Can spruce plantations support a diverse, forest-associated arthropod fauna?

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Background

Plantation forests constitute a large proportion of the forest estate in many countries.

In Britain and Ireland, a large proportion of these plantations are comprised of non-native conifers, particularly Picea sitchensis and Picea abies.

Cover of plantations and natural woodlands is low and fragmented within intensively managed agricultural landscapes.

In light of this, it is important that the potential of these plantations to support a diverse flora and fauna, particularly of forest-associated species, is assessed.

Study Questions

1. Do arthropod assemblages differ between plantations and semi-natural woodlands?
2. Can plantations support a forest-associated fauna?

Experimental design

<table>
<thead>
<tr>
<th>Stand type</th>
<th>No. stands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Spiders</td>
</tr>
<tr>
<td>Semi-natural woodlands</td>
<td></td>
</tr>
<tr>
<td>Oak</td>
<td>10</td>
</tr>
<tr>
<td>Ash</td>
<td>10</td>
</tr>
<tr>
<td>Plantation forests</td>
<td></td>
</tr>
<tr>
<td>Norway spruce (NS)</td>
<td>10</td>
</tr>
<tr>
<td>NS - Oak mix</td>
<td>5</td>
</tr>
<tr>
<td>NS - Scots pine mix</td>
<td>5</td>
</tr>
<tr>
<td>Sitka spruce</td>
<td>5</td>
</tr>
</tbody>
</table>

Arthropod species examined:
- Spiders
- Beetles: Family Carabidae
- Macro-moths

Arthropod sampling

Spiders & Carabid beetles
- 5 pitfall traps per plot.
- Three plots per site.
- Samples collected over 9 weeks from May 08 or 2009.

Macro-moths
- Sampled Summer & Autumn 08, Spring 09.
- Two light traps per site.
- Adjacent to pitfalls.

Redundancy Analysis

No significant difference in total or forest-associated species richness among forest types for any taxa.

Proportion of forest species associated with particular forest types as identified by Indicator Species Analysis

Conclusions

Plantations support a similar number of forest-associated species as semi-natural woodlands but assemblages differ.

Spiders and moths
- Forest specialists unique to conifer plantation or broadleaved woodlands.
- Conifer specialists may have survived in natural woodlands in low numbers or recolonised Ireland in recent years.

Beetles
- Forest generalists found across forest types.
- Loss of specialists in Ireland which have not recolonised.

Increased planting of conifers has lead to a change in common forest species in Ireland.

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