

## DAFTAR PUSTAKA

- Bala, A., P. J. Murphy, and K. E. Giller. 2004. Classification of tropical tree rhizobia based on phenotypic characters forms nested clusters of phylogenetic groups. *West African Journal of Applied Ecology*. 6: 9-19.
- Bandyopadhyay, S., P. Bhattacharjee., N. Mukherjee. 1979. In vitro sensitivity of *Rhizobium* species to some fungicides and insecticides. *Pesticides*. 13:22-25.
- Berrada, H. and F. Benbrahim. 2014. Taxonomy of the rhizobia : current perspectives. *British Microbiology Research Journal*. 6 : 616-639.
- Brencic, A. and S. C. Winans. 2005. Detection of and response to signals involved in host microbe interactions by plant-associated bacteria. *Microbial Molecular Review*. 69: 155-194.
- Bruce, R.C., L.A. Warrell., D.G. Edwards., and L.C. Bell. 1988. Effects of aluminum and calcium in the soil solution of acid soils on root elongation of *Glycine max* cv. Forrest. *J. Agric. Res*. 38: 319-338
- Bruning, B. and J. Rozema. 2013. Symbiotic nitrogen fixation in legumes : Perspective for saline agriculture. *Environmental and Experimental Botany*. 92 : 134-143.
- Buol, S.W., F.D. Hole., and R.J. McCracken. 1973. *Soil Genesis and Classification*. Iowa State Univ. Press, Ames. 273-281.
- Chen, W.X., G.H. Yang., J.L. Li. 1988. Numerical taxonomy study of fastgrowing soybean rhizobia and a proposal that *Rhizobium fredii* be assigned to *Sinorhizobium* gen. nov. *Int. J. Syst. Bacteriol*. 38: 392–397.
- Chen, W., E. Wang., S. Wang., Y. Li., X. Chen., Y. Li. 1995. Characteristics of *Rhizobium tianshanense* sp. nov., a moderately and slow growing root nodule bacterium isolated from an arid saline environment in Xinjiang. People's Republic of China. *Int. J. Syst. Bacteriol*. 38: 392–397.
- Craswell, E.T, and E. Pushparajah. 1989. *Management of Acid Soils in the Humid Tropics of Asia*. Australian Centre for International Agricultural Research. Australia.
- Fatima, Z., M. Zia., dan M.C. Haudhary. 2006. Effect of *Rhizobium* strain and phosphorus on growth of soybean (*Glycine max*) and survival of *Rhizobium* and P-solubilizing bacteria. *Pakistan Journal of Botany* 2:459-464.

- Frederick, L.R. 1975. Soybean inoculation. International Publication. Collage of Agriculture University of Illinois.
- Graham, P.H. 1992. Stress tolerance in *Rhizobium* and *Bradyrhizobium*, and nodulation under adverse soil conditions. *Can. J Microbiol.* 38: 475-484
- Guimaraes, A.A., P. M. D. Jaramillo., R.S.A. Nobrega., L.A. Florentino. 2012. Genetic and symbiotic diversity of nitrogen-fixing bacteria isolated from agricultural soils in Western Amazon by using cowpea as the trap plant. *Applied Environmental Microbiology.* 78:6726-6733.
- Hadioetomo, R. S. 1993. Mikrobiologi Dasar Dalam Praktek: Teknik dan Prosedur Laboratorium. PT. Gedia Pustaka Utama, Jakarta
- Hilman, Y. A. Kasno, dan N. Saleh. 2004. Kacang-kacangan dan umbi-umbian: Kontribusi terhadap ketahanan pangan dan perkembangan teknologinya. Inovasi pertanian tanaman pangan. Puslitbangtan Bogor. 95-132.
- Jacobson, I. 1985. The role of phosphorus in nitrogen fixation by young pea plants. *Physiol Plant.* 64:190-196
- Janczarek, M., K. Rachwal, A. Marzec, and J. Grzadziel. 2015. Signal molecules and cell-surface components involved in early stages of the legume-rhizobium interactions. *Applied Soil Ecology.* 85 : 94-113.
- Johnson, A. C., and M. Wood. 1990. DNA a possible site of action of aluminum in *Rhizobium* spp. *Appl. Environ. Microbiol.* 56:3629-3633.
- Jordan, D.C. 1982. Transfer of *Rhizobium japonicum* Buchanan 1980 to *Bradyrhizobium* gen. nov., a genus of slow-growing, root nodule bacteria from leguminous plants. *Int. J. Syst. Bacteriol.* 32: 136–140
- Jutono, J., S. Soedarsono., Hartadi., S.Kabirun, Suhadi, dan Soesanto. 1973. Pedoman Praktikum Mikrobiologi Umum Untuk Perguruan Tinggi. Departemen Mikrobiologi Fakultas Pertanian Universitas Gadjah Mada, Yogyakarta.
- Kumar, S.P. 2012. Characterization and cross inoculation groups studies of *Rhizobia* isolated from crop wild relatives of *Vigna*. Department of Botany, Faculty of Science, University of Pradeniya, Sri Lanka.
- Kuykendall, L.D., B. Saxena., T.E. Devine., T.E. Udell. 1992. Genetic diversity in *Bradyrhizobium japonicum* Jordan 1982 and a proposal for *Bradyrhizobium elkanii* sp. nov., *Can. J. Microbiol.* 38: 501– 505.

- Kuykendall, L. D., J. M. Young, E. Martinez-Romero, A. Kerr, and H. Sawada. 2005. *Rhizobium*. In: Don J. Brenner, Noel R. Krieg, and James T. Staley *Bergey's Manual of Systematic Bacteriology* 2nd ed. Vol. 2. Springer, New York.
- Langley, and Beveridge. 1999. Effect of O-side-chain-lipopolysaccharide chemistry on metal binding. *Applied Environmental Microbiology*. 65 : 489-498.
- Lindeque, M. I. 2006. Diversity of root nodule bacteria associated with *Phaseolus coccineus* and *Phaseolus vulgaris* species in South Africa. Department of Microbiology and Plant Pathology, Faculty of Natural and Agriculture Sciences, University of Pretoria. Doctoral Disertation.
- Macdonald, T.L. and R.B. Martin. 1988. Aluminium ion in biological systems. *Trends Biochem. Sci.* 13: 15-19.
- Martani, E., S. Margino., D. Indradewa., and A. Priyono. 2011. Isolation and selection of *Rhizobium* tolerant to pesticides and aluminum from acid soils in Indonesia. *J. Tropical soils*. 16: 47-54.
- Masson-Boivin, C., E. Giraud., X. Perret., and J. Batut. 2009. Establishing nitrogen-fixing symbiosis with legume: how many *Rhizobia* species. *Trends in Microbiology*. 17: 458-466.
- Midranisiah., N. Marlina., S.E. Rahim., and E. Hawayanti. 2016. Utilization of organic fertilizer on sweet corn (*Zea mays saccharata* Sturt) crop at shallow swamp land. *MATEC Web of Conferences*. 97: 1-8.
- Moreira, F.M.S. 2006. Nitrogen-fixing Leguminosae-nodulating bacteria. In: Moreira, F.M.S., Siqueira, J.O., Brussaard, L. *Soil biodiversity in Amazonian and other Brazilian ecosystems*. CAB International. Wallingford, United Kingdom. 237-270.
- Mulyani, A. 2006. Potensi Pengembangan Tanah Masam Untuk Pertanian. *Warta Penelitian dan Pengembangan Pertanian*. 28: 16-17.
- Naveed, M., I. Mehboob., M.B. Hussain., and Z.A. Zahir. 2015. Perspective of rhizobial inoculation for sustainable crop production. *Plant Microbes Symbiosis*. 11: 209-239.
- Neves, M. C.P., and N.G. Rumjanek. 1997. Diversity and adaptability of soybean and cowpea rhizobia in tropical soils. *Soil Biology and Biochemistry*. 29: 889-895.

- Norris, J.R., and W.R. Douglas. 2002. Biochemical Test. Methods in Microbiology : 10.
- Notohadiprawiro, T. 2006 Budidaya: Suatu system pengusahaan lahan bagi keberhasilan prog transmigrasi pola pertanian lahan kering. Repro: Ilmu Tanah UGM. Yogyakarta. 1-10.
- Ozawa, T., Y. Imai ., H.I. Sukiman., H. Karsono., D. Ariani., S. Saono. 1999. Low pH and aluminium tolerance of *Bradyrhizobium* strains isolated from acid soils in Indonesia. Soil Sci. Plant Nutri. 45: 987-992.
- Pastorino, G.N., V.M. Alcantara., P.A. Balatti. 2003. Identification of fast and slow growing rhizobia nodulating soybean (*Glycine max* L. Merr) by a multiplex PCR reaction. FEMS Microbiology. 29: 153-158.
- Pereira, SI., A.L. Lima., E. M. Figueira. 2006. Screening possible mechanisms mediating cadmium resistance in *Rhizobium leguminosarum* bv. Viciae isolated from contaminated Portuguese soils. Microbial Ecology. 52: 176-186.
- Rao, N. S. S. 1982. Biofertilizers in Agriculture. Oxford& IBH Publishing Company. New Delhi, Bombay.
- Rao, N.S.S. 1994. Mikroorganisme Tanah dan Pertumbuhan Tanaman Edisi kedua. Universitas Indonesia Press, Jakarta.
- Rasolomampianina, R., X. Bailly, R. Fetiarison, R. Rabevohitra, G. Bena, L. Ramaroson, M. Raherimandimby, L. Moulin, P. De lajudie, B. Dreyfus, and J.C. Avarre. 2005. Nitrogen-fixing nodules from rose wood legume trees (*Dalbergia* spp.) Endemic to madagascar host seven different genera belonging to alfa and beta proteobacteria. Molecular Ecology. 14: 4135-4146.
- Richardson, A. E., R. J. Simpson, M. A. Djordjevic, and B. J. Rolfe. 1988. Expression of nodulation genes in *Rhizobium leguminosarum* bv. trifolii is affected by low pH and by Ca and Al ions. Appl. Environ. Microbiol. 54:2541-2548.
- Rodriguez, D.N., I. M. Oliver., M. A. Contreras., J.E. Ruiz-Sainz. 2011. Soybean interactions with soil microbes, agronomical, and molecular aspects. Agronomy Sustainability. 31: 173-190.
- Santoso, D. 1991. Agricultural land of Indonesia. IARDJ. 13;33-36.

- Saxena, D., M. Amin., S. Khanna. 1996. Modulation of protein profiles in *Rhizobia* sp. under salt stress. *Can J Microbiology*. 42 : 617-620.
- Simanungkalit, R.D.M., R.J. Roughley., R.D. Hastuti., A. Indrasumunar, and Pratiwi, E. 1996. Inoculation of soybean with selected strains of *Bradyrhizobium japonicum* can increase yield on acid soils in Indonesia. *Soil BioI. Biochem*. 28: 257-259
- Somasegaran, P. and H.J. Hoben. 1985. *Methods in Legume : Rhizobium Technology*. Department of Agronomy and Soil Science, University of Hawaii.
- Sumarno. 2005. Strategi pengembangan kedelai di lahan masam. *Prosiding Lokakarya Pengembangan Kedelai di Lahan Suboptimal*. Puslitbangtan Bogor. 37-46
- Sutherland, I.W. 1985. Biosynthesis and composition of g-negative bacterial extracellular and wall polysaccharides. *Annu Rev Microbiology*. 39 : 243-270.
- Taufiq, A., and A.G. Manshuri. 2003. Pemupukan dan Pengapuran pada Varietas Kedelai Toleran Lahan Masam di Lampung. <http://www.pangan.litbang.pertanian.go.id/tanaman-pangan-292.html>. Diakses pada tanggal 1 April 2017.
- Tim Primatani. 2006. Inovasi teknologi unggulan tanaman pangan berbasis agroekosistem mendukung primatani. *Puslitbangtan Bogor*. 26: 40.
- Triadiati., N. R. Mubarik., and Y. Ramasita. 2013. Growth response of soybean to acid tolerant *Bradyrhizobium japonicum* and fertilizers application in acid soil. *J. Agronomy Indonesia*. 41:24-31.
- Tu, J C. 1981. Effect of salinity on *Rhizobium*-root hair interaction, nodulation and growth of soybean. *Can J Plant Sci*. 61:231.
- Valverde,C., A.F. Hozbor., A. Legares. 1997. Rapid preparation of affinity-purified lipopolysaccharide samples for electrophoretic analysis. *BioTechniques*. 22: 230-236.
- van Berkum, P., B.D. Eardly. 1998. Molecular evolutionary systematics of the rhizobiaceae. In *the Rhizobiaceae*. Kluwer Academic, Dordrecht. 1-24.
- Vincent, J. M. 1970. *A Manual for the Practical Study of the Root Nodule Bacteria*. IBP Hand Book No. 15. Blackwell Scientific Publishing, Oxford.

- Vinuesa, P., M. León-Barrios., C. Silva., A. Willems., Jarabo-Lorenzo, A., R. Pérez-Galdona., D. Werner., E. Martínez-Romero. 2005. *Bradyrhizobium canariensesp.* nov., an acid-tolerant endosymbiont that nodulates endemic genistoid legumes (Papilionoideae: Genisteae) from the Canary Islands, along with *Bradyrhizobia japonicum* bv. *genistearum*, *Bradyrhizobia* genospecies alpha and *Bradyrhizobia* genospecies beta. *Int. J. Syst. Evol. Microbiol.* 55: 569-575.
- Weaver, R.W. 1970. Population of *Rhizobium japonicum* in Iowa soils and inoculums level needed for nodulation of *Glycine max* (L.) Merrill. Iowa state university. Retrospective Theses and Disertations.
- Xu, L.M., Ge C., Cui Z., Li J., Fan H. 1995. *Bradyrhizobium liaoningense* sp. nov., isolated from the root nodules of soybeans. *Int. J. Syst. Bacteriol.* 45: 706–711.
- Yusnawan, E., A. Inayati., H. Kuswantoro. 2015. Total Pnenolic contents and antioxidant activities of ten soybean promising lines tolerant to acid soil. Indonesian Legumes and Tuber Crops Research Institute, Indonesia.
- Yuwono, T. 2006. *Bioteknologi Pertanian*. Gadjah Mada University Press. Yogyakarta.
- Zahran, H.H. 1999. *Rhizobium-Legume Symbiosis and Nitrogen Fixation under Severe Conditions and in an Arid Climate*. *Microbiology and Molecular Biology Reviews.* 63 : 968-989