Native and adventive detritivores in forests of Manawatu-Whanganui

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Abstract

Little is known about many New Zealand invertebrates, including detritivores which have a key role in the functioning of ecosystems and are threatened by habitat modification and the addition of adventive species. Detritivores are an abundant group, and, like many other New Zealand taxa, they contain a high level of endemism that needs conserving. Detritivores are so scarcely studied, that it remains unknown how their forest communities are influenced by changes to New Zealand's forest habitats. This study aimed to increase knowledge on the identity, abundance, and distribution of detritivores in forests of Manawatu-Whanganui. Four main questions were addressed: (1) are adventive detritivores capable of invading native forests?, (2) can pine forests provide an alternative forest habitat for native detritivores?, (3) does proximity to forest edge affect native and adventive detritivores?, (4) are native and adventive detritivores co-occurring in the same habitats? Three detritivore groups (Diplopoda, Isopoda, and Amphipoda) were collected from edge and centre plots in six pine forests and ten native forests (including those that are small and close to urban areas) in Manawatu-Whanganui region of New Zealand.

The results show that a number of adventive taxa have spread throughout native forests in Manawatu-Whanganui, which does not support the hypothesis that native forests are resistant to adventive detritivores. Adventive Diplopoda were actually more abundant in native forests, and abundance of adventive Amphipoda and adventive Isopoda was high in both native and pine forests. Some native taxa were less dominant or absent in pine forests, and forest type influenced the community structure of Diplopoda and possibly Isopoda. The likelihood that a randomly collected

detritivore would be an adventive was also influenced by forest type in all three detritivore groups. Human disturbance may have facilitated the invasion and establishment of adventive species, because small, urban, and highly modified native remnants appeared to have higher abundance and diversity of adventive species. Edge proximity had little influence on abundance of detritivores, but did affect the predicted likelihood of encountering an adventive individual in all three groups.

Adventive and native detritivores co-occurred in all forest habitats and it is possible that adventive detritivores will be influencing native species. Native Amphipoda appear to be under the most immediate threat in Manawatu-Whanganui, with adventive Amphipoda having higher abundance and higher probability of being found throughout all investigated forest habitats; there is evidence that adventive *Arcitalitrus* is displacing native species. The presence of adventive species could alter the functioning of native forest ecosystems and further research into the effect of adventive species in native forest is recommended. The data also revealed that for all three investigated taxa pine forests can support as many native detritivores as native forests, suggesting that pine forests contribute to preserving native biodiversity. Pine forests may be used as a tool to conserve native detritivores, but the conditions which promote the establishment of native species need further investigation.

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Table of contents

List of figures

List of tables