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DAFTAR PUSTAKA

Acosta-Durán, C. & E. Martínez-Romero. 2002. Diversity of rhizobia from nodules of the leguminous tree *Gliricidia sepium* , a natural host of *Rhizobium tropici*. Arch Microbiol 178:161–164

Adeleke, R.A., T. E. Cloete, A. Bertrand & D.P. Khasa. 2012. Iron ore weathering potentials of ectomycorrhizal plants. Mycorrhiza 22:535–544

Aguilera, L.E., C. Armas, A.P. Cea, J.R. Gutierrez, P.L. Meserve & D.A. Kelt. 2016. Rainfall, microhabitat and small mammals influence the abundance of soil microorganisms in a Chilean semi-arid shrubland. Journal of Semiarid Environments. 126: 37-46

Akinrinde, E.A. 2004. Soils: Nature, Fertility Conservation and Management. AMS Publishing, Inc. Vienna, Austria. 116 hal.

Allen, B.L. & B.F. Hajek, 1989. Mineral occurrence in soil environments. Dalam: J.B. Dixon & S.B. Weed. Minerals in Soil Environments. Second ed. Soil Science Society of America. Madison. hal: 199-278.

Aneja, M.K., S. Sharma, F. Fleischmann, S. Stich, W. Heller, G. Bahnweg, J.C. Munch & M. Schloter. 2006. Microbial colonization of beech and spruce litter—influence of decomposition site and plant litter species on the diversity of the microbial community. Microb Ecol 52:127–135

Anhar, A. 2005. The Role of Biological Nitrogen Fixation in the Cacao Agroforestry System in Central Sulawesi Indonesia. Dalam: Vlek, P.L.G. Ecology and Development Series No 27, 2005. Cavillier Verlag Gottingen. 100 hal.

Anonim. 1975. Munsell Soil Color Charts. Munsell Color. Macbeth a division of Kollmorgen Corporation. Maryland.

Anonim, 2006 – 2012. Gunungkidul Dalam Angka 2006 - 2012. Badan Pusat Statistik Kabupaten Gunungkidul.

Asanok, L., D. Marod, P. Duengkae, U. Pranmongkol. H. Kurokawa, M. Aiba, M. Katabuchi & T. Nakashizuka. 2013. Relationships between functional traits and the ability of forest tree species to reestablish in secondary forest

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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and enrichment plantataions in the uplands of northern Thailand. Forest Ecology and Management. 296: 9-23

Atlas R.M. 1997. Principles of Microbiology. 2nd Edition. Wm. C. Brown Publisher. Dubuque. Iowa. 1297 hal.

Badano, E.I., O.R. Samour-Nieva, J. Flores & D. Douterlungne. 2015. Microclimate and seeding predation as drivers of tree recruitment in human-disturbed Oak forests. Forest Ecology and Management. 356: 93-100

Barlocher, F. 2005. Leaf Mass Loss Estimated by Litter Bag Technique. Dalam: M.A.S. Graca, F. Barlocher & M.O. Gessner. Methods to Study Litter Decomposition. A Practical Guide. Springer. Netherland. pp: 37-42

Barlow, J., T.A. Gardner, L.V. Ferreira & C.A. Peres. 2007. Litter fall and decomposition in primary, secondary and plantation forests in the Brazilian Amazon. Forest Ecology and Management. 247: 91-97

Bates, J.D., T.S. Svejcar & R.F. Miller. 2007. Litter decomposition in cut and uncut western juniper woodlands. Journal of Arid Environments. 70: 222-236

Bautista, F., G. Palacio-Aponte, P. Quintana & J.A. Sinck. 2011. Spatial distribution and development of soils in tropical karst areas from the Peninsula of Yucatan, Mexico. Geomorphology. 135: 308-321.

Bayer, C., J. Mielniczuk, L. Martin-Neto & P.R. Ernani. 2002. Stocks and humification degree of organic matter fractions as affected by no-tillage on a subtropical soil. Plant and Soil 238: 133–140

Berg, B. 2014. Decomposition pattern for foliar litter – A theory for influencing factors. Soil Biology and Biochemistry. 78: 222-232

Berry, D.R. 1988. Products of primary metabolic pathways. Dalam: D.R. Berry (Ed.). Physiology of Industrial Fungi. Blackwell Scientific Publications. Oxford. Hal: 130-160

Blake, G.R. and K.H. Hartge. 1986. Bulk density. Dalam A. Klute (Ed.) Methods of Soil Analysis. Part 1. Physical and Mineralogical Methods. 2nd Edition. Madison, Wisconsin. hal: 363-376

Blum, J.D., A. Klaue, C.A. Nezat, C.T. Driscoll, C.E. Johnson, T.G. Siccama, C. Eagar, T.J. Faheyk & G.E. Likens. 2002. Mycorrhizal weathering of

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

apatite as an important calcium source in base-poor forest ecosystems. Nature, 417: 729-731.

Bockheim, J.G. 2005. Soil endemism and its relation to soil formation theory. Geoderma. 129: 109–124

Bonneville, S., D.J. Morgan, A. Schmalenberger, A. Bray, A. Brown, A.S. Banwart & L.G. Benning. 2011. Tree-mycorrhiza symbiosis accelerate mineral weathering: Evidences from nanometer scale elemental fluxes at the hypha-mineral interface. Geochimica et Cosmochimica Acta. 75: 6988-7005

Borchardt, G. 1989. Chapter 14. Smectites. Dalam: J.B. Dixon dan S.B.Weed (co-eds). Minerals in Soils Environments. 2nd ed. Soil Science Society of America. Wisconsin. Hal: 675-717

Brown, G. & G.W. Brindley. 1980. Chapter 5. X-Ray Diffraction Procedure for Clay Mineral Identification. dalam: Brindley, G.W. & G. Brown. Crystal Structures of Clay Minerals and Their X-Ray Identification. Mineralogical Society. Monograph No 5. Mineralogical Society. London. hal: 305 – 358

Buol, S.W., R.J. Southard, R.C. Graham & P.A. McDaniel. 2003. Soil Genesis and Classification. 5th edition. Iowa State Press. Iowa. 94 p.

Buscot, F. 2005. What's are soils. Dalam F. Buscot & A. Varma. (eds.) Microorganisms in Soils: Roles in Genesis and Functions. Springer-Verlag. Berlin. Hal: 3-18

Carter, M.R., E.G. Gregorich, D.A. Angers, R.G. Donald & M.A. Bolinder. 1998. Organic C and N storage, and organic C fractions, in adjacent cultivated and forested soils of eastern Canada. Soil and Tillage Research. 47: 253-261

Celentano, D., R.A. Zahawi. B. Finegan, R. Ostertag. R. J. Cole & K.D. Ho. 2011. Litterfall Dynamics Under Different Tropical Forest Restoration Strategies in Costa Rica. BIOTROPICA 43(3): 279–287

Chandrasekarana, S. & P.S. Swamy. 2002. Biomass, litterfall and aboveground net primary productivity of herbaceous communities in varied ecosystems at Kodayar in the western ghats of Tamil Nadu. Agriculture, Ecosystems and Environment 88: 61–71

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Chang, T.T. & C.Y. Li. 1998. Weathering of Limestone, Marble, and Calcium Phosphate by Ectomycorrhizal Fungi and Associated Microorganisms. Taiwan J. For. Sci. 13(2): 85-90

Chirwa, P.W., C.R. Black, C.K. Ong & J.A. Maghembe. 2003. Tree and crop productivity in gliricidia/maize/ pigeonpea cropping systems in southern Malawi. Agroforestry Systems 59: 265–277

Chittamart, N., A. Suddhiprakarn, I. Kheoruenromne and R.J. Gilkes. 2010. The Geo-Pedochemistry of Vertisols Under tropical savannah climate. Geoderma. 159: 304-316

Cizungu, L., J. Staelens, D. Huygens, J. Walangululu, D. Muhindo, O. Van Cleemput & P. Boeckx. 2014. Litterfall and leaf litter decomposition in a central African tropical mountain forest and Eucalyptus plantation. Forest Ecology and Management. 326: 109-116

Crawford, R.L. 1981. Lignin Biodegradation and Transformation. John Wiley and Sons. New York. 154 hal.

Cromack Jr., K., P. Sollins, W.C. Graustein, K. Speidel, A.W. Todd, G. Spicer, C.Y. Li, & R.L. Todd. 1979. Calcium oxalate accumulation and soil weathering in mats of the hypogeous fungus *Hysterangium crassum*. Soil Biol Biochem. 44:463-468

Dawud , S.M., K. Raulund-Rasmussen, T. Domisch, L. Finer, B. Jaroszewicz & L. Vesterdal. 2016. Is Tree Species Diversity or Species Identity the More Important Driver of Soil Carbon Stocks, C/N Ratio, and pH? Ecosystems DOI: 10.1007/s10021-016-9958-1

De la Rosa-Garcia, S.C., O. Ortega-Morales, C.C. Gaylarde, M. Beltrán-García, P. Quintana-Owen and M. Reyes-Estebanez. 2011. Influence of fungi in the weathering of limestone of Mayan monument. Revista Mexicana de Micología 33: 43-51

Deng, L., K. Wang, M. Chen, Z. Shangguan. S. Sweeney. 2013. Soil organic carbon storage capacity positively related to forest succession on the Loess Plateau, China. Catena. 110: 1-7

Dickinson, C.H. & G.J.F. Pugh, 1974. Biology of Plant Litter Decomposition. Academic Press, London

Fearnside, P.M. 2006. Fragile soils and deforestation impacts: The rationale for environmental services of standing forest as a development paradigm in Latin America. pp. 158-171. Dalam: D.A. Posey & M.J. Balick (eds.) Human Impacts on Amazonia: The Role of Traditional Ecological

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Knowledge in Conservation and Development. Columbia University Press, New York, U.S.A.

Feng, Q., W. Zhao, J. Wang. X. Zhang, M. Zhao, L. Zhong, Y. Liu & X. Fang. 2016. Effects of Different Land-Use Types on Soil Erosion Under Natural Rainfall in the Loess Plateau, China. Pedosphere 26: 243–256

Fisher, R.F. & D. Binkley. 2000. Ecology and Management of Forest Soils. 3rd Ed. John Wiley & Sons Inc. New York. 489 hal.

Fornós, J.J., L. Gómez-Pujol, J. Cifre & F. Hierro. 2011. First Steps in Limestone Weathering and Erosion: An Atomic Force Microscopy (AFM) and Scanning Electron Microscopy (SEM) Approach. Acta Carsologica. 40(2): 275–282

Frouz, J., K. Prach, V. Pizl, L. Hanel, J. Stary, K. Tajovsky, J. Materna, V. Balık, Jiri Kalcik, K. Rehounkova. 2008. Interactions between soil development, vegetation and soil fauna during spontaneous succession in post mining sites. European Journal of Soil Biology. 44 : 109 – 121

Gadd, G.M. 1988. Carbon nutrition and metabolism. Dalam: D.R. Berry (Ed.). Physiology of Industrial Fungi. Blackwell Scientific Publications. Oxford. Hal: 21-57

Goma-Tchimbakala, J. & F. Bernhard-Reversat. 2006. Comparison of litter dynamics of an indigenous timber tree species (*Terminalia superba*) and a natural tropical forest in Mayombe, Congo. Forest Ecology and Management. 229: 304-313

Gomoryova, E., K. Strelcova, J. Skvarenina & D. Gomory. 2013. Responses of soil microorganisms and water content in forest floor horizons to environmental factors. European Journal of Soil Biology. 55: 71-76

Griscom, H.P & M.S. Ashton. 2011. Restoration of dry tropical forests in Central America: A review of pattern and process. Forest Ecology and Management. 261: 1564-1579

Guillaume, T., D. Maranguit, K. Murtilaksono & Y. Kuzyakov. 2016. Sensitivity and resistance of soil fertility indicators to land-use changes: New concept and examples from conversion of Indonesian rainforest to plantations. Ecological Indicators. 67: 49-57

UNIVERSITAS
GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Ha, K.V., P. Marschner & E. K. Bünemann. 2008. Dynamics of C, N, P and microbial community composition in particulate soil organic matter during residue decomposition. Plant and Soil. 303: 253–264

Hansen, K., L. Vesterdal, I.K. Schimdt, P. Gundersen, L. Sevel, A. Bastrup-Birk, L.B. Pedersen & J. Bille-Hansen. 2009. Litterfall and nutrient return of five tree species in common garden experiment. Forest Ecology and Management. 257: 2133-2144

Hanum, I.F. & L.J.G. van der Maesen. 1997. Auxiliary plants. Plant Resources of South East Asia. No 11. Backhuys Publishers, Leiden.

Hardiwinoto, S., H. Supriyo, F. Mangkuwibowo & S. Sabarnurdin, 1994. Pengaruf Sifat Kimia terhadap Tingkat Dekomposisi Beberapa Jenis Daun Tanaman Hutan. Jurnal Penelitian lingkungan Hidup. UGM. Yogyakarta

Hardwick, S.R., R. Toumi, M. Pfeifer, E.C. Turner, R. Nilus & R.M. Ewers. 2015. The relationship between leaf area index and microclimate in tropical forest and oil palm plantation: Forest disturbance drives changes in microclimate. Agricultural and Forest Meteorology. 201: 187-195

Hartemink, A.E. & J.N. O'Sullivan. 2001. Leaf litter decomposition of Piper aduncum, Gliricidia sepium and Imperata cylindrica in the humid lowlands of Papua New Guinea. Plant and Soil 230: 115–124

Hasanuzzaman, M.D. & M. Hossain. 2014. Litter production and nutrient return through leaf litter of selected cropland agroforest tree species in Southwestern Bangladesh. Agriculture & Forestry, 60 (1): 221-233

Hassink, J. 1995. Density fractions of soil macroorganic matter and microbial biomass as predictors of C and N mineralization. Soil Biol. Biochem. Vol. 27 (8): 1099-1108

Hassink, J., A.P. Whitmore & J. Kubat. 1997. Size and density fractions of soil organic matter and the physical capacity of soil to protect organic matter. European Journal of Agronomy. 7: 189-199

Hernandez, A., E.C. Arellano, D. Morales-Moraga & M.D. Miranda. 2016. Understanding the effects of three decades of land use change on soil quality and biomass productivity in a Mediterranean landscape in Chile. 140: 195-204

UNIVERSITAS
GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Hossain, M.F., W. Chen & Y. Zhang. 2015. Bulk density of mineral and organic soils in the Canada's arctic and sub-arctic. Information Processing in Agriculture. 2: 183-190

Ikerra, S.T., J.A. Maghembe, P.C. Smithson & R.J. Buresh. 1999. Soil nitrogen dynamics and relationships with maize yields in a gliricidia–maize intercrop in Malawi. *Plant and Soil* 211: 155–164,

Isidorov, V., Z. Tyszkiewicz & E. Piroznikow. 2016. Fungal succession in relation to volatile organic compounds emissions from Scott pine and Norway spruce leaf litter-decomposing fungi. Atmospheric Environment. 131: 301-306

Izquierdo, I., F. Caravaca, M.M. Alguacil, G. Hernandez & A. Roldan. 2005. Use of microbiological indicators for evaluating success in soil restoration after revegetation of a mining area under subtropical conditions. Applied Soil Ecology. 30: 3-10

Jaafar, H.Z.E. 2001. Utilization of marginal soils in Malaysia: Bris and Tin-Tailings. Workshop Proceedings Vegetation Recovery in Degraded Lang Areas. Promaco Conventions. Western Australia. Hal: 139-152

Jalonen, R., P. Nygren & J. Sierra. 2009. Root exudates of a legume tree as a nitrogen source for a tropical fodder grass. Nutr Cycl Agroecosyst. DOI 10.1007/s10705-009-9259-6

Jamaa, B.A. & P.K.R. Nair. 1996. Decomposition and nitrogen mineralization patterns of *Leucaena leucocephala* and *Cassia siamea* mulch under tropical semiarid conditions in Kenya. Plant Soil 179, 275-285

Jose, B. & L.J. Reddy. 2010. Evaluation of antibacterial activity of the leaf and flower essential oils of Gliricidia sepium from South India. International Journal of Applied Pharmaceutics. 2: 20-22

Jutono, J. Soedarsono., S. Hartadi, S. Kabirun, S. Darmosuwito & Soesanto. 1980. Pedoman Praktikum Mikrobiologi Umum. Departemen Mikrobiologi Fakultas Pertanian UGM Yogyakarta

Kaniampady, M.M., M.M. Arif, L. Jirovetz & P.M. Shafi. 2007. Essensial oil composition of *Gliricidia sepium* (Leguminosae) leaves and flowers. Indian Journal of Chemistry. 46B: 1359-1360

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Koutika, L.S., F. Andreux, J. Hassink, Th. Choné & C.C. Cerri. 1999. Characterization of organic matter in topsoils under rain forest and pasture in the eastern Brazilian Amazon basin. Biol Fertil Soils. 29: 309–313

Kunze, G.W. & J.B. Dixon. 1986. Pretreatment for mineralogical analysis. Dalam A. Klute (Ed.) Methods of Soil Analysis. Part 1. Physical and Mineralogical Methods. 2nd Edition. Madison, Wisconsin. hal: 91-100

Laganiere, J., D. Pare, Y. Bergeron, H.Y.H. Chen, B.W. Brassard & X. Cavard. 2013. Stability of Soil Carbon Stocks Varies with Forest Composition in the Canadian Boreal Biome. Ecosystems. 16: 852–865

Lal, R. 1986. Soil surface management in the Tropics for intensive land use and high and sustained production. Dalam: B.A. Stewart. (Ed.) Advances in Soil Science. Volume 5. Springer-Verlag. New York. hal: 1-110.

Lalor, B.M., W.R. Cookson & D.V. Murphy. 2007. Comparison of two methods that assess soil community level physiological profiles in a forest ecosystem. Soil Biology & Biochemistry. 39: 454-462

Langer, E.R., M.R. Davis & C.W. Ross. 1999 Rehabilitation of lowland indigenous forest after mining in Westland. Science For Conservation 117. Department of Conservation. Wellington, New Zealand

Leung, A.K., A. Garg & C.W.W. Ng. 2015. Effects of plant roots on soil-water retention and induced suction in vegetated soil. Engineering Geology. 193: 183-197

Leuschner, C. & M.W. Rode. 1999. The role of plant resources in forest succession: changes in radiation, water and nutrient fluxes, and plant productivity over a 300-yr-long chronosequence in NW-Germany. Perspectives in Plant Ecology, Evolution and Systematics. 2: 103–147

Li, W., L. Yu, D. Yuan, Y. Wu & X. Zeng. 2005. A study of the activity and ecological significance of carbonic anhydrase from soil and its microbes from different karst ecosystems of Southwest China. Plant and Soil. 272: 133–141

Liao, J., H. Wang, C. Tsai & Z. Hseu. 2006. Litter production, decomposition and nutrient return of uplifted coral reef tropical forest. Forest Ecology and Management. 235: 174-185

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Macedo, M.O., A.S. Resende, P.C. Garcia, R.M. Boddey, C.P. Jantalia, S. Urquiaga, E.F.C. Campello & A.A. Franco. 2008. Changes in soil C and N stocks and nutrient dynamics 13 years after recovery of degraded land using leguminous nitrogen-fixing trees. Forest Ecology and Management. 255 : 1516–1524

Machado, P.L.O. de A. & C.A. Silva. 2001. Soil management under no-tillage systems in the tropics with special reference to Brazil. Nutrient Cycling in Agroecosystems 61: 119–130

Madigan, M.T., J.M. Martinko & J. Parker. 1997. Brock. Biology of Microorganisms. 8th ed. Prentice Hall International Inc. London.

Mafongoya, P.L., P. Barak & J.D. Reed. 2000. Carbon, nitrogen and phosphorus mineralization of tree leaves and manure. Biol Fertil Soils. 30: 298–305

Mavris, C., M. Egli, M. Plötze, J.D. Blum, A. Mirabella, D. Giaccai & W. Haeberli. 2010. Initial stages of weathering and soil formation in the Morteratsch proglacial area (Upper Engadine, Switzerland). Geoderma. 155: 359–371

McLaren, R.G. & K.C. Cameron, 2005. Soil Science. Sustainable Production and Environmental Protection. New edition. Oxford University Press. London. 304 hal.

McLean, E.O. 1982. Soil pH and lime requirements. Dalam: A.L. Page, R.H. Miller and D.R. Keeney (eds.) Methods of Soil Analysis Part 2. Second edition. Agronomy Society of America and Soil Science Society of America. Madison. hal: 199 – 224

Meijboom, F.W., J. Hassink & M. Van Noordwijk. 1995. Short Communication: Density fractionation of soil macroorganic Matter using silica suspensions. Soil Biol. Biochem. 27 (8): 1109-1111.

Mella, W. & A.R. Mermut. 2010. Genesis and mineralogy of soils formed on uplifted coral reef in West Timor, Indonesia. Geoderma, 154: 544-553

Mensah, J.K., P.A. Akomeah & E.K. Eifediyi. 2007. Soil Fertility Regeneration of Impoverished Ultisols of Edo State Using *Gliricidia sepium* Jacq Walp.. *Journal of Agronomy, 6: 593-596.*

Mikutta, R., M. Kleber, M.S. Torn & R. Jahn. 2006. Stabilization of soil organic matter: association with minerals or chemical recalcitrance? Biogeochemistry. 77: 25–56

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Nelson, D.W. & L.E. Sommers. 1982. Total carbon, Organic C and organic matter. Dalam: A.L. Page, R.H. Miller & D.R. Keeney (eds.) Methods of Soil Analysis Part 2. Second edition. Agronomy Society of America and Soil Science Society of America. Madison. hal: 539 - 577

Ness, R.L.L. & P.L.G. Vlek. 2000. Mechanism of Calcium and Phosphate Release from Hydroxy-Apatite by Mycorrhizal Hyphae. *Soil Science Society of America Journal* 64: 949-955.

Nurjanto, H.H.**,** H. Supriyo & D.T. Adriyanti. 2011. Pemanfaatan Tegakan Pohon Cepat Tumbuh untuk Pemapanan Kembali Tanaman Dipterokarpa di Lahan Bekas Tambang Batubara. dalam: Budiadi, H. Supriyo, S. Indrioko, S. Rahayu, Y. Widyana & Widiyatno. Prosiding Seminar Nasional dalam rangka Dies Natalis ke-47 dan Purna Tugas Prof. Dr. Ir. Sambas Sabarnurdin, M.Sc. hal: 228-238

Nygren, P. & P. Cruz. 1998. Biomass allocation and nodulation of Gliricidia sepium under two cut-and-carry forage production regimes. Agroforestry Systems 41: 277–292

Nygren, P., A. Lorenzo & P. Cruz. 2000. Decomposition of woody legume nodules in two tree/grass associations under contrasting environmental conditions. *Agroforestry Systems* 48: 229–244

O'Hara, C.P., J. Bauhus & P.J. Smethurst, 2006. Role of light fraction soil organic matter in the phosphorus nutrition of *Eucalyptus globulus* seedlings. Plant and Soil 280:127–134

Okogun, J. A., N. Sanginga, & K. Mulongoy. 2000. Nitrogen contribution of five leguminous trees and shrubs to alley cropped maize in Ibadan, Nigeria. Agroforestry Systems 50: 123–136

Orwa, C., A. Mutua, R. Kindt, R. Jamnadass & S. Anthony. 2009. Agroforestry Database: A tree reference and selection guide. Version 4. HTTP:/www.worldagroforestry.org/sites/ treedbs/treedatabases.asp). 6 hal

Ostertag, R., E. Marın-Spiotta, W.L. Silver & J. Schulten. 2008. Litterfall and decomposition in relation to soil carbon pools along a secondary forest chronosequence in Puerto Rico. Ecosystems. 11: 701–714

Pastor, J. & W.M. Post. 1986. Influence of climate, soil moisture, and succession on forest carbon and nitrogen cycles. Biogeochemistry 2: 3-27

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Pattimahu, D. V., 2004. *Restorasi Lahan Kritis Pasca Tambang Sesuai Kaidah Ekologi*. Makalah Falsafah Sains. Program Pasca Sarjana (S_3). IPB, Bogor.

Paul, E.A. & Clark, F.E. 1989. Soil Microbiology and Biochemistry. Academic Press Inc. London

Payan, F., D.L. Jones & J. Beer. 2007. Dynamics of size–density fractions of soil organic matter following the addition of tree litter to organic coffee farms. Geoderma. 141: 15–22

Petritan, I.C., R. Marzano, A.M. Petritan & E. Lingua. 2014. Overstory succession in a mixed Quercus petraea – Fagus sylvatica old growth forest revealed through the spatial pattern of competition and mortality. Forest Ecology and Management. 326: 9-17

Pelczar, Jr., M.J., E.C.S. Chan & N.R. Krieg. 1986. Microbiology. 5th ed. Tata McGraw-Hill Pub. Co. New Delhi

Plaster, E.J., 2003. Soil Science and Management. 4th Ed. Delmar Learning. New York. 384 p.

Powlson, D.S., P.C. Brookes, & B.T. Christensen. 1987. Measurement of soil microbial biomass provides an early indication of changes in total soil organic matter due to straw incorporation. Soil Biol. Biochem. 19: 159–164.

Porter, R. 1979. Microbial Processes: Promising Technologies for Developing Countries. National Academy of Siences. Washington DC. 195 hal.

Rao, N.S.S. 1982. Biofertilizers in Agriculture. Oxford & IBH Pub. Co. New Delhi. 185 hal.

Rao, N.S.S. 1999. Soil Microbiology (Fourth Edition of Soil Microorganisms and Plant Growth). Science Publisher Inc. Enfield USA. 407 hal.

Reintam, L., E. Kaar & I. Rooma. 2002. Development of soil organic matter under pine on quarry detritus of open-cast oil-shale mining. Forest Ecology and Management. 171: 191–198

Richards, B.N. 1974. Introduction to the Soil Ecosystem. Longman Group Limited. London. 266 hal.

Ritter, M.E. 2009. The Physical Environment: An Introduction to Physical Geography. http://www.uwsp.edu/geo/faculty/ritter/geog101/textbook/title_page.html. Visited : 13-2-2012 08.50

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Roshetko, J.M. & R.C. Gutteridge, 1996. Nitrogen Fixing Trees for Fodder Production: a field manual. Winrock Int. Arkansas.

Rosling, A., B.D. Lindahl, A.F.S. Taylor & R.D. Finlay. 2004. Mycelial growth and substrate acidification of ectomycorrhizal fungi in response to different minerals. FEMS Microbiology Ecology 47: 31-37

Scheer, M.B., G. Gatti, C. Wisniewski, A.Y. Mocochinski, A.T. Cavassani, A. Lorenzetto & F. Putini. 2009. Patterns of litter production in a secondary alluvial Atlantic Rain Forest in southern Brazil. Revista Brasil. Bot. 32 (4): 805-817

Scherer-Lorenzen, M., J.L. Bonilla & C. Potvin. 2007. Tree species richness affects litter production and decomposition rates in a tropical biodiversity experiment. Oikos 116: 2108-2124

Sedov, S., E. Solleiro-Rebolledo, S.L. Fedick, T. Pi-Puig, E. Vallejo-Gómez and M.L. Flores-Delgadillo. 2008. Micromorphology of a Soil Catena in Yucatán: Pedogenesis and Geomorphological Processes in a Tropical Karst Landscape. Dalam: S. Kapur, A. Mermut and G. Stoops (Eds). New Trends in Soil Micromorphology. Hal: 19-37.

Sicardi, M., F.Garcıa-Préchac & L. Frioni. 2004. Soil microbial indicators sensitive to land use conversion from pastures to commercial *Eucalyptus grandis* (Hill ex Maiden) plantations in Uruguay. Applied Soil Ecology 27: 125–133

Smiley, G.L. & J. Kroschel, 2008. Temporal change in carbon stocks of cocoa–gliricidia agroforests in Central Sulawesi, Indonesia. Agroforest Syst. 73:219–231

Smits, M.M., S. Bonneville, L.G. Benning, S.A. Banwart & J.R. Leake. 2012. Plant-driven weathering of apatite – the role of an ectomycorrhizal fungus. Geobiology. 10: 445–456

Smits, M.M., S. Bonneville, S. Haward & J.R. Leake. 2008. Ectomycorrhizal weathering, a matter of scale? Mineralogical Magazine. 72(1): 131–134

Soekotjo. 2004. Rehabilitasi daerah kritis pada kondisi tanah berbatu dan reklamasi areal bekas pertambangan. Dalam: Pramudibyo, RIS., OH Suseno, H. Supriyo, Soekotjo, M. Naiem, U. Iskandar. Dari Bukit-Bukit Gundul sampai ke Wanagama-1. Yayasan Sarana Wana Jaya. Yogyakarta. Hal: 87-102

Sourkova, M., J. Frouz, U. Fettweis, O. Bens, R.F. Huttl & H. Santruckova. 2005. Soil development and properties of microbial biomass succession in

PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
REHABILITASI LAHAN KRITIS DI HUTAN PENDIDIKAN WANAGAMA I YOGYAKARTA
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

reclaimed post mining sites near Sokolov (Czech Republic) and near Cottbus (Germany). Geoderma 129: 73–80

Stewart, J. L., Allison, G. E. & Simons, A. J. 1996. *Gliricidea sepium* : genetic resources for farmers. Oxford Forestry Institute. Department of Plant Sciences – University of Oxford. United Kingdom.

Subrahmanyam, G., R. Vaghela, N.P. Bhatt & G. Archana. 2012. Carbonate-Dissolving Bacteria from 'Miliolite', a Bioclastic Limestone, from Gopnath, Gujarat, Western India. Short Communication. Microbes Environ. 27 (3): 334–337

Suciatmih, Suliasih, & Hidayati, N. 1999. Inokulasi mikrosimbion dan pemupukan organic terhadap pertumbuhan Kaliandra dan Albizia di lahan bekas penambangan emas. Dalam Reklamasi Lahan Bekas Penambangan Emas Jampang. R. Abdulhadi, N. Hidayati, M. Siregar & B. Sunarko. LIPI. Bogor. hal: 43-50

Sukumar, D. & C. Aparna 2014. Phytochemical Studies And Antibacterial Investigations on *Gliricidia sepium*. Indian Journal of Rsearch. 3 (1): 12-13

Sundarapandian, S.M. & P.S. Swamy. 1999. Litter production and leaf-litter decomposition of selected tree species in tropical forests at Kodayar in the Western Ghats, India. Forest Ecology and Management 123: 231-244

Supriyo, H. 1992. Mineralogy and Chemistry of some soils from Java and Kalimantan, Indonesia. Thesis. Laboratory of Soil Science. Ehime University. 119 hal.

Supriyo, H. 2004. Perkembangan Fisik. Dalam: Pramudibyo, RIS., OH Suseno, H. Supriyo, Soekotjo, M. Naiem, U. Iskandar. Dari Bukit-Bukit Gundul sampai ke Wanagama-1. Yayasan Sarana Wana Jaya. Yogyakarta. hal: 41-69

Supriyo, H., E. Faridah, W. D. Atmanto & A. Figyantika. 2012. Effect of Tree Stands on Litter Biomass and Carbon Content in Wanagama Educational and Experimental Forest, Yogyakarta, Indonesia. Dalam: E.B. Hardiyanto, S. Solberg & M. Osaki (eds). Proceedings of International Conference on New Perspectives of Tropical Forest Rehabilitation for Better Forest Functions and Management. Faculty of Forestry Universitas Gadjah Mada, Yogyakarta, Indonesia. 17th – 19th October 20ll. Hal 136 – 139.

UNIVERSITAS GADJAH MADA
PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Supriyo, H., D. Prehaten & A. Figyantika. 2013. Soil Properties of Eight Forest Stands Resulted from Rehabilitation of Degraded Land on the Tropical Area for Almost A Half Century. Jurnal Manusia dan Lingkungan. 20: 294-302

Suseno, O.H. 2004. Sejarah Wanagama 1. Dalam: Pramudibyo, RIS., OH Suseno, H. Supriyo, Soekotjo, M. Naiem, U. Iskandar. Dari Bukit-Bukit Gundul sampai ke Wanagama-1. Yayasan Sarana Wana Jaya. Yogyakarta. Pp: 7-40

Tan, K.H. 2008. Soils in the Humid Tropics and Monsoon Region of Indonesia. CRC Press. New York. 557p.

Thiao, M., M. Neyra, E. Isidore, S. Sylla & D. Lesueur. 2004. Diversity and effectiveness of rhizobial strains from Gliricidia sepium native to Reunion Island, Kenya and New Caledonia. World Journal of Microbiology & Biotechnology 20: 703–709

Tian, G., M.A. Badejo, A.I. Okoh, F. Ishida, G.O. Kolawole, Y. Hayashi & F.K. Salako. 2007. Effects of residue quality and climate on plant residue decomposition and nutrient release along the transect from humid forest to Sahel of West Africa. Biogeochemistry. 86:217–229

Triadiati, S. Tjitrosemito, E. Guhardja, Sudarsono, I. Qayim & C. Leuschner. 2011. Litterfall production and leaf litter decomposition at natural forest and cacao agroforestry in Central Sulawesi, Indonesia. Asian Journal of Biological Sciences. 4: 221-234

Troeh, F.R., Hobbs, J. A. & Donahue, R. L., 1980. *Soil and Water Conservation for Productivity and Environmental Protection.* Englewoor Cliffs, New Jersey.

Valera, C.A., R.F. Valle Jr., S.G.P. Varandas, L.F.S. Fernandes & F.A.L Pacheco. 2016. The role of environmental land use conflicts in soil fertility: A study on the Uberaba river basin, Brazil. Science of the Total Environment. 562: 463-473

Vanlawue, B., K. Aihou, B.K. Tossah, J. Diels, N. Sanginga & R. Merckx. 2005. Senna siamea trees recycle Ca from a Ca-rich subsoil and increase the topsoil pH in agroforestry systems in the West African derived savanna zone. Plant and Soil. 269: 285–296

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GADJAH MADA
**PERAN GAMAL (Gliricidia sepium (Jacq.) Kunth ex Walp) PADA PEMBENTUKAN TANAH DALAM PROSES
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Universitas Gadjah Mada, 2016 | Diunduh dari http://etd.repository.ugm.ac.id/

Van Breemen, N. & P. Buurman. 2002. Soil formation. Second edition. Kluwer Academic Publishers. Netherlands.

Walpola, B.C.., K.K.I.U. Aruna-Kumara, A.P. Senanayake & S.D. Wanniarachchi. 2009. *Gliricidia* leaves decomposition: The effect of particle size on microbial respiration. Bangladesh J. Agril. Res. 34(3) : 343-350

Wang, Q., S. Wang, B. Fan & X. Yu. 2007. Litter production, leaf litter decomposition and nutrient return in Cunninghamia lanceolata plantations in south China: effect of planting conifers with broadleaved species. Plant Soil 297: 201–211

Wang, X., S. Yu, L. Zhou & S. Fu. 2016. Soil microbial characteristics and the influencing factors in subtropical forests. Acta Ecologica Sinica. 36: 8-15

Whittig, L.D & W.R. Allardice. 1986. X-Ray Diffraction Technique. Dalam: A. Klute (Ed.) Methods of Soil Analysis. Part 1. Physical and Mineralogical Methods. 2nd Edition. Madison, Wisconsin. hal: 331-360

Wiersum,K.F. & I.M. Nitis. 1992. Plant Resources of South-East Asia. 4. Forages. Prosea Foundation Bogor Indonesia

Yang, Y., J. Guo, G. Chen, Y. Yin, R. Gao & C. Lin. 2009. Effects of forest conversion on soil labile organic carbon fractions and aggregate stability in subtropical China. Plant Soil. 323:153–162

Zaharah, A.R. & A.R. Bah. 1999. Patterns of decomposition and nutrient release by fresh Gliricidia (*Gliricidia sepium*) leaves in an ultisol. *Nutrient Cycling in Agroecosystems* 55: 269–277

Zaharah, A.R, A.R. Bah, N.K. Mwange, P. Kathuli & P. Juma. 1999. Management of Gliricidia (*Gliricidia sepium*) residues for improved sweet corn yield in an ultisol. *Nutrient Cycling in Agroecosystems* 54: 31–39