人工林不同疏伐強度作業對無脊椎動物族群及群聚組成之影響

The effects of differential thinning on diversity and community structures of invertebrates in artificial forests

東海大學　生命科學系　林惠真　卓逸民　林仲平

研究計畫中英文摘要：

（一）計畫中文摘要

　　無脊椎動物佔有現今世界上生物多樣性的多數，並且靠著它們與其他物種豐富的互動關係，在食物網中物質及能量的傳遞上扮演了很重要的角色。而且，無脊椎動物對於棲地環境之變化非常敏感，極適合作為指標生物來探討環境變動隊生物多樣性所造成之影響。因此了解不同人工林結構對於無脊椎動物多樣性的影響，是作為森林經營管理重要的參考。本計劃將藉由比較群聚結構及物種組成，探討蓮花池人工林不同疏伐程度，對無脊椎動物（包括十足綱、昆蟲綱、蜘蛛綱汲水生無脊椎動物）多樣性的影響。本計劃將監測及量化在四個不同疏伐程度（0% 、12.5% 、25% 和50% ）的人工林棲地中，無脊椎動物多樣性及微棲地（例如溫度、濕度及光度）的變化。計劃將從94年8月到98年7月，每個月我們將有系統地採集土壤、地表、植被、溪流及樹冠層的無脊椎動物。採集到的標本將予分類、鑑定及建立資料庫。調查時間物種多樣性的改變，將透過分析物種豐富度、物種歧異度、優勢度及棲地相似度來估算並利用多變量分析探討各樣區之微棲地結構、微氣候與其中之無脊椎動物多樣性間之相互關係。預期得到的基本資料將提供台灣中低海拔森林棲地物種多樣性資料庫的建立，所得結果並可以作為發展永續長期經營人工林策略的參考。

（二）計畫英文摘要

　　Invertebrate fauna accounts for the majority of animal diversity in the world, and are important in mediating material and energy flow in a multitude of directions in ecosystems through their richness of interactions with other organisms.　Moreover, invertebrates are very sensitive to the change in habitats, and therefore they are suitable ecological indicators to assess the effects of environmental impacts on biodiversity.　Understanding the effects of various strategies for forest restoration on invertebrate biodiversity plays a central role in long-term management of forests in Taiwan. This study aims to investigate the diversity of invertebrates (i.e., decapods, insects, spiders & aquatic invertebrates) in Lian Hwa Ts,s lowland forests, and to assess the influences of various degree of logging on invertebrate

diversity by comparing the community structure and guild composition of different invertebrate taxa.   We propose to monitor and quantify invertebrate diversity and microhabitat parameters (e.g. temperature, humidity & intensity of light) in four plantation types with 0%, 12.5%, 25% and 50% logging treatments.   We propose to conduct the experiments from August 2005 to July 2009, and once each month we will systematically collect invertebrates from the soil, ground, bush, stream, and canopy of each habitat. Collected invertebrate specimens will be sorted, identified, and databased. Changes in invertebrate diversity during the course of study and among habitat types will be estimated by calculating the species richness, index of dominance, index of diversity (e.g., Shannon-Wiener function), and index of similarity. Multivariate analyses will be used to examine the relationships between microhabitat structure, microclimates and invertebrate diversities. The findings will provide basic information useful for both biodiversity databases of lowland forests in Taiwan, and have the potential of exposing novel, specific methods for plantation management that might be more useful for long-term and sustaining forest management than commonly used strategies today.