

## References

- Armstrong, J., Armstrong, W. 2005. Rice: Sulfide-induced barriers to root radial oxygen loss, Fe<sup>2+</sup> and water uptake, and lateral root emergence. *Annals of Botany* 96: 625-638.
- Armstrong, W. 1979. Aeration in higher plants. *Advance in botanical research* 7
- Aschi-Smiti, S., Chaibi, W., Brouquisse, R., Ricard, B., Saglio, P. 2003. Assessment of Enzyme Induction and Aerenchyma Formation as Mechanisms for Flooding Tolerance in *Trifolium subterraneum* 'Park'. *Annals of Botany* 91: 195-204.
- Atlin, G. N., Lafitte, H. R., Tao, D., Laza, M., Amante, M., Courtois, B. 2006. Developing rice cultivars for high-fertility upland systems in the Asian tropics. *Field Crops Research* 97(1): 43-52.
- Atwell, B. J., Kriedemann, P. E., Turnbull, C. G. N. 1999. Waterlogging and submergence of terrestrial plant. In: *Waterlogging and submergence: surviving poor aeration*.
- Bange, M. P., Milroy, S. P., Thongbai, P. 2004. Growth and yield of cotton in response to waterlogging. *Field Crops Research* 88(2-3): 129-142.
- Banoc, D. M., Yamauchi, A., Kamoshita, A., Wade, L. J., Pardales, J. R. 2000a. Dry matter production and root system development of rice cultivars under fluctuating soil moisture. *Plant Production Science* 3(2): 197-207.
- Banoc, D. M., Yamauchi, A., Kamoshita, A., Wade, L. J., Pardales, J. R. 2000b. Genotypic variations in response of lateral root development to fluctuating soil moisture in rice. *Plant Production Science* 3(3): 335-343.

- Catling, H. D., Puckridge, D. W., HilleRisLamber, D. 1988. The environment of Asian deepwater rice. In Proceedings of The 1987 International Deepwater Rice Workshop,. Bangkok, Thailand, 11-34.
- Chang, S. C. 1976a. Phosphorus in submerged soils and phosphorus nutrition and fertilization of rice. in The fertility of paddy soils and fertilizer application for rice (93-116). Taipei, Taiwan.
- Chang, T.-T. 2003. Origin, Domestication, and Diversification. Smith, C W and Dilday, R H. in Rice: Origin, History, Technology, and Production (3-25). the United States of America: John Wiley & Sons, Inc.
- Chang, T. T. 1976b. The origin, evolution, cultivation, dissemination and diversification of Asian and African rices. *Euphytica* 25: 425-441.
- Chang, T. T. 1985. Crop history and genetic conservation: rice-a case study. Iowa State Univ. J. Res. 54(4): 81-89.
- Chiang, C. T. 1963. The interrelationship between available phosphorus and soil pH, Eh. in A study of the availability and forms of phosphorus in paddy soils (61). Taiwan.
- Clark, L. H., Harris, W. H. 1981. Observations on the root anatomy of rice (*Oryza sativa* L.). *American Journal of Botany* 68(2): 154-161.
- Colmer, T. D. 2003a. Aerenchyma and an Inducible Barrier to Radial Oxygen Loss Facilitate Root Aeration in Upland, Paddy and Deep-water Rice (*Oryza sativa* L.). *Annals of Botany* 91: 301-309.
- Colmer, T. D. 2003b. Long-distance transport of gases in plants; a perspective on internal aeration and radial oxygen loss from roots. *Plant, Cell and Environment* 26: 17-36.

- Colmer, T. D., Bloom, A. J. 1998. A comparison of  $\text{NH}_4^+$  and  $\text{NO}_3^-$  net fluxes along roots of rice and maize. *Plant, Cell and Environment* 21: 240-246.
- Colmer, T. D., Cox, M. C. H., Voeselek, L. A. C. J. 2006. Root aeration in rice (*Oryza sativa*): evaluation of oxygen, carbon dioxide, and ethylene as possible regulators of root acclimatizations. *New Phytologist* 170: 767-778.
- Colmer, T. D., Gibberd, M. R., Wiengweera, A., Tinh, T. K. 1998. The barrier to radial oxygen loss from roots of rice (*Oryza sativa* L.) is induced by growth in stagnant solution. *Journal of Experimental Botany* 49: 1431-1436.
- Colonel, V. P. 1980. Response of rice and wheat at seedling stage to aluminum in nutrient solution and soils. Secondary Response of rice and wheat at seedling stage to aluminum in nutrient solution and soils. Los Banos, Languna, The Philippines, University of the Philippines M.Sc. Thesis.
- DACNET. 2006. Rice productivity Analysis in India: <http://dacnet.nic.in/rice/Productivity?20Analysis%20-%2005.htm> (5 April 2006).
- De Datta, S. K. 1981. Principles and Practices of Rice Production. Los Banos, Philippines.
- De Datta, S. K. 1986. Tolerance of rice varieties for stagnant flooding. in Progress in Rainfed Lowland Rice (201-206). Manila, Philippines: International Rice Research Institute.
- DOA. 2003. Rice and temperate cereal Bangkok, Thailand. Department of Agriculture (Press in Thai).
- Drew, M. C. 1992. Soil aeration and plant root metabolism. *Soil Sci* 154: 259-268.

- Drew, M. C. 1997. Oxygen deficiency and root metabolism: Injury and acclimation under hypoxia and anoxia. *Annual Reviews Plant Physiology, and Plant Molecular Biology* 48: 223-250.
- Drew, M. C., Cobb, D. G., Johnson, J. R., Andrews, D., Morgan, P. W., Jordan, w., He, C. J. 1994. Metabolic acclimation of root tips to oxygen deficiency. *Annals of Botany* 74: 281-286.
- Drew, M. C., Saker, L. R. 1986. Ion transport to the xylem in aerenchymatous roots of *Zea mays* (L.). *Journal of Experimental Botany* 37: 22-33.
- Fageria, N. K., Wright, R. J., Baligar, V. C. 1988. Rice cultivar response to aluminum in nutrient solution. *Common. Soil Sci. Plant Anal* 19: 1133-1142.
- Fan, M., Zhu, J., Richards, C., Brown, K. M., Lynch, J. P. 2003. Physiological roles for aerenchyma in phosphorus-stressed roots. *Functional Plant Biology* 30: 439-506.
- FAO. 1998a. African rice producing countries: <http://www.fao.org/ag/agp/agpc/doc/riceinfo/africa/afribody.htm> (30 March 2006).
- FAO. 1998b. American rice producing countries: <http://www.fao.org/ag/agp/agpc/doc/riceinfo/America/AmeriBODY.htm> (4 April 2006).
- FAO. 1998c. European rice producing countries: <http://www.fao.org/ag/agp/agpc/doc/riceinfo/Europe/EUROBODY.htm> (4 April 2006).

- FAO. 1998d. Oceanian rice production: <http://www.fao.org/ag/agp/agpc/doc/riceinfo/oceania/oceabody.htm> (4 April 2006).
- FAO. 1998e. Rice crisis looms in Asia: Green Revolution technologies are "almost exhausted" of any further productivity gains: <http://www.fao.org/ag/magazine/9809/spot1.htm> (30 March 2006).
- FAO. 1998f. Rice production in CORIFA: <http://www.fao.org/ag/agp/agpc/doc/riceinfo/CORIBODY.htm> (4 April 2006).
- FAO. 2000a. Asian rice producing countries: <http://www.fao.org/ag/agp/agpc/doc/riceinfo/Asia/AsCont.htm> (30 March).
- FAO. 2000b. Rice producing in Thailand: <http://www.fao.org/ag/agp/agpc/doc/riceinfo/Asia/Thailand.HTM> (30 March 2006).
- FAO. 2005. Rice faces with future: <http://www.fao.org/ag/magazine/0512sp2.htm> (30 March 2006).
- Fukai, S., Inthapanya, P., Blamey, F. P. C., Khunthasuvon, S. 1999. Genotypic variation in rice grown in low fertile soils and drought-prone, rainfed lowland environments. *Field Crops Research* 64: 121-130.
- Gardner, W., Barber, D., Parberry, D. 1983. The acquisition of phosphorus by *Lupinus albus* L. III. The probable mechanism by which phosphorus movement in the soil/root interface is enhanced. *Plant and Soil* 70: 107-124.
- George, T., Magbanua, R., Roder, W., Van Keer, K., Trebil, G., Reoma, V. 2001. Upland rice response to phosphorus fertilization in Asia. *Agronomy Journal* 93: 33-36.

Grist, D. H. 1986. Rice. 6th edn. New York. Longman.

Guindo, D., Norman, R. J., Wells, B. R. 1994a. Accumulation of fertilizer nitrogen-15 by rice at different stages of development. *Soil Sci. Soc. Am. J.* 58: 410-415.

Guindo, D., Wells, B. R., Norman, R. J. 1994b. Cultivar and nitrogen rate influence on nitrogen uptake and partitioning in rice. *Soil Sci. Soc. Am. J.* 58: 840-845.

Harlan, J. R. 1989. The tropical African cereals. Harris, D R and Hillman, G C. in *Foraging and Farming* (335-343). London: Unwin Hyman.

Hayashi, T., Ogawa, Y., Kouta, H. 1951. Productive efficiency of phosphorus nutrient for rice plant. *J. Sci. Soil Manure Jpn* 22: 29-32.

Huang, S., Greenway, H., Colmer, T. D. 2003a. Anoxia tolerance in rice seedlings: exogenous glucose improves growth of an anoxia-intolerant, but not of a tolerant genotype. *Journal of Experimental Botany* 54(391): 2363-2373.

Huang, S., Greenway, H., Colmer, T. D. 2003b. Responses by Coleoptiles of Intact Rice Seedlings to Anoxia:  $K^+$  Net Uptake from the External Solution and Translocation from the Caryopses. *Annals of Botany* 91: 271-278.

Huguenin-Elie, O., Kirk, G. J. D., Frossard, E. 2003. Phosphorus uptake by rice from soil that is flooded, drained or flooded then drained. *European Journal of Soil Science* 54: 77-90.

Ingram, K. T. 1995. Rainfed lowland rice-agricultural research for high-risk environments. IRRI Publication.

Inthapanya, P., Sipaseuth, S. P., Sihathep, V., Chanphengsay, M., Fukai, S., Basnayake, J. 2000a. Genotype differences in nutrient uptake and utilisation



for grain yield production of rainfed lowland rice under fertilised and non-fertilised conditions. *Field Crops Research* 65: 57-68.

Inthapanya, P., Sipaseuth, S. P., Sihathep, V., Chanphengsay, M., Fukai, S., Basnayake, J. 2000b. Genotypic performance under fertilised and non-fertilised conditions in rainfed lowland rice. *Field Crops Research* 65: 1-14.

IRRI. 1975. Major research in upland rice. Los Banos, Philippines. International Rice Research Institute.

IRRI. 2004. Rough rice production (ton), by country and geographical region, 1961-2004: <http://www.irri.org/science/ricestat/pdfs/WRS2005-Table01.pdf> (24 March 2006).

Jan, F., Pettersson, S. 1993. Effects of low aluminium levels on growth and nutrient relations in three rice cultivars with different tolerances to aluminium. *Journal of Plant Nutrition* 16(2): 359-372.

Jones, R., Etherington, J. R. 1973. Comparative studies of plant growth and distribution in relation to waterlogging: The uptake of phosphorus by dune and dune slack plants. *J. Ecol.* 61: 109-116.

Justin, S. H. F. W., Armstrong, W. 1987. The anatomical characteristics of roots and plant response to soil flooding. *New Phytologist* 106: 465-495.

Kamoshita, A., Wade, L. J., Yamauchi, A. 2000. Genotypic variation in response of rainfed lowland rice to drought and rewatering III. Water extraction during the drought period. *Plant Production Science* 3(2): 189-196.

Kirk, G. 2004. *The Biogeochemistry of Submerged Soils*. John Wiley & Son.

Kirk, G. J. D. 2003. Rice root properties for internal aeration and efficient nutrient acquisition in submerged soil. *New Phytologist* 159(1): 185-194.

- Kirk, G. J. D., Du, L. V. 1997. Changes in rice root architecture, porosity, and oxygen and proton release under phosphorus deficiency. *New Phytologist* 135: 191-200.
- Kirk, G. J. D., Saleque, M. A. 1995. Solubilization of phosphate by rice plants growing in reduced soil: prediction of the amount solubilized and the resultant increase in uptake. *European Journal of Soil Science* 46: 247-255.
- Koncalova, H. 1990. Anatomical adaptations to waterlogging in roots of wetland graminoids: limitations and drawbacks. *Aquatic Botany* 38: 127-134.
- Kondo, M., Pablico, P. P., Aragonos, D. V., Agsibit, R., Abe, J., Morita, S., Courtois, B. 2003. Genotypic and environmental variations in root morphology in rice genotypes under upland field conditions. *Plant and Soil*: 1-12 (Uncorrected).
- Koyama, T. C., Chammek, C., Snitwongse, P. 1973. Varietal difference of Thai rice in the resistance to phosphorus deficiency. Tropical Agriculture Research Center, Ministry of Agriculture and Forestry. Japan.
- Kronzucker, H. J., Kirk, G. J. D., Siddiqi, M. Y., Glass, A. D. M. 1998. Effects of hypozya on  $\text{NH}_4^+$  fluxes in rice roots: kinetics and compartmental analysis. *Plant Physiology* 116: 581-587.
- Kuo, S. 1986. Concurrent sorption of phosphorus and zinc, cadmium, or calcium by a hydrous ferric oxide. *Soil Sci. Soc. Am. J.* 50(1412-1419)
- Lafitte, H. R., Bennett, J., Tuong, T. P. 2006. Preparing rice for a water-limited future: From molecular to regional scale. *Field Crops Research* 97(1): 1-2.
- lafitte, H. R., Courtois, B., Arraudeau, M. 2002. Genetic improvement of rice in aerobic systems: progress from yield to genes. *Field Crop Res.* 75: 171-190.



- Lamber, D. H. R., Gomosta, A. R., Kupkanchanakul, T. 1986. Screening for submergence tolerance. in *Progress in Rainfed Lowland Rice (177-190)*. Manila, Philippines: International Rice Research Institute.
- Lambers, H., van der Werf, A., Bergkotte, M. 1993. Respiration: the alternative pathway. GAF Hendry and JP Grime, eds. in *Methods in Comparative Plant Ecology (140-144)*. London: Chapman and Hall.
- Lin, C. F., Lee Wang, T. S., Chang, A. H., Cheng, C. Y. 1973. Effect of some long term fertilizer treatments on the chemical properties of soil and yield of rice. *J. Taiwan Agric. Res.* 22: 241-262.
- Lipton, D., Blanchar, R., Blevins, D. 1987. Citrate, malate and succinate concentration in exudates from P-deficient and P-stressed *Medicago sativa* L. seedlings. *Plant Physiology* 85: 315-317.
- Londo, J. P., Chiang, Y.-C., Hung, K.-H., Chiang, T.-Y., Schaal, B. A. 2006. Phylogeography of Asian wild rice, *Oryza rufipogon*, reveals multiple independent domestications of cultivated rice, *Oryza sativa*. *PNAS* 103(25): 9578-9583.
- Lorenzen, B., Brix, H., Mendelsohn, I. A., McKee, K. L., Miao, S. L. 2001. Growth, biomass allocation and nutrient use efficiency in *Cladium jamaicense* and *Typha domingensis* as affected by phosphorus and oxygen availability. *Aquatic Botany* 70: 117-133.
- Lu, Y., Wassmann, R., Neue, H. U., Huang, C. 1999. Impact of phosphorus supply on root exudation, aerenchyma formation and methane emission of rice plants. *Biogeochemistry* 47: 203-218.

- Lynch, J. P., Lauchli, A., Epstein, E. 1991. Vegetative growth of the common bean in response to phosphorus nutrition. *Crop Science Research* 31: 380-387.
- Ma, Z., Bielenberg, D. G., Brown, K. M., Lynch, J. P. 2001. Regulation of root hair density by phosphorus availability in *Arabidopsis thaliana*. *Plant, Cell and Environment* 24: 459-467.
- Mackill, D. J. 1986. Varietal improvement for rainfed lowland rice in South and Southeast Asia: Results of a survey. in *Progress in Rainfed Lowland Rice* (115-158). Manila, Philippines: International Rice Research Institute.
- Mackill, D. J., Coffman, W. R., Garrity, D. P. 1996. Rainfed lowland rice improvement. P.O. Box 933, Manila, Philippines. International Rice Research Institute.
- Malik, A. I., Colmer, T. D., Lambers, H., Schortemeyer, M. 2003. Aerenchyma formation and radial O<sub>2</sub> loss along adventitious roots of wheat with only the apical root portion exposed to O<sub>2</sub> deficiency. *Plant, Cell and Environment* 26: 1713-1722.
- Marschner, H. 1995. Mineral nutrition of higher plant 2nd edition. Academic press.
- Matsuo, T. 1952. Genecological studies on cultivated rice. *Bull. Natl. Inst. Agr. Sci.* 3: 1-111.
- Matsuo, T., Hoshikawa, K. 1993. Science of the rice plant I morphology. Tokyo, Japan. Food and Agriculture Policy Research Center.
- Maurya, D. M., Mall, C. N. 1986. Breeding rice varieties for rainfed lowland areas. in *Progress in Rainfed Lowland Rice* (159-175). Manila, Philippines: International Rice Research Institute.

- McDonald, M. P., Galwey, N. W., Colmer, T. D. 2001a. Waterlogging tolerance in the tribe Triticeae: the adventitious roots of *Critesion marinum* have a relatively high porosity and a barrier to radial oxygen loss. *Plant, Cell and Environment* 24: 585-596.
- McDonald, M. P., Galwey, N. W., Colmer, T. D. 2002. Similarity and diversity in adventitious root anatomy as related to root aeration among a range of wetland and dryland grass species. *Plant, Cell and Environment* 25: 441-451.
- McDonald, M. P., Galwey, N. W., Ellneskog-Staam, P., Colmer, T. D. 2001b. Evaluation of *Lophopyrum elongatum* as a source of genetic diversity to increase the waterlogging tolerance of hexaploid wheat (*Triticum aestivum*). *The New Phytologist* ve151: 369-380.
- Mohanty, H. K. 1986. Breeding for submergence tolerance in rice in India. in *Progress in Rainfed Lowland Rice* (191-200). Manila, Philippines: International Rice Research Institute.
- Moldenhauer, K. A. K., Gibbons, J. H. 2002. Rice morphology and development. Smith, C W and Dilday, R H. in *Rice: Origin, History, Technology, and Production* (103-128). Hobeken, New Jersey: John Wiley & Sons, Inc.
- Moog, P. R. 1998a. Flooding tolerance of *Carex* species. I. Root structure. *Planta* 207: 189-198.
- Moore, P. A., Gilmour, J. T. J., Wells, B. R. 1981. Seasonal patterns of growth and soil nitrogen uptake by rice. *Soil Sci. Soc. Am. J.* 45: 875-879.
- Moormann, F. R., van Breemen, N. 1978. The hydrology of rice lands in *In: Rice: soil, water, land* (Los Banos, Philippines: International Rice Research Institute.

- Morishima, H. 1969. Differentiation of pathogenic races of *Piricularia oryzae* into two groups, Indica and Japonica. *SABRAO Newsl* 1: 81-94.
- Morishima, H. 1984. Species relationships and the search for ancestors. Tsunoda, S and Takahashi, N. in *Biology of Rice* (3-30). Tokyo: Japan Scientific Societies Press Elsevier.
- Morishima, H., Hinata, K., Oka, H. I. 1963. Comparison of modes of evolution of cultivated forms from two wild rice species, *O. breviligulata* and *O. perennis*. *Evolution* 17: 170-181.
- Morishima, H., Sano, Y., Oka, H. I. 1992. Evolutionary studies in cultivated rice and its wild relatives. *Oxford Surv. Evol. Biol.* 8: 135-184.
- Morita, S., Abe, J. 1996. Development of root systems in wheat and rice. In: Ito, O., Johansen, C., Adu-Gyamfi, J.J., Katayama, K., Kumar Rao, J.V.D.K. and Rego, T.J. ed. . in *Dynamics of Roots and Nitrogen in Cropping Systems of the Semi-Arid Tropics* (199-209). Tsukuba, Japan: Japan International Research Centre for Agricultural Sciences.
- Murphy, J., Riley, J. 1962. A modified single solution method for the determination of phosphate in natural waters. *Analytica Chimica Acta* 27: 31-36.
- Nakagahra, M. 1978. The differentiation, classification and center of genetic diversity of cultivated rice (*Oryza sativa* L.) by isozyme analysis. *Trop. Agri. Res. Ser.* 11: 77-82.
- Nayar, N. M. 1973. Origin and cytogenetics of rice. *Adv. Genet* 17: 153-292.
- Norman, R. J., Wilson, C. E., Jr., Slaton, N. A. 2003. Soil fertilization and mineral nutrition in U.S. mechanized rice culture. in *Rice: Origin, history, technology and production* (331-412). United State of America: John Wiley & Sons, Inc.

- O' Brien, T. P., McCully, M. E. 1981. The Study of Plant Structure: Principles and selected Methods. Melbourne. Termarcarphi Private Limited.
- Oka, H. I. 1953. Variations in various characters and character combinations among rice varieties. *Jpn. J. breed.* 3(2): 33-43.
- Oka, H. I. 1958. Intervarietal variation and classification of cultivated rice. *Ind. J. Genet. Plant Breed.* 18: 79-89.
- Oka, H. I. 1974. Experimental studies on the origin of cultivated rice. *Genetics* 78: 475-486.
- Oka, H. I. 1988. Origin of cultivated rice. Tokyo. Japan Scientific Societies Press Elsevier.
- Parish, D. H. 1971. Effects of compaction on nutrient supply to plants. Barnes, K. K., Charleton, W. M., Taylor, H. M., Throckmorton, R. I. and Vanden Berg, G. E. in *Compaction in Agricultural Soils* (279-291). St. Joseph, Michigan: Am. Soc. Agr. Eng.
- Patrick, W. H., Jr., Mahapatra, I. C. 1968. Transformation and availability to rice of nitrogen and phosphorus in waterlogged soils. *Adv. Agron* 20: 323-359.
- Patrick, W. H., Mikkelsen, D. S., Wells, B. R. 1985. Plant nutrient behavior in flooded soils. Engelstad, O P. in *Fertilizer Technology and Use* 3rd ed. (197-228). America: Madison WI.
- Pinheiro, B. d. S., de Castro, E. d. M., Guimaraes, C. M. 2006. Sustainability and profitability of aerobic rice production in Brazil. *Field Crops Research* 97(1): 34-42.
- Place, G. A., Wells, B. R., Sims, J. L., Hall, V. L. 1971. Phosphorus fertilization of rice on the Grand Prairie of Arkansas. *Univ. Ark. Agric. Exp. Stn. Bull.*

- Ponnamperuma, F. N. 1972. The chemistry of submerged soils. *Advance in Agronomy* 24: 29-96.
- Ponnamperuma, F. N. 1975. Growth-limiting factors of aerobic soils. Institute, The International Rice Research. in *Major Research in Upland Rice* (40-43). Los Banos, Laguna, Philippines: The International Rice Research Institute.
- Prom-u-thai. 2006. *Hydroponics for experiments and laboratory techniques*. Chiang Mai, Thailand. Ming Muang limited.
- Ranathunge, K., Kotula, L., Steudle, E., Lafitte, R. 2004. Water permeability and reflection coefficient of the outer part of young rice roots are differently affected by closure of water channels (aquaporins) or blockage of apoplastic pores. *Journal of Experimental Botany* 55(396): 433-447.
- Ranathunge, K., Steudle, E., Lafitte, R. 2003. Control of water uptake by rice (*Oryza sativa* L.): role of the outer part of the root. *Planta* 217: 193-205.
- Raskin, I. 1983. A method for measuring leaf volume, density, thickness, and internal gas volume. *Hortscience* 18: 698-699.
- Rerkasem, B. 2005. Transforming Subsistence Cropping in Asia. *Plant Production Science* 8(3): 275-287.
- Richaria, R. H. 1960. Origins of cultivated rices. *Indian J. Gen. Pl. Breed.* 20: 1-14.
- Rubinigg, M., Stulen, I., Elzenga, J. T. M., Colmer, T. D. 2002. Spatial patterns of radial oxygen loss and nitrate net flux along adventitious roots of rice raised in aerated or stagnant solution. *Functional Plant Biology* 29: 1475-1481.
- Saito, K., Linqvist, B. A., Altin, G. N., Phanthaboon, K., Shiraiwa, T., Horie, T. 2006. Response of traditional and improved upland rice cultivars to N and P fertilizer in northern Laos. *Field Crops Research* 96: 216-223.



- Sarkunan, V., Biddappa, C. C. 1982. Effect of aluminium on the growth, yield and chemical composition of rice. *Oryza* 19: 188-190.
- Second, G. 1991. Molecular markers in rice systematics and the evaluation of genetic resources. Bajaj, Y P S. in *Rice Biotechnology in Agriculture and Forestry* (468-494). Berlin: Springer-Verlag.
- Seng, V., Bell, R. W., Willett, I. R. 2004. Amelioration of growth reduction of lowland rice caused by a temporary loss of soil-water saturation. *Plant and Soil* 265: 1-16.
- Shapiro, R. E. 1958. Effect of organic matter and flooding on availability of soil and synthetic phosphates. *Soil Sci.* 85: 267-272.
- Sims, J. L., Place, G. A. 1968. Growth and nutrient uptake of rice at different growth stages and nutrient levels. *Agronomy Journal* 60: 692-696.
- Slaton, N. A., Cartwright, R. D., Wilson, C. E., Jr.,. 1995. Potassium deficiency and plant diseases observed in rice fields. *Better Crops* 79(4): 12-14.
- Smith, S. E., Read, D. J. 1997. *Mycorrhizal symbiosis*. San Diego, CA. Academic Press.
- Snyder, C. S. 2002. Effects of soil flooding and drying on Phosphorus reactions. News & Views <http://www.ppi-ppic.org>
- Thomson, C. J., Armstrong, W., Waters, I., Greenway, H. 1990. Aerenchyma formation and associated oxygen movement in seminal and nodal root of wheat. *Plant, Cell and Environment* 13: 395-403.
- Thongbai, P., Milroy, S., Bange, M., Rapp, G., Smith, T. 2001. Agronomic Responses of Cotton to Low Soil Oxygen During Waterlogging. In *Proceedings of 10th Sustralian Agronomy Conference*. Hobart, Australia

- Ting, Y. 1949. chronological studies of the cultivation and the distribution of rice varieties, Keng and Sen. Agr. Bull. Col. Agr. Sun Yatsen Univ. 6: 1-32.
- Van Toai, T., Bolles, C. 1991. Postanoxic injury in soybean (*Glycine max*) seedlings. Plant Physiology 97: 588-592.
- Vance, C. P., Uhde-Stone, C., Allan, D. L. 2003. Phosphorus acquisition and use: critical adaptations by plants for securing anonrenewable resource. New Phytologist 157: 423-447.
- Wade, L. J., Fukai, S., Samson, B. K., Ali, A., Mazid, M. A. 1999 Rainfed lowland rice: physical environment and cultivar requirements. Field Crops Research 64: 3-12.
- Watabe, T. 1977. the rice road. Tokyo. NHK.
- Waters, I., Armstrong, W., Thompson, C. J., Setter, T. L., Adkins, S., Gibbs, J., Greenway, H. 1989. Diurnal changes in radial oxygen loss and ethanol metabolism in roots of submerged and nonsubmerged rice seedlings. New Phytologist 113: 439-451.
- Weng, J. H., Chen, C. Y. 1989. Photosynthetic ability, grain yield and an esterase band in rice genotypes. Euphytica 42: 265-268.
- Wiengweera, A., Greenway, H. 2004. Performance of seminal and nodal roots of wheat in stagnant solution: K<sup>+</sup> and P uptake and effects of increasing O<sub>2</sub> partial pressures around the shoot on nodal root elongation. Journal of Experimental Botany 55(405): 2121-2129.
- Wiengweera, A., Greenway, H., Thomson, C. J. 1997. The Use of Agar Nutrient Solution to Simulate Lack of Convection in Waterlogged Soils. Annals of Botany 80: 115-123.

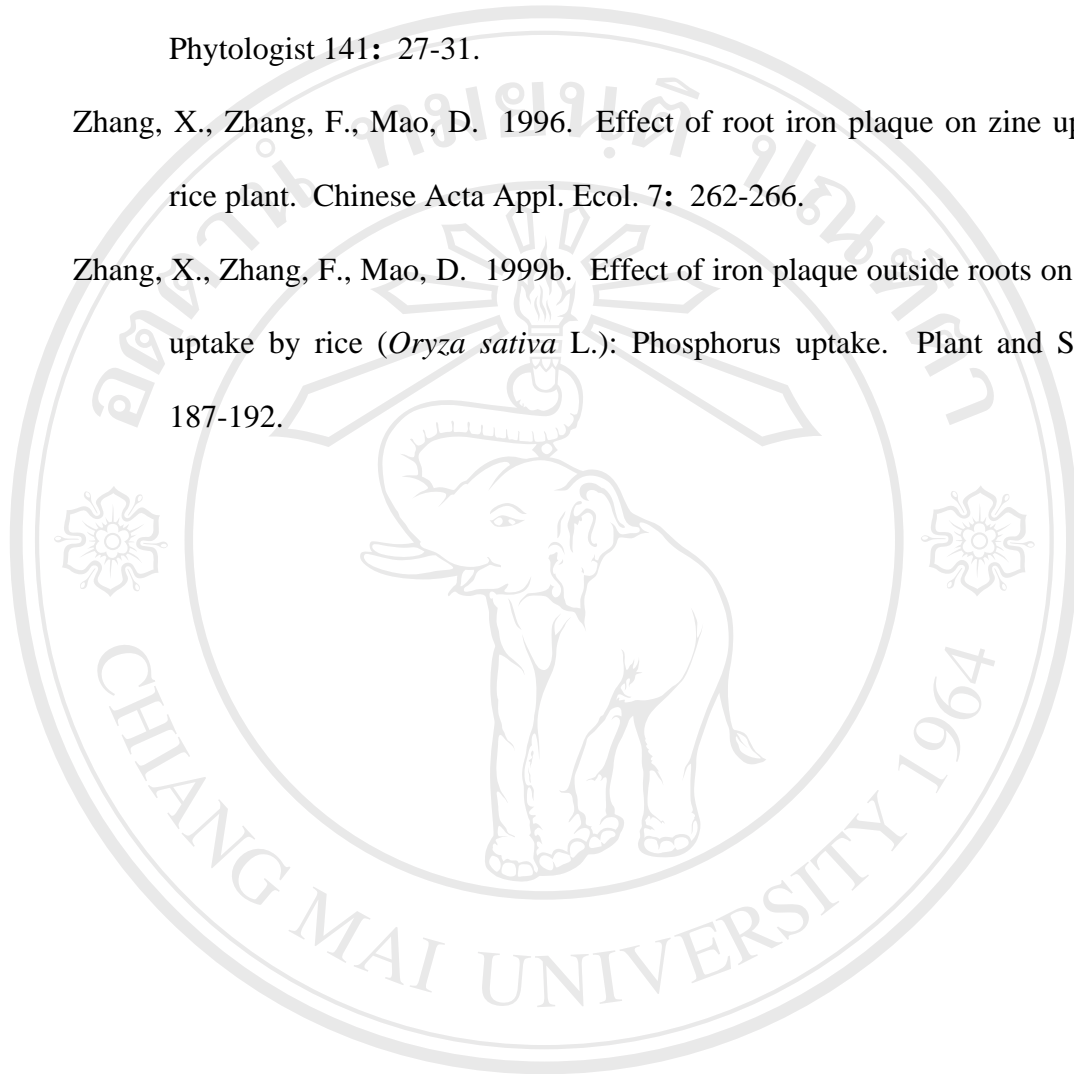
- Wild, A. 1981. Mass flow and diffusion. In the chemistry of soil processes(37-80).  
New York: John Wiley & Sons, Ltd.,.
- Wilson, C. E., Jr., Bollich, P. K. J., Norman, R. J. 1998. Nitrogen application timing effects on nitrogen efficiency of dry-seeded rice. *Soil Sci. Soc. Am. J.* 62: 959-964.
- Wissuwa, M. 2003. How do plants achieve tolerance to phosphorus deficiency? Small with big effects. *Plant Physiology* 133: 1947-1958.
- Yamauchi, A., Aragonés, D. V., Casayuran, P. R., Sta, P. C., Asis, C. A. J., Cruz, R. T. 2000. Seedling Establishment and Grain Yield of Tropical Rice Sown in Puddled Soil. *Agronomy Journal* 92: 275-282.
- Yatsuyanagi, S. 1960. Scheduled cultivation of rice in Tohoku region. *Agri. Horitic.* 35: 1425-1427.
- Yeung, E. C. 1998. A beginner's guide to the study of plant structure. In: Tested studies for laboratory teaching. In Proceedings of Proceedings of the 19th Workshop/Conference of the Association for Biology Laboratory Education (ABLE), 125-142.
- Yoshida, S. 1979. Mineral nutrition of rice. in *Fundamental of rice crop science* (111-176). Los Banos, Philippines.
- Yoshida, S. 1981. *Fundamentals of rice crop science*. Los Banos, Philippines.
- Zeigler, R. S., Puckridge, D. W. 1995. Improving sustainable productivity in rice-based rainfed lowland systems of South and Southeast Asia. *Geo J* 35: 307-324.

- Barker, R., Herdt, R. W. 1979. Rainfed lowland rice as a research priority-an economist's view. in Rainfed lowland rice: selected papers from the 1978 International Rice Research Conference (3-50). Los banos, Philippines.
- Bartholomew, R. P. 1931. Changes in the availability of phosphorus in irrigated rice soils. *Soil Sci* 31: 209-218.
- Bates, T. R., Lynch, J. P. 1996. Stimulation of root hair elongation in *Arabidopsis thaliana* by low phosphorus availability. *Plant Cell and Environment* 19: 529-538.
- Beacher, R. L. 1952. Rice fertilization: Results of tests from 1946 through 1951. *Univ. Ark. Agric. Exp. Stn. Bull.*
- Bell, P. F., Kovar, J. L. 2000. Rice. In C. R. Campbell (ed.), *Reference Sufficiency Ranges for Plant Analysis in the Southern Region of the United States*. South. Coop. Serv. Bull. 394, July: <http://www.agr.state.nc.us/agronomi/saaesd/s394/htm> (10 April 2006).
- Bolan, N. S. 1991. A critical review on the role of mycorrhizal fungi in the uptake of phosphorus by plants. *plant Soil* 134: 189-207.
- Bouman, B. A. M. 2001. Water-efficient management strategies in rice production. *Int. Rice Res. Notes* 26(2): 17-22.
- Buddenhagen, I. W. 1978. Rice ecosystem in Africa. in *Rice in Africa* (11-27). London: Academic Press.
- Bufogle, A., Bollich, P. K. J., Kovar, J. L., Lindau, C. W., Macchivelli, R. E. 1997. Rice plant growth and nitrogen accumulation from midseason application. *Journal of Plant Nutrition* 20: 1191-1201.

Zhang, X., Yi, C., Zhang, F. 1999a. Iron accumulation in root apoplasm of dicotyledonous and graminaceous species grown on calcareous soil. *New Phytologist* 141: 27-31.

Zhang, X., Zhang, F., Mao, D. 1996. Effect of root iron plaque on zine uptake by rice plant. *Chinese Acta Appl. Ecol.* 7: 262-266.

Zhang, X., Zhang, F., Mao, D. 1999b. Effect of iron plaque outside roots on nutrient uptake by rice (*Oryza sativa* L.): Phosphorus uptake. *Plant and Soil* 209: 187-192.



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่  
Copyright © by Chiang Mai University  
All rights reserved