Aggregation of water beetles - mechanisms of dispersal -

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understand species occurrences

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

**environment**
- food
- shelter
- oviposition substrate

Scale specific match
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
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
Research setup

- different watertypes
  - Oligo-mesotrophic
  - Meso-eutrophic

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

- Floating rafts “Bunk Erde”
- aggregation of waterbeetles

<table>
<thead>
<tr>
<th></th>
<th>Other samples</th>
<th>Rafts</th>
<th>Other samples</th>
<th>Rafts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oligo-mesotrophic</td>
<td>0</td>
<td>1000</td>
<td>0</td>
<td>200</td>
</tr>
<tr>
<td>Meso-eutrophic</td>
<td>100</td>
<td>500</td>
<td>200</td>
<td>800</td>
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</tbody>
</table>

- Graph showing coleoptera and other groups in different trophic conditions.
What beetles species aggregate?

- reflection of assemblage in rest of waterbody?
What beetles species aggregate?

More Hydraenidae & Hydrophilidae, less Dytiscidae and Noteridae in rafts
What beetles species aggregate?

Species with high abundances in rafts:
- detritivorous
- Herbivorous
- crawling
Where do the beetles come from?

1. arial dispersal (from other water bodies)
2. aquatic locomotion (from other microhabitats within the water body)

Hypothesis:

A selective dispersal results in comparable abundances between the rafts in both watertypes.
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)
Species example:

**Hydraena testacea**

**Hydraena palustris**

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Species example:

*Noterus crassicornis*

*Noterus clavicornis*

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Department of Animal Ecology
Species example: *Ilybius ater*
Where do the beetles come from?

Dispersers (aselective) dominate rafts.
dispersive species:
- (good) flyers
- more abundant in the area Korenburgerveen
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.
Species example: *Hydroporus angustatus*
Dispersers (aselective) more abundant in oligo-mesotrophic water type