Water chemistry and not urbanization influences community structure of non-marine Ostracoda (Crustacea) in northern Belgium

Marie Cours[1], Jan Vanaverbeke[1], Koen Parmentier[1], Marc Knockaert[1], Janet Higuti[2], Koen Martens[1,3,*] & Isa Schön[1,4,*]

[1] Royal Belgian Institute of Natural Sciences, Natural Environments, Brussels, Belgium
[2] State University of Maringá, Research group Nupélia, Maringá, PR, Brazil
[3] University of Ghent, Department of Biology, Ghent, Belgium
[4] University of Hasselt, Research group CMK, Diepenbeek, Belgium
[*] Corresponding authors: kmartens@naturalsciences.be, ischoen@naturalsciences.be

museum
Operational Directorate Natural Environment
OD Nature I OD Natuur I DO Nature

Background

- Urbanization is one of the major causes of the destruction of natural habitats in the world
- The **SPEEDY project - SPatial and environmental determinants of Eco-Evolutionary DYnamics: anthropogenic environments as a model** – has studied the effect of anthropogenic disturbance on biodiversity, including of small waterbodies, in Belgium
- This is a spin-off study on the effects of urbanization on non-marine ostracod communities

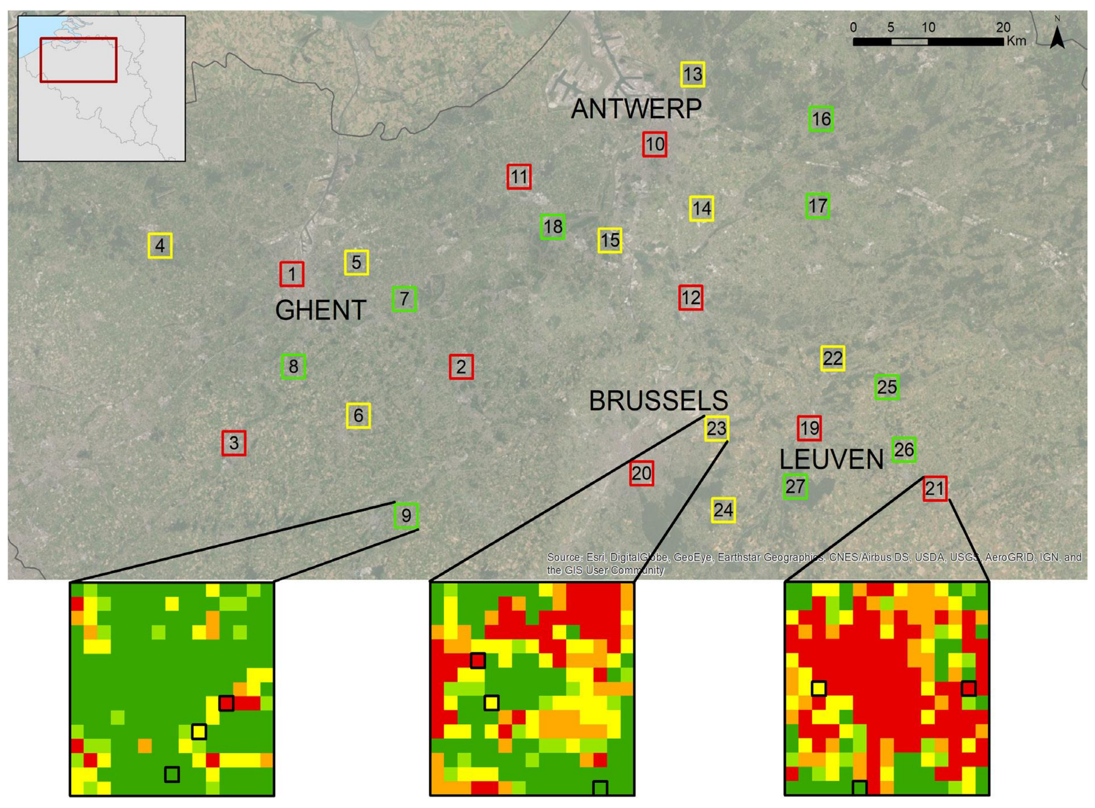

Fig. 1: Nested SPEEDY study design.
At local (200x200m) and landscape (3x3km) scale:
Low intermediate & high urbanization level.

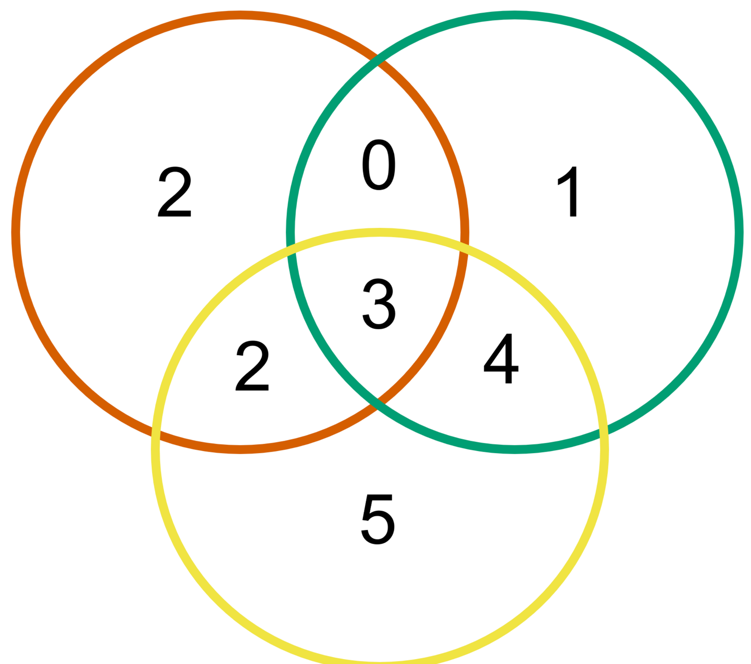

Fig. 2: Exclusive and shared ostracod species for the three urbanization categories on local-scale. There were 21 pools in low (green), 22 pools in intermediate (yellow) and 17 pools in high local-scale urbanization areas which contained ostracods.

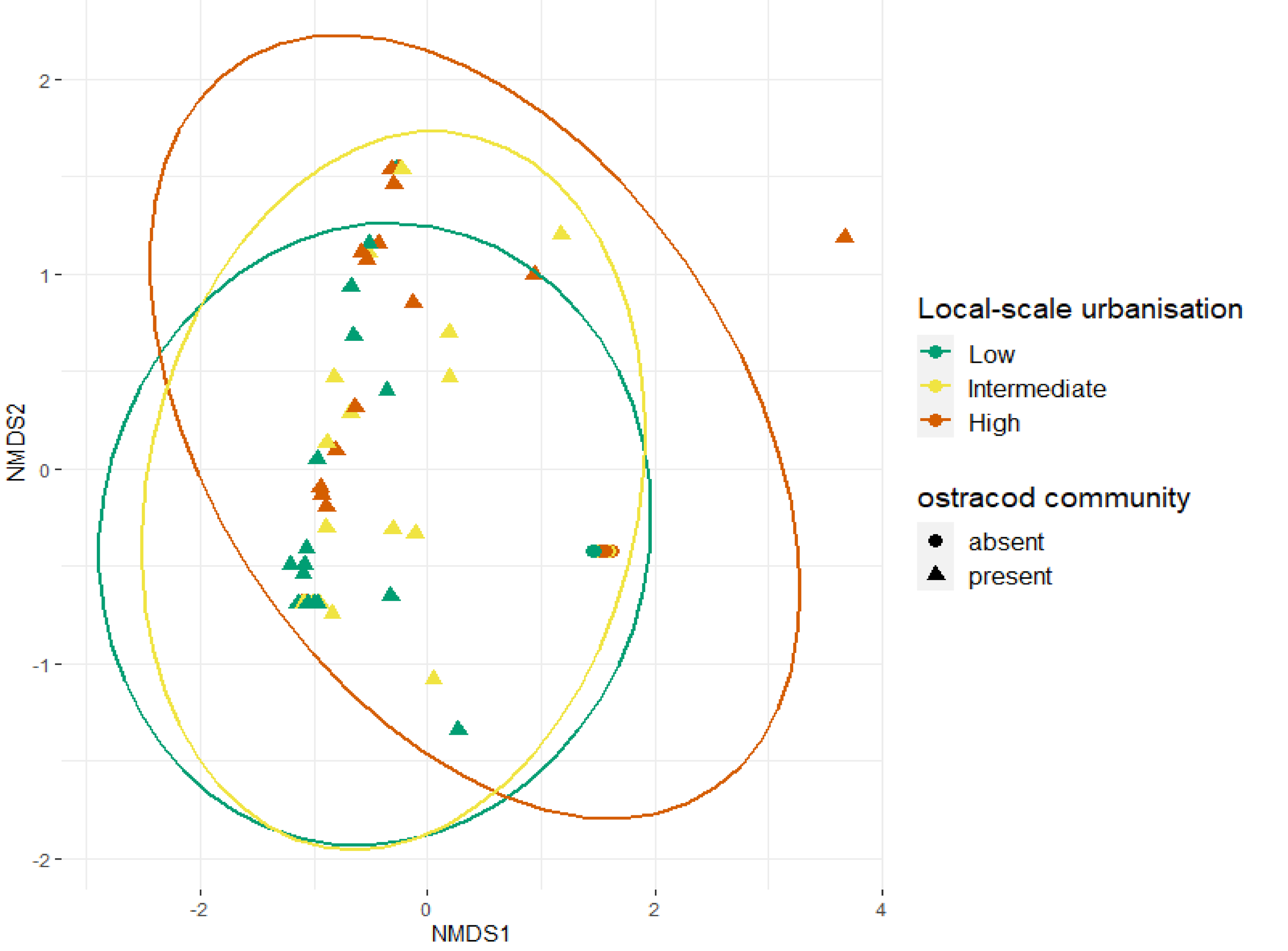

Fig. 3: Non-metric multidimensional scaling analysis of the ostracod community structure across local-scale urbanization.
A 95% data ellipse is depicted by local-scale urbanization. Stress = 0.08.

Results & Discussion

- We identified **17 ostracod species**, together occurring in 60 of the **81 sampled pools** (Fig 2)
- We found that **urbanization *per se*** had **no significant effect** on ostracod communities (Fig 3)
- Of all the measured local factors, **ammonium and total phosphorus** concentrations had a **significant effect** on the community structure (Fig. 4)
- In contrast, **water temperature** had **no significant effect**, most likely because the ostracod species found in northern Belgium in the present survey mostly have **wide temperature tolerances**

Species

Candonopsis kingsleii (Brady & Robertson, 1870)
Cyclocypris ovum (Jurine, 1820)
Cypria ophtalmica (Jurine, 1820)
Cypria subsalsa (Redeke, 1936)
Cypridopsis vidua (O. F. Müller, 1776)
Darwinula stevensoni (Brady & Robertson, 1870)
Fabaeformiscandona breuili (Paris, 1920)
Fabaeformiscandona fabaeformis (Fischer, 1851)
Herpetocypris chevreuxi (Sars, 1896)
Ilyocypris inermis (Kaufmann, 1900)
Limnocythere inopinata (Baird, 1843)
Notodromas monacha (O.F. Müller, 1776)
Plesiocypridopsis newtoni (Brady & Robertson, 1870)
Potamocypris arcuata (Sars, 1903)
Potamocypris unicaudata (Schäfer, 1943)
Prionocypris zenkeri (Chyzer & Toth, 1858)
Pseudocandona hartwigi (G. W. Müller, 1900)

Table 1: Species found in the present survey

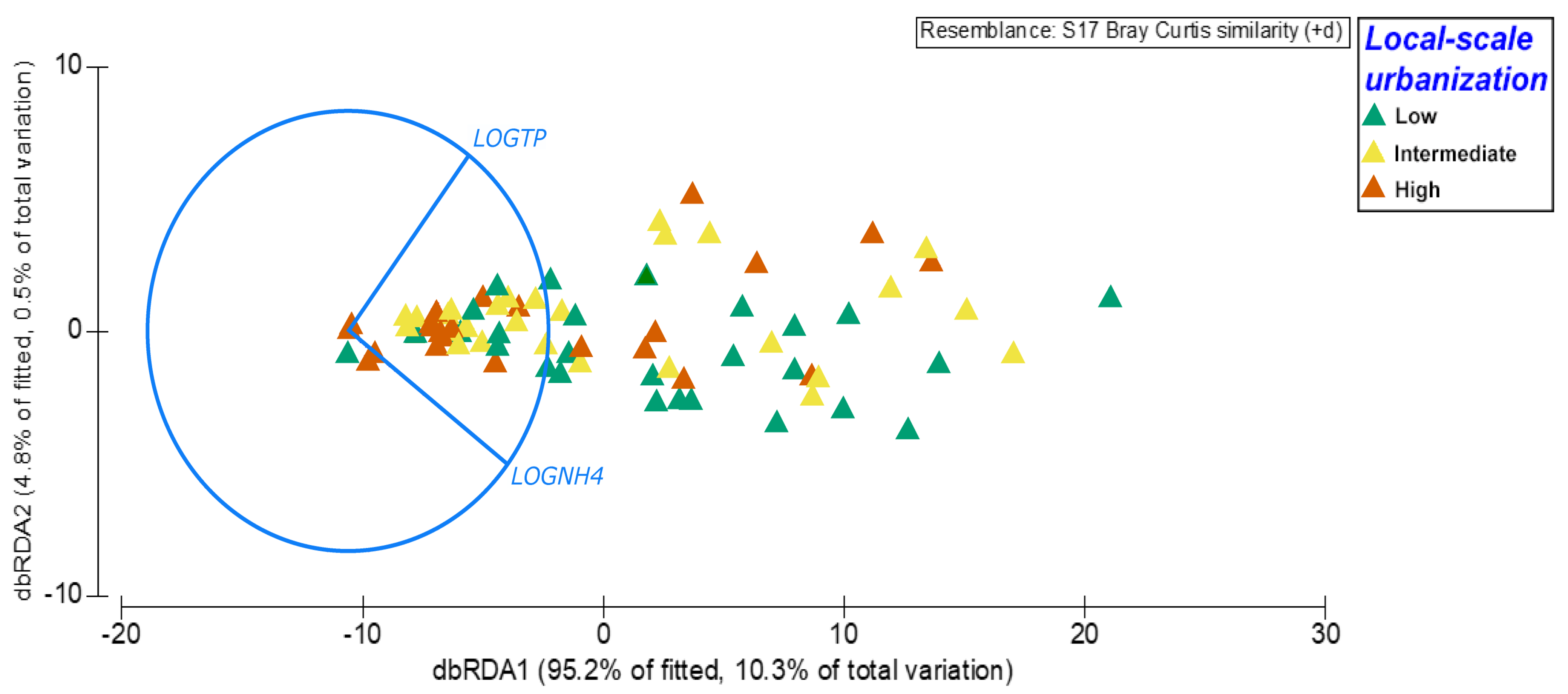

Fig. 4: Distance-based redundancy analysis of the ostracod community structure and environmental variables. Only the environmental variables retained by stepwise selection using distance-based linear modelling are shown.

Belgian Science Policy Office
belspo

Acknowledgements
The project SPEEDY was funded by the Belgian Science Policy (Belspo).

Cours M., Vanaverbeke J., Parmentier K., Knockaert M., Higuti J., Martens K. & Schön I. (2021). Water chemistry and not urbanization influences community structure of non-marine Ostracoda (Crustacea) in northern Belgium. *Belgian Journal of Zoology* 151: 149–167. https://doi.org/10.26496/bjz.2021.91