

POSTER ABSTRACTS

FOREST RESTORATION AND FACILITATING REGROWTH OF EVERGREEN SPECIES IN NORTHERN THAILAND

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Background There is a need to restore dry evergreen forests in northern Thailand. Forest ecologists suggest that a way to restore degraded forestlands is to “accelerate” natural succession. Two approaches are suggested: 1) planting “hardy” pioneer tree species such as acacias, eucalypts and teak (PARROTTA, 1993); 2) planting “framework” species, those capable of both establishing quickly and attracting a variety of seed-dispersing wildlife (GOOSEM & TUCKER, 1995; FOREST RESTORATION RESEARCH UNIT 1998). Still, questions remain as to the degree to which these methods will encourage evergreen regrowth and about the length of time it will take.

Proposed Research To investigate when and under what conditions evergreen species enter the successional sequence in northern Thailand. Information on the recruitment of mature forest species will contribute to efforts to re-establish dry evergreen forests by providing additional insights on the nature of natural succession.

Methodology

- Identify “indicator” dry evergreen forest species
- Select study area – dry evergreen forest vegetation
- Select successional sites with sequential ages (5, 10 , 15 years) – satellite images
- Observe and record indicator species present on various aged successional sites
- Document site conditions (cover, humidity, soil)

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PLANT SUCCESSION AND SPECIES RICHNESS DURING THE REGENERATION OF DEGRADED EVERGREEN BROAD-LEAVED FOREST ON GUANGXI DAMING MOUNTAIN.

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Daming Mountain is located at 23° 10' - 23° 38' N latitude and 108° 10' - 108° 45' E longitude, on the tropic of Cancer. The total area is about 1,100 km². As a result of mankind's economic activities, biodiversity has been destroyed on a large scale on Daming Mountain. Ecological and environmental studies in this area have theoretical and practical significance for the conservation and utilisation of biodiversity, for understanding the laws of plant succession and for developing methods of restoring the degraded forest ecosystem.

The key to the recovery of degraded forest ecosystems is the restoration of species richness and diversity. The process of plant succession and the rate of increase of species richness were studied at two elevations in regenerating degraded evergreen broad-leaved forest on Daming Mountain. In the mid-mountain area, all plant species were recorded within an area of 600 m² in 20-year-old *Cunninghamia lanceolata* plantations, which had been established after controlled burning. In the lower foothills, species were surveyed in a 400 m² area in 20-30 year-old restored forest. The main results were as follows:

1. The rate of increase in species diversity following forest rehabilitation was very different at the two sites. At the mid-mountain site, 178 species were recorded, including 58 species in the tree layer. A forest community consisting of light demanding broad-leaved pioneer trees and semi-shade-tolerant broad-leaved trees regenerated within about 20 years and developed into semi-shade-tolerant evergreen broad-leaved forest in 60-100 years. At the lower site, the rate of increase in species richness was much slower, with only 22 species recorded in the plots in 20-30-year-old restored forest, including only 3 species in the tree layer. *Pinus massoniana* forest in this district was disturbed continually by human actions and had difficulty in recovering, remaining in a relatively stable, but degraded state.

2. Total species richness in regenerating forest ecosystems tended to increase quickly and climaxed in the early stage of recovery (2-20 years), decreased in the mid stage (50-60 years) and remained stable in the late stage (over 150 years).

3. Changes in the density of individuals differed according to the structural layer of the community. In the tree layer, density increased from 1 to 20 years and decreased later. However, shrub density tended to increase continuously during the regeneration of the degraded ecosystem. Density in the herb layer decreased in a non-linear fashion.

Keywords: evergreen broad-leaved forest; species diversity; degraded ecosystem restoration; Daming Mountain

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FACTORS LIMITING REGENERATION OF ABANDONED AGRICULTURAL CLEARINGS IN TROPICAL MONTANE FOREST

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Degraded and fragmented forests can be restored by accelerating tree regeneration through natural succession (accelerated natural regeneration or ANR). In seasonal tropical montane forest in northern Thailand, abandoned agricultural clearings were studied to identify limitations to tree regeneration so that optimal ANR techniques could be devised. Seed dispersal and establishment of tree seedling species were monitored in three clearings. Species were classified into three groups: D, failed to disperse; R, dispersed but failed to recruit seedlings and E, successfully established. Mean seed length of species in each group was $(D=E) > R$. Only species with seeds between 2 and 14 mm established.

The effects of seasonal drought on germination of groups D, R and E and of weed competition on seedling establishment of groups D and E were determined experimentally. Drought tolerance did not explain the recruitment failure in group R. Weed cover improved dry season survival, but decreased rainy season growth, with no difference between groups.

Large-seeded, drought-tolerant species were limited by poor dispersal and may be suitable for direct sowing in cleared areas. Small-seeded and drought-sensitive species were limited by poor recruitment and should be introduced as nursery-raised seedlings. Further research is needed on the timing of weed control in relation to season.

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