

DAFTAR PUSTAKA

- Acquaah, G. 2012. *Principle of Plant Genetics and Breeding*. John Wiley & Sons Ltd. USA, p. 290.
- Ahluwalia, V. K. 2015. *Environmental pollution and health*. The Energy and Resources Institute. India, p. 2-4.
- Ahmad, P. 2016. *Plant metal interaction: emerging remediation techniques*. Elsevier Inc. Oxford, p. 22, 162, 560.
- Anggraeni, C. P. 2017. Strategi pemasaran meningkatkan daya saing batik (Tesis). STIE Widya Wiwaha Yogyakarta, Yogyakarta.
- Aprile, A. and L. D. Bellis. 2020. Editorial for issue “heavy metals accumulation, toxicity, and detoxification in plants”. *International Journal of Molecular Science*, 21: 4103.
- Badan Pusat Statistik. 2018. *Statistik tanaman sayuran dan buah-buahan semusim*. BPS RI. Jakarta, p. 97.
- Badan Pusat Statistik. 2019. *Produksi tanaman sayuran 2019*. <http://www.bps.go.id/indicator/55/61/1/produksi-tanaman-sayur>. Diakses tanggal 20 Maret 2021, jam 15.34 WIB.
- Barcelo, J. and C. Poschenrieder. 2002. Fast root growth responses, root exudates, and internal detoxification as clues to the mechanisms of aluminium toxicity and resistance: a review. *Environmental and Experimental Botany*, 48 (1): 75-92.
- Batool, R., M. Hameed, M. Ashraf, M. S. A. Ahmad, and S. Fatima. 2015. Physio-anatomical responses of plant to heavy metal. *In*. M. Ozturk, M. Ashraf, A. Aksoy, & M. S. A. Ahmad (Eds.) *Phytoremediation for Green Energy*. Springer Science+Business Media Dordrecht. New York, p. 85.
- Bengough, A. G., M. F. Bransby, J. Hans, S. J. McKenna, T. J. Roberts, and T. A. Valentine. 2006. Root responses to soil physical conditions: growth dynamics from field to cell. *Journal of Environmental Botany*, 57 (2): 437-447.
- Bhuiyan, N.H., W. Liu, G. Liu, G. Selvaraj, Y. Wei, and J. King. 2007. Transcriptional regulation of genes involved in the pathways of biosynthesis and supply of methyl units in response to powdery mildew attack and abiotic stresses in wheat. *Plant Mol. Biol.*, 64: 305–318.
- Bojorques-Quintal, E., C. Escalante-Magana, I. Echevarria-Machado, and M. Martinez-Estevéz. 2017. Aluminum, a friend or foe of higher plants in acid soils. *Frontiers in Plant Science*, 8: 1767.
- Brusseau, M. L., I. L. Pepper, and C. P. Gerba. 2019. *Environmental and pollution science*. 3rd. Elsevier Inc. Oxford, p. 3-4.

- Cabane, M., D. Afif, and S. Hawkins. 2012. Lignin and abiotic stresses. *In*. L. Jouanin and C. Lapiere (Eds.). *Lignin: Biosynthesis, Biodegradation, and Bioengineering*. Elsevier Ltd. Amsterdam, p. 246.
- Chanu, L. B. and A. Gupta. 2016. Toxicity of zinc on growth of an aquatic macrophyte, *Ipomoea aquatica* Forsk. *Current World Environment*, 11 (1): 218-227.
- Coelho, L. C., A. R. R. Bastos, P. J. Pinho, G. A. Souza, J. G. Carvalho, V. A. T. Coelho, L. C. A. Oliveira, R. R. Domingues, and V. Faquin. 2017. Marigold (*Tagetes erecta*) : the potential value in the phytoremediation of chromium. *Pedosphere*, 27 (3): 559-568.
- Concado, G. M. A., L. L. Loguercio, P. R. Martins, S. N. Parentoni, E. Paiva, A. Borem, and M. A. Lopes. 1999. Hematoxylin staining as a phenotypic index for aluminium tolerance selection in tropical maize (*Zea mays* L.). *Theoretical and Applied Genetics*, 99: 747-754.
- Crestani, M., J. A. G. Silva, E. W. Tessmann, I. Mezzalira, A. C. Oliveira, and F. I. F. Carvalho. 2011. A proposal for aluminium tolerance selection in white oat under hydroponic condition. *Journal of Crop Science and Biotechnology*, 14 (1): 71-77.
- Environment Protection Agency. 2014. *Priority pollutant list*. Environment Protection Agency. United States of America.
- Erwindo, S. J. 2019. Karakterisasi air limbah batik di Kota Yogyakarta dan Kabupaten Bantul dengan parameter BOD, COD, dan TSS (Skripsi). Universitas Islam Indonesia, Yogyakarta.
- Fahn, A. 1967. *Plant anatomy*. 1st. Pergamon Press Ltd. Oxford, p. 3, 5.
- Gall, H. L., F. Philippe, J. Domon, F. Gillet, J. Pelloux, and C. Rayon. 2015. Cell wall metabolism in response to abiotic stress. *Plants*, 4: 112-166.
- Gao, L., K. Peng, Y. Chen, G. Wang, Z. Shen. 2012. Roles of apoplastic peroxidases, laccases, and lignification in the manganese tolerance of hyperaccumulator *Phytolacca americana*. *Acta Physiol. Plant*, 34: 151–159.
- Ghori, N. H., T. Ghori, M. Q. Hayat, S. R. Imadi, A. Gul, V. Altay, and M. Ozturk. 2019. Heavy metal stress and responses in plant. *International Journal of Environmental Science and Technology*, 16: 1807-1828.
- Gomes, M. P., T. C. L. L. de S. M. Marques, M. de O. G. Nogueira, E. M. de Castro, and A. M. Soares. 2011. Ecophysiological and anatomical changes due to uptake and accumulation of heavy metal in *Brachiaria decumbens*. *Scientia Agricola*, 68 (5): 566-573.
- Gratha, B. 2012. *Panduan mudah belajar membuat batik*. Demedia Pustaka. Jagakarsa, p. 11-15.

- Greger, M. 2004. Metal availability, uptake transport, and accumulation in plants. *In*. M. N. V. Prasad & J. Hagemeyer (Eds.) *Heavy metal stress in plants*. Springer Berlin Heidelberg. New York, p.12-13.
- Hajihashemi, S., S. Mbarki, M. Skalicky, F. Noedoost, M. Raeisi, and M. Brestic. 2020. Effect of wastewater irrigation on photosynthesis, growth, and anatomical features of two wheat cultivars (*Triticum aestivum* L.). *Water*, 12: 607.
- Hindryawati, N. 2020. *Fotokatalisis dalam pengolahan limbah tekstil*. Deepublish Publisher. Yogyakarta, p. 3-4.
- Islam, M. R. and M. G. Mostafa. 2018. Textile dyeing effluents and environment concerns – a review. *Journal Environment Science & Natural Resources*, 11 (1&2): 131-144.
- Jadeja, A. S., D. V. Hirpara, L. C. Vekaria, and H. L. Sakarvadia. 2021. *Soil fertility and nutrient management: a way to sustainable agriculture*. CRC Press. Boca Raton, p. 40.
- Jaishree and T. I. Khan. 2013. Effect of textile waste water on *Vigna unguiculata* var RC-101 (cow pea) in a pot experiment with reference of heavy metal bioaccumulation. *Internatioal Journal of Science and Research*, 4 (5): 1795-1800.
- Jadoon, I. B. K., S. Ali, Q. B. K. Jadoon, M. B. Shakoor, S. A. Bharwana, and M. A. Farooq. 2013. Effect of irrigation with waste water from different industries on vegetables grown in vicinity of Faisalabad, Pakistan. *International Research Journal of Plant Science*, 4 (6): 144-148.
- Jones, J. B. 1997. *Hydroponics: a practical guide for the soilless grower*. St Luice Press. Boca Raton, p. 54-57-59-60.
- Jones, J. B. 2014. *Complete guide for growing plants hydroponically*. Taylor& Francis Group. Boca Raton, p. 46-47.
- Jones, D. L. and P. R. Ryan. 2017. Aluminium toxicity. *In* B. Thomas, B. G. Murray, & D. J. Murphy (Eds.) *Encyclopedia of applied plant science*. Elsevier. Oxford, p. 213.
- Juhaeti, T., N. W. Utami, F. Syarif, and P. Lestari. 2014. *Prospek dan teknologi budi daya beberapa jenis sayuran lokal*. LIPI Pres. Jakarta, p. 75-83.
- Kaur, H. and N. Garg. 2021. Zinc toxicity in plants: a review. *Planta*, 253: 129.
- Kopittke, P. M. and F. P. C. Blamey. 2016. Theoretical and experimental assessment of nutrient solution composition in short-term studies of aluminium rhizotoxicity. *Plant Soil*, 406: 311-426.
- Kovacik, J. and M. Backor. 2007. Phenylalanine ammonia-lyase and phenolic compounds in chamomile tolerance to cadmium and copper excess. *Water Air Soil Pollut*, 185: 185–193

- Lambers, H., F. S. Chapin III, and T. L. Pons. 2008. *Plant physiological ecology*. 2nd. Springer Science + Business Media LLC. New York, p. 321.
- Lestari, M. 2018. Pengembangan buku saku fotografi anatomi kangkung air (*Ipomoea aquatica* Forssk) di sawah dan di tepi sungai di Magelang sebagai sumber belajar materi jaringan tumbuhan kelas XI MAN 1 Magelang (Skripsi). Universitas Islam Negeri Walisongo, Semarang.
- Lin, C.C., L. M. Chen, and Z. H. Liu. 2005. Rapid effect of copper on lignin biosynthesis in soybean roots. *Plant Sci*. 168: 855–861.
- Linggawati, A., Maryani, A. P. Nugroho, and D. Rachmawati. 2022. Anatomical and Histochemical Responses of Vetiver Grass (*Chrysopogon zizanioides* L. Roberty) to Phytoremediation Ability of Liquid Batik Waste. *Environment and Natural Resources Journal*, 20 (4): 359-368
- Liu, Q., L. Luo, and L. Zheng. 2018. Lignin biosynthesis and biological function in plants. *International Journal of Molecular Science*, 19 (2): 335.
- Liu, Q., L. Zheng, F. He, F. J. Zhao, Z. Shen, L. Zheng. 2015. Transcriptional and physiological analyses identify a regulatory role for hydrogen peroxide in the lignin biosynthesis of copper-stressed rice roots. *Plant Soil*, 387: 323–336.
- Mao, C., K. Yi, L. Yang, B. Zheng, Y. Wu, F. Liu, and P. Wu. 2004. Identification of aluminium-regulated genes by cDNA-AFLP in rice (*Oryza sativa* L.): Aluminium-regulated genes for the metabolism of cell wall components. *J. Exp. Bot.*, 55: 137–143.
- Marschner, P. 2012. Marschner's mineral nutrition of higher plant. Elsevier Ltd. San Diego, p.249, 423.
- Marwari, R. and T. I. Khan. 2012. Effect of textile waste water on tomato plant, *Lycopersicon esculentum*. *Journal of Environmental Biology*, 33: 849-854.
- Moesa, Z. 2016. *Hidroponik kreatif, membangun instalasi unik menggunakan barang bekas*. Agromedia Pustaka. Yogyakarta, p. 62.
- Mratihatani, A. S. 2013. Menuju pengelolaan sungai bersih di kawasan industri batik yang padat limbah cair (Skripsi). Universitas Diponegoro, Semarang.
- Murti, V. M. and Maryani. 2020. Anatomical responses of marigold (*Tagetes erecta* L.) roots and stems to batik wastewater. *AIP Conference Proceeding*, 2260: 030018.
- Nugroho, L. H. 2017. *Struktur dan produk jaringan sekretori tumbuhan*. Gadjah Mada University Press. Yogyakarta, p. 115-117.
- Nugroho, L. H., Purnomo, and I. Sumardi. 2012. *Struktur dan perkembangan tumbuhan*. Penebar Swadaya. Depok, p. 104-115.
- Nurainun, Heriyana, and Rasyimah. 2008. Analisis industri batik di Indonesia. *Fokus Ekonomi*, 7 (3): 124-135.

- Nurlaela. 2007. Distribusi dan akumulasi aluminium pada akar padi dalam kondisi cekaman aluminium pada larutan hara (Skripsi). Institut Pertanian Bogor, Bogor.
- Opik, H and S. Rolfe. 2005. *The physiology of flowering plants*. Cambridge University Press. Cambridge, p. 104, 130.
- Patra, A., R. K. Rekwar, A. Dutta, and A. Chattopadhyay. 2020. Toxicity of aluminium on plant physiological & metabolic functions. *Food and Science Report*, 1 (5): 29-32.
- PERDA DIY. 2016. *Peraturan Daerah Daerah Istimewa Yogyakarta nomor 7 tahun 2016 tentang Baku Mutu Air Limbah*. Yogyakarta.
- Polle, E., C. F. Konzak, and J. A. Kittrick. 1978. Visual detection of aluminium tolerance levels in wheat by hematoxylin staining of seedling roots. *Crop Science*, 18: 823-827.
- PP RI. Peraturan Pemerintah Republik Indonesia no. 20 tahun 1990 tentang Pengendalian Pencemaran Air. Jakarta.
- PP RI. Peraturan Pemerintah Republik Indonesia no. 82 tahun 2001 tentang Kualitas Air & Pengendalian Pencemaran Air. Jakarta.
- Putri, L. A. 2018. Pengaruh limbah cair pewarnaan batik terhadap struktur anatomi akar krisan (*Chrysanthemum morifolium* Ramat. (Skripsi). Universitas Gadjah Mada, Yogyakarta.
- Rahman, R. and H. Upadhyaya. 2020. Aluminium toxicity and its tolerance in plant: a review. *Journal of Plant Biology*, 64: 101-121.
- Rane, N. R., S. M. Patil, V. V. Chandanshive, S. K. Kadam, R. V. Khandare, J. P. Jadhav, and A. P. Govindwar. 2016. *Ipomoea hederifolia* rooted soil bed and *Ipomoea aquatica* rhizofiltration coupled phytoreactors for efficient treatment of textile wastewater. *Water Research*, 96: 1-11.
- Riaz, M., X. Wu, L. Yan, S. Hussain, D. Aziz, A. Shah, and C. Jiang. 2018. Boron supply alleviates Al-induced inhibition of root elongation and physiological characteristics in rapeseed (*Brassica napus* L.). *Journal of Plant Interactions*, 13(1): 270-276.
- Rohaningsih, D. and B. S. Muntalif. 2015. Akumulasi logam timbal (Pb) pada kangkung darat (*Ipomoea reptans* Poir.). *Jurnal Teknik Lingkungan*, 21 (2): 159-168.
- Rucinska-Sobkowiak, R. 2016. Water relations in plants subjected to heavy metal stresses. *Acta Physiologiae Plant*, 38: 257.
- Sade, H., B. Meriga, V. Surapu, J. Gadi, M. S. L. Sunita, P. Suravajhala, and P. B. K. Kishor. 2016. Toxicity and tolerance of aluminium in plants: tailoring plants to suit to acid soils. *Biometals*, 29 (2): 187-210.
- Sall, M. L., A. K.D. Diaw, D. G. Sall, S. E. Aaron, and J. J. Aaron. 2020. Toxic heavy metals : impact on the environment and human health, and treatment

with conducting organis polymers, a review. *Environmental Science and Pollution Research*, 27: 29927-29942.

- Schuetz, M., A. Benske, R. A. Smith, Y. Watanabe, Y. Tobimatsu, J. Ralph, T. Demura, B. Ellis, and A. L. Samuels. 2014. Laccase direct lignification in the discrete secondary cell wall domains of protoxylem. *Plant Physiology*, 166 (2): 798-807.
- Singh, S, P. Pariha, R. Singh, V. P. Singh, and S. M. Prasad. 2016. Heavy metal tolerance in plants: role of transcriptomics, proteomics, metabolomics, and ionomics. *Frontiers in Plant Science*, 6: 1143.
- Sisarti, R. D., A. Rosyidah, and I. Murwani. 2020. Potensi tanaman kangkung darat (*Ipomoea reptans*) dan bayam cabut (*Amaranthus tricolor* L.) sebagai hiperakumulator logam berat timbal (Pb) terhadap pertumbuhan dan akumulasinya. *Jurnal Agronisma*, 8 (2): 59-71.
- Soumya, V., P. Kiranmayi, and K. S. Kumar. 2022. Morpho-anatomical responses of *Catharanthus roseus* (L.) G.Don due to combined heavy metal stress observed under scanning electron microscope. *Plant Science Today*, 9 (3): 623-631.
- Suchaida, A., K. P. Wicaksono, and A. Suryanto. 2015. Tanaman kangkung darat (*Ipomoea reptans* Poir.) sebagai fitoremediator lumpur sidoarjo. *Jurnal Produksi Tanaman*, 3(6): 442-449.
- Sulton, M. 2016. Aplikasi pupuk guano sebagai agen pengkelat logam Pb dan Cd pada tanah tercemar limbah dengan menggunakan tanaman kangkung darat (*Ipomoea reptans* Poir.) (Skripsi). Universitas Jember, Jember.
- Sun, E. and F. Wu. 1998. Along-vein necrosis as indicator symptom on water spinach caused by nickel in water culture. *Botanical Bulletin of Academia Sinica*, 39: 255-259.
- Suratman, D. Priyanto, and A. D. Setyawan. 2000. Analisis keragaman genus *Ipomoea* berdasarkan karakter morfologi. *Biodiversitas*, 1 (2): 72-79.
- Susanto, T. 2015. *Rahasia sukses budidaya tanaman dengan metode hidroponik*. Bibit publisher. Jakarta, p. 39.
- Sutikno. 2018. Buku praktikum mikroteknik tumbuhan. Laboratorium Struktur dan Perkembangan Tumbuhan, Fakultas Biologi, UGM. Yogyakarta, p. 28-32, 37.
- Syarief, E., S. Duryatmo, S. Angkasa, R. N. Apriyanti, A.A. Raharjo. K. Rizkika, D. S. Rahimah, A. Titisari, B. Setyawan, R. Vebriansyah, *et al.* 2014. *Hidroponik praktis*. PT Trubus Swadaya. Depok, p. 39, 53, 55.
- Van de Mortel, J. E., L. A. Villanueva, H. Schat, J. Wekkeboom, S. Coughlan, P. D. Moerland, E. V. L. Van Themaat, M. Koornneef, and M. G. M. Aarts. 2006. Large expression differences in genes for iron and zinc homeostasis, stress response, and lignin biosynthesis distinguish roots of *Arabidopsis*

thaliana and the related metal hyperaccumulator *Thlaspi caerulescens*. *Plant Physiol.*, 142: 1127–1147.

- Walker, C. H., R. M. Sibly, S.P. Hopkin, and D. B. Peakal. 2012. *Principle of ecotoxicology*. 4th. Taylor and Francis Group LLC. Boca Raton, p. 6, 157.
- Xalxo, R., V. Chandrakar, M. Kumar, and S. Keshavkant. 2020. Ecophysiological responses of plant under metal/metalloid toxicity. *In*. M. Hasanuzzaman (Eds.) *Plant ecophysiology and adaptation under climate change: mechanisms and perspectives I*. Springer Nature. Singapore, p. 402-403.
- Yang, Y. J., L. M. Cheng, and Z. H. Liu. 2007. Rapid effect of cadmium on lignin biosynthesis in soybean roots. *Plant Sci.*, 172: 632–639.
- Yusuf, M., K. Nurtjahja, and R. Lubis. 2016. Analisis kandungan logam Pb, Cu, Cd, dan Zn pada sayuran sawi, kangkung, dan bayam di areal pertanian dan industri Desa Paya Rumpit Titipapan Medan. *BioLink*, 3 (1): 56-64.
- Yusuf, I. A. 2014. Kajian kriteria mutu air irigasi. *Jurnal irigasi*, 9 (1): 1-15.
- Zhang, H., Z. Jiang, R. Qin, H. Zhang, J. Zou, W. Jiang, and D. Li. 2014. Accumulation and cellular toxicity of aluminium in seedling of *Pinus massoniana*. *BMC Plant Biology*, 14: 264.