

Abstract of thesis entitled

ENRICHING NATIVE FLORISTIC DIVERSITY IN EXOTIC TREE PLANTATION IN HONG KONG

Submitted by

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For the degree of Master of Philosophy
at The University of Hong Kong
in October 2007

The current artificial plantations in Hong Kong have been established since the 1950s and most of them are exotic monocultures. They have been found to be low in natural regeneration and the understoreys are dominated by shrub species. The aims of this research study were to examine the practicality of planting nursery-grown seedlings and direct seeding in enriching plantation understoreys in Hong Kong. The allelopathic potential exerted by the planted exotic tree species on understorey species was also investigated.

Seedlings of four native tree species (*Cyclobalanopsis neglecta*, *Lithocarpus hardlandii*, *Ormosia pachycara* and *Sterculia lanceolata*) were planted in three exotic *Lophostemon confertus* plantations. Except *S. lanceolata*, over 80% of the native species survived after a year. The results show that planting native tree seedlings is a possible method in enriching the understorey diversity of exotic plantations though it is labour intensive and costly. The mortality of *S. lanceolata* was attributed to non-trophic animal damage (uprooting and cutting stem) with variations in sites and seedling sizes. Trophic seedling consumption occurred seasonally (mostly in the dry season) but to a much less serious extent. Non-trophic animal damage was also observed on natural seedlings in the plantation sites. Eurasian Wild Pig and East Asian Porcupine are believed to cause such damage to the seedlings. Non-trophic animal damage appears to be species specific and varies spatially and temporally.

Seven native tree species were sown with two sowing treatments (sown on soil surface or buried) in two *Acacia confusa*, *L. confertus* and mixed plantations respectively. The eventual establishment of *Cyclobalanopsis edithiae*, *C. myrsinifolia*, *C. neglecta* and *Ormosia emarginata* seedlings were satisfactory (43.3-83.3%) and these species have relatively large and hard seed coats. *Choerospondias axillaris*, *Reevesia thyrsoidea* and *S. lanceolata* showed low germinations, which were constrained by seed dormancy, rapid loss of seed viability and seed predation by ants respectively in the plantations. Sowing treatments made no difference on germination and establishment. Direct seeding to enrich plantation understorey is feasible for large-seeded or hard seed-coated species.

Aqueous extracts of fresh leaves, litter and soil from *A. confusa*, *L. confertus* and *Melaleuca quinquenervia* plantations were bioassayed on potential allelopathic influences on germination and growth of the seeds of lettuce and three native understorey woody species. Extracts from all sources inhibited lettuce's germination and root growth, with significantly higher influences in *A. confusa* and fresh leaf extracts. Less apparent inhibitory effects were observed from the growth of native species, except significant inhibition on germination of *Psychotria asiatica* by *A. confusa*.

Enriching exotic monoculture stands in Hong Kong with a combination of planting seedlings and direct seeding will be an optimum strategy in the future. Shade-tolerant tree species that are less vulnerable to non-trophic animal damage and seed predation should be planted either or both as seedlings and seeds. The plantation sites should be subject to a mammal diversity survey for assessing the risk of non-trophic animal damage and seed predation in order to enable the planning of appropriate measures to stop such unfavourable damage to seedlings and seeds.