Variasi Genetik Kultivar Tebu Unggul (*Saccharum officinarum* L.) Berdasarkan Karakter Morfologis dan Molekuler

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INTISARI

Tebu merupakan salah satu komoditi yang penting dalam sektor komersial karena menyumbang 65% produksi gula di seluruh dunia. Di Indonesia setiap tahunnya, terjadi peningkatan terhadap permintaan tebu di berbagai macam industri, sebagai bahan baku pembuatan gula dan menjadi fokus pemerintah untuk mencapai swasembada gula. Tujuan dari penelitian ini adalah untuk mengetahui variasi genetik kultivar tebu unggul di PT. Gunung Madu Plantations berdasarkan karakter morfologis dan molekuler serta mengetahui hubungan variasi genetik antar keduanya. Analisis karakter morfologis dilakukan dengan metode deskriptif, dendogram hubungan kekerabatan fenetik dan *Principal Component Analysis* (PCA), sedangkan karakter molekuler dilakukan dengan menggunakan lima primer penanda *Random Amplified Polymorphic DNA* (RAPD) meliputi analisis polimorfisme dan nilai *Polymorphic Information Content* (PIC). Dendogram hubungan kekerabatan fenetik dikonstruksi menggunakan metode pengklasteran UPGMA (*Unweighted Pair-Group With Arithmetic Average*) dan *Gower's General Similarity Coefficient*. Hasil penelitian terhadap 15 kultivar tebu menunjukkan adanya variasi morfologis pada hampir semua karakter yang diamati yaitu variasi morfologis daun, pelepah daun, ruas, batang, mata tunas dan agronomis. PCA menunjukkan bahwa total variasi pada aksis I berkontribusi sebesar 27,62% variasi dari 37 karakter morfologis yang digunakan, dengan eigen value sebesar 0,25; sedangkan aksis 2 sebesar 17,9% dengan eigen value 0,16. Penanda RAPD menghasilkan rata-rata persentase polimorfisme sebesar 87,7%, dengan persentase berkisar antara 84,6% hingga 93,7%. Nilai *Polymorphic Information Content* (PIC) setiap primer berkisar antara 0,24 hingga 0,34. Hasil analisis variasi genetik kultivar tebu pada penelitian ini dapat menjadi dasar dalam karakterisasi plasma nuftah tebu yang ada di PT. GMP dan memberikan informasi tentang seleksi pada program pemuliaan tebu ke depan.

Kata Kunci: Tebu, Variasi Genetik, Morfologis, Molekuler.

Genetic Variation of Superior Sugarcane (*Saccharum officinarum* L.) Cultivars Based on Morphological and Molecular Characters

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ABSTRACT

Sugarcane is one of the important commodities in the commercial sector because it accounts for 65% of sugar production worldwide. In Indonesia every year, there is an increase in the demand for sugar cane in various industries as a raw material for making sugar and as the focus of the government to achieve sugar self-sufficiency. The purpose of this study was to determine the genetic variation of superior sugarcane cultivars from crosses at PT. Gunung Madu Plantations based on morphological and molecular characteristics as well as to know the genetic variation between the two. Analysis of genetic variation of morphological characters was carried out using descriptive methods, dendograms of phenetic kinship relationships and Principal Component Analysis (PCA). Meanwhile, the molecular characteristics were performed using five Random Amplified Polymorphic DNA (RAPD) marker primers, including polymorphism analysis and Polymorphic Information Content (PIC) values. The dendogram of phenetic kinship relationships was constructed using the UPGMA (Unweighted Pair-Group With Arithmetic Average) clustering method and Gower's General Similarity Coefficient. The results of the research on 15 sugarcane cultivars showed that there were morphological variations in almost all the observed characters, namely morphological variations of leaves, leaf midrib, internodes, stems, buds, and agronomic. PCA showed that the total variation on axis I contributed 27.62% to the variation of the 37 morphological characters used, with an eigen value of 0.25; while axis 2 is 17.9% with an eigen value of 0.16. The RAPD marker produced an average polymorphism percentage of 87.7%, with percentages ranging from 84.6% to 93.7%. The Polymorphic Information Content (PIC) value of each primer ranged from 0.24 to 0.34. The results of the analysis of genetic variation of sugarcane cultivars in this study can be used as the basis for the characterization of sugarcane germplasm in PT. GMP and provide information on selection in future sugarcane breeding programs.

Keywords: Sugarcane, Genetic Variations, Morphological, Molecular.