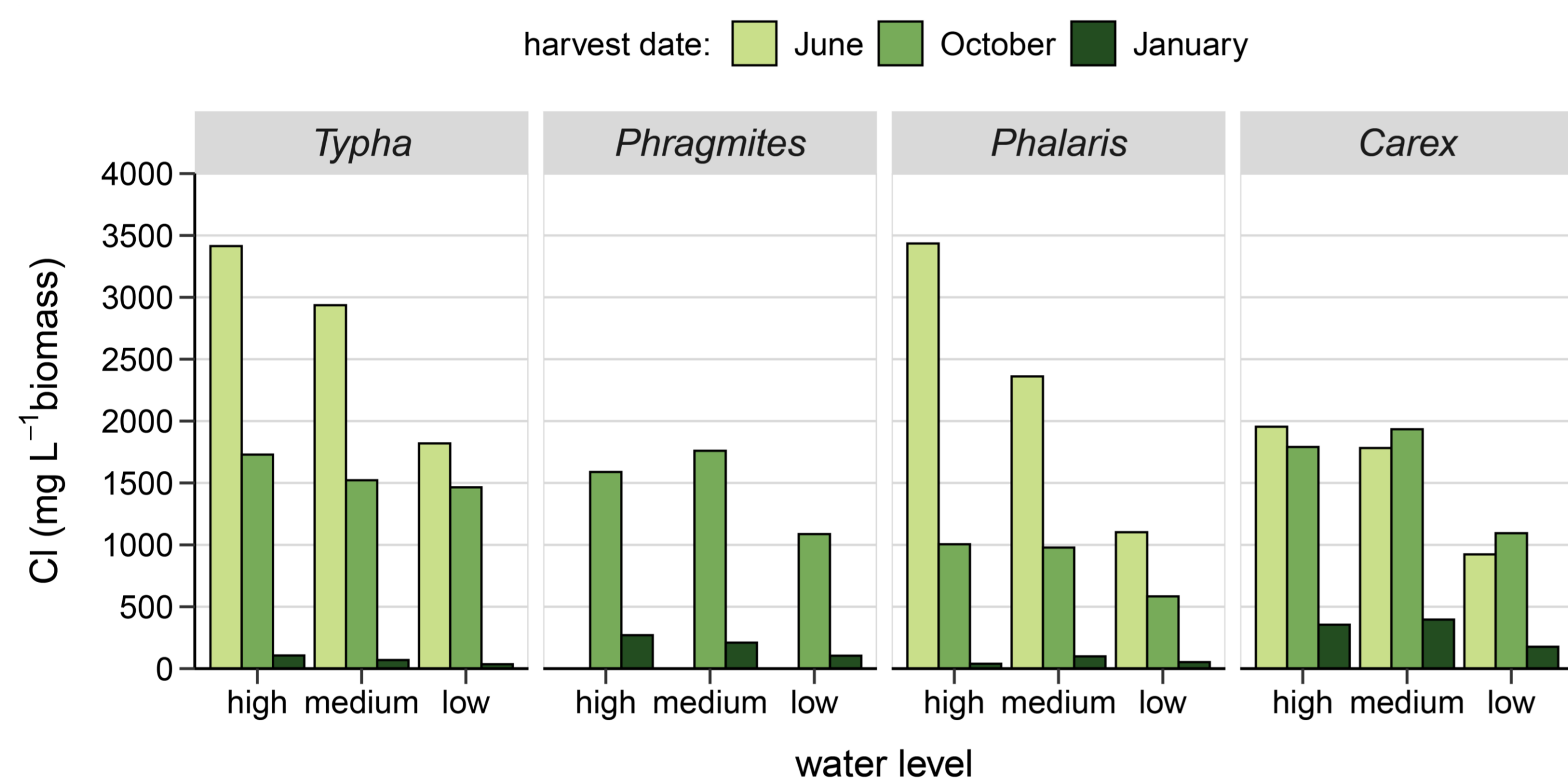


Fig. 2: Chloride content of *Typha*, *Phragmites*, *Phalaris* and *Carex* from Freisinger Moos for different harvest dates and water levels.

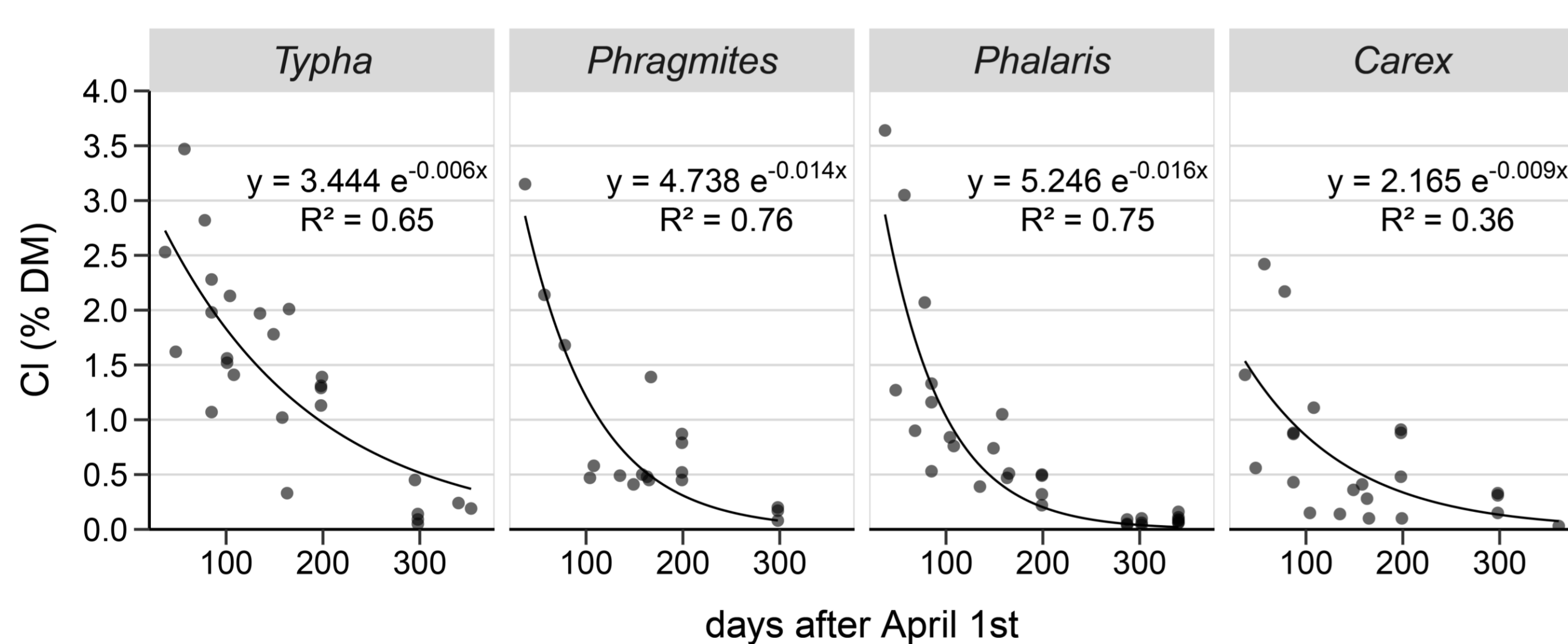


Fig. 3: Relation of chloride content and harvest date (first cut samples from Freisinger Moos and additional samples).

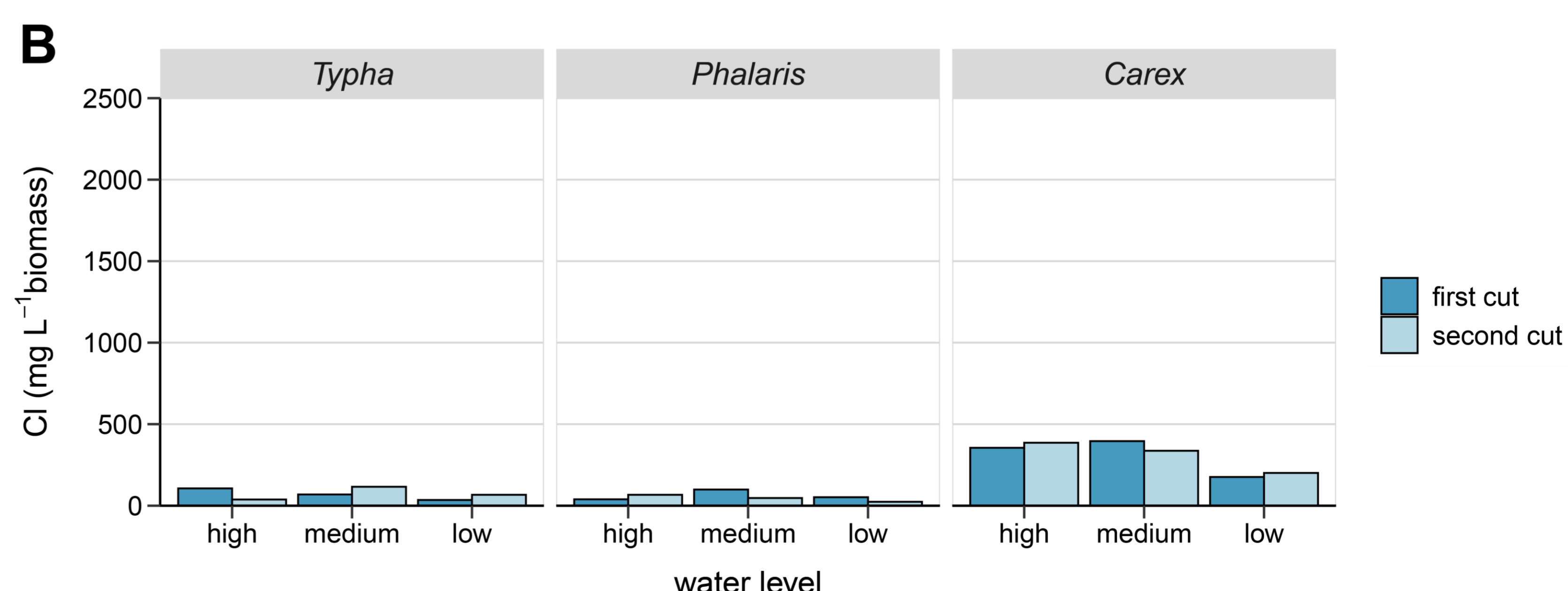
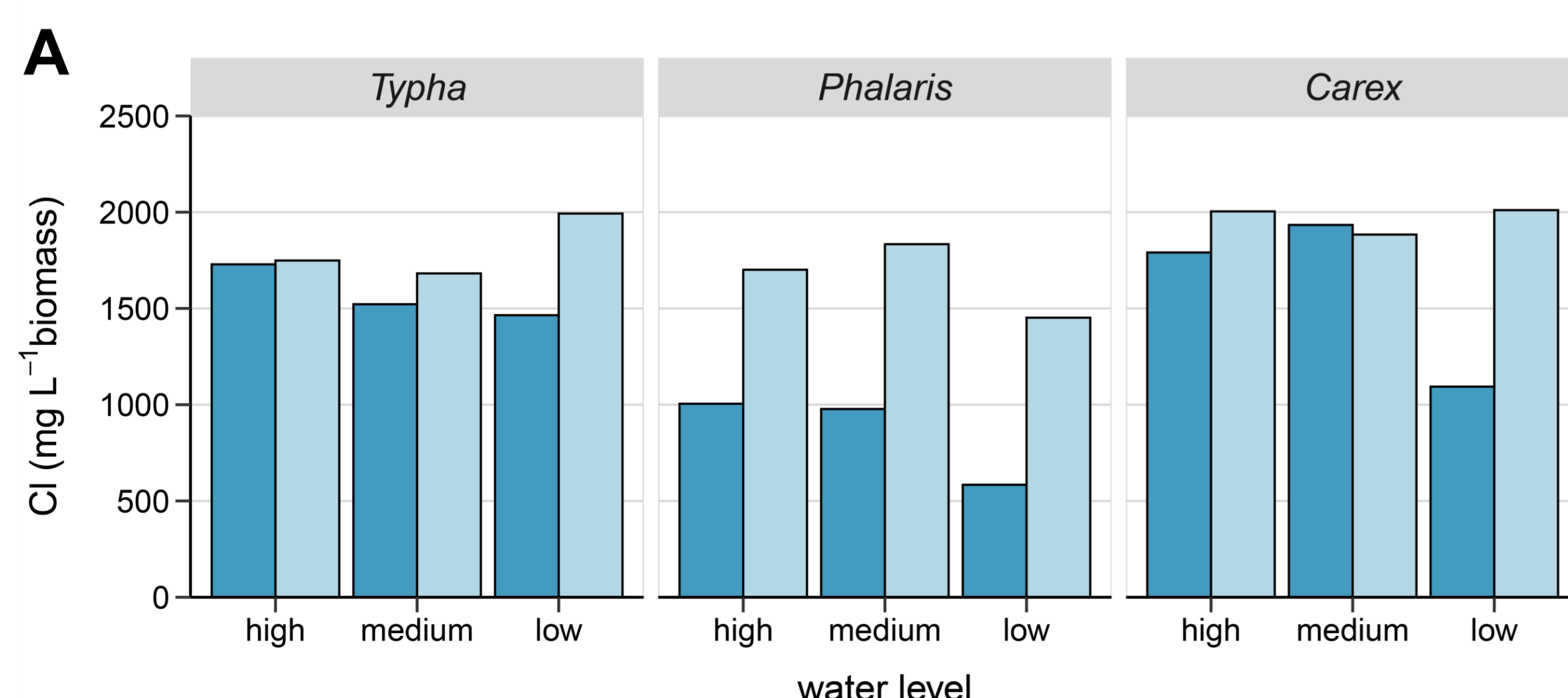


Fig. 4: Chloride content of *Typha*, *Phalaris* and *Carex* from Freisinger Moos harvested in October 2017 (A) or January 2018 (B) for different cutting frequencies and water levels.

Conclusion: Only fen plants harvested at the end of winter might be suitable as raw material for growing media.