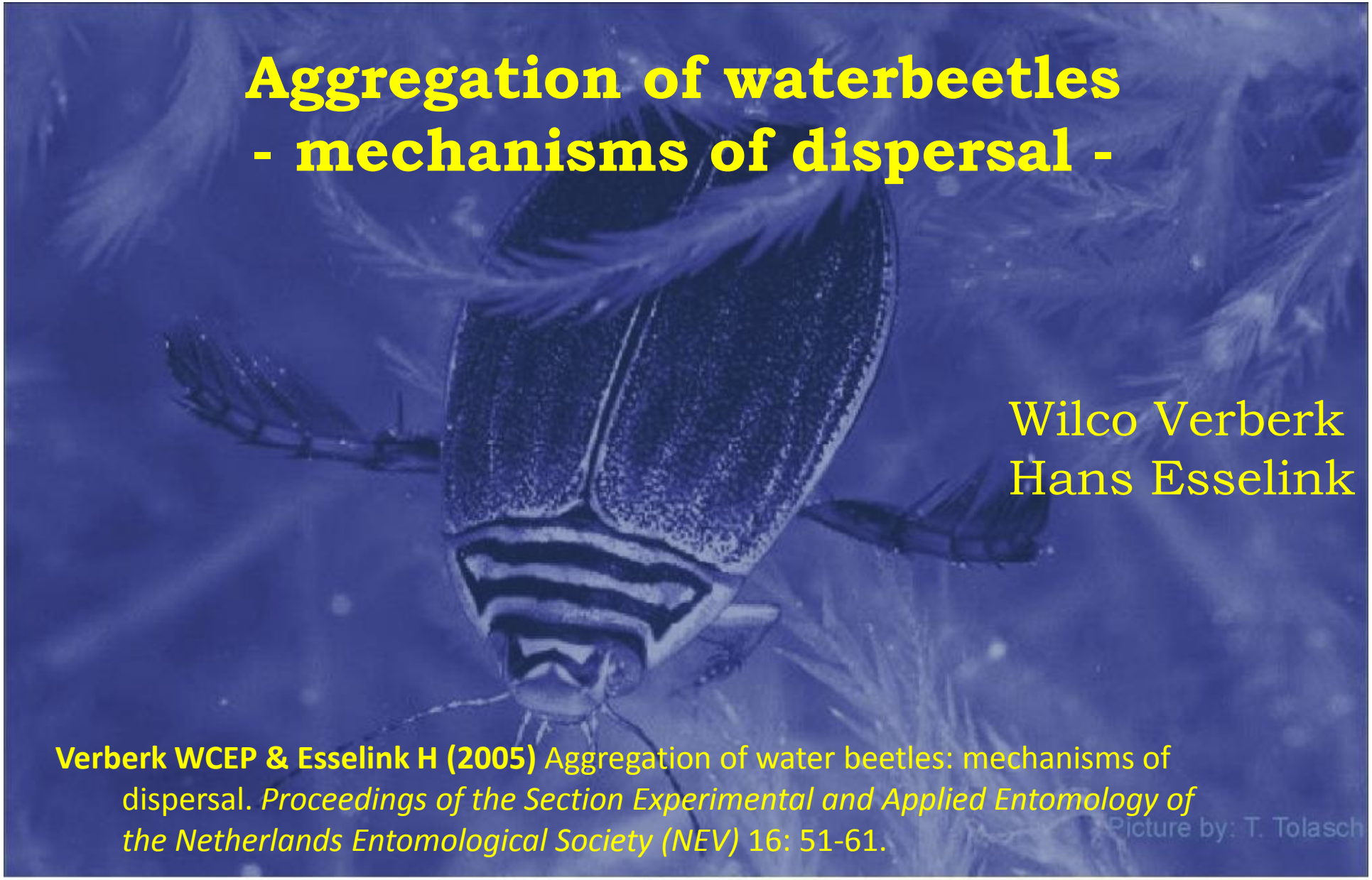
Aggregation of waterbeetles
- mechanisms of dispersal -



Wilco Verberk
Hans Esselink

Picture by: T. Tolasch

Verberk WCEP & Esselink H (2005) Aggregation of water beetles: mechanisms of dispersal. *Proceedings of the Section Experimental and Applied Entomology of the Netherlands Entomological Society (NEV)* 16: 51-61.

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understand species occurrences

species
- wings & flight muscles
- large jaws
- compound eyes

Scale specific match

environment
- food
- shelter
- oviposition substrate

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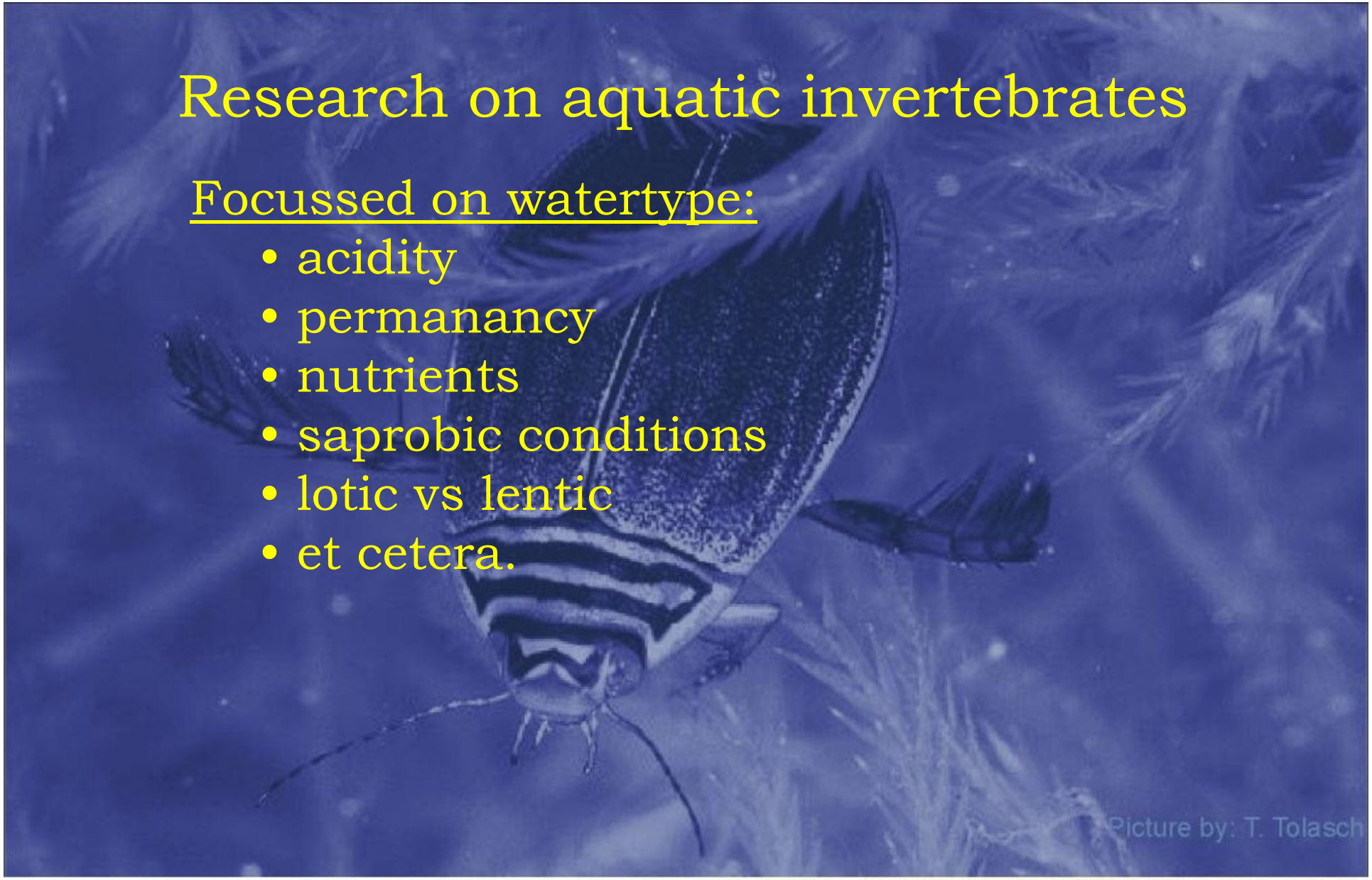
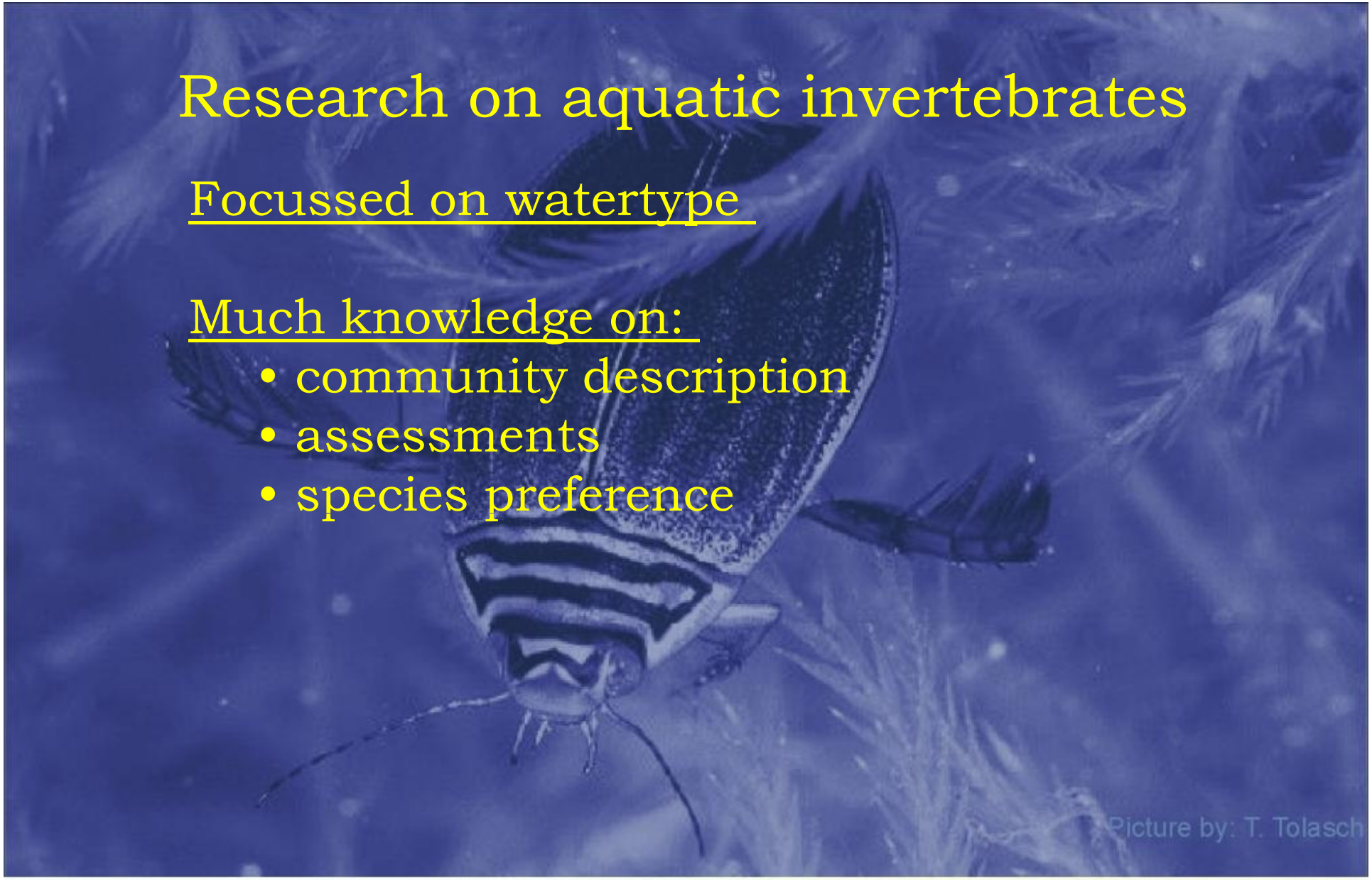
Research on aquatic invertebrates



Focussed on watertype:

- acidity
- permanancy
- nutrients
- saprobic conditions
- lotic vs lentic
- et cetera.

Research on aquatic invertebrates



Focussed on watertype

Much knowledge on:

- community description
- assessments
- species preference

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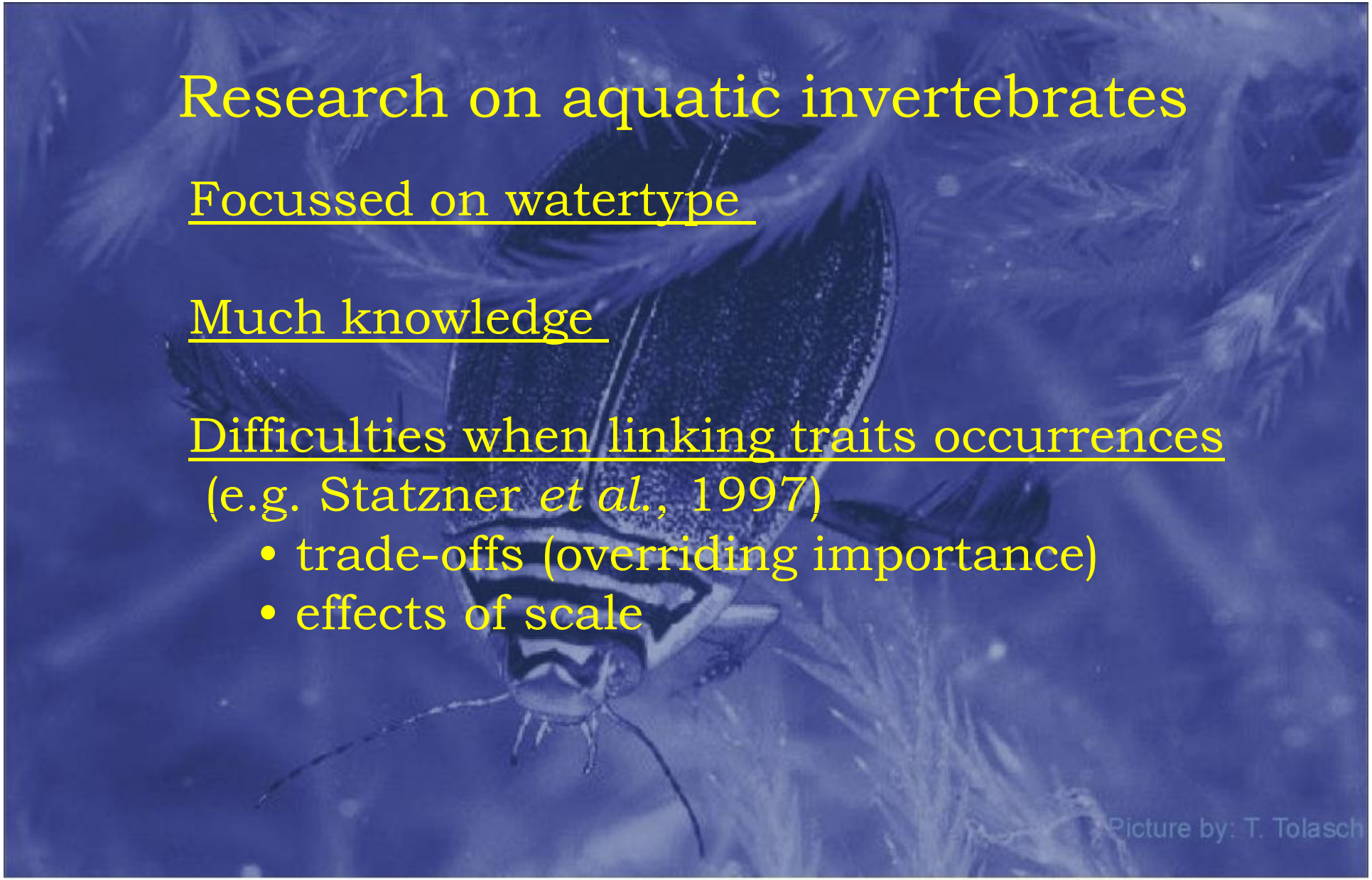
Research on aquatic invertebrates

Focussed on watertype

Much knowledge

Difficulties when linking traits occurrences
(e.g. Statzner *et al.*, 1997)

- trade-offs (overriding importance)
- effects of scale



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Research setup

- different watertypes

Oligo-mesotrophic

Meso-eutrophic

- different microhabitats (complex - simple)
- different seasons (winter, spring, summer, autumn)

Picture by: T. Tolasch

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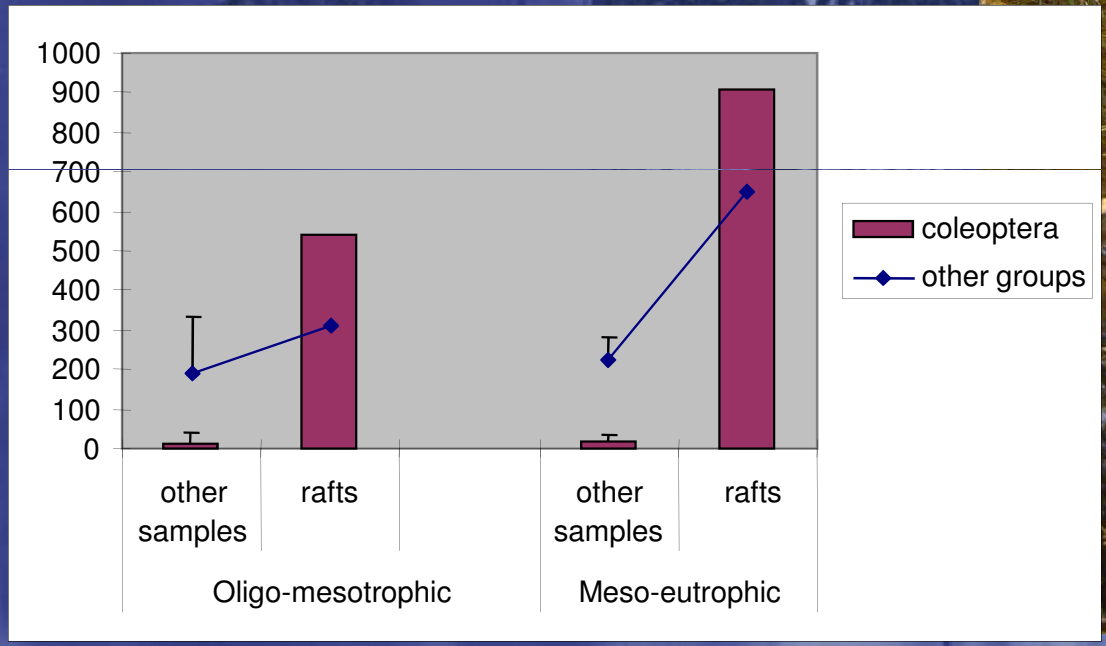
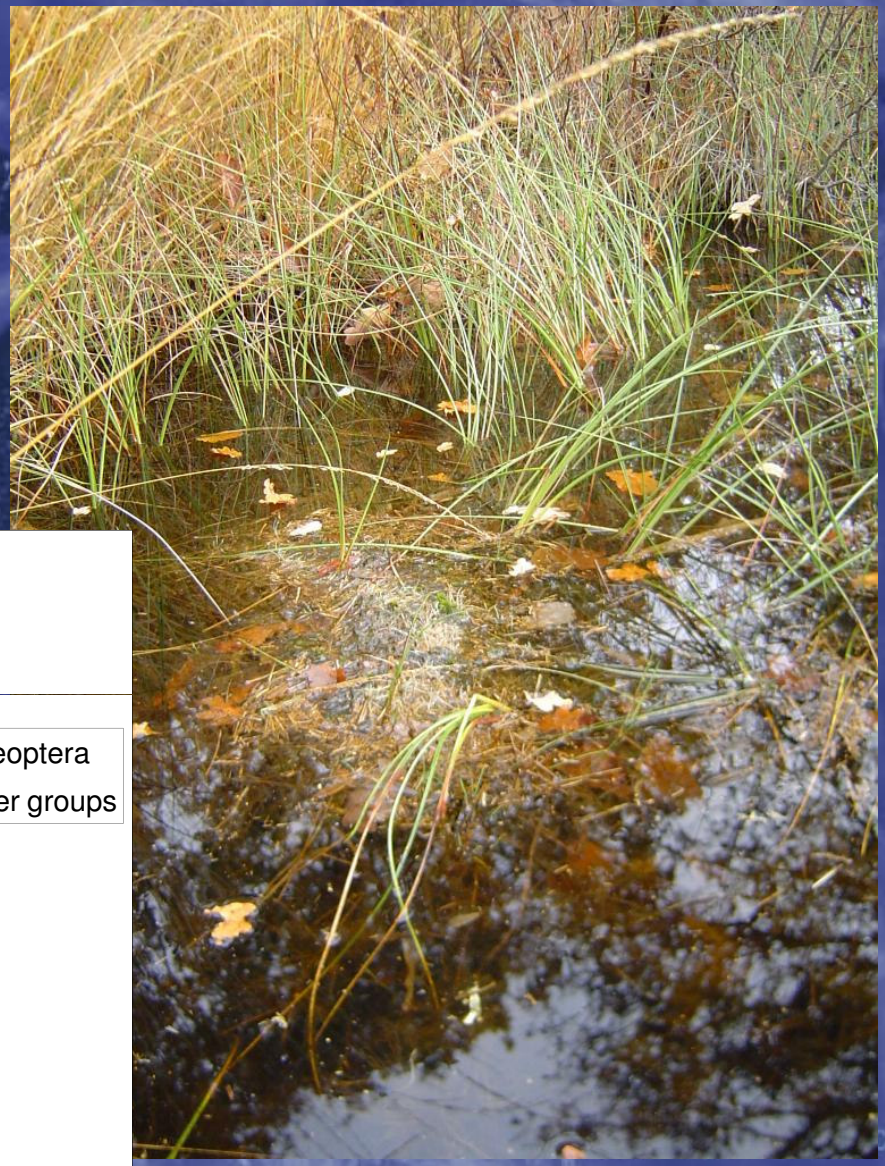
Autumn

- Floating rafts “Bunk Erde”
- aggregation of waterbeetles





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What beetles species aggregate?

- reflection of assemblage in rest of waterbody?

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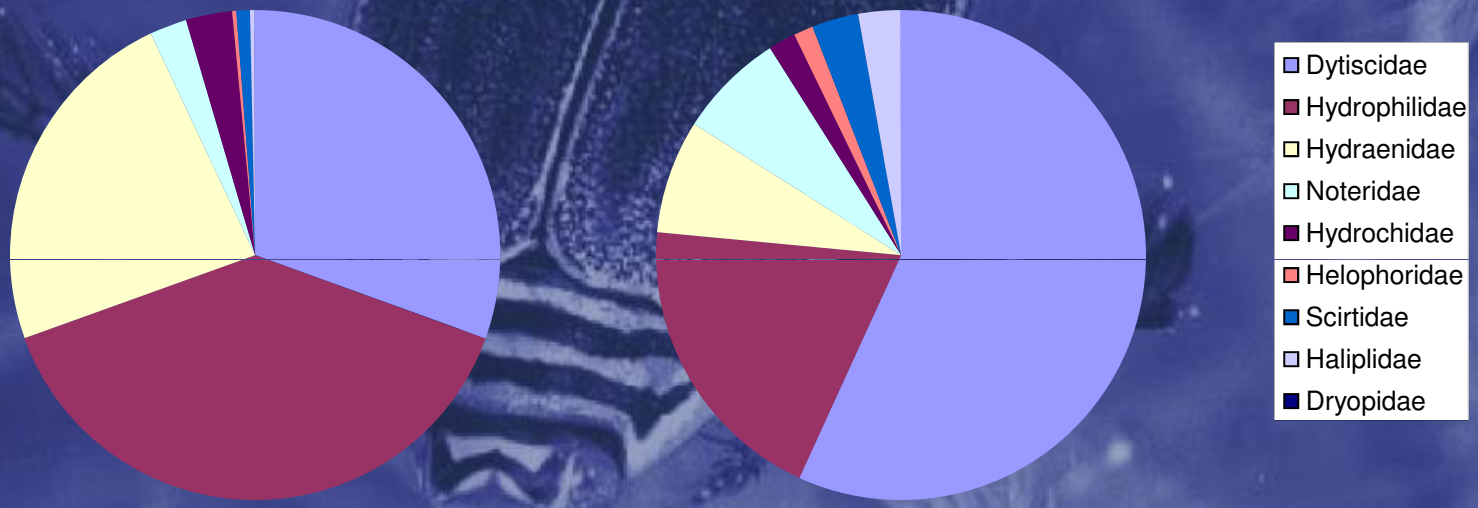
What beetles species aggregate?

Rafts

Other samples



More Hydraenidae & Hydrophilidae, less Dytiscidae and Noteridae in rafts

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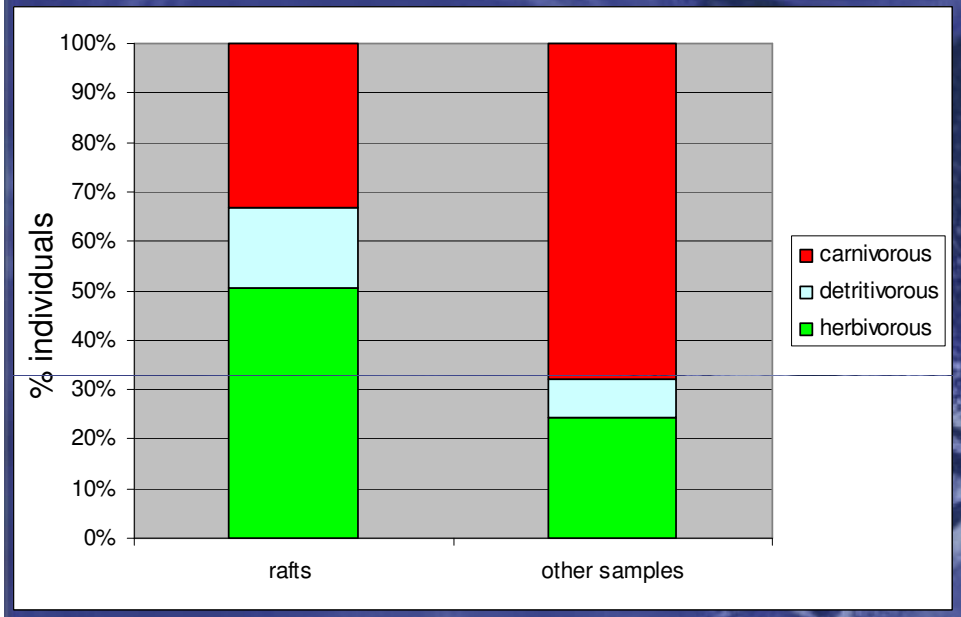
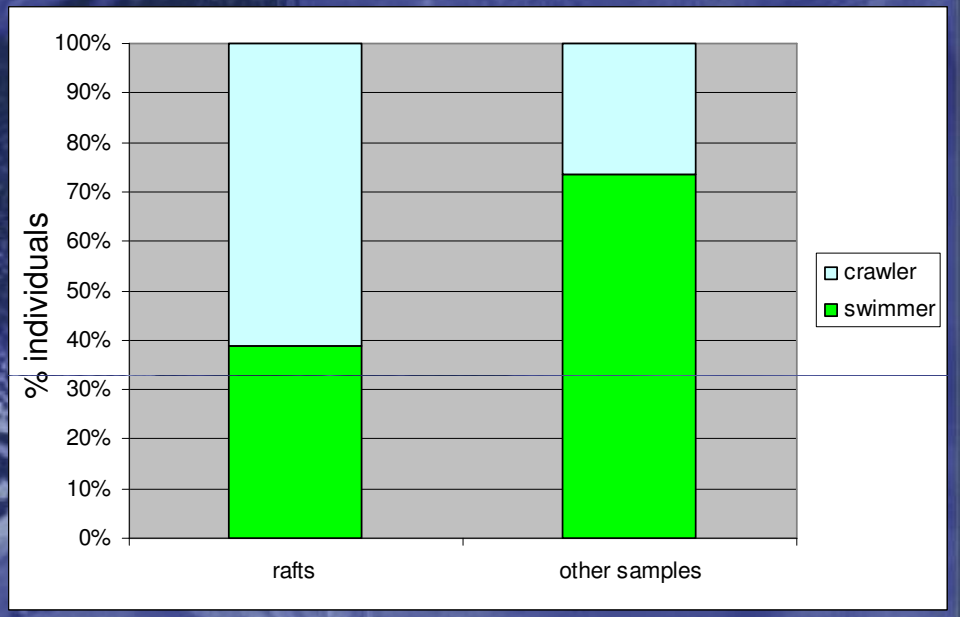
What beetles species aggregate?





Species with high abundances in rafts:
-detritivorous
-Herbivorous
-crawling

Picture by: T. Tolasch

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Where do the beetles come from?

1. arial dispersal (from other water bodies)

2. aquatic locomotion (from other microhabitats within the water body)

Hypothesis:

Aselective dispersal results in comparable abundances between the rafts in both watertypes

Picture by: T. Tolasch

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Where do the beetles come from?

- arial dispersal (from other water bodies)
- aquatic locomotion (from other microhabitats within the water body)

Using data on:

- Previous occurrences
- Occurrences in other microhabitats
- Differences between rafts in both watertypes

Species found in rafts grouped into:

- Arial dispersal
  - selective
  - aselective
- Aquatic locomotion
- Unknown (not enough data)

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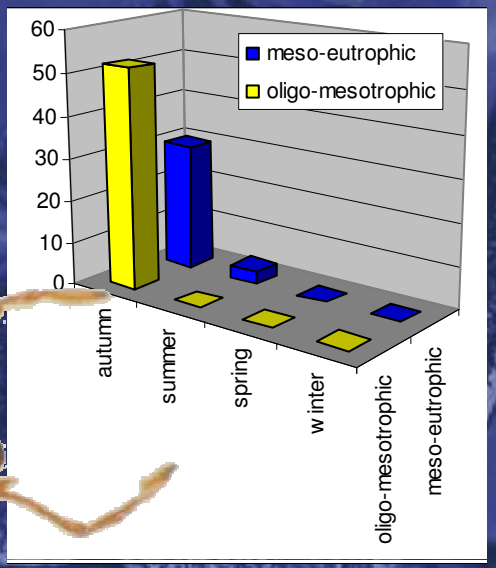
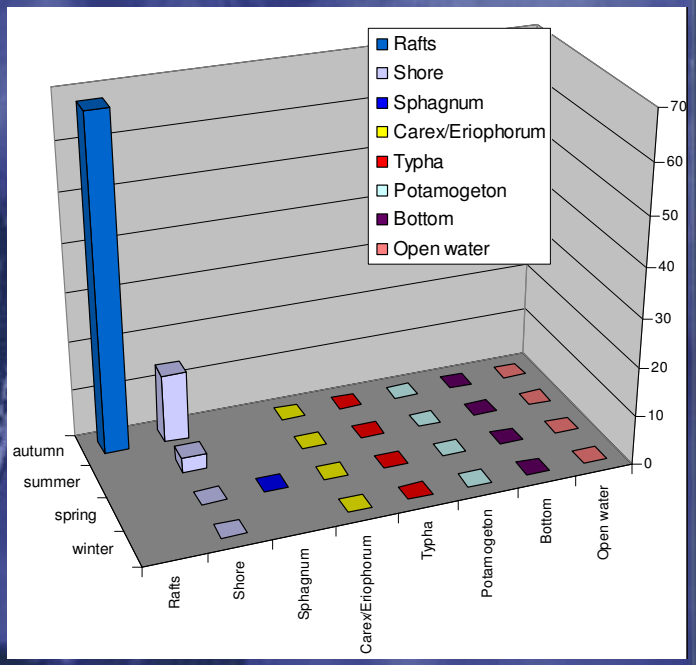
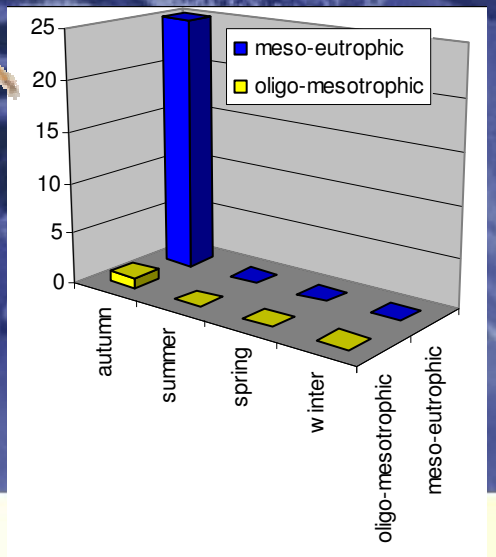
Species example:

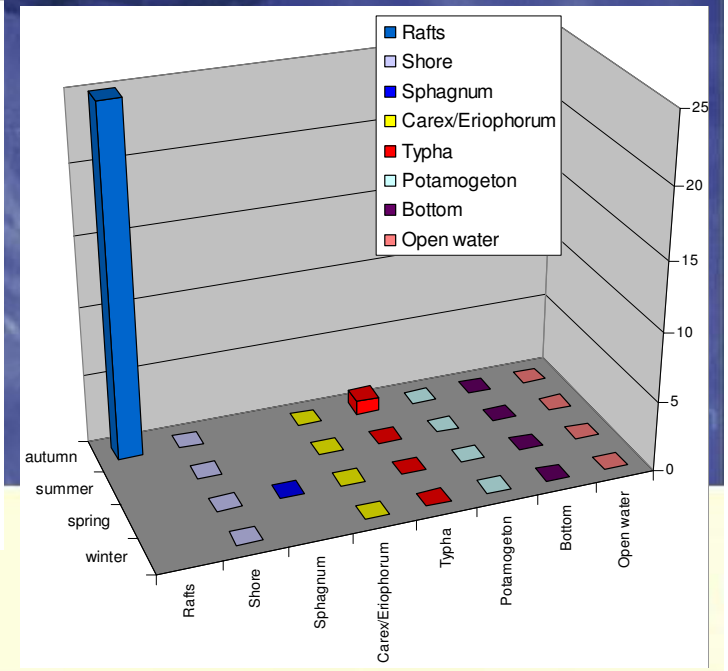
Hydraena testacea

Hydraena palustris









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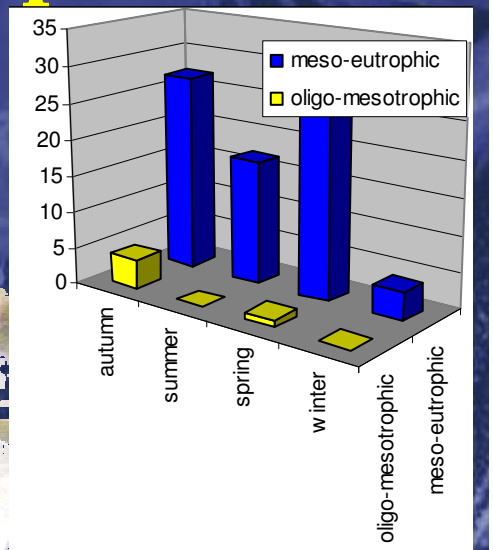
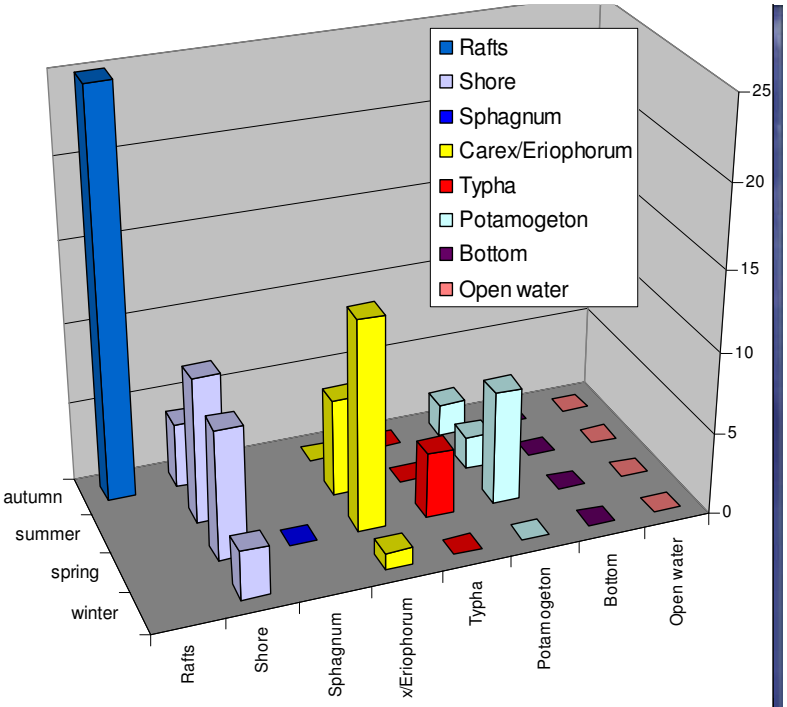
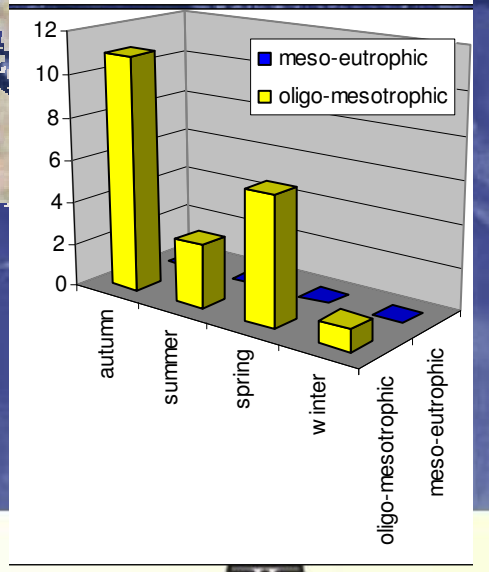
Species example:

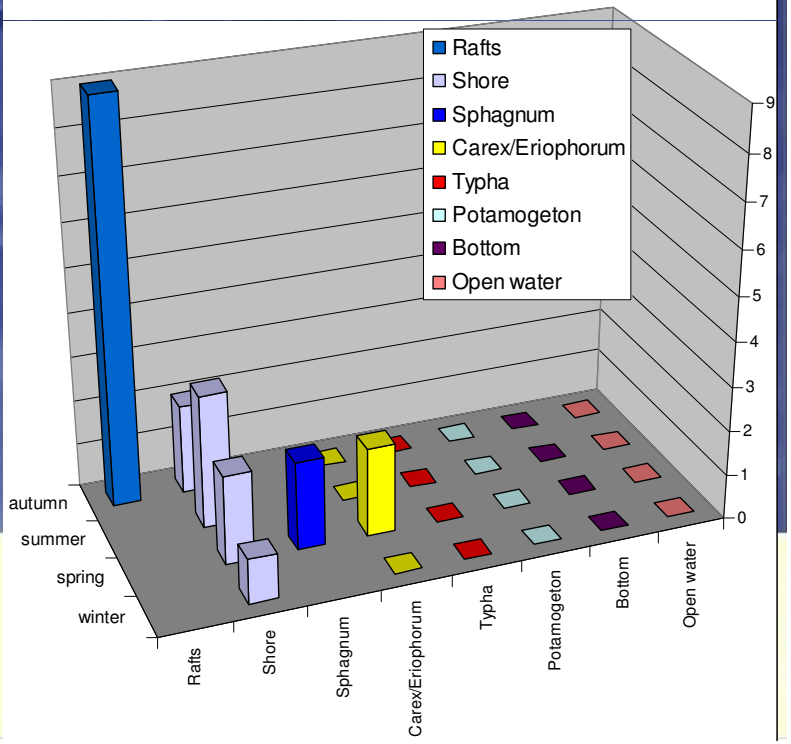
Noterus crassicornis

Noterus clavicornis









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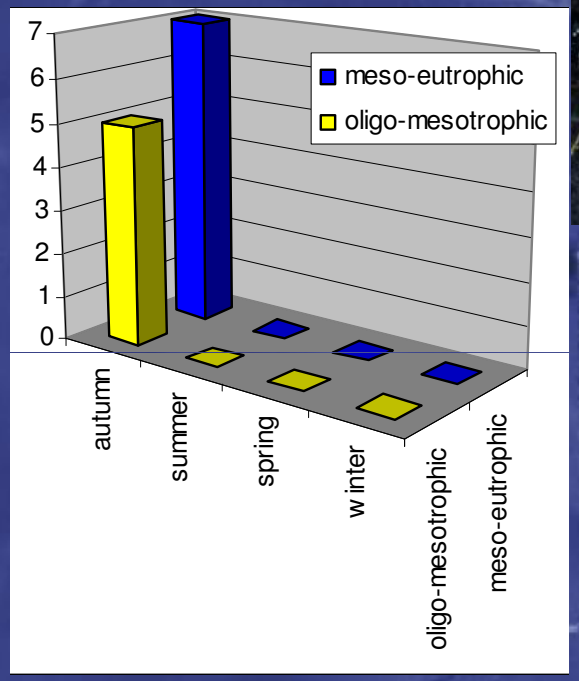
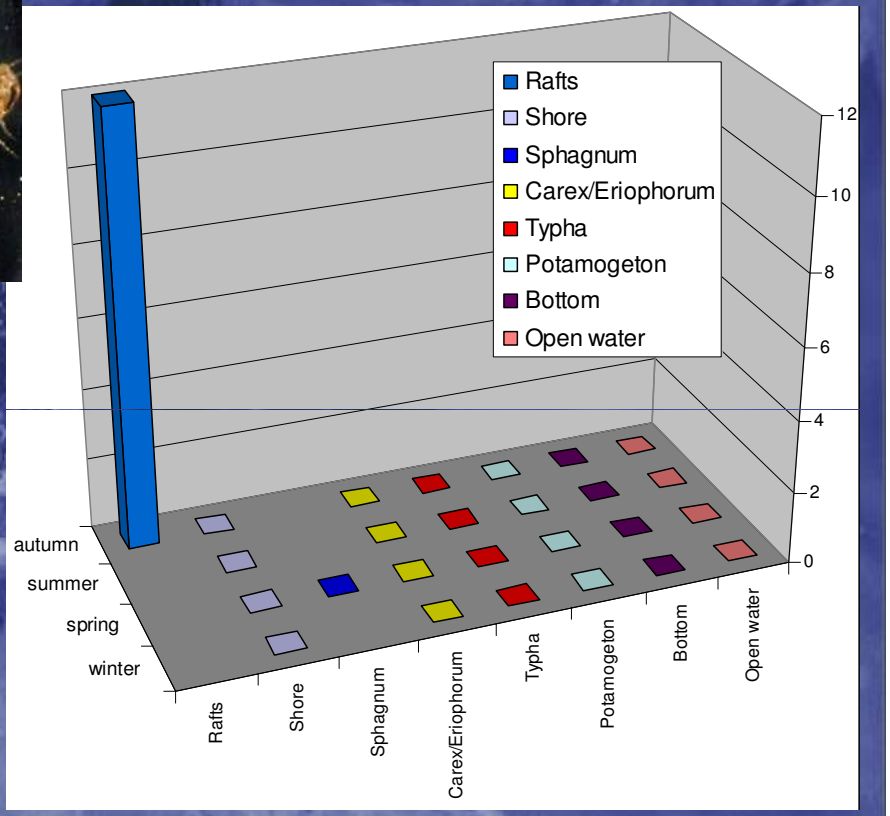
Species example: *Ilybius ater*





Picture by: T. Tolasch

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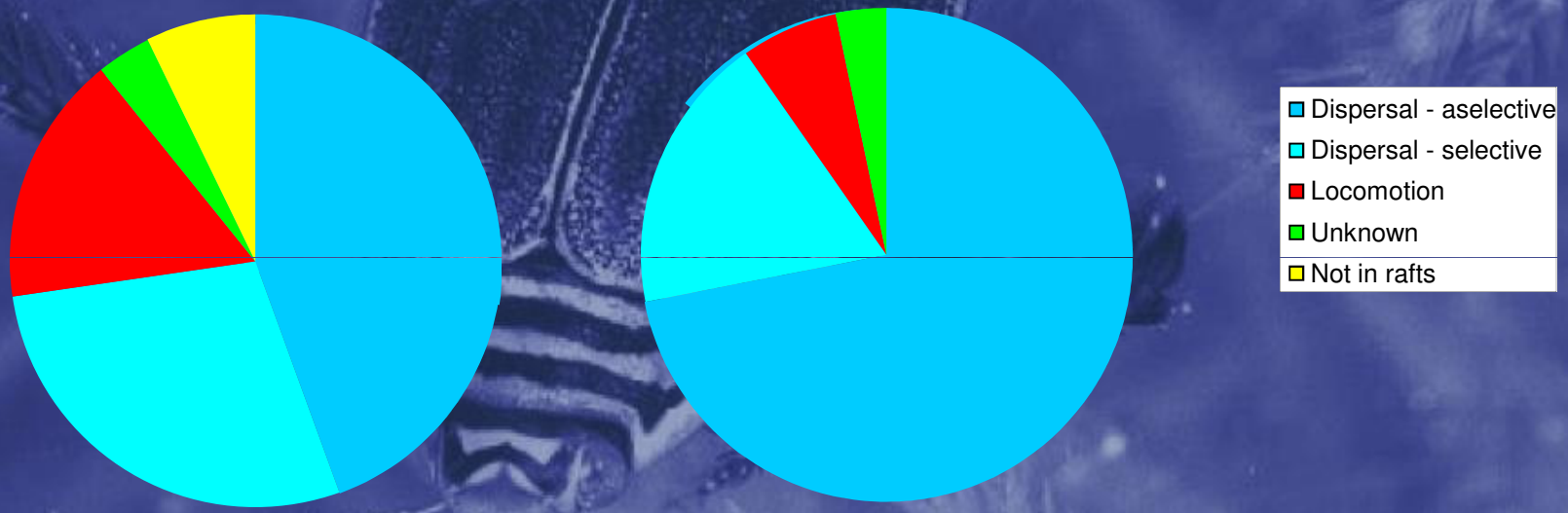
Where do the beetles come from?

Other samples

Rafts



Dispersers (aselective) dominate rafts

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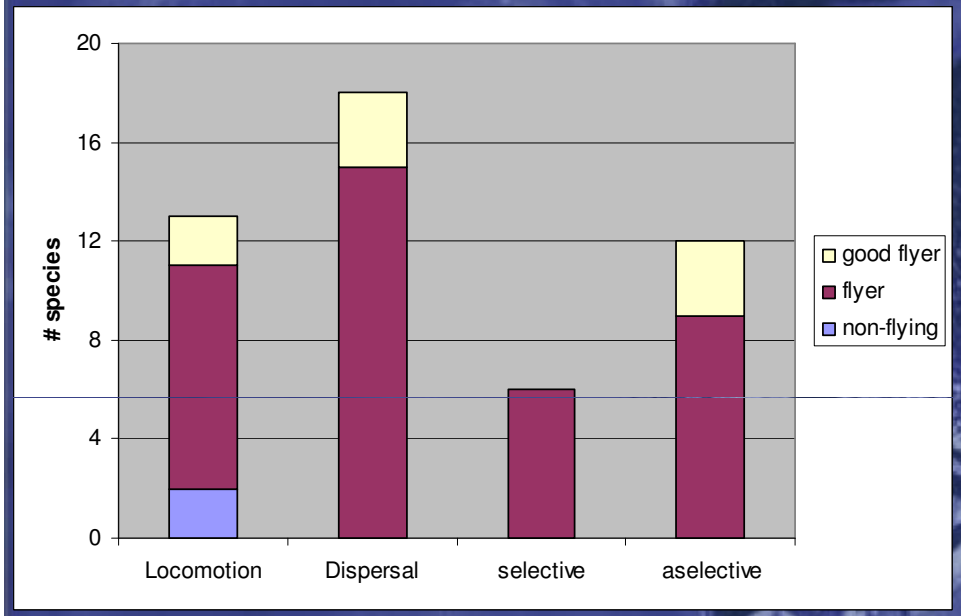
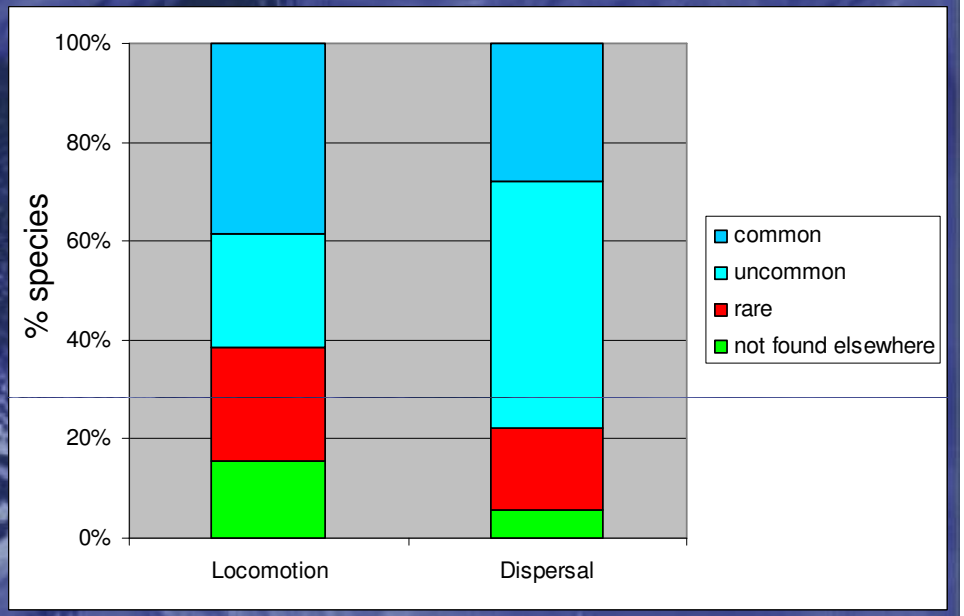
arial dispersal vs aquatic locomotion





Dispersive species:
- (good) flyers
- more abundant in the area Korenburgerveen

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Conclusions

Floating rafts in autumn
(detritus, algae, secondary production)

Assemblages characterised by
- good dispersers
- locally abundant
- herbivorous and detritivorous species
- crawling species

Rafts provide abundant foodsource, which are detected and consequently exploited by dispersive (& small) coleoptera.

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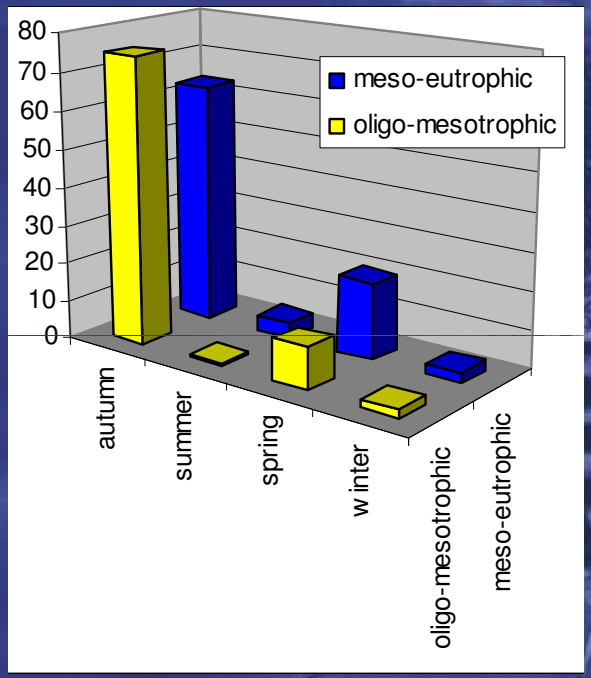
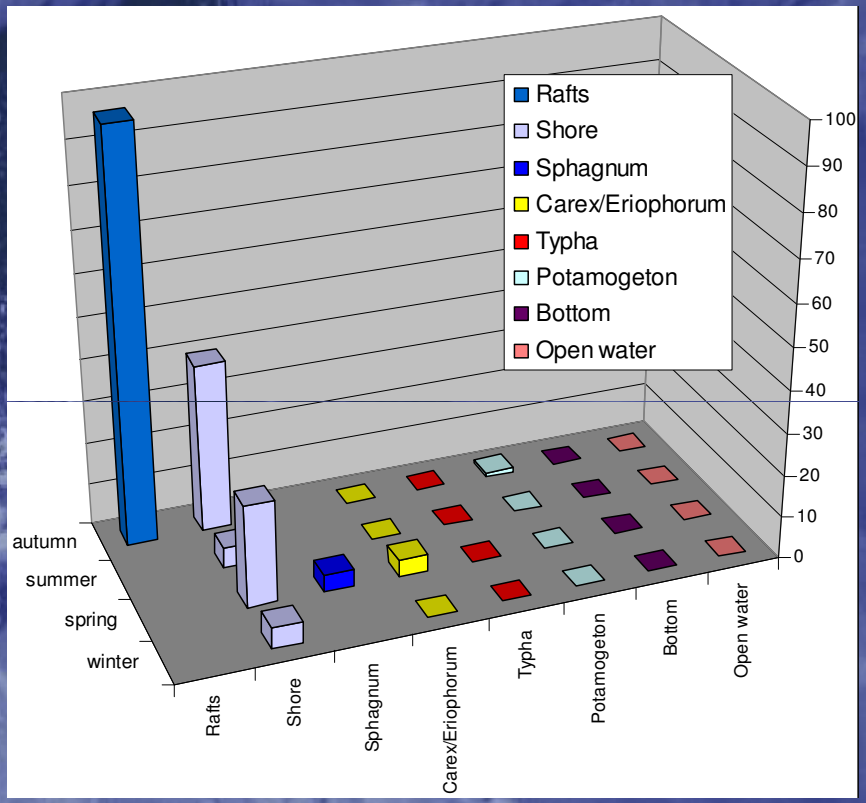
Species example: *Hydroporus angustatus*





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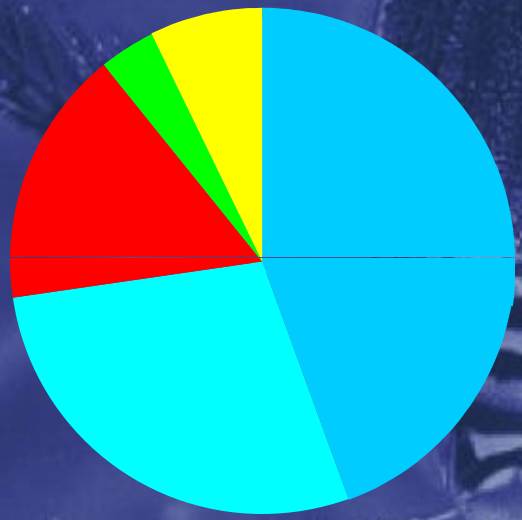
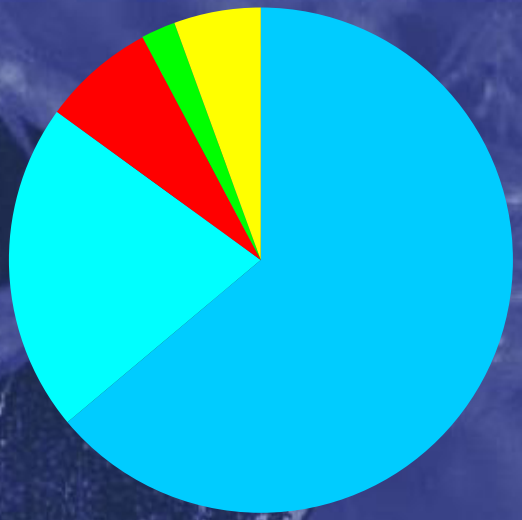
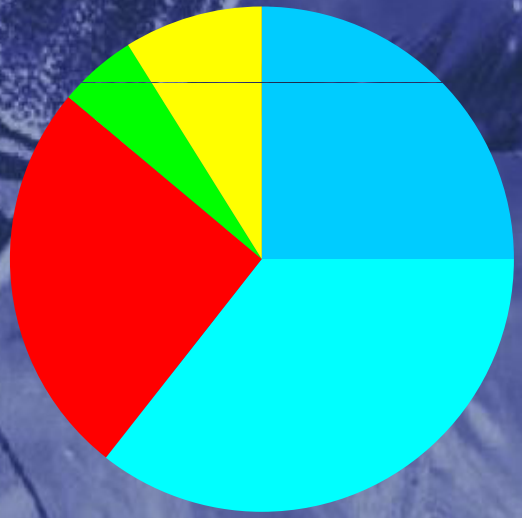
Other samples



Oligo-mesotrophic



Meso-eutrophic



Dispersal - aselective
Dispersal - selective
Locomotion
Unknown
Not in rafts

Picture by: T. Tolasch

Dispersers (aselective) more abundant in oligo-mesotrophic water type

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