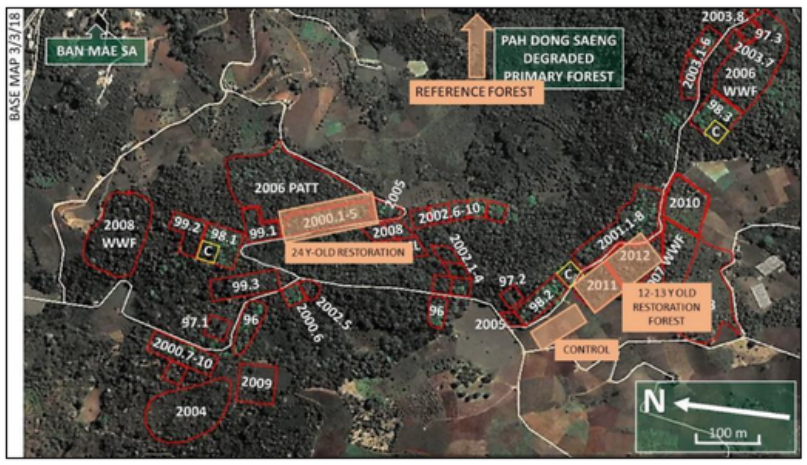
Recovery of Small Mammal Communities During Restoration of Upland Evergreen Forest in Northern Thailand

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Introduction

Chiang Mai University's Forest Restoration Research Unit (FORRU-CMU) has spent over 30 years restoring tropical forest ecosystems using the Framework Species Method (FSM). The technique involves planting 20-30 carefully selected tree species, representative of the reference forest, and caring for them for two or more years (e.g. weeding, applying fertilizer etc.) (FORRU, 2005). While forest restoration is increasingly prioritized for biodiversity conservation, few studies assess its impact on mammal recovery. Restoring seed-dispersing mammals is important, as their return enhances seed dispersal and supports the recovery of ecological functionality. This study tested the hypothesis that the FSM encourages recovery of small mammal communities, when applied to restore upland evergreen forest. Mammal surveys were carried out using automatic camera traps in the upper Mae Sa Valley within Doi Suthep-Pui National Park, Chiang Mai, Thailand.

Methodology



- 4 study habitat: Degraded site (as a control) (CON), 12-year-old forest (R12), 24-year-old forest (R24) & nearest natural forest (as a reference) (REF).
- Installed 4 cameras in each sites. (708 trap nights in REF, 716 in other sites).
- Duration: May to November 2024
- Frequency of Detection (FD) was calculated as "**FD =(E/TN) * 100"** (E = the number of animal encounters, TN = the total number of trap nights).

Results & Discussion

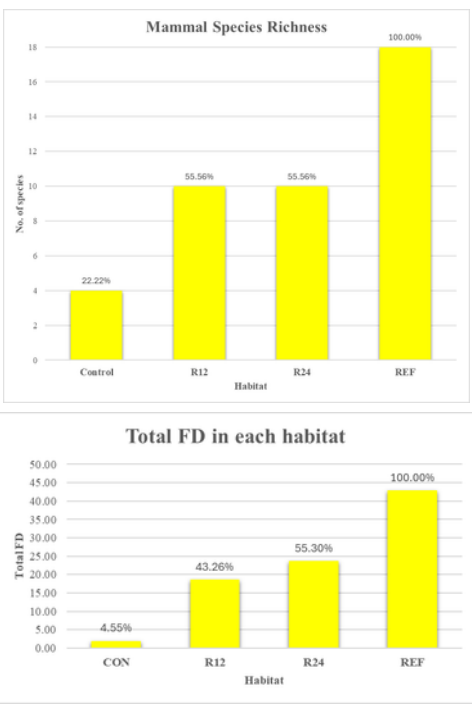


Figure 1-3. Total FD & species richness across all 4 habitats.

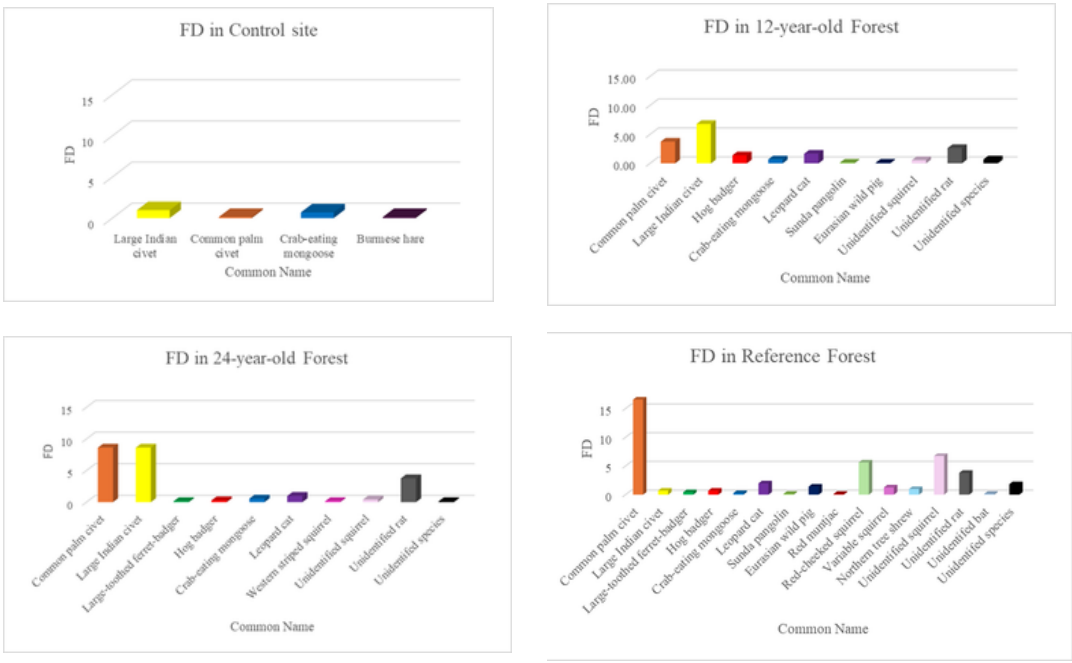


Figure 4-7. FD of mammal species from each habitats.

- Of the 41 tree species recorded in Tun (2025)'s sample plots in R24 only 15 (37%) had been planted; the rest had established naturally, probably via seed dispersal.
- Fruits of 80% of the framework tree species planted in R24 were attractive to seed-dispersing mammals, which might be responsible for the dispersal of 58% of the recruit tree species in the plot. (Dispersal mode of each tree species was determined by reviewing existing literature*).

Main dispersal agent	No. of species	%
Wind	0	0.0
Mammals	4	26.7
Birds	3	20.0
Both mammals & birds	8	53.3
Total no. of mammal-dispersed species	12	80.0
Total no. of species	15	

Main dispersal agent	No. of species	%
Wind	6	23.1
Mammals	5	19.2
Birds	5	19.2
Both mammals & birds	10	38.5
Total no. of mammal-dispersed species	15	57.7
Total no. of species	26	

Table 1&2. Dispersal agents of planted framework tree species (left) & recruit tree species (right) found in R24.





- Common Palm Civet (left) is likely to be the most prolific seed-dispersing mammal (Nakashima et al, 2010) in the area. Large Indian Civet (right) may not disperse seeds as prolifically as the common palm civet as it is mostly carnivorous. (Simcharoen et al, 2020).
- Carnivores like Leopard Cat & Mongoose support forest restoration by controlling the seed predator population (mostly rodents).





Conclusion

- Planting a limited number of trees to attract seed-dispersers of a large number of the tree species.
- FSM promotes seed dispersal into restoration plots by attracting frugivorous mammals.
- FSM promotes recovery of mammal communities and steady recovery of ecological functionality over time.
- Cameras worked well for identification of medium sized mammals but for studies of small mammals (particularly rodents), live trapping might be a better option.
- Civets are critical seed dispersers to support forest ecosystem restoration.

References:

- Forest Restoration Research Unit, 2005. How to Plant a Forest: The Principles and Practice of Restoring Tropical Forests. Compiled by Elliott, S., D. Blakesley, J.F. Maxwell, S, Doust & S. Suwannaratana. Biology Department, Science Faculty, Chiang Mai University, Thailand, 200 pp.
- Nakashima, Yoshihiro & SUKOR, Jumrafiha. 2010. Importance of common palm civets (Paradoxurus hermaphroditus) as a long-distance disperser for large-seeded plants in degraded forests. Tropics, 18. 229. 10.3759/tropics.18.221.
- Simcharoen, Saksit & Simcharoen, Achara & Hasin, Sasitorn & Cuthbert, Francesca & Smith, James. 2020. Diet of the Large Indian Civet (Viverra zibetha L., 1758) in west-central Thailand. 72. 287-293.
- Tun, P.S. 2025. Potential economic value of carbon credits in forest restoration plots in northern Thailand. Bachelor's Thesis, Faculty of Tropical AgriSciences, Czech University of Life Sciences Prague.

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