# VARIASI GENETIK DAN KLASIFIKASI INTRASPESIES
## *Begonia longifolia* Blume DI INDONESIA BERDASARKAN KARAKTER MORFOLOGIS DAN MOLEKULER

Wahyu Dewi Astuti Ningrum (17/421597/PBI/1525)

## ABSTRAK

*Begonia longifolia* Blume adalah tumbuhan anggota suku Begoniaceae dari *section Sphenanthera* yang memiliki sebaran geografis terluas di Asia, termasuk Indonesia. Penelitian ini bertujuan untuk mempelajari variasi genetik berdasarkan karakter morfologis dan molekuler, hubungan kekerabatan fenetik dan filogenetik, serta klasifikasi intraspesies *B. longifolia* di Indonesia. Spesimen hidup berasal dari Lampung (Sumatera) dan Sukabumi (Jawa), koleksi Kebun Raya Bogor-LIPI dan dari Purwokerto (Jawa); Buleleng, Gianyar, Jembrana, Tabanan (Bali) dan Lombok Timur (Lombok), koleksi Kebun Raya "Eka Karya" Bali-LIPI. Data morfologis diamati berdasarkan deskriptor genus *Begonia* dari Kementrian Pertanian Republik Indonesia dengan modifikasi. Analisis kekerabatan fenetik menggunakan *software MVSP* dengan metode c*lustering* UPGMA berdasarkan *Pearson Coefficient,* dilengkapi dengan *Principal Component Analysis* (PCA). Data molekuler berupa sekuen ITS-rDNA dilakukan *alignment* dengan *software Mesquite.* Rekonstruksi pohon filogenetik menggunakan *software MEGA7* dengan metode *Neighboor Joining,* model substitusi *Kimura-2-Parameter* pada 1000 *bootstrap.* Hasil penelitian menunjukkan bahwa secara morfologis terdapat variasi yang tinggi dalam hal warna batang, warna tangkai dan pertulangan daun, varigasi pada daun dan tepi daun. Sekuen ITS-rDNA menunjukkan variasi dengan jarak genetik 0-1,6 %. Analisis fenetik menunjukkan 2 klaster utama yaitu klaster 1 (Tabanan 1, Lombok, Jembrana 1, Gianyar 2, Buleleng 2, Gianyar 1, Buleleng 1, Tabanan 2 dan Purwokerto) dan klaster 2 (Sukabumi, Jembrana 2 dan Lampung). Analisis filogenetik menunjukkan 6 *sub-clade* yaitu *sub-clade* A (Lampung, Purwokerto dan Sukabumi), *sub-clade* B (Tabanan 1, Buleleng 1 dan Buleleng 2), *sub-clade* C (Gianyar 2 dan Lombok), *sub-clade* D (Jembrana 2), *sub-clade* E (Tabanan 2 dan Jembrana 1), *sub-clade* F (Gianyar 1). Terdapat kecenderungan bahwa aksesi Lampung, Sukabumi dan Purwokerto memisah dengan aksesi Bali dan Lombok, sehingga dapat dikelompokkan menjadi 2 grup yaitu grup Sumatera Jawa dan grup Bali Lombok.

**Kata kunci:** *Begonia longifolia,* morfologis, rDNA-ITS, intraspesies

# GENETIC VARIATION AND INTRASPESIFIC CLASSIFICATION OF
# *Begonia longifolia* Blume IN INDONESIA BASED ON MORPHOLOGICAL
# AND MOLECULAR CHARACTERS

Wahyu Dewi Astuti Ningrum (17/421597/PBI/1525)

## ABSTRACT

*Begonia longifolia* Blume is a member of the Begoniaceae family which has the widest distribution in Asia including Indonesia. This research aimed to study genetic variation based on morphological and molecular characters, phenetic and phylogenetic relationships, and the intraspecific classification of *B. longifolia* in Indonesia. Living specimens were from Lampung (Sumatera) and Sukabumi (Jawa), collection of the Bogor Botanic Garden-Indonesian Institute of Science, and from Purwokerto (Jawa), Buleleng, Gianyar, Jembrana, Tabanan (Bali) and Lombok Timur (Lombok) , collection of the Bali Botanic Garden-Indonesian Institute of Sciences. Morphological data were observed based on *Begonia* descriptors from the Ministry of Agriculture of Indonesia with modification. Analysis of phenetic relationships was performed using *MVSP* software with the UPGMA clustering method based on the Pearson Coefficient, equipped with Principal Component Analysis (PCA). Molecular data in the form of nrDNA-ITS sequences were aligned using *Mesquite* software. Phylogenetic tree was reconstructed by MEGA7 software using Neighbor Joining method with the Kimura-2-parameter substitution model at 1000 bootstrap. The results showed that morphologically, there were high variations in the color of the stem, petiole and leaf veins, variegation on the upper surface of the leaf, leaf tip and leaf edges. The nrDNA-ITS sequence showed variations with a genetic distance of 0-1.6%. Phenetic analysis showed 2 main clusters, i.e. cluster 1 (Tabanan 1, Lombok, Jembrana 1, Gianyar 2, Buleleng 2, Gianyar 1, Buleleng 1, Tabanan 2 and Purwokerto) and cluster 2 (Sukabumi, Jembrana 2 and Lampung). Phylogenetic analysis showed 6 sub-clades, i.e. sub-clade A (Lampung, Purwokerto and Sukabumi), sub-clade B (Tabanan 1, Buleleng 1 and Buleleng 2), sub-clade C (Gianyar 2 and Lombok), sub-clade D (Jembrana 2), sub-clade E (Tabanan 2 and Jembrana 1), sub-clade F (Gianyar 1). There was a trend that accessions of Lampung, Sukabumi and Purwokerto separate from accessions of Bali and Lombok, therefore it could be divided into 2 groups, group Sumatera Jawa and group Bali Lombok.

**Key Words:** *Begonia longifolia,* morphology, nrDNA-ITS, intraspecific