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

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ABSTRACT

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). While forest restoration is increasingly prioritized for biodiversity conservation, few studies assess its impact on mammal recovery. Restoring seed-dispersing mammals is especially 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 ecosystem in northern Thailand. From May to November 2024, mammal surveys were carried out, using automatic camera traps in the upper Mae Sa Valley within Doi Suthep-Pui National Park, placed in evergreen forest of two different ages (12- and 24-year-old), restored by the FSM; a nearby area of reference forest (disturbed primary evergreen forest) and a control site (degraded area), where no restoration interventions had been implemented. To interpret the results, Frequency of Detection (FD) was calculated, using the same formula as in the Relative Abundance Index (RAI) = (E/TN) * 100, where E is the number of animal encounters and TN is the total number of trap nights. The camera-traps revealed the presence of 20 mammal species across the study area, including the critically endangered Sunda pangolin (*Manis javanica*) in the

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reference forest. The more common species included Common Palm Civet (*Paradoxurus hermaphroditus*), Large Indian Civet (*Viverra zibetha*) and Crab-eating Mongoose (*Herpestes urva*). Mammal activity and species richness in restored plots was around 50% that of reference forest, suggesting steady recovery of ecological functionality. Highest mammal activity was recorded in the reference forest (FD = 42.70) and the lowest in control habitat (FD = 1.94). FD values in 12- and 24-year-old restoration plots were 43% and 55% of the reference forest value, indicating steady increase in mammal activity as restoration progresses. In 24-year-old restoration plot, 63% of the tree species recorded had established naturally via seed dispersal and more than 75% of them were dispersed by mammals and/or birds. The study supports a key principle of the Framework Species Method (FSM): planting a limited number of tree species can attract seed-dispersing mammals and enhance seed dispersal into restoration plots.

Keywords: seed-dispersal, the Framework Species Method, biodiversity recovery, mammal communities, forest restoration, camera trapping, Frequency of Detection.

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