

VARIASI GENETIK DAN ANALISIS FILOGENETIK STROBERI
(*Fragaria* spp.) BERDASARKAN DNA *BARCODING INTERNAL*
TRANSCRIBED SPACER 2 (ITS2) REGION

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INTISARI

Stroberi (*Fragaria* spp.) menjadi buah yang diminati karena kaya nutrisi dan rasa, serta memiliki banyak manfaat. Budidaya stroberi di Indonesia, menawarkan potensi ekonomi yang besar, namun pembudidayaan yang dilakukan belum optimal karena kurangnya informasi tetua unggul dan variasi genetik kultivar stroberi di Indonesia. Variasi genetik pada stroberi menjadi hal yang penting untuk dikaji, karena mempengaruhi sifat dari stroberi yang beragam baik pada morfologi, anatomi, maupun genetik. Identifikasi molekuler menjadi salah satu cara dalam mengatasi kurangnya informasi variasi fenotip antar spesies stroberi, DNA *barcoding* diusulkan sebagai teknik taksonomi molekuler yang andal dalam membantu identifikasi kultivar stroberi. Penelitian ini bertujuan untuk mengidentifikasi variasi genetik berdasarkan DNA *barcode* wilayah *ITS2*, menganalisis rekonstruksi pohon filogenetik melalui pendekatan *Maximum-Likelihood* (ML) dan *Bayesian inference* (BI), serta menganalisis pola distribusi dan persebaran geografis melalui analisis *haplotype network* dan PCoA. Metode yang digunakan pada penelitian ini adalah isolasi DNA, uji kualitatif dan uji kuantitatif, PCR dan *sequencing* berdasarkan *barcode ITS2*, analisis pohon filogenetik berdasarkan pendekatan ML dan BI, serta analisis *variabel sites*, jarak genetik, *haplotype network*, dan PCoA. Hasil analisis menunjukkan 16 sampel berhasil diamplifikasi berdasarkan wilayah *ITS2* dengan 430-478bp, terdapat 187 *polymorphic sites* sampel dengan sampel referensi NCBI. Rekonstruksi filogenetik pendekatan ML dan BI akurat yang divalidasi dengan hasil analisis lainnya (*haplotype network*, *polymorphic sites*, jarak genetik, PCoA) yang sama. Analisis Filogenetik menunjukan hubungan kekerabatan yang erat antara stroberi Indonesia dengan sampel dari Amerika dan Eropa, menunjukkan pola distribusi dan persebaran geografis stroberi di Indonesia berasal dari wilayah Amerika dan Eropa.

Kata kunci: *Bayesian Inference*, DNA *barcoding*, *Fragaria*, *ITS2*, *Maximum-Likelihood*

**GENETIC VARIATION AND PHYLOGENETIC ANALYSIS OF
STRAWBERRY (*Fragaria* spp.) BASED ON DNA BARCODING OF
*INTERNAL TRANSCRIBED SPACER 2 (ITS2) REGION***

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ABSTRACT

Strawberries (*Fragaria* spp.) are a highly favored fruit due to their rich nutritional content and numerous economic benefits. However, the current cultivation practices are not optimal due to a lack of information about superior parentage lines and the high genetic variation among strawberry cultivars in Indonesia. Genetic variation in strawberries is crucial to study because it affects the diverse traits of strawberries, including morphology, anatomy, and genetics. Molecular identification is one way to address the lack of phenotypic variation among strawberry species. DNA barcoding is proposed as a competent molecular taxonomy technique to assist in the identification of strawberry cultivars. The objectives of this study is to identify genetic variations based on *ITS2* region DNA barcode, analyses phylogenetic tree reconstruction using the maximum-likelihood (ML) and Bayesian inference (BI) approaches, and analyze geographic distribution and dispersal patterns by haplotype network and PCoA. The methods were obtained DNA isolation, qualitative and quantitative tests, PCR and sequencing, phylogenetic tree analysis based on ML and BI approaches, and analyses of variable sites, genetic distance, haplotype network, and PCoA. The results showed 16 samples were successfully amplified based on the *ITS2* region with 430-478bp, there were 187 polymorphic sites of samples with NCBI reference samples. The phylogenetic reconstruction based on the ML and BI approaches are accurate and validated by the identical results of further analysis, including the haplotype network, polymorphic sites, genetic distance, and PCoA. The phylogenetic analysis revealed a close evolutionary relationship between Indonesian strawberries and samples from America and Europe, suggesting that the distribution path of strawberries in Indonesia originated from the Americas and Europes.

Keywords: *Bayesian Inference, DNA barcoding, Fragaria, ITS2, Maximum-Likelihood*