

Daftar Pustaka

- Agarwal, M, N. Shrivastava and H. Padh. 2008. Advances in molecular marker techniques and their applications in plant sciences. *Plant Cell Rep* 27: 617-631.
- Aikpokpodion, P.O., J. C. Motamayor, V. O. Adetimirin, Y. A. Ampomah, I. Ingelbrech, A. B. Eskes, R. J. Schnell and M. K. Allen. 2009. Genetic diversity assessment of sub-samples of cacao, *Theobroma cacao* L. collections in West Africa using simple sequence repeats marker. *Tree Genetics & Genome* 5: 699-711.
- Anonim. 2006. What is genetic marker? Genetic Resource Conservation Program. University of California, USA.
- Anonim. 2011. Laporan Unggulan Kakao PT Pagilaran. UGM, Yogyakarta.
- Anonim. 2013. Peraturan Menteri Pertanian Nomor 09/Permentan/OT.140/1/2013. <[http://perundangan.pertanian.go.id/admin/file/Permentan%209-2013%20\(fix\).pdf](http://perundangan.pertanian.go.id/admin/file/Permentan%209-2013%20(fix).pdf)>. diakses tanggal 12 Juni 2017.
- Anonim. 2014. Statistik Perkebunan Indonesia 2013-2014: Kakao. Direktorat Jenderal Perkebunan, Jakarta.
- Anonim. 2015a. Kakao: Sejarah, Botani, Proses Produksi, Pengolahan, dan Perdagangan. Gadjah Mada University Press, Yogyakarta.
- Anonim. 2016a. Random Amplified Polymorphic DNA (RAPD). <<https://www.ncbi.nlm.nih.gov/genome/probe/doc/TechRAPD.shtml>>. Diakses tanggal 15 Oktober 2016.
- Anonim. 2016b. Random Amplified Polymorphic DNA (RAPD). <<https://www.wur.nl/en/show/Random-Amplified-Polymorphic-DNA-RAPD.htm>>. Diakses tanggal 15 Oktober 2016.
- Aziza, E.N. 2015. Pengujian keseragaman genetik kakao (*Theobroma cacao* L.) hasil embriogenesis somatik menggunakan penanda RAPD, SSR dan cpSSR. Fakultas Pertanian, Universitas Gadjah Mada. Yogyakarta. Tesis.
- Bardakci, F. 2001. Random amplified polymorphic DNA (RAPD) markers. *Turk J Biol* 25: 185-196.
- Barret, L. W., S. Fletcher and S. D. Wilton. 2013. Untranslated Gene Regions and Other Non-coding Elements. Springer.
- Bhattacharjee, R. and P. L. Kumar. 2007. Cocoa *In*: C. Kole (ed.). Genome Mapping and Molecular Breeding in Plants, Vol. 6 Technical Crops. Springer-Verlag, Berlin Heidelberg, p: 127-142.
- Boza, E. J., B. M. Irish., A. W. Meerow, C. L. Tondo, O. A. Rodri'guez, M. Ventura-Lo'pez, J. A. Go'mez, J. M. Moore, D. Zhang, J. C. Motamayor, and R. J. Schnell. 2013.

Genetic diversity, conservation, and utilization of *Theobroma cacao* L.: genetic resources in the Dominican Republic. *Genet Resour Crop Evol* 60: 605–619.

- Cheesman, E. E. 1944. Notes on the nomenclature, classification and possible relationship of cacao populations. *Tropical Agriculture* 21: 144-159.
- Clement, D., A.M. Risterucci, J.C. Motamayor, J. N’Goran, and C. Lanaud. 2003. Mapping quantitative trait loci for bean traits and ovule number in *Theobroma cacao* L. *Genome* 46: 103–111.
- Crouzillat, D., E. Lerceteau, V. Petiard, J. Morera, H. Rodriguez, D. Walker, W. Phillips, C. Ronning, R. Schnell, J. Osei, and P. Fritz. 1996. *Theobroma cacao* L.: a genetic linkage map and quantitative trait loci analysis. *Theor Appl Genet* 93:205-214.
- Crouzillat, D., B. M’enard, A. Mora, W. Phillips, and V. P’etiard. 2000a. Quantitative trait analysis in *Theobroma cacao* using molecular markers. *Euphytica* 114: 13–23.
- Cuatrecacas, J. 1964. Cacao and its allies: a taxonomic revision of the genus *Theobroma*. *Contribution from the United States Herbarium* 35: 379-614.
- Dinarti, D., A. W. Susilo, L. W. Meinhardt, K. Ji, L. A. Motilal, S. Mischke, and D. Zhang. 2015. Genetic diversity and parentage in farmer selections of cacao from Southern Sulawesi, Indonesia revealed by microsatellite markers. *Breeding Science* 65: 438-446.
- Dos Santos, R. C., J. L. Pires, U. V. Lopes, K. P. G. Gramacho, A. Batistaflores, R. D. C. S. Bahia, H. C. Cristineramos, R. X. Correa, and D. Ahnert. 2005. Assesment of genetic diversity on a sample of cocoa accessions resistant to witches broom disease based on RAPD and pedigree data. *Bragantia, Campinas* 64 (3): 361-368.
- Efombagn, I. B. M., J. C. Motamayor, O. Sounigo, A. B. Eskes, S. Nyasse, C. Cilas, R. Schnell, M. J. M. Dauleux and M. K. Allen. 2008. Genetic diversity and structure of farm and GenBank accessions of cacao (*Theobroma cacao* L.) in Cameroon revealed by microsatellite markers. *Tree Genetics & Genomes* 4: 821-831.
- Efombagn, I. B. M., O. Sounigo, S. Nyasse, M. J. M. Dauleux, C. Cilas, A. B. Eskes, and M. K. Allen. 2006. Genetic diversity in cocoa germplasm of Southern Cameroon revealed by simple sequences repeats (SSRs) markers. *African Journal of Biotechnology* 5(16): 1441-1449.
- Figueira, A., J. Janick, and P. Goldsbrough. 1992. Genome Size and DNA Polymorphism in *Theobroma cacao*. *J. Amer. Soc. Hort. Sci.* 117 (4): 673-677.
- Figueira, A., J. Janick, M. Levy, and P. Goldsbrough. 1994. Reexamining the classification of *Theobroma cacao* L. using molecular markers. *J. Amer. Soc. Hort. Sci.* 119 (5): 1073-1082.
- Hamon, P., M. Seguin, X. Perrier, and J. C. Glaszmann. 2003. Genetic Diversity of Cultivated Tropical Plants. CRC Press, Florida.



- Herrmann, L., C. Felbinger, I. Haase, B. Rudolph, B. Biermann, and M. Fischer. 2015. Food fingerprinting: Characterization of the Ecuadorean type CCN-51 of *Theobroma cacao* L. using microsatellite markers. *J. Agric. Food Chem.* 63: 4539-4544.
- Kristantini, Taryono, P. Basunanda, R. H. Murti. 2014. Keragaman Genetik Kultivar Padi Beras Hitam Lokal Berdasarkan Penanda Mikrosatelit. *Jurnal AgroBiogen* 10 (2): 69-76.
- Lanaud, C., A. M. Risterucci, I. Pieretti, M. Falque, A. Bouet, and P. J. L. Lagoda. 1999. Isolation and characterization of microsatellites in *Theobroma cacao* L. *Molecular Ecology* 8: 2141-2152.
- Lerceteau, E., T. Robert, V. Petiard, and D. Crouzillat. 1997a. Evaluation of the extent of genetic variability among *Theobroma cacao* accessions using RAPD and RFLP markers. *Theor Appl Genet* 95: 10-19.
- Lerceteau, E., J. Quiroz, J. Soria, S. Flipo, V. P'etiard, and D. Crouzilat. 1997b. Genetic differentiation among Ecuadorian *Theobroma cacao* L. accessions using DNA and morphological analyses. *Euphytica* 95: 77-87.
- Lo'pez, C. M. R., A. C. Wetten, and M. J. Wilkinson. 2004. Detection and quantification of in vitro-culture induced chimerism using simple sequence repeat (SSR) analysis in *Theobroma cacao* (L.). *Theor Appl Genet* 110: 157-166.
- Madesis, P., I. Ganopoulos, and A. Tsiftaris. 2013. Microsatellites: Evolution and Contribution *In*: S. K. Kantartzi (ed.). *Methods in Molecular Biology*, Vol. 1006. Springer Science+Business Media, London, p: 1-13.
- Mohan, M., S. Nair, A. Bhagwat, T. G. Krishna, M. Yano, C. R. Bhatia, and T. Sasaki. 1997. Genome mapping, molecular markers and marker-assisted selection in crop plants. *Molecular Breeding* 3: 87-103.
- Motamayor, J. C., P. Lachenaud, J. W. da Silva e Mota, R. Looor, D. N. Kuhn, J. S. Brown and R. J. Schnell. 2008. Geographic and Genetic Population Differentiation of the Amazonian Chocolate Tree (*Theobroma cacao* L.). *PLoS ONE* 3 (10): 1-8.
- Motilal, L. and D. Butler. 2003. Verification of identities in global cacao germplasm collections. *Genet. Resour. Crop Evol.* 50: 799-807.
- Motilal, L. A., D. Zhang, P. Umaharan, S. Mischke, V. Mooleedhar, and L. W. Meinhardt. 2010. The relic Criollo cacao in Belize – genetic diversity and relationship with Trinitario and other cacao clones held in the International Cocoa Genebank, Trinidad. *Plant Genetic Resources: Characterization and Utilization* 8(2): 106-115.
- Motilal, L. A., D. Zhang, S. Mischke, L. W. Meinhardt, and P. Umaharan. 2013. Microsatellite-aided detection of genetic redundancy improves management of the International Cocoa Genebank, Trinidad. *Tree Genetics & Genomes* 9:1395-1411.



- Mujaju, C., J. Sehic, G. Werlemark, L. Garkava-Gustavsson, M. Fatih and H. Nybom. 2010. Genetic diversity in watermelon (*Citrullus lanatus*) landraces from Zimbabwe revealed by RAPD and SSR markers. *Hereditas* 147: 142–153.
- N'goran, J. A. K., V. Laurent, A. M. Risterucci and C. Lanaud. 1994. Comparative genetic diversity studies of *Theobroma cacao* L. using RFLP and RAPD markers. *Heredity* 73: 589-597.
- Ntuli, N. R., P. B. Tongoona, A. M. Zobolo. 2015. Genetic diversity in *Cucurbita pepo* landraces revealed by RAPD and SSR markers. *Scientia Horticulturae* 189: 192-200.
- Ovando, J. A. V., F. Molina-Freaner, J. Nuñez-Farfán, I. Ovando-Medina, and M. Salvador-Figueroa. 2014. Genetic identification of *Theobroma cacao* L. trees with high Criollo ancestry in Soconusco, Chiapas, Mexico. *Genet. Mol. Res.* 13 (4): 10404-10414.
- Panggeso, J., A. Anshary, S. Samudin, and Z. Basri. 2015. Genetic diversity of different cocoa clones by RAPD (Random Amplified Polymorphic DNA) markers. *International Journal of Current Research and Academic Review* 3 (3): 195-201.
- Peakall, R. and P. Smouse. 2012. GenAEx 6.5: genetic analysis in Excel. <
<http://biology.anu.edu.au/GenAEx/>>. Diakses tanggal 18 April 2017.
- Pejic, I., P. Ajmone-Marsan, M. Morgante, V. Kozumplick, P. Castiglioni, G. Taramino, and M. Motto. 1998. Comparative analysis of genetic similarity among maize inbred lines detected by RFLPs, RAPDss, SSRs, and AFLPs. *Theor Appl Genet* 97: 1248-1255.
- Poerba, Y. S. dan D. Martanti. 2008. Keragaman genetik berdasarkan marka random amplified polymorphic DNA pada *Amorphophallus muelleri* Blume di Jawa. *Biodiversitas* 9 (4): 245-249.
- Pokou, N. D., J. C. Motamayor, R. Schnell, A. B. Eskes. 2014. Genetic diversity of outstanding accessions (*Theobroma cacao* L.) from farmers' field in Côte-d'Ivoire using SSR markers. *International Journal of Plant and Animal Sciences* 3(1): 105-111.
- Pugh, T., O. Fouet, A. M. Risterucci, P. Brottier, M. Abouladze, C. Delerez, B. Courtois, D. Clement, P. Larmande, J. A. K. N'Goran and C. Lanaud. 2004. A new cacao linkage map based on codominant markers: development and integration of 201 new microsatellite markers. *Theor Appl Genet* 108: 1151-1161.
- Rifka, N. Aisyah, Muslimin, dan I N. Suwastika. 2014. Polimorfisme klon kakao (*Theobroma cacao* L.) dari perkebunan rakyat Kabupaten Sigi. *Online Jurnal of Natural Science* 3 (3): 269-277.
- Risterucci, A. M., L. Grivet, J. A. K. N'Goran, M. H. Flament, and C. Lanaud. 2000. A high-density linkage map of *Theobroma cacao* L. *Theor Appl Genet* 101:948–955.
- Rubiyo. 2013. Inovasi perbaikan bahan tanam kakao di Indonesia. *Buletin RISTRI* 4 (3): 199-214.



- Saxena, B., R. Kaur, and S. V. Bhardwaj. 2011. Assesment of genetic diversity in cabbage cultivars using RAPD and SSR markers. *J. Crop Sci. Biotech* 14 (3): 191-196.
- Semagn, K., A. Bjornstad, and M. N. Ndjiondjop. 2006. An overview of molecular marker methods for plants. *African Journal of Biotechnology* 5 (25): 2540-256.
- Sereno, M. L., P. S. B. Albuquerque, R. Vencovsky, and A. Figueira. 2006. Genetic diversity and natural population structure of cacao (*Theobroma cacao* L.) from the Brazilian Amazon evaluated by microsatellite markers. *Conservation Genetics* 7: 13–24.
- Siburian, R. H. S. 2009. Keragaman Genetik *Gyrinops verstegii* asal Papua Berdasarkan RAPD dan Mikrosatelit. IPB, Thesis.
- Sounigo, O., R. Umaharan, Y. Christopher, A. Sankar, and S. Ramdahin. 2005. Assessing the genetic diversity in the International Cocoa Genebank, Trinidad (ICG, T) using isozyme electrophoresis and RAPD. *Genetic Resources and Crop Evolution* 52: 1111–1120.
- Susilo, A. W. 2007. Akselerasi program pemuliaan kakao (*Theobroma cacao* L.) melalui pemanfaatan penanda molekuler dalam proses seleksi. *Warta Pusat Penelitian Kopi dan Kakao Indonesia* 23 (1): 11-24.
- Taufik, M., Gustian, A. Syarif, dan I. Suliansyah. 2009. Seleksi hybrid F1 kakao berproduksi tinggi pada fase bibit memanfaatkan analisis diskriminan. *Akta Agrosia* 12 (2): 106-114.
- Taryono. 2014. Pengantar Bioteknologi untuk Pemuliaan Tanaman. Gadjah Mada University Press, Yogyakarta.
- Toxopeus, H. 1969. Cacao, *Theobroma cacao* L. In: F. P. Ferwerda and F. Wit (eds.). *Outlines of perennial crop breeding in the tropics*, Wageningen, Pays-Bas, Veenman and Zonen, p: 79-109.
- Walunjar, B. C., A. Parihar, N. K. Singh and L. D. Parmar. 2015. Genetic diversity of wild and cultivated genotypes of pigeonpea through RAPD and SSR markers. *Journal of Environmental Biology* 36: 461-466.
- Weising K, H. Nybon, K. Wolff and G. Kahl. 2005. *DNA Fingerprinting in Plants: Principles, Methods, and Applications*. CRC Press Taylor & Francis Group, US.
- Williams, J.G.K., A. R. Kubelik, K. J. Livak, J. A. Rafalski, and S. V. Tingey. 1990. DNA polymorphisms amplified by arbitrary primers are useful as genetic markers. *Nucleic Acids Res* 18: 6531-6535.
- Whitkus, R., M. de la Cruz, L. Mota-Bravo and A. Gomez-Pompa. 1998. Genetic diversity and relationships of cacao (*Theobroma cacao* L.) in Southern Mexico. *Theor Appl Genet* 96: 621-627.
- Yunita, T. R. 2015. Kajian Kompatibilitas dan Pengaruh Xenia Hasil Persilangan Lima Klon Kakao (*Theobroma cacao* L.). UGM, Thesis.

- Zane, L., L. Bargelloni and T. Patarnello. 2002. Strategies for microsatellite isolation: a review. *Molecular Ecology* 11: 1-6.
- Zargar, S. M., S. Farhat, R. Mahajan, A. Bhakhri and A. Sharma. 2014. Unraveling the efficiency of RAPD and SSR markers in diversity analysis and population structure estimation in common bean. *Saudi Journal of Biological Sciences* 23: 139-149.
- Zhang, D., E. Arevalo-Gardini, S. Mischke, L. Zuniga-Cernandes, A. Barreto-Chaves, and J. A. D. Aguila. 2006. Genetic diversity and structure of managed and semi-natural populations of cocoa (*Theobroma cacao*) in the Huallaga and Ucayali Valleys of Peru. *Annals of Botany* 98 (3): 647-655.
- Zhang, D., M. Boccara, L. Motilal, D. R. Butler, P. Umaharan, S. Mischke, and L. Meinhardt. 2008. Microsatellite variation and population structure in the “Refractario” cacao of Ecuador. *Conserv Genet* 9: 327–337.
- Zhang, D., M. Boccara, L. Motilal, S. Mischke, E. S. Johnson, D. R. Butler, B. Bailey, and L. Meinhardt. 2009. Molecular characterization of an earliest cacao (*Theobroma cacao* L.) collection from Upper Amazon using microsatellite DNA markers. *Tree Genetics & Genomes* 5: 595–607.
- Zhang, D., W. J. Marti´nez, E. S. Johnson, E. Somarriba, W. Phillips-Mora, C. Astorga, S. Mischke, and L. W. Meinhardt. 2012. Genetic diversity and spatial structure in a new distinct *Theobroma cacao* L. population in Bolivia. *Genet Resour Crop Evol* 59:239–252.
- Zhou, F., J. Sosa, and K. A. Feldmann. 2007. High Throughput Approaches for the Identification of Salt Tolerance Genes in Plant. In A. J. Matthew, P. M. Hasegawa and S. M. Jain (Eds.) *Advances in Molecular Breeding Toward Drought and Salt Tolerant Crops*. Springer, Netherlands, p: 359-379.