

The Research Group
Ecology and Biodiversity

has the honor to invite you to the public defense of the PhD thesis of

Stijn VAN ONSEM

to obtain the degree of Doctor of Sciences

Title of the PhD thesis:

Ponds in the human landscape - Biomonitoring, drivers and reproductive ecology of macrophytes in a peri-urban setting

Promotor:

Prof. Dr. Ludwig Triest

The defense will take place on

Monday October 9 2017 at 13:00 h

in Auditorium D.2.01 at the campus Humanities, Sciences and Engineering of the Vrije Universiteit Brussel, Pleinlaan 2 - 1050 Elsene, and will be followed by a reception.

Members of the jury:

Prof. Dr. Nico Koedam (chairman)

Prof. Dr. Harry olde Venterink (secretary)

Prof. Dr. Dominique Maes

Dr. Elisabeth Bakker (Nederlands Instituut voor Ecologie)

Prof. Dr. Laura Serrano (Universidad De Sevilla)

Curriculum vitae

After obtaining a Master degree in Biology at the VUB in 2006 and following a one-year specialization in environmental sciences, Stijn Van Onsem joined several policy-supporting research projects, involving monitoring of benthic diatoms, macrophytes and macro-invertebrates for quality assessment as part of the European Water Framework Directive, amongst others. In parallel, he studied fundamental aspects of pond ecological functioning, with a focus on submerged macrophyte dynamics.

Abstract of the PhD research

Urbanization alters our globe at a troublesome rate. As a result, nature conservation should try to maximize the ecological value of green and blue urban space. In this PhD, drivers of establishment and reproductive traits of submerged macrophytes (macroalgae and plants evolved to live an underwater life) were investigated in peri-urban ponds (mainly situated in the Brussels-Capital Region, Belgium), together with the development of an integrated biomonitoring scheme.

In a first stage, we studied the reproductive fitness of the macroalgae *Chara globularis* in response to duckweed cover. Shading stress resulted in decreased biomass and density of reproductive organs, impacting potential oospore release. Next, deposition rates and accumulation of propagules in vegetation communities were quantified using a novel approach of collection near the sediment, which indicated large within-species differences and the absence of a relation between macrophyte abundance and reproductive output.

On a pond-scale level, the dominant stressor acting on submerged macrophytes was phytoplankton-induced turbidity, followed by waterfowl grazing pressure. In addition, low densities of specialized propagules stored in the sediment seemed to be a bottleneck for restoration of turbid ponds.

Finally, a methodology was developed to allow efficient biomonitoring of ponds in function of European directives and cyanobacterial surveillance. Two aquatic habitat types of the Habitats Directive were found to occur in the Brussels-Capital Region – albeit in a degraded or ephemeral state.

In summary, submerged vegetation in peri-urban ponds is significantly affected by autotrophic stressors, attraction of birds and reduced propagule availability, making a case for continued efforts of nutrient and fish reduction, waterfowl control and sufficient biomonitoring to identify challenges and opportunities.