VULNERABILITY OF NORTH QUEENSLAND RAINFOREST PLANTS TO PREDISPERSAL SEED PREDATION BY INSECTS

Thesis submitted by

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10/3/2000

Peter Alexander Juniper

ABSTRACT

Seed predation by animals is one of the major causes of death for seeds in tropical rainforests. By reducing seed availability in tropical rainforests seed predation may affect the recruitment of new plants, as has been shown in other types of ecosystems. Seed predation may therefore be one of the factors that determines the species composition of tropical rainforests. The purpose of this thesis was to determine what factors were associated with the vulnerability of rainforest plants to seed predation, what types of species were most vulnerable to seed predation and hence what types of species were most likely to be limited in abundance by seed predation. This study focussed on predispersal seed predation by insects in the tropical rainforests of north Queensland, on the Atherton Tablelands.

The presence and intensity of insect predispersal seed predation (IPSP) on the seed crops of rainforest plants was assessed and associations between the presence and intensity of IPSP, and species and site characteristics were tested.

Five factors were found to be associated with variations in IPSP:

1) Plants that produced fruit with a hard, thick pericarp layer (fruit wall) were less likely to be attacked by IPSPs than those with a thin hard pericarp or no hard pericarp at all.

2) The total fruit pericarp thickness was also inversely related to the likelihood that any seeds within were attacked. This relationship was caused by the confounding effects of hard pericarp thickness, which is positively correlated with total pericarp thickness.

3) Differences in the intensity of IPSP found among plants of different families suggest that the vulnerability of plants to IPSP was also associated with phylogeny. Plants belonging to the Lauraceae had particularly low intensities of IPSP while plants belonging to the Euphorbiaceae and the Sapindaceae had particularly high intensities of IPSP.

4) Native species of plant were more likely to be attacked by IPSP than exotic species. This was not due to any confounding phylogenetic differences.

5) There were indications that shade dwelling species of plant were less likely to be attacked by IPSPs than species that grew in well lit conditions. However, this association may be due to confounding differences in growth form.

Native species that grew in high light conditions and had soft and/or thin fruit pericarp layers were considered to be more vulnerable to IPSP than species that were exotic, grew in low light conditions and that had thick hard seed pericarp layers. Hence seed availability and in turn possibly seedling recruitment, was more likely to be limited by IPSP in the former species, particularly species in the Euphorbiaceae and the Sapindaceae.

The recruitment of plants is also affected by many other factors, hence the varying effect of IPSP on the recruitment of different species will be modified. The possible effects of IPSP on seed availability, and in turn recruitment, are discussed within the context of these other modifying factors, in particular - seed longevity and post-dispersal seed predation.

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STATEMENT OF SOURCES DECLARATION

I declare that this thesis is my own and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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Peter Alexander Juniper

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