

KOMPOSISI, STRUKTUR DAN PERTUMBUHAN TEGAKAN CENDANA (*Santalum album* Linn.) PADA AREA DEMPLOT PENGEMBANGAN CENDANA DI KABUPATEN TIMOR TENGAH SELATAN

Maria Magdalena Minata ¹ Budiadi ² Suryo Hardiwinoto ³

INTISARI

Penelitian ini bertujuan menganalisis komposisi, struktur tegakan, asosiasi vegetasi, dan faktor lingkungan pertumbuhan cendana (*Santalum album* Linn.) di Demplot Pengembangan Cendana, Kabupaten Timor Tengah Selatan, guna menyediakan basis data ilmiah pemulihan spesies hemiparasit terancam punah ini. Kajian difokuskan pada tiga tipe tutupan lahan: sabana, agroforestri, dan hutan alam sekunder. Metode *Stratified Purposive Sampling* digunakan pada 45 petak ukur bertingkat (masing-masing tutupan 15 petak) untuk mengukur nama jenis, tinggi, diameter setinggi dada (DBH), lebar tajuk, dan koordinat pohon. Struktur dan arsitektur tegakan divisualisasikan menggunakan SExI-FS versi 2.1.0. Analisis kuantitatif vegetasi menggunakan INP, Indeks Shannon-Wiener (H'), dan Indeks Similaritas Sorensen. Hubungan asosiasi diuji dengan Korelasi Rank *Spearman*, dan pengaruh iklim mikro diuji dengan Kendall's Tau b.

Hasil menunjukkan cendana mendominasi fase tiang dan sapihan di sabana (INP 175,0% & 169,5%) serta agroforestri (INP 212,6% & 139,6%). Namun, sabana mengalami krisis regenerasi (semai 9,2%) akibat persaingan gulma pecut kuda (*Stachytarpheta jamaicensis*) dengan INP 111,3%, kekeringan, dan kebakaran. Agroforestri menjadi habitat ideal fase awal sampai menengah karena dukungan inang *Fabaceae* (gamal/*Gliricidia sepium*) dan naungan kayu putih (*Melaleuca cajuputi*). Hutan alam sekunder memiliki komunitas paling stabil dan beranekaragaman sedang (H' pohon=2,15; semai=2,09), di mana cendana mampu bersaing di kanopi atas bersama jati (*Tectona grandis*) dan mahoni (*Swietenia mahagoni*). Simulasi SExI-FS mengonfirmasi pola distribusi vegetasi mengelompok yang memicu kompetisi intraspesifik ketat, sehingga diperlukan penjarangan jarak tanam dan pemangkasan tajuk inang cendana untuk mengoptimalkan serapan nutrisi serta transmisi cahaya.

Kata Kunci: Cendana (*Santalum album* Linn.), SExI-FS, Struktur Tegakan, Timor Tengah Selatan

¹ Student at The Departement of Silviculture, Faculty of Forestry, Gadjah Mada University

² Lecture at The Departement of Silviculture, Faculty of Forestry, Gadjah Mada University

COMPOSITION, STAND STRUCTURE, AND GROWTH OF SANDALWOOD (*SANTALUM ALBUM* LINN.) IN THE SANDALWOOD DEVELOPMENT DEMONSTRATION PLOT IN SOUTH CENTRAL TIMOR REGENCY

Maria Magdalena Minata ¹ Budiadi ² Suryo Hardiwinoto ³

ABSTRACT

This study aims to analyze the composition, stand structure, vegetation association, and environmental factors influencing the growth of *sandalwood* (*Santalum album* Linn.) in the Sandalwood Development Demonstration Plot, South Central Timor Regency, to provide a robust scientific database for the recovery of this endangered hemiparasite species. The comprehensive investigation focused on three distinct land cover types: savanna, agroforestry, and secondary natural forest. A stratified purposive sampling method was employed across 45 nested plots (15 plots per land cover type) to measure species names, height, diameter at breast height (DBH), crown radius, and spatial coordinates of trees. Stand structure and architectural projection profiles were spatially visualized using SExI-FS software version 2.1.0. Quantitative vegetation analysis was calculated based on the Important Value Index (IVI), Shannon-Wiener Diversity Index (H'), and Sorensen's Similarity Index. Interspecific associations were analyzed using *Spearman's* Rank Correlation, while the influence of microclimate was tested through the non-parameteretric Kendall's Tau b method.

The results indicated that sandalwood significantly dominated the pole and sapling stages in both savanna (IVI of 175.0% and 169.5%, respectively) and agroforestry (IVI of 212.6% and 139.6%, respectively). However, the savanna ecosystem suffers from a regeneration crisis (seedling IVI of 9.2%) driven by severe competition with *Stachytarpheta jamaicensis*, IVI of 111.3%), extreme drought, and surface fires. Agroforestry represents the most ideal habitat for the early to middle growth stages, supported by the presence of potential host trees from the Fabaceae family (*Gliricidia sepium*) and partial shading from *Melaleuca cajuputi* canopies. The secondary natural forest exhibited the most stable community stratification with moderate diversity (H' trees = 2.15; seedlings = 2.09), where sandalwood successfully coexisted and competed within the upper canopy strata alongside *Tectona grandis* and *Swietenia mahagoni*. SExI-FS simulations confirmed a clumped vegetation distribution pattern that triggers intense intraspecific competition; hence, stand thinning management and host canopy pruning are crucially required to optimize underground nutrient uptake and solar radiation transmission for the sustainable growth of sandalwood.

Keywords: Sandalwood (*Santalum album* Linn.), SExI-FS, Stand Structure, South Central Timor.

¹ Student at The Departement of Silviculture, Faculty of Forestry, Gadjah Mada University

² Lecture at The Departement Forest Management, Faculty of Forestry, Gadjah Mada University