

## INTISARI

Anatomi kelapa sawit berperan penting dalam menentukan kemampuan adaptasi terhadap cekaman lingkungan akibat perubahan iklim. Meskipun demikian, kajian anatomi kelapa sawit pada tingkat progeni masih terbatas. Penelitian ini bertujuan untuk mengetahui perbedaan anatomi akar dan anak daun kelapa sawit progeni DyP Dumpy, D×P Langkat, dan D×P PPKS 540 serta korelasinya dengan transpirasi. Penelitian dilakukan pada kelapa sawit menghasilkan (TM) berumur 13 tahun di demonstrasi plot Kebun Benih Adolina, Sumatera Utara. Pembuatan preparat anatomi dilakukan dengan metode *paraffin-embedding*, sedangkan laju transpirasi harian diukur dengan Heat Ratio Method (HRM). Data dianalisis secara deskriptif, kemudian variabel anatomi dan transpirasi dikorelasikan dengan metode Pearson. Hasil menunjukkan bahwa perbedaan anatomi akar yang khas terletak pada susunan korteks, dimensi stele, jumlah berkas pembuluh akar, dimensi pembuluh xilem akar, dimensi *midrib*, dan dimensi berkas pembuluh *midrib*. Variabel anatomi yang berkorelasi positif dengan transpirasi, antara lain ketebalan korteks, ketebalan endodermis, dimensi stele, ketebalan perisikel, dimensi pembuluh xilem *midrib*, dan densitas berkas pembuluh lamina. Sebaliknya, dimensi pembuluh xilem akar, ketebalan mesofil, ketebalan daun, panjang stomata, dan dimensi berkas pembuluh lamina berkorelasi negatif. Temuan ini menunjukkan adanya perbedaan anatomi kelapa sawit pada tingkat progeni yang berkorelasi kuat dengan laju transpirasi. Hubungan tersebut mengindikasikan bahwa beberapa karakter anatomi dapat digunakan sebagai penanda seleksi tanaman kelapa sawit yang tahan terhadap perubahan iklim.

Kata kunci: akar, anak daun, fisiologi, perubahan iklim, varietas

## ***ABSTRACT***

Oil palm anatomy is a key determinant of its adaptability to environmental stresses driven by climate change. However, anatomical studies of oil palm at the progeny level remain limited. This study investigated anatomical differences in roots and leaflets of three oil palm progenies, including DyP Dumpy, D×P Langkat, and D×P PPKS 540, as well as the correlation between anatomical traits and transpiration rate. The research was conducted on 13-year-old productive plants at the demonstration plot of Adolina Seed Garden, North Sumatra. Anatomical slides were prepared using the paraffin-embedding method, and daily transpiration rate was measured using the Heat Ratio Method (HRM). Descriptive statistics were used to evaluate anatomical variables, and Pearson's correlation assessed their relationship with transpiration. The results showed that distinctive root anatomical differences were observed in cortical arrangement, stele dimension, number of root vascular bundles, xylem vessel diameter of the root, midrib dimension, and midrib vascular bundle size. Anatomical variables positively correlated with transpiration included cortex thickness, endodermis thickness, stele diameter, pericycle thickness, midrib xylem vessel diameter, and vascular bundle density in the lamina. In contrast, root xylem vessel diameter, mesophyll thickness, leaf thickness, stomatal length, and vascular bundle dimension of the lamina were negatively correlated. These findings indicate distinct anatomical variations across oil palm progenies that show a strong correlation with transpiration rate. This relationship suggests that specific anatomical traits can serve as early selection markers for climate resilience.

Keywords: climate change, leaflet, physiology, root, variety