

Abstract of thesis entitled

**COLONIZATION OF EXOTIC PLANTATIONS BY NATIVE
PLANTS AND MAMMALS IN HONG KONG**

Submitted by

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Reforestation since the 1950s using mainly exotic tree species has resulted in large areas of even-aged monocultures in Hong Kong. With the current stress on preserving and enhancing native biodiversity within the government and internationally, the role of exotic plantations in reforestation programmes needs to be reassessed. The major aim of this study was to assess whether forest succession is taking place under these exotic plantations and if they have fulfilled the objective of rehabilitating degraded hillsides in Hong Kong. The possibility of increasing plant diversity within exotic plantations by means of enrichment planting of native tree species was also studied.

Multivariate analysis of the woody species composition of four types of 30-year-old exotic plantations showed that the understory plant community of most plantations was significantly different from spontaneous secondary forests of similar age. Sites near secondary forest seed sources had a more similar species composition to secondary forests, while isolated sites, especially *Lophostemon confertus* plantations, had a low-diversity plant community dominated by a few shrub species and lacking tree seedlings. *Acacia confusa* plantations had the lowest regenerated stem density, suggesting a possible effect of allelopathy.

Seed traps placed in three *Lophostemon confertus* plantations showed that the seed rain into plantations is very variable. Two sites had a mean seed rain of only 11 seeds $\text{m}^{-2} \text{yr}^{-1}$ while the third received 142 seeds $\text{m}^{-2} \text{yr}^{-1}$, but over 70% of them were of a single shrub species, *Psychotria asiatica*. Nineteen of the 20 woody seed species collected are bird-dispersed, suggesting that the attractiveness of the plantations to birds may control the seed input. On an annual basis, the number of seeds arriving in plantations is greater than the number of stems established, suggesting that other, post-dispersal, processes are limiting understory stem density.

Eight species of native trees (*Castanopsis concinna*, *Cyclobalanopsis neglecta*, *Elaeocarpus nitentifolius*, *Garcinia oblongifolia*, *Machilus breviflora*, *Mallotus paniculatus*, *Ormosia pachycarpa* and *Sterculia lanceolata*) were under-planted in an *Acacia confusa* plantation and their growth was monitored for a year. Two species of Fagaceae with taller seedlings showed over 80% survival, but other species suffered a 90% loss from animal damage, apparently by Malayan porcupines (*Hystrix brachyura*). Mortality from other causes was minor, suggesting that if damage by wild mammals could be prevented, enrichment planting with native trees is a feasible way to increase plant diversity in plantations, as well as expanding the distribution of currently restricted forest species.

Auto-trigger cameras placed in exotic plantations and adjacent spontaneous secondary forests photographed similar activities of large mammals. Most species do not avoid entering plantations, but whether they live in plantations or merely travel through them needs further investigation.

The results of this study show that measures to accelerate and diversify the woody colonization of exotic plantations are needed if they are to fulfill their objective of rehabilitating degraded hillsides. Future reforestation programmes in Hong Kong should take into account the serious drawbacks of creating even-aged monocultures. Hong Kong should make more use of natural succession rather than creating an alien habitat for both plants and wildlife.