

## DAFTAR PUSTAKA

- Ahmed, N.A., J.-I.Park, H.-J. Joung, Y. Hur & I.-S. Nou. 2014. Anthocyanin biosynthesis for cold and freezing stress tolerance and desirable color in *Brassica rapa*. *Funct. Integr. Genomics*. 16: 383–394.
- Agren, J. & D.W. Schemske. 1991. Pollination by Deceit in a Neotropical Monoecious Herb, *Begonia involucrata*. *Biotropica*. 23(3): 235–241.
- Allis C.D., M.-L. Caparros, T. Jenuwein, D. Reinberg. 2007. (ed.): *Epigenetics*. Cold Spring Harbor Lab. Press, New York. p.408.
- Andrew. R.L., I.R. Wallis, C.E. Harwood & W.J. Foley. 2010. Genetics and environmental contributions to variation and population divergence in a broad-spectrum foliar defence of *Eucalyptus tricarpa*. *Annals of Botany*. 105: 707–717.
- Backes G, B. Hatz, A. Jahoor & G. Fischbeck. 2003. RFLP diversity within and between major groups of barley in Europe. *Plant Breeding*. 122: 291– 299.
- Beaumont, M.A., K. M. Ibrahim, P. Boursot & M.W. Bruford. 1998. *Measuring Genetic Distance. Molecular Tools for Screening Biodiversity*. Edited by A. Karp, P. G. Isaac & D. S. Ingram. Chapman & Hall, London. Chapter 17.1. pp. 315–325.
- Cheng, T., C. Xu, L. Lei, C. Li, Y. Zhang, & S. Zhou. 2016. Barcoding the kingdom Plantae: new PCR primers for ITS regions of plants with improved universality and specificity. *Molecular Ecology Resources*. 16: 138–149.
- Daryono, B. S., & Natsuaki, K. T. 2002. Application of Random Amplified Polymorphic DNA Markers for Detection of Resistant Cultivars of Melon (*Cucumis melo*) against Cucurbitaceae Viruses. *Acta Horticulturae*. (588): 321–329.
- Davis, P.H. & V.H. Heywood. 1963. *Principles of Angiosperm Taxonomy*. Van Nostrand Co.. Princeton, N.J.
- Davis, J.I. & A.J. Gilmartin. 1985. Morphological Variation and Speciation. *Systematic Botany*. 10(4): 417–425.
- de Schepper, S., P. Debergh, E. van Bockstaele, M. de Loose, A. Gerats & A. Depicker. 2003. Genetic and epigenetic aspects of somaclonal variation: flower colour bud sports in *Azalea*, a case study. *South African Journal of Botany*. 69(2): 117–128.

- des Roches, S., D.M. Post, N.E. Turley, J.K. Bailey, A.P. Hendry, M.T. Kinnison, J.A. Schweitzer & E.P. Palkovacs. 2018. The ecological importance of intraspecific variation. *Nat Ecol Evol.* 2:57–64.
- Dewitte, A., T. Eeckhaut, J. Van Huylenbroeck & E. Van Bockstaele. 2010. Induction of unreduced pollen by trifluralin and N<sub>2</sub>O treatments. *Euphytica.* 171 (2): 283-293.
- Dharmayanti, N.L.P.I. 2011. Filogenetika Molekuler: Metode Taksonomi Organisme Berdasarkan Sejarah Evolusi. *Wartazoa.* 21(1) : 1-10.
- Ding, Y.F & W. Zhang. 2017. *Cultivation and Appreciation of Wild Begonia.* Phoenix Science Press. China.
- Doorenbos, J., M.S.M. Sosef & J.J.F.E. de Wilde. 1998. *The sections of Begonia, including descriptions, keys and species lists.* Leiden: Backhuys Publishers.
- Edger, P.P., M. Tang, K.A.Bird, D.R. Mayfield, G. Conant, K. Mummenhoff, M.A.Koch & J.C. Pires. 2014. Secondary Structure Analyses of the Nuclear rRNA Internal Transcribed Spacers and Assessment of Its Phylogenetic Utility across the Brassicaceae (Mustards). *PLOS One.* 9 (7): 1-7.
- Encyclopedia of Life, 2018. <https://eol.org/pages/2879561/names> diakses pada 14 Januari 2019.
- Forrest, L.L. & P.M. Hollingsworth. 2003. A recircumscription of *Begonia* based on nuclear ribosomal sequences. *Plant Syst. Evol.* 241: 193–211.
- Gilmartin, A.J. 1974. Variation within populations and classification. *Taxon* 23: 523-536.
- Girmansyah, D. 2008. Keanekaragaman Jenis *Begonia* (*Begoniaceae*) Liar Di Jawa Barat. *Berita Biologi.* 9(2):195-203.
- Girmansyah, D. 2009. A taxonomic study of Bali and Lombok *Begonia* (*Begoniaceae*). *Reinwardtia* 12 (5): 419-434.
- Girmansyah, D., H. Wiriadinata, D. C. Thomas & W.S. Hoover. 2009. Two New Species and One New Subspecies of *Begonia* (*Begoniaceae*) From Southeast Sulawesi, Sulawesi, Indonesia. *Reinwardtia.* 13(1): 69 – 74.
- Gould, K.S., D.A.Dudle, & H.S. Neifeld. 2010. Why some stems are red: cauline anthocyanins shield photosystem II against high light stress. *Journal of Experimental Botany.* 61(10): 2707-2717

- Govaerts, R. & M.J.S. Sands. 2018<sup>a</sup>. *World Checklist of Begoniaceae*. Facilitated by the Royal Botanic Gardens, Kew. <http://www.theplantlist.org/1.1/browse/A/Begoniaceae/>. Diakses pada tanggal 9 November 2018.
- Govaerts, R. & M.J.S. Sands. 2018<sup>b</sup>. *World Checklist of Begoniaceae*. Facilitated by the Royal Botanic Gardens, Kew. [https://wcsp.science.kew.org/namedetail.do?name\\_id=362166](https://wcsp.science.kew.org/namedetail.do?name_id=362166). Diakses pada tanggal 15 November 2018.
- Govaerts, R. & M.J.S. Sands. 2018<sup>c</sup>. *World Checklist of Begoniaceae*. Facilitated by the Royal Botanic Gardens, Kew. [https://wcsp.science.kew.org/synonymy.do?jsessionid=DBB6BD38B66AC373F54E67FB90712722.kppapp05-wcsp?name\\_id=362166](https://wcsp.science.kew.org/synonymy.do?jsessionid=DBB6BD38B66AC373F54E67FB90712722.kppapp05-wcsp?name_id=362166). Diakses pada tanggal 9 November 2018.
- Grant, V. 1981. *Plant Speciation*. 2nd edn. Columbia University Press, New York.
- Hamby, R.K. & E.A. Zimmer, 1992. *Ribosomal RNA as a phylogenetic tool in plant systematics*. In: Soltis PS, Soltis DE, Doyle JJ [eds] *Molecular systematics of plants*. Chapman and Hall, New York, pp. 50-91.
- Hara, N. 1957. Studi of the variegated leaves with special reference to those caused by air spaces. *Japanese journal of botany*.16:86-101.
- Hartutiningsih, M.S. & M. Siregar. 2013. Seratus Jenis Begonia Eksotik Kebun Raya Siap Bersaing Mendukung Bisnis Florikultura di Masa yang Akan Datang. *Prosiding Seminar Inovasi Florikultura Nasional*. pp. 79-96.
- Hughes, M. 2002. *Population structure and speciation in Begonia* L. PhD thesis, University of Glasgow.
- Hughes, M. & P.M. Hollingsworth, 2008. Population genetic divergence corresponds with species level biodiversity patterns in the large genus *Begonia*. *Molecular ecology*.17 (11): 2643-2651.
- Hughes, M. & D. Girmansyah. 2011. A revision of *Begonia* sect. *Sphenanthera* (Hassk.) Warb. (Begoniaceae) from Sumatra. *Gard. Bull. Singapore*. 62 (2): 239-251.
- Hughes, M., Moonlight, P.W., Jara-Muñoz, A., Tebbitt, M.C., Wilson, H.P. & Pullan, M. 2015. *Begonia Resource Centre*. Online database available from <http://padme.rbge.org.uk/begonia/> (diakses pada 29 Oktober 2019).**
- Hughes, N.M.,T.C. Vogelmann & W.K. Smith. 2008. Optical effects of abaxial anthocyanin

- on absorption of red wavelengths by understorey species: revisiting the backscatter hypothesis. *Journal of Experimental Botany*. 59(12): 3435-3442.
- Jain, J.R., B. Timsina, K.B. Satyani & S.H. Manohari. 2017. A comparative assessment of morphological and molecular diversity among *Sechium edule* (Jacq.) Sw. accessions in India. *Biotech*.7(106): 1-8.
- Junker, L.V. & I. Ensminger. 2016. Relationship between leaf optical properties, chlorophyll fluorescence and pigment changes in senescing *Acer saccharum* leaves. *Tree Physiology*. 36(6): 694–711.
- Kato, S., H. Sakayama, S. Sano, F. Kasai, M.M. Watanabe, J. Tanaka & H. Nozaki. 2008. Morphological variation and intraspecific phylogeny of the ubiquitous species *Chara braunii* (Charales, Charophyceae) in Japan. *Phycologia*. 47(2): 191-202.
- Kebun Raya Bali. 2018<sup>a</sup>. *Sejarah*. <http://www.kebunrayabali.com/sejarah.html>. Diakses pada tanggal 17 Oktober 2018.
- Kebun Raya Bali. 2018<sup>b</sup>. *Perkembangan Koleksi 2018*. <http://www.kebunrayabali.com/perkembangan-koleksi.html>. Diakses pada tanggal 17 Oktober 2018.
- Kebun Raya Bali. 2018<sup>c</sup>. *Penelitian*. <http://www.kebunrayabali.com/penelitian.html>. Diakses pada tanggal 17 Oktober 2018.
- Kebun Raya Bogor. 2019<sup>a</sup>. *Sejarah Kebun Raya Bogor*. <http://krbogor.lipi.go.id/id/Sejarah-Kebun-Raya-Bogor.html>. Diakses pada tanggal 6 Oktober 2019.
- Kebun Raya Bogor. 2019<sup>b</sup>. *Jumlah Koleksi Kebun Raya Bogor*. <http://krbogor.lipi.go.id/id/Jumlah-Koleksi-Kebun-Raya-Bogor.html>. Diakses pada tanggal 6 Oktober 2019.
- Kementrian Pertanian Republik Indonesia. 2014. Panduan Pelaksanaan Uji (PPU) BUSS Kebaruan, Keunikan, Keseragaman dan Kestabilan. Hal. 7-19
- Khoo. H.E., A. Azlan, S.T. Tang & S.M. Lim. 2017. Anthocyanidins and anthocyanins: colored pigments as food, pharmaceutical ingredients, and the potential health benefits. *Food Nutr Res*. 61(1): 1361779.
- Kitamura, S. 1956. Compositae Japonicae, *Pars Quinta. Mem. Coll. Sci. Univ. Kyoto, Ser. B Biol.*. 23: 116-123.
- Kovach WL. 2007. MVSP-A Multivariate Statistical Package, 3.1. Kovach Computing Services, Pentraeth, Wales

- Lashermes, P., M.C.Combes, P. Trouslot & A. Charrier. 1997. Phylogenetic relationships of coffee-tree species (*Coffea* L.) as inferred from ITS sequences of nuclear ribosomal DNA. *Theor Appl Genet.* 94:947-955.
- Lawrence, G.H.M., 1958. *Taxonomy of Vascular Plants*. The Macmillan Company, USA, pp. 53-57.
- Le Corff, J., J. Ågren & D.W. Schemske. 1998. Floral display, pollinator discrimination, and female reproductive success in two monoecious *Begonia* species. *Ecology.* 79:1610-1619.
- Li-juan, J. & S. Yu-Min. 2013. Evaluating Candidate DNA Barcodes among Chinese *Begonia* (Begoniaceae) Species. *Plant Diversity and Resources.* 35 (6): 715-724.
- Maddison, W. P. & Maddison, D.R. 2017. Mesquite: a modular system for evolutionary analysis. Ver 3.31. <http://mesquiteproject.org>.
- Matolweni, L.O., K. Balkwill & T. McLellan. 2000. Genetic diversity and gene flow in the morphologically variable, rare endemics *Begonia dregei* and *Begonia homonyma* (Begoniaceae). *American Journal of Botany.* 87:431-439.
- Matthies, D., B. Schmid & P. Schmid-Hempel. 1995. The importance of population processes for the maintenance of biological diversity. *GAIA.* 4:199-209.
- Mauro, D.S. & A. Agorreta, 2010. Molecular Systematics: A Synthesis of The Common Methods and The State of Knowledge. *Cellular & Molecular Biology Letters.* 15: 311-341.
- May, R., S.Warner & A. Wingler. 2017. Classification of intra-specific variation in plant functional strategies reveals adaptation to climate. *Annals of Botany.* 119: 1343–1352.
- McLellan, T & N.G. Dengler. 1995. Pattern and Form in Repeated Elements in the Development of Simple Leaves of *Begonia dregei*. *International Journal of Plant Sciences.* 156 (5):581-589.
- Murwanto, A.G. 2008. Pentingnya Analisis Genetik dengan Menggunakan Metode Randomly Amplified Polymorphic DNA (RAPD) untuk Konservasi Genetik Rusa Timur (*Cervus timorensis*) di Papua. *Jurnal Ilmu Peternakan.* 3(2):72-83.
- Neale, S., W. Goodall-Copestake & C.A. Kidner. 2006. *The Evolution of Diversity in Begonia*. In book: Floriculture, Ornamental and Plant Biotechnology:

- Advances and Topical Issues*. Chapter: 69. Publisher: Global Science Books. pp.606-611.
- Nei, M. & S. Kumar. 2000. *Molecular Evolution and Phylogenetics*. Oxford University Press. New York. pp: 119-120.
- Nei, M. 1996. Phylogenetic Analysis in Molecular Evolutionary Genetics. *Annual Review of Genetics*. 30(1): 371–403.
- Nilsson, R.H., E. Kristiansson, M. Ryberg, N. Hallenberg & K.H. Larsson. 2008. Intraspecific ITS Variability in the Kingdom Fungi as Expressed in the International Sequence Databases and Its Implications for Molecular Species Identification. *Evolutionary Bioinformatics*. 4: 193–20.
- Ondimu, S. & H. Murase. 2008. Water stress detection in Sunagoke moss (*Racomitrium canescens*) using combined thermal infrared and visible light imaging techniques. *Biosystems Engineering*. 100(1): 413.
- Pagola, M., R. Ortiz, I. Irigoyen, H. Bustince, E. Barrenechea, P. AparicioTejo, C. Lamsfus & B. Lasa. 2009. New method to assess barley nitrogen nutrition status based on image colour analysis, Comparison with SPAD-502. *Computers and Electronics in Agriculture*. 65(2) 213218.
- Pudjoarinto, A., Santosa & I. Sumardi. 1993. *Botani*. Departemen Pendidikan dan Kebudayaan. Jakarta.
- Purnomo, D.W., M. Magandhi, F. Kuswantoro, R.A. Risna & J.R. Witono. 2015. Pengembangan koleksi tumbuhan Kebun Raya Daerah dalam kerangka strategi konservasi tumbuhan di Indonesia. *Buletin Kebun Raya*. 18 (2): 111-124.
- Purnomo, L.N. Faizah & B.S. Daryono. 2017<sup>a</sup>. Variability and Intraspecific Classification of Gembili (*Dioscorea esculenta* (lour.) Burk.) Based on Morphological Characters. *Sabrao J. Breed. Genet.*. 49 (1): 1-8.
- Purnomo, B.S. Daryono & H. Shiwachi. 2017<sup>b</sup>. Phylogenetic Relationship of Indonesian Water Yam (*Dioscorea alata* L.) Cultivars Based on DNA Marker Using ITS-rDNA Analysis. *Journal of Agricultural Science*. 9 (2):154-161
- Pusat PVTPP. 2018. *Daftar Varietas Hasil Pemuliaan Terdaftar*. <http://pvtp.p.setjen.pertanian.go.id/cms2017/informasi-publik/daftar-varietas-hasil-pemuliaan-terdaftar-pdf/>. Diakses pada tanggal 25 November 2018.
- Rajbhandary, S. 2013. Traditional uses of *Begonia* species (*Begoniaceae*) in Nepal. *J. Nat. His. Mus*. 27: 25-34.



- Rao, V.R. & T. Hodgkin. 2002. Genetic diversity and conservation and utilization of plant genetic resources. *Plant Cell, Tissue and Organ Culture*. 68: 1-19.
- Saitou, N. and Nei, M. 1987. The Neighbor-joining method: a new method for reconstructing phylogenetic trees. *Mol. Biol. Evol.* 4(4): 406-425.
- Schaberg P.G., A.K. van den Berg, P.F. Murakami, J.B. Shane. J.R. Donnelly. 2003. Factors influencing red expression in autumn foliage of sugar maple trees. *Tree Physiol.* 23:325–333.
- Schagerl, M, D. Angeler & A. Coleman. 1999. Intraspecific phylogeny of *Pandorina morum* (Volvocales, Chlorophyta) inferred from molecular, biochemical and traditional data. *European Journal of Phycology*. 34:1, 87-93.
- Schemske, D.W. & J. Ågren. 1995. Deceit pollination and selection on female flower size in *Begonia involucrata*: An experimental approach. *Evolution* 49: 207-214.
- Schemske, D.W., J. Ågren, J. Le Corff. 1996. Deceit pollination in the monoecious, neotropical herb *Begonia oaxacana*. In: Lloyd DG, Barrett SCH (eds). *Floral Biology*. Chapman and Hall. New York. pp 292-318.
- Schradin, C. 2013. Intraspecific variation in social organization by genetic variation, developmental plasticity, social flexibility or entirely extrinsic factors. *Phil. Trans. R. Soc. B*. 368:20120346.
- Shehzad, T., H. Okuizumi, M. Kawase & K. Okuno. 2009. Development of SSR-based sorghum (*Sorghum bicolor* (L.) Moench) diversity research set of germplasm and its evaluation by morphological traits. *Genetic Resources and Crop Evolution*. 56:809–827.
- [Shen, Y.](#), [L. Guan](#), [D. Wang](#) & [X. Gan](#). 2016. DNA barcoding and evaluation of genetic diversity in Cyprinidae fish in the midstream of the Yangtze River. [Ecol Evol.](#) 6(9): 2702–2713.
- Shueu .C.-R., S.-H. Pao, L.-F. Chien, P.Chesson, C.-I. Peng. 2012. Natural foliar variegation without costs? The case of *Begonia*. *Annals of Botany*. 109( 6): 1065-1074.
- Singh, 2010. *Plant systematics an Integrated Approach*. 3rd edition. Science Publisher, India.
- Sokal, R.R., 1986. Phenetic Taxonomy: Theory and Methods. *Ann. Rev. Ecol. Syst.* 17 : 421-442.
- Stace, C.A., 1989. *Plant Taxonomy and Biosystematics*. 2nd edition. Cambridge University Press, Cambridge. pp. 192-195.

- Studer, S. & P.J. Edwards. 2002. Morphological variation of plant population from differently managed grasslands. *Bulletin of the Geobotanical Institute ETH*. 68:29-44.
- Stuessy, T.F. 1990. *Plant Taxonomy. The Systematic Evaluation of Comparative Data*. New York: Columbia University Press.
- Tanaka, K & Y. Takahara. 2013. Intraspecific phylogenetic relationships in *Ixeridium dentatum* (Compositae) complex based on genetic and morphological evidence. *Plant. Syst. Evol.* 299(8): 1493–1502.
- Tebbitt, M.C. 2003. Taxonomy of *Begonia longifolia* Blume (Begoniaceae) and related species. *Brittonia*. 55 (1): 19-29.
- Thomas, D.C., M. Hughes, T. Phutthai, S. Rajbhandary, R. Rubite, W.H. Ardi, & J.E. Richardson. 2011. A non-coding plastid DNA phylogeny of Asian *Begonia* (Begoniaceae): Evidence for morphological homoplasy and sectional polyphyly. *Molecular Phylogenetics and Evolution*. 60 (2011):428–444
- Tjitrosoepomo, G. 1997. *Morfologi Tumbuhan*. Gadjah Mada University Press Bulaksumur. Yogyakarta.
- Undaharta, N.K.E. & I.M. Ardaka. 2011. *Flora Indonesiana Begonia of Bali*. <http://www.kebunrayabali.com/files/Begonia%201.pdf>. Diakses pada tanggal 9 November 2018.
- Van Welzen, P.C., J.A.N. Parnell & J.W. F. Slik. 2011. Wallace's Line and plant distributions: two or three phytogeographical areas and where to group Java?. *Biological Journal of the Linnean Society*. 103: 531-545.
- Vicente A., M.A. Alonso & M.B. Crespo. 2016: Taxonomic circumscription of the African endemic *Biscutella raphanifolia* (Brassicaceae) based on morphological and molecular characters. *Willdenowia*. 46: 411–422.
- Vogel, S. 1978. *Evolutionary shifts from reward to deception in pollen flowers*. In A. J. Riecherts (Ed.). *The pollination of flowers by insects*. Academic Press, London, England. pp. 89-96.
- Wang, J., L. Shao, J. Wang, H. Ren, H. Liu, Q.M. Zhang, Q.F. Guo & X.W. Chen. 2016. Comparison of morphological and physiological characteristics in two phenotypes of a rare and endangered plant, *Begonia fimbristipula* Hance. *Photosynthetica*. 54 (3): 381-389.
- Weising, K., H. Nybom, K. Wolff & G. Kahl. 2005. *DNA Fingerprinting in Plants Principles, Methods, and Applications*. 2nd edition. CRC Press. Florida, USA.



- Whang, S.S., K. Choi, R.S. Hill & J.H. Pak. 2002. A morphometric analysis of infraspecific taxa within the *Ixeris chinensis* complex (Asteraceae, Lactuceae). *Bot. Bull. Acad. Sin.* 43: 131-138.
- White T.J., T. Bruns, S. Lee & J. Taylor, 1990. Amplification and direct sequencing of fungal ribosomal RNA genes for phylogenetics. In: Innis, M.A., D.H. Gelfand, J.J. Sninsky & T.J. White. ( eds.) *PCR Protocols: a guide to methods and applications*. Academic Press. San Diego. pp. 315-322.
- Widyatmoko, D. & R.A. Risna. 2017. A role of Indonesian Botanic Gardens in achieving global strategy for plant conservation goals. *Ann. Missouri Bot. Gard.* 102: 377-385.
- Wiriadinata, H., D. Girmansyah, S. Hoover & J. Hunter. 2002. Kekayaan *Begonia* Taman Nasional Gunung Halimun. *Berita Biologi* 6 (1): 91-97.
- Wood, F.A. & W.G. Barker. 1963. Stem Pigmentation in Lowbush Blueberry. *Plant Physiology*. 38 (2): 191-193.
- Zhang, L., B. Wang, L.Pan & J. Peng. 2013. Recycling Isolation of Plant DNA, A Novel Method. *Journal of Genetics and Genomics*. 40:45-54
- Zhang, Q-d., R-Z. Jia, C. Meng, C-W. Ti & T-Y. Wang. 2015. Diversity and population structure of a dominant deciduous tree based on morphological and genetic data. *AoB Plants*.7:1-13.