Influence of coarse woody material (CWM) on soil microarthropods in black spruce-feather moss forests of Western Québec

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Timothy Work
INTRODUCTION

• In boreal forests, downed CWM is both a conservation and a forest productivity issue. How is linked CWM decomposition with soil organisms?

• In the black-spruce clay-belt region of Western Québec soil nutrients are limited by paludification and *Sphagnum* growth

• Does the CWM affect forest floor microarthropods in this environment?
INTRODUCTION

ORGANIC SOIL

Marra & Edmonds, 1998
INTRODUCTION

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INTRODUCTION

- Paludification

Moss cover gets thick

Water table rises

Forest floor is acidic and cold

Fenton et al., 2004
INTRODUCTION

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INTRODUCTION

BRYOPHYTE

ORGANIC SOIL
METHODS

• Study site
METHODS

- Black spruce forest development

Oliver 1981
Harper et al. 2005
METHODS

• Sampling design
RESULTS

- Microarthropod community
  - 292 springtails
  - 1062 mites (826 Oribatida)
  - 44 oribatid species
RESULTS

- Influence of CWM
RESULTS

• Position and species assemblage

40 species

34 species

Sorensen index = 0.811
Morisita-Horn index = 0.792
Shared species = 30
RESULTS

- **Forest development**

  $F = 3.79, P < 0.05, \text{d.f.} = 2, 36$
RESULTS

• Forest stage and species assemblage

<table>
<thead>
<tr>
<th></th>
<th>INITIATION</th>
<th>STEM EXCLUSION</th>
<th>OLD GROWTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorensen index =</td>
<td>0.745</td>
<td>0.645</td>
<td>0.761</td>
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<tr>
<td>Morisita-Horn index =</td>
<td>0.492</td>
<td>0.726</td>
<td>0.667</td>
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</table>
RESULTS

- Forest stage and species assemblage

<table>
<thead>
<tr>
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<th>Hulbert Diversity Index</th>
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</thead>
<tbody>
<tr>
<td>Stem Exc 1</td>
<td>0.85 a</td>
</tr>
<tr>
<td>Stem Exc 2</td>
<td>0.92 b</td>
</tr>
<tr>
<td>Old Growth</td>
<td>0.90 ab</td>
</tr>
</tbody>
</table>

![Graph showing estimated number of species vs. number of individuals for Stem Exc 1, Stem Exc 2, and Old Growth](image-url)
DISCUSSION

• The impeded litter fall hypothesis
DISCUSSION

- Forest development

![Graph showing forest development over time since fire, with lines indicating changes in trees, deadwood, abundance, and diversity.](image-url)
TAKE HOME MESSAGES

In black spruce-feather moss forests:

• CWM do affect oribatid mite communities (but contrary to our initial expectations)
• Lower density and diversity of oribatids under logs than in adjacent open spaces suggest a preference for recent litter supply
• Oribatid abundance decrease temporally following tree thinning
• Oribatid similarity is consistent between positions and forest stages
GRACIAS!!