

REFERENCES

- Allen, O.N. and E.K. Allen. 1981. "Leguminosae: a source book of characteristics, uses, and nodulation." Univ. of Wisconsin Press, Madison.
- Allos, H.F. and W.V. Bartholomew. 1959. Replacement of symbiotic fixation by available nitrogen. *Soil Sci.* 87:61-66.
- Andrews, C.S., A.D. Johnson and R.L. Sandland. 1973. Effect of aluminium on the growth and chemical composition of some tropical and temperate pasture legumes. *Aust. J. Agric. Res.* 24:325-339.
- Azevedo, J. L., W. Maccheroni Jr., J. O. Pereira, W. L. Araujo. 2000 . Endophytic microorganisms: a review on insect control and recent advances on tropical plants. *EJB Electronic J. Biotechnol.* 3(1):40-65.
- Baldwin, A.R. and Fulmer, R. W. 1984. Expanding opportunities for utilization of soybean oil and protein. *Proceedings of world soybean research conference III.* Iowa State University. pp.135-141.
- Bashan, Y. 1998. Inoculants of plant-promoting bacteria for use in agriculture. *Biotechnol. Adv.* 16: 729-770.
- Bernstein, L., and G. Ogata. 1966. Effect of salinity on nodulation, nitrogen fixation and growth of soybean and alfalfa. *Agron. J.* 68: 201-203.
- Bezdicek, D.F., D.W. Evans, B. Abede and R. E. Witters. 1978. Evaluation of peat and granular inoculum for soybean yield and N fixation under irrigation. *Agron. J.* 70:865-868.

- Bien, P. V., Tien, H. H., Quy, P. N., Tam, M. T. and Nu, B. V. 1996. *The Soybean. Agriculture Public House.* Hanoi. 78pp. (in Vietnamese).
- Bottomley, P.J. and D.D. Myrold. 2007. Biological N inputs. in Paul (Ed.), *Soil microbiology, ecology, and biochemistry* (377p), Oxford: Academic Press in an imprint of Elsevier.
- Brady, D.J., C.H. Hecht-Buchholz, C.D. Asher, and D.G. Edwards. 1990. Effects of low activities of aluminium on soybean (*Glycine max*) 1. Early growth and nodulation. in: van Beusichem, M.L.(Ed.), *Plant nutrition-physiology and applications* (pp. 329-334), Dordrecht: Kluwer Academic Publishers.
- Brockwell, J., P.J. Bottomley and J.E. Thies. 1995. Manipulation of rhizobia microflora for improving legume productivity and soil fertility: a critical assessment. *Plant Soil.* 174:143-180.
- Caldwell, B.E. and G. Vest. 1968. Nodulation interactions between soybean genotypes and serogroups of *Rhizobium japonicum*. *Crop Sci.* 8:680-682.
- Caldwell, B.E. and G. Vest. 1970. Effect of *Bradyrhizobium japonicum* strains on soybean yields. *Crop Sci.* 10:19-21.
- Campo, R. J. 1995. *Residual effects of aluminium on Bradyrhizobium japonicum in defined medium and soil solution.* Ph.D. Thesis. The University of Reading, Reading.
- Cataldo, D. A., M. Maroon, L. E. Schrader, V. L. Youngs. 1975. Rapid colorimetric determination of nitrate in plant tissue by nitration of salicylic acid *Communications in Soil Science and Plant Analysis* 6: 71 – 80.

- Cattelant, A. J., and M. Hungria. 1994. Nitrogen nutrition and inoculation. P. 201-212. in Tropical soybean: Improvement and Production. FAO. Rome. 368 pp.
- Christensen, E. H. 1970. The miracle bean. *Agricultural marketing* 15(11): 16.
- Chet, I., R. Shapira, A. Ordentlich and A. B. Oppenheim. 1990. Mechanisms of biocontrol of soil-borne plant pathogens by rhizobacteria. *Plant Soil* 129: 85-92.
- Cooper, J.E., M. Wood and A.J. Holding . 1983. The influence of soil acidity factors on rhizobia. in Jones, D.G. and D.R. Davies (Eds.), *Temperate legumes: Physiology, genetics and nodulation*. Pittman, London. pp. 319-335.
- Coventry, D.R. and J. Evans. 1989. Symbiotic nitrogen fixation and soil acidity. in Robison, A.D. (Ed.), *Soil acidity and plant growth* (pp. 103-137), Sydey: Academic Press.
- Crawford, D., J. M. Lynch, J. M. Whipps and M. A. Qusley. 1993. Isolation and characterization of actinomycetes antagonists of a fungal root pathogen. *App. Environ. Microbiol.* 46(4): 925-929.
- CSO. 2006. *Myanmar Agricultural Statistics (1992-1993 to 2004-2005)*. Central Statistical Organization, Ministry of National Planning and Economic Development.
- CSO. 2007. *Myanmar Agricultural Statistics (1992-1993 to 2004-2005)*. Central Statistical Organization, Ministry of National Planning and Economic Development.
- DAR. 2004. *Research Outcomes from Agricultural Research Golden Jubilee*. Department of Agricultural Research (DAR), MOAI, pp.115. Myanmar.

- Dart, P. J. 1974. The infection process. P. 23-38. in Quispel, A. (Ed.), *Biological Nitrogen Fixation*. North Holland Publishing Co.
- Dart, P. J. 1974. Development of root-nodule symbioses. in Quispel, A. (Ed.), *The Biology of Nitrogen Fixation* (pp. 381-429), New York: American Elsevier Publishing Company, Inc.
- Date, R. 1996. Selection of strains for inoculant production. in Balatti, A. P. and J.R.J. Freire (Eds.), *Legume inoculants: Selection and characterization of strains, production, use and management* (pp. 148), Argentina: Calle 6. N 221. La Plata. Buenos Aires.
- Denarie, J., F. Debelle and C. Rosenberg. 1992. Signalling and host range variation in nodulation. *Annual Review of Microbiology*. 46:453-464.
- Diatloff, A. and S. Langford. 1975. Effective natural nodulation of peanuts in Queensland. *Queensl. J. Agric. Anim. Sci.* 32:95-100.
- Dilworth, M.J., J.G. Howieson, W.G. Reeve, R. T. Tiwari and A. R. Glenn. 2001. Acid tolerance in legume root nodule bacteria and selecting for it. *Aust. J. Expt. Agric.* 41:446-453.
- Dowling, D.N. and W.J. Broughton. 1986. Competition for nodulation of legumes. *Annual review of Microbiology*. 40:191-197.
- Eaglasham, A.R., J.S. Hassouna and R. Seegers. 1983. Fertilizer-N effect on N₂ fixation by cowpea and soybeans. *Agron. J.* 75:61-66.
- Erdman, L.W. and U.M. Means. 1952. Use of total yield for predicting nitrogen content of inoculated legumes grown in sand cultures. *Soil Sci.* 73: 231-235.

- Evens, H.J. and L.E. Barbar. 1977. Biological nitrogen fixation for food and fiber production. *Science*. 197:332-339.
- FAO. 1984. *Legume Inoculants and Their Use*. Food and Agriculture Organization of the United Nation. Rome. 63 pp.
- FAO. 1998. *Crop Production*. FAOSTAT Database 1995, FAO Rome.
- Giller, K.E. and K.J. Wilson. 1993. *Nitrogen fixation in tropical cropping systems*. CAB International, Wallingford, UK, 313 pp.
- Gomez, K.A and A.A Gomez. 1984. *Stastical Procedures for Agricultural Research*. 2nd Edn, John Wiley and Sons, Inc., New York, ISBN-10: 0471870927.
- Graham, P.H., K.J. Draeger, M.L. Ferrey, M. J. Conroy, B.E. Hammer, E. Martinez, S.R. Aarons and C. Quinto. 1994. Acid pH tolerance in strains of *Rhizobium* and *Bradyrhizobium*, and initial studies on the basis for acid tolerance of *Rhizobium tropici* UMR 1899. *Can. J. Microbiol.* 40:198-207.
- Halliday, J. 1984. Principles of *Rhizobium* strain selection. in Alexander, M. (Ed.), *Biological nitrogen fixation: Ecology, technology and physiology* (pp. 155-171), New York: Plenum Press.
- Hallmann, J., A. Quadt- Hallmann, W. F. Mahaffee, and J. W. Kloepoor. 1997. Bacterial endophytes in agricultural crops. *Can. J. Microbiol.* 43: 895-914.
- Ham, G.E., L.R. Frederick and I. C. Anderson. 1971. Serogroups of *Rhizobium japonicum* in soybean nodules. *Agron. J.* 63:69-72.
- Herridge, D. 2002. Legume N and Inoculants: Global and Vietnamese Perspectives. in Herridge. D. (Ed.), *Inoculants and nitrogen fixation of legumes in Vietnam*.

Proceedings of a Workshop Held in Hanoi, Vietnam 17-18 February 2001,

p.7.

Herridge, D. F and M. B. Peoples. 2002. Timing of xylem sampling for ureide analysis of Nitrogen fixation. *Plant and Soil.* 238: 57-67.

Hinson, K., and E. E. Hartwig. 1982. *Soybean Production in The Tropics.* FAO. Rome. 158 p.

Hla Than and Thein Han. 1988. Contribution of nitrogen fixation to crop production in Myanmar. *Proc. Myanmar Agri. Sci. Res.Div. 19th Congress (1988)*:131-144.

Howieson, J.G., G.W.O. Hara and S. J. Carr. 2000. Changing roles for legumes in Mediterranean agriculture: developments from an Australian perspective. *Field Crops Research.* 65:107-122.

Hungria, M., M.A.T. Vargas and R.S. Araujo. 1997. Fixacao biologica do nitrogenio em feijoeiro. in Vargas, M.A.T., and M.Hungria (Eds.), *Biologia dos Solos doc Cerrados*(pp. 189-295), Brazil: EMBRAPA-CPAC, Planaltina

Hymowitz, T., R.J. Singh and K.P. Kollipara. 1998. The genomes of the *Glycine*. in Janick, J. (Ed.), *Plant Breeding Reviews.* 16:289-311.

ITTA. 1985. *Grain Legume Improvement Program. Research Highlights 1981-1984.* Nigeria. 80 p.

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.* 32:136-139.

- Jordan, D.C. 1984. *Rhizobiaceae*. CONN 1938. in Krieg, N.R. and J.G. Holt (Eds.), *Bergey's Manual of systematic Bacteriology, Vol. I.* Baltimore: The Williams and Wilkins Co.
- Kim, M.M., C.J. Asher, D.G. Edwards and R.A. Date. 1985. Aluminium toxicity : effects on growth and nodulation of subterranean clover. *Proceedings of the 15th International Grasslands Congress, Kentucky*, pp: 501-503.
- Kuykendall, L.D., and D.F. Weber. 1978. Genetically marked *Rhizobium* identifiable as inoculum strain in the nodules of soybean plants grown in fields populated with *Rhizobium japonicum*. *Appl. Environ. Microbiol.* 36: 915-919.
- Kuykendall, L.D., B. Saxena, T.E. Devine and S.E. Udell. 1992. Genetic diversity in *Bradyrhizobium japonicum* Jordan 1982 and proposal for *Bradyrhizobium elkanii* sp. nov. *Can. J. Microbiol.* 38:501-505.
- Ladha, J. K., and M. B. Peoples. 1995. *Management of Biological N₂fixation of the Development of More Productive and Sustainable Agricultural Systems.* Kluewer Academic Publishers. 125 p.
- Libbenza, K. R. and R. J. Bogers. 1974. Root- nodule morphogenesis. in Quispel, A. (Ed.), *The Biology of Nitrogen Fixation* (pp. 430-472), New York: American Elsevier Publishing Company, Inc.
- Lopez-Garcia, S.L., T. E .E . Vazquez, G. Favelukes and A. R. Lodeiro. 2001. Imporved soybean root association of N-starved *Bradyrhizobium japonicum*. *J. Bacteriol.* 183: 7241-7254.
- Lowendorff, H.S. 1981. Factor affecting survival of *Rhizobium* in soil. *Adv. Microbial Ecol.* 4:87-124.

- Matsukuma, S., T. Okuda and J. Watanabe. 1994. Isolation of actinomycetes from pine litter layers. *Actinomycetol.* 8(2): 57-65.
- Maw Maw Than, Kyi Kyi San and Maung Maung Thein. 2006. Evaluation of effective rhizobial strains for commercial legume inoculants. *Proceedings of Second Agricultural Research Conference, Yezin Agricultural University (YAU), Nay Pyi Taw, Myanmar, 24-26 November 2006*, pp 264-280.
- Moawad, A.M. 2000. *Soil Biology. Institute of Agronomy in the tropics*. University of Gottingen. Germany.
- Mulonggoy, K., and M. Gueye. 1990. *Biological N₂ fixation and Sustainability of Tropical Agriculture*. Jhon Wiley and Sons. Inc. New York. 435 p.
- Muns, D. N. 1977. Mineral nutrition and the legume symbiosis. in Hardy, R. W. E., and H. Gibson (Eds.), *A Treatise on Dinitrogen Fixation. Section IV. Agronomy and Ecology* (pp. 353-391), New York: John Wiley and Sons.
- Murphy, H.E., D.G. Edwards and C.J. Asher. 1984. Effects of aluminum on nodulation and early growth of four tropical pasture legumes. *Aust. J. Agric. Res.* 35:663-673.
- Nguyen Xuan Cu. 1996. *The performance of soybean on low phosphorous acid soil in the northern mountainous region of vietnam*. MSc Thesis. Chiang Mai University, Thailand. 41-45 p.
- Okazaki, T., K. Takahashi, M. Kizuka and R. Enokita. 1995. Studies on actinomycetes isolated from plant leaves. *Ann. Rep. Sanko Res. Lab.* 47:97-106.
- Paulitz, T.C and R. G. Linderman. 1991. Lack of antagonism between the biocontrol

- agent *Gliocladium virens** and vesicular arbuscular mycorrhizal fungal. *New hytol.* 117: 303-308.
- Peoples, M.B.; F.J. Bergersen; D.F. Herridge.; M.N. Sudin; A.W. Faizah; K. Chong and M. Norhayati, 1988a. Estimation of nitrogen fixation in legumes in the tropics by xylem sap analysis. in Shanmsuddin, Z.H.; W.M.W. Othman; M. Marziah and J. Sundram (Eds.), *Biotechnology of nitrogen fixation in the tropics* (pp. 117-126), Serdang, Malaysia: Universiti Pertanian Malaysia.
- Peoples, M.B. A.W. Faizah, B. Rerkasem, and D.F. Herridge. 1989. Methods for evaluating nitrogen fixation by nodulated legumes in the field. *ACIAR Monograph .11 (7)*: 39-40.
- Perret, X., C. Staechelin and W.J. Broughton. 2000. Molecular basis of symbiotic promiscuity. *Microbiology and Molecular Biology Reviews.* 64:180-201.
- Phillips, D.A., W.R. Streit, H. Volpin and and C.M. Joseph. 1997. Plant regulation of root colonisation by *Rhizobium meliloti*. in Legocki, A., H. Bothe, and A. Puhler (Eds.), *Biological fixation of nitrogen for ecology and sustainable agriculture* (pp. 133-136), Berlin, Germany: Springer-Verlag.
- Quispel, A.1992. A search for signals in endophytic microorganisms. in Verma D.P.S.(Ed.), *Molecular signals in plant-microbe communications* (pp.471-490), Boca Raton: CRC Press.
- Rennie, R.J. and S. Dubetz, 1984. Multistain vs. single strain *Rhizobium japonicum* inoculants for early maturing (00 and 000) soybeans cultivars: N₂ quantified by N¹⁵ isotopic dilution. *Agron . J.* 76.498-502.

- Sadowsky, M.J. and P.H. Graham. 1998. Soil biology of the *Rhizobiaceae*. in Spaink, H.P., A. Kondorosi and P.J.J. Hooykaas (Eds.), *The Rhizobiaceae* (pp.155-172), Kluwer: Dordrecht. The Netherlands.
- Sardi, P., M. Saracchi, S. Quaroni, B. Peterolini, G. E. Borgonovi and S. Merli. 1992. Isolation of endophytic *Streptomyces* strains from surface-sterile roots. *Appl. Environ. Microbiol.* 58: 2691-2693.
- Sawada, H., L.D. Kuykendall and J.M. Young. 2003. Changing concepts in the systematics of bacterial nitrogen-fixing legume symbiosis. *J. Gen Appl Microbiol* 49:155-179.
- Schlaman, H.R.M., D.A. Phillips and E. Kondorosi. 1998. Genetic organisation and transcriptional regulation of rhizobial nodulation genes. in Spaink, H.P., A. Kondorosi and P.J.J. Hooykaas (Eds.), *The Rhizobiaceae* (pp. 361-386), Kluwer: Dordrecht. The Netherlands.
- Senaratne, R., C. Amornpinol and G. Hardarson. 1987. Effect of combined nitrogen on nitrogen fixation of soybean (*Glycine max* L. Merril) as affected by cultivar and rhizobial strain. *Plant Siol.* 103:45-50.
- Sessitsch, A., B. Reiter and G. Berg. 2004. *Endophytic bacterial communities of field-grown potato plants and their plant-growth-promoting and antagonistic abilities*. *Can. J. Microbiol.* 50(4): 239–249.
- Shimizu, M., Y. Nakagawa, Y. Sato, T. Furumai, Y. Igarashi, H. Onaka, R. Yoshida and H. Kunoh. 2000. Studies on endophytic actinomycetes (I) *Streptomyces* sp. isolate from rhododendron and its antifungal activity. *J. Gen. Plant Patho.* 66: 360-366.

- Sinha, S. K. 1977. *Food Legumes Distribution Adaptability and Biology of Yield.* FAO. Rome. 230 p.
- Somasegaran, P. and H.J.Hoben. 1984. *Handbook for Rhizobia. Methods in legumes-Rhizobium technology.* Springer-Verlag, New York. Inc. pp.450.
- Tanner, J. W., and D. J. Hume. 1978. Management and production. P. 164-166. in N. Geoffreyy (Ed.), *Soybean Physiology, Agronomy and Utilization.* New York Academic Press.
- Thapanapongworakul, P. 2003. *Characterization of endophytic actinomycetes capable of controlling sweet pea root rot diseases and effects on root nodule bacteria.* MSc Thesis. Chiang Mai University, Thailand. pp.45.
- Thi Thi Aung. 2007. *Selection of effective Bradyrhizobium strains for soybean (Glycine max).* MSc Thesis. Yezin Agriculture University, Myanmar. pp. 38-41.
- Tokala, R.K., J. L. Strap, C. M. Jung, D. F. Crawford, M. H. Salove, L. A. Deobald, J. F. Bailey and M. J. Morra. 2002. Novel Plant-Microbe Rhizosphere Interaction Involving *Streptomyces lydicus* Wyec108 and the Pea Plant (*Pisum sativum*). *Applied and Environmental Microbiology*, 68 (5): 2161-2171.
- Van der Merwe, S.R., B.W. Strijdom, and C.J. Uys. 1974. Groundnut response to seed inoculation under extensive agricultural practices in South African soils. *Phytophylactica*. 6:295-302.
- Van Kammen, A. 1995. The molecular development of nitrogen fixing root nodules.

- in Tikhonovich, I.A., N.A. Provorov, V.I. Romanov and W.E. Newton (Eds.), *Nitrogen fixation: Fundamentals and applications* (pp. 9-14): Kluwer Academic Publishers. The Nethrelands.
- Vargas, A.A.T. and P.H. Graham. 1988. *Phaseolus vulgaris* cultivar and *Rhizobium* strain variation in acid-pH tolerance and nodulation under acidic conditions. *Field crops Res.* 19:91-101.
- Wadisirisuk, P. and R.W. Weaver. 1985. Importance of bacteroid number in nodules and effective nodule mass to dinitrogen fixation by cowpeas. *Plant and Soil.* 87:223-231.
- Walter, O.S.; and R.A. Samuel. 1983. *Modern Soybean Production*. Pulication, Inc. Illinois, USA. 209-212 p.
- Weaver, R.W. and L.R. Frederick. 1974. Effects of inoculum rate on competitive nodulation of *Glycine max* L. Merril. II. Field studies. *Agron. J.* 66:233-236.
- Weaver, R.W, J.S Angle, and P.S Bottomley, 1994. Method of soil analysis. Part 2: Microbiological and biochemical properties. Soil Science Society of America Book Series, No.5. Soil Science Society of America, Madison, Wisconsin, USA.
- Wilson, P. W., and W. W. Umbriet. 1967. Fixation and transfer of nitrogen in the soybean. Zenthl. *Bact. Etc. 2 Abt.* 96: 402-411.
- Xu, L.M., C. Ge, Z. Cui, J. Li and H. Fan 1995. *Bradyrhizobium liaoningense* sp. nov., isolated from the root nodules of soybeans. *Int. J. Syst. Bacteriol.* 45:706-711.

- Yemm and Cocking, 1955. E.W. Yemm and E.C. Cocking, The determination of amino acids with ninhydrin. *Analyst* 80 (1955), pp. 209–213.
- Young, E. G., C. F. Conway. 1942. On the estimation of Allantoin by the Rimini-Schryver reaction. *J Biol Chem.* 142:839–853.
- Yunan, W. M and D. L. Crawford. 1995. Characterization of *Streptomyces lydicus* WYEC108 as a potential biological agent against fungal root and seed rots. *Appl. Environ. Microbiol.* 61(8): 3119-3128.
- Zary, K.W., J.C. Miller, Jr. R.W. Weaver, and L.W. Barnes. 1978. Intraspecific variability for nitrogen fixation in southern pea (*Vigna unguiculata* L. Walp). *J. Amer. Soc. Hort. Sci.* 103(6):806-808.