Linking Native and Exotic Aquatic Plant Palatability to Herbivores with Shared or Unshared Home Ranges

A Trait-Based Approach
Herbivory and invasions

- Numerous plant invasions
- Different filters acting (geographic, physicochemical)
- Biological filter: herbivores
Introduction: plant-herbivore hypotheses (palatability)

**Enemy release hypothesis**

```
Native plant  Exotic plant
```

Adapted Fig 3b. in Xiong et al. 2008 Freshw Biol

**Biotic resistance**

“Native herbivores prefer non-native plants”

Parker & Hay 2005  Ecol Lett
Introduction: welcome to my world
Introduction: other frameworks / complicating factors

Who is naïve?

- Phylogenetic distance (e.g. Myriophyllum)  
  Verhoeven et al. 2009 Ecol Lett
- Native range  
  Nelis 2012 Oecologia

Gradients

- Latitudinal gradient, or not  
  e.g. see Moles et al. 2011 Functional Ecology

Invasive/dominant species

- Reduced palatability?  
  e.g. see Bottollier-Curtet et al. 2013 Journal of Vegetation Science
Method

- No-choice feeding trials (generalists *Lymnaea stagnalis* & *Pomacea canaliculata*)
- 41 aquatic plants (21 native to the Netherlands)
- Plant traits (classification and measured ones like N, P etc.)
Results: snail consumption (mg/g/d) and plant origin

Results (1 of 4) (consumption of lettuce is equal)
Results: snail consumption (mg /g /d) and plant clade

Results (2 of 4)
Results: snail consumption (mg/g/d) and latitudinal gradient

Results (3 of 4)
Results: snail consumption (mg/g/d) and invasiveness

Results (4 of 4)
To improve our understanding of herbivory and invasions

- Patterns to mechanisms
- Utilise ecological theory
- Incorporate trait-based approach

>> Drivers of palatability

- Nitrogen / protein
- C:N ratio
- Dry matter content

Elger & Lemoine 2005; Wong et al. 2010
Ecosystem functions of native and exotic aquatic plants

- Increase water clarity
- Provide oxygen
- Provide habitat
- Provide food
Thanks for your attention!

And to Yvonne Roijendijk, Miquel Prado, Dennis Waasdorp, Suzanne Wiezer, Nico Helmsing and Amit Bhikharie for their assistance

References


