Keragaman dan Hubungan Kekerabatan Kultivar Talas (*Colocasia* spp.) di Kalimantan berdasarkan karakter Morfologis, Anatomis dan Molekular

Intisari

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Talas (*Colocasia* spp.) terutama *Colocasia esculenta* (L.) Schott merupakan salah satu tanaman pangan berumbi yang tersebar dan dibudidayakan secara luas di daerah tropis dan sub tropis termasuk di Kalimantan. Talas mempunyai peranan penting di dunia karena memiliki kandungan karbohidrat yang cukup tinggi, memiliki potensi sebagai bahan kosmetik dan sebagai tanaman obat tradisional. Namun informasi mengenai keragaman dan hubungan kekerabatan talas terutama di Kalimantan masih sangat terbatas. Penelitian ini bertujuan untuk mengetahui keragaman dan hubungan kekerabatan kultivar talas di Kalimantan berdasarkan karakter morfologis, anatomis dan molekular. Pengambilan sampel penelitian dilakukan di 25 kabupaten dan kota di Propinsi Kalimantan Timur, Kalimantan Tengah, Kalimantan Utara, Kalimantan Selatan dan Kalimantan Barat.

Data morfologis diperoleh berdasarkan pengamatan lapangan dan di laboratorium. Identifikasi, pembuatan deskripsi dan analisis keserupaan fenetik dilakukan berdasarkan 39 karakter morfologis. Data anatomis diperoleh melalui pengamatan preparat permanen dan preparat sayatan segar dari organ daun, tangkai daun, dan akar. Analisis data molekular menggunakan penanda *Random Amplified Polymorphism DNA* (RAPD) dengan 12 primer dan sekuen daerah *Internal Transcribed Spacer* (ITS)-rDNA menggunakan ITS-5 sebagai primer *forward* dan ITS-4 sebagai primer *reversed*. Analisis data fenetik ditampilkan dengan menggunakan metode UPGMA (U*nweighted Pairgroup Method with Arithmetic Average*) dengan perangkat MVSP versi 3.1 pc. Analisis data filogenetik menggunakan sekuen daerah ITS-rDNA dan pembentukan pohon filogenetik menggunakan metode *Neighbour Joining* (NJ) yang terdapat dalam perangkat MEGA7. Hasil penelitian diharapkan dapat memberikan informasi tentang keragaman dan hubungan kekerabatan kultivar talas di Kalimantan berdasarkan karakter morfologis, anatomis dan molekular.

Hasil analisis karakter morfologis menunjukkan bahwa talas di Kalimantan terdiri dari spesies *Colocasia* sp., *Colocasia esculenta* dan *Colocasia affinis*. Dendogram karakter morfologis menghasilkan dua klaster utama talas di Kalimantan dengan indeks similaritas mencapai 61,5-97,4%. Karakter morfologis yang paling penting dalam pengelompokan aksesi talas terdapat pada daun dan sangat dipengaruhi oleh karakter warna. Spesies *C.esculenta* terdiri dari dua varietas *C. esculenta* var. *esculenta* dan *C.esculenta* var. *antiquorum* serta memiliki kultivar yang sangat beragam. Karakter anatomis talas menunjukkan

modifikasi epidermis daun membentuk papila kecuali aksesi KB-90 dan KB-116. Talas di Kalimantan memiliki tingkat polimorfisme yang tinggi, mencapai 97% berdasarkan analisis karakter molekular RAPD. Nilai similaritas aksesi talas berdasarkan karakter molekular RAPD berkisar antara 68,8%-94,3%. Berdasarkan analisis sekuen daerah ITS-rDNA menghasilkan pohon filogenetik dengan dua cabang utama. Cabang I terdiri dari 35 aksesi talas yang merupakan spesies *C. esculenta, C.affinis,C. esculenta* var. *antiquorum, Colocasia* sp. dan cabang II terdiri dari satu aksesi KB-96 yang merupakan talas budidaya. Kedua cabang terpisah dengan jarak genetik tinggi mencapai 0,28. Diketahui bahwa *C. esculenta* lebih berkerabat dekat dengan *Remusatia* dibandingkan *Alocasia*.

Kata kunci : *Colocasia*, kultivar, fenetik, kekerabatan filogenetik

Diversity and Relationship of Cultivar Taro (*Colocasia* spp.) in Borneo Based on Morphological, Anatomical and Moleculer Character

Abstract

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Taro (*Colocasia* spp.*)* especially *Colocasia esculenta* (L.) Schott, is one of the crops plant that scattered and widely cultivated in the tropics and sub-tropics regions including Borneo Island. Taro has an important role in the world because it has a relatively rich of carbohydrates and potential as an ingredient of cosmetics and traditional medicinal plants. However, information about the diversity and similarity analysis of taro especially in Kalimantan are still very limited. This study aims to determined the diversity and similarity analysis between taro cultivar in Borneo based on morphological, anatomical and moleculer characters. Sampling was carried out in twenty five region and district in East Borneo, Central Borneo, North Borneo, South Borneo and West Borneo.

Morphological data are obtained through observation and measurement taro samples in the field and laboratory. Identification, description and phenetic similarity analysis are done based on 39 morphology characters. Anatomical characters based on observation of permanent preparation that include leaf, petiole, corms, and root. Molecular marker approach is conducted using *Random Amplified Polymorphism DNA* (RAPD) with 12 primers and sequenced region *Internal Transcribed Spacer* (ITS) with ITS-5 as a *forward* primer and ITS-4 as a *reversed* primer. Phenetic data analysis is determined using U*nweighted Pairgroup Method with Arithmetic Average* (UPGMA) method with MVSP versi 3.1 pc. Phylogenetic approach is done using a sequence of ITS regions. The phylogenetic tree is constructed by the *Neighbour Joining* (NJ) in MEGA7 device. The results of this study are expected to give information about the diversity and genetic relationship cultivar of taro in Borneo based on morphological, anatomical and moleculer characters.

Based on the research morphological character taro in Borneo were consist of *Colocasia* sp., *Colocasia esculenta* and *C. affinis*. Dendogram show that two major cluster of taro in Borneo with similarity index 61,5-97,4%. The most important morphological character in grouping taro accessions are found in leaves and strongly influenced by colour characters. *C. esculenta* species consists of two varieties *C. esculenta* var. *esculenta* and *C.esculenta* var. *antiquorum* and have variable cultivar. The results of anatomical characteristic showed that most accessions of taro were modified on the leaf surface of epidermis in form of undulatus except KB-90 and KB-116. Based on molecular RAPD marker taro in Borneo showed that are higly polimorfisme degree reach 97%. Genetic similarity based on RAPD range 68,8%-94,3%. Based on molecular ITS-rDNA marker

produced phylogenetic tree with two main branch. The first branch consist of 35 accessions which are *C. esculenta*, *C.affinis*, *C. esculenta* var. *antiquorum*, *Colocasia* sp. and second branch is KB-96 which is cultivated taro. The branches have genetic distance reach of 0,28. *C. esculenta* more closely related with *Remusatia* than *Alocasia*.

Keywords : *Colocasia*, cultivated variety, phenetic, phylogenetic relationship