DAFTAR PUSTAKA

Andriani, Y., B. Irawan., Iskandar., I. Zidni., R. Partasasmita. 2019. Short communication: diversity of *duckweed* (Araceae-Lemnoideae), morphological characteristics and its potentials as food sources for herbivorous fishes in West Java, Indonesia. BIODIVERSITAS 20 : 1 – 7.

Appenroth, K. J., K. S. Sree., M. Bog., J. Ecker., C. Seeliger., V. Bohm., S. Lorkowski., K. Sommer., W. Vetter., K. Tolzin-Banasch., dan R. Kirmse. 2018. Nutritional value of the *duckweed* species of the genus *Wolffia* (Lemnaceae) as human food. *Frontiers in chemistry* 6 : 1 – 13.

Arsita, R., H. Karim., Y. Hala., N. Iriany., dan O. Jumadi. 2019. Isolation and identification of nitrogen-fixing bacteria in the corn rhizosphere (*Zea mays* l.) originating from Jeneponto Regency, South Sulawesi. ICFST 484 : 1 – 8.

Ashwini, K., G. Kumar., L. Karthik., K. V. R. Bhaskara. 2011. Optimization, production and partial purification of extracellular α-amylase from *Bacillus* sp. marini. Arch. Appl. Sci. Res. 3 : 33 – 42.

Baig, K. S., M. Arshad., Z. A. Zahir., dan M. A. Cheema. 2010. Comparative efficacy of qualitative and quantitative methods for rock phosphate solubilization with phosphate solubilizing rhizobacteria. Soil & Environ. 29 : 82 – 86.

Bog, M., K. J. Appenroth., dan K. S. Sree. 2020. Key to the determination of taxa of Lemnaceae: an update. Nordic Journal of Botany 38 : 1 – 12.

Cao, H. X., P. Fourounjian., dan W. Wang. 2018. The importance and potential of *duckweed*s as a model and crop plant for biomass-based applications and beyond. Handbook of Environmental Materials Management. Springer International Publishing, Cham 1 – 16.

Centre for Agricutlure and Bioscience Inernational. 2009. *Lemna perpusilla* (*duckweed*). https://www.cabi.org/isc/datasheet/30243#tosimilaritiesToOtherSpeciesOrConditions. Diakses tanggal 08 Mei 2021.

Chikuvire, T. J., P. Muchaonyerwa., dan R. Zengeni. 2018. Biomass, nitrogen uptake and content of *Wolffia arrhizal* depends on strength of swine lagoon water. Water Environment Research 90 : 2066 – 2074.

Chrismadha, T., T. Suryono., M. Magfiroh., Y. Mardiati., dan E. Mulyana. 2018. Phytoremediation of Maninjau Lake water using minute *duckweed* (*Lemna perpusilla* Torr.). Earth and Environment Science 308 : 1 – 13.

Coico, R. 2005. Gram staining. Current Protocols in Microbiology. <https://currentprotocols.onlinelibrary.wiley.com/doi/10.1002/9780471729259.mca03cs00>. Diakses 11 Mei 2021.

Compant, S., C. Clement., dan A. Sessitsch. 2010. Plant growth-promoting bacteria in the rhizo- and endosphere of plants: their role, colonization, mechanisms involved and prospects for utilization. Soil Biology & Biochemistry 42 : 669 – 678.

Crawford, D. J. dan E. Landolt. 1995. Allozyme divergence among species of *Wolffia* (Lemnaceae). Plant Systematics and Evolution 197 : 59 – 69.

Dawwam, G. E., A. Elbeltagy., H. M. Emara., I. H. Abbas., M. M. Hassan. 2013. Beneficial effect of plant growth promoting bacteria kultur ed from the roots of potato plant. Annals of Agricultural Science 28 : 195 – 201.

De Beukelaar, M. F., G. G. Zeinstra., J. J. Mes., dan A. R. Fischer. 2019. *Duckweed* as human food. The influence oof meal context and information on *duckweed* acceptability of Dutch consumers. Food Quality and Preference 71 : 76 – 86.

Edward, P., M. S. Hassan., C. H. Chao., dan C. Pacharaprakiti. 1992. Cultivation of *duckweed*s in septage-loaded earthen ponds. Bioresource Technology 40 : 109 – 117.

Elshaghabee, F. M. F., N. Rokana., R. D. Gulhane., C. Sharma., dan H. Panwar. 2017. *Bacillus as potential probiotics*: status, concerns, and future prespective. Frontiers in Microbiology 8 : 1 – 15.

Esitken, A., H. E. Yildiz., S. Ercisli., M. F. Donmez., M. Turan., dan A. Gunes. 2010. Effect of plant growth promoting bacteria (PGPB) on yield, growth and nutrient contents of organically grown strawberry. Scientia Horticulturae 124 : 62 – 66.

Fujita, M., K. Mori., dan T. Kodera. 1999. Nutrient removal and starch production through cultivation of *Wolffia arrhiza.* Journal of Bioscience and Bioengineering 87 : 194 – 198.

Gamalero, E. dan B. R. Glick. 2011. Mechanisms used by plant growth-promoting bacteria. Bacteria in Agrobiology: Plant Nutrient Management 17 – 46.

Goswami, D., J. N. Thakker., dan P. C. Dhandukia. 2015. Simultaneous detection and quantification of indole-3-acetic acid (IAA) and indole-3-butyric acid (IBA) produced by rhizobacteria from L-tryptophan (Trp) using HPTLC. Journal of Microbiological Methods 110 : 7 – 14.

Govindasamy, V., M. Senthilkumar., V. Magheswaran., Kumar V., P. Bose., V. Sharma. dan K. Annapurna. 2010. *Bacillus* and *Paenibacillus* spp.: potential PGPR for sustainable agriculture. Microbiology Monographs 333 – 364.

Hall, B. G. 2013. Building phylogenetic trees from molecular data with MEGA. Molecular Biology and Evolution 30 : 1229 – 1235.

Hall, B.G. 2001. Phylogenetic Trees Made Easy: A How - to Manual for Molecular

Hashem, A., B. Tabassum., dan E. F. Abd_Allah. 2019. *Bacillus subtilis*: A plant-growth promoting rhizobacterium that also impacts biotic stress. Saudi Journal of Biological Sciences 26 : 1291 – 1297.

Huelsenbeck, J.P. and D.M. Hillis. 1993. Success of phylogenetic methods in the four-taxon case. Systematic Biology 42: 247 – 264.

Huang, P., L. de-Bashan., T. Crocker., J. W. Kloepper., dan Y. Bashan. 2017. Evidence that fresh weight measurement is imprecise for reporting the effect of plant growth-promoting (rhizo)bacteria on growth of crop plants. Biol Fertil Soils 53 : 199 – 208.

Ishizawa, H., M. Kuroda., M. Morikawa., dan M. Ike. 2017. Evaluation of environmental bacterial communities as a factor affecting the growth of *duckweed Lemna minor*. Biotechnology for Biofuels 10 : 1 – 10.

Ishizawa, H., Y. Ogata., Y. Hachiya., K. I. Tokura., M. Kuroda., D. Inoue., T. Toyama., Y. Tanaka., K. Mori., M. Morikawa. dan M. Ike. 2020. Enhanced biomass production and nutrient removal capacity of *duckweed* via two-step cultivation process with a plant growth-promoting bacterium, *Acinetobacter calcoaceticus* P23. Chemosphere 238 : 1 – 8.

Jaelani, A., S. Djaya., dan T. Rostini. 2014. Produktivitas gulma air (*duckweed*) sebagai sumber pakan. Prosiding Seminar Nasional "Bioresource Untuk Pembanungan Ekonomi Hijau", Bogor, 24 September 2014.

Jaiprasert, A. 2018. Development of *duckweed* transformation technique for biological application. Burapha University. Doctoral Dissertation.

Kantur, D., dan A. Jehemat. 2018. Produksi dan kandungan nutrisi *duckweed* sebagai alternatif suplemen pakan ternak dan pupuk organik pada berbagai ingkat intensitas cahaya PARTNER 23 : 745 – 757.

Khairina, Y., R. Jog., C. Boonmak., T. Toyama., T. Oyama., dan M. Morikawa. 2021. Indigenous bacteria, an excellent reservoir of functional plant growth promoters for enhancing *duckweed* biomass yield on site. Chemosphere 268 : 1 – 8.

Kittiwongwattana, C. 2015. Biodiversity of endophytic bacteria kultur ed from *duckweed* (*Landoltia punctata*) and their IAA production. Thammasat International Journal of Science and Technology 1 : 1 – 11.

Kittiwongwattana, C. dan C. Thawai. 2014. *Rhizobium lemnae* sp. nov., a bacterial endophyte of *Lemna aequinoctialis*. International Journal of Systematic and Evolutionary Microbiology 64 : 2455 – 2460.

Kuan, K. B., R. Othman., K. R. Adbul., dan Z. H. Shamsuddin. 2016. Plant growth-promoting rhizobacteria inoculation to enhance vegetative growth, nitrogen fixation and nitrogen remobilization of maize under greenhouse conditions. PLOS ONE 11 : 1 – 19.

Kumar, A., A. Prakash., dan B. N. Johri. 2011. *Bacillus* as PGPR in crop ecosystem. Bacteria in Agrobiology: Crop Ecosystems 37 – 59.

Kumar, S. A., K. Murugan., H. Chakdar., N. Anuroppa., dan D. Bagyaraj. 2019. *Bacillus* species in soil as a natural resource for plant health and nutrition. Journal of Applied Microbiology 128 : 1 – 12.

Kuykendall, L. D., J. M. Young., E. Martinez-Romero., A. Kerr., dan H. Sawada. 2015. Rhizobium. Bergey's Manual of Systematics of Archaee and Bacteria 1 – 36.

Leng, R. A., J. H. Stambolie., dan R. Bell. 1995. *Duckweed* – a potential high-protein feed resource for domestic animals and fish. Livestock Research for Rural Development 7 : 1 – 11.

Maeng, J. dan A. K. Khudairi. 1973. Studies on the flowering mechanism in *Lemna. I. amino acid changes during flower induction. Physiologia Plantarum 28 : 264 – 270.*

Marcelle, R. 1975. Relations between photosynthesis and floweing in *Lemnaceae*. SPRINGER : 161 – 169.

Mawarti, I., B. L. Fibriarti., D. Zul., R. M. Roza., A. Martina., dan T. M. Linda. 2017. Seleksi isolat aktinomisetes asal tanah gambut desa rimbo panjang kabupaten kamar dalam menghasilan hormone IAA (indole acetic acid). Jurnal Riau Biologi 2 : 47 – 54.

Mwale, M. dan F. R. Gwaze. 2013. Characteristics of *duckweed* and its potential as feed source for chicken reared for meat production: A review. Scientific Research and Essays 8 : 689 – 697.

MyTaq HS Red Mix Manual. 2020. bioline.com. Diakses 5 Juli 2021.

Nopriani, U., P. D. M. H. Karti., dan I. Prihantoro. 2014. Produktivitas *duckweed (Lemna minor*) sebagai hijauan pakan alternatif ternak pada intensitas cahaya yang berbeda. JITV 19 : 272 – 286.

Nugraha, R., T. Ardyati., dan Suharjono. 2014. Eksplorasi bakteri selulolitik yang berpotensi sebagai agen biofertilizer dari tanah perkebunan apel kota batu, Jawa Timur. Jurnal Biotropika 2 : 159 – 163.

Numponsak, T., J. Kumla., N. Suwannarach., K. Matsui., dan S. Lumyong. 2018. Biosynthetic pathway and optimal conditions for the production of indole-3-acetic acid by and endophytic fungus. PLOS ONE 13 : 1 – 17.

Olanrewaju, O. S., B. R. Glick., dan O. O. Babalola. 2017. Mechanisms of action of plant growth promoting bacteria. World Journal Microbiology Biotechnology 33 : 1 – 16.

Omitoyin, B. O., E. K. Ajani., O. I. Okeleye., O. Akpoilih., B. U. And., E. A. Demola. 2016. Efficiency of toxic substance removal from aquaculture wastewater by *duckweed* (*Lemna minor*) and bacteria (*Bacillus* sp.). African Journal of Fisheries and Aquatic 1 : 31 – 40.

Oron, G. 1994. *Duckweed* culture for wastewater renovation and biomass production. Agricultural Water Management 26 : 27 – 40.

Pandey, P., S. C. Kang., C. P. Gupta., D. K. Maheshwari. 2005. Rhizosphere competent *Pseudomonas aeruginosa* GRC_1 produces characteristic siderophore and enhances growth of Indian mustard (*Brassica campestris*). Current Microbiology 51 : 303 – 309.

Pelczar, M. J. dan E. C. S. Chan. 1988. Elements of Microbiology. McGraw-Hill Companies. United States.

Piotrowska, A., A. Bajguz., B. Godlewska-Zylkiewicz., dan E. Zambrzycka. 2010. Changes in growth, biochemical components, and antioxidant activity in aqutic plant *Wolffia arrhiza* (Lemnaceae) exposed to cadmium and lead. Arch Environ Contam Toxicol 58 : 594 – 604.

Prabhu, N., S. Borkar., dan S. Garg. 2019. Phosphate solubilization by microorganisms. Advances in Biological Science Research 11 : 161 – 176.

Prasad, R., M. Kumar., dan A. Varma. 2014. Role of PGPR in soil fertility and plant health. Plant-Growth-Promoting Rhizobacteria (PGPR) and Medicinal Plants 12 : 247 – 260

Przemieniecki, S. W., T. P. Kurowski., dan A. Karwowska. 2015. Plant growth promoting potential of *Pseudomonas* sp. SP0113 isolated from potable water from a closed water well. Arch. Biol. Sci. 67 : 663 – 673.

Radić, S., Stipaničev, D., Cvjetko, P., Rajčić, M.M., Širac, S., Pevalek-Kozlina, B. and Pavlica, M., 2011. *Duckweed* Lemna minor as a tool for testing toxicity and genotoxicity of surface waters. Ecotoxicology and environmental safety *74* : 182 – 187.

Ribeiro, R. A., M. A. Rogel., A. Lopez-Lopez., E. Ormeno-Orillo., F. G. Barcellos., J. Martinez., F. L. Thompson., E. Martinez-Romero., dan M. Hungria. 2012. Reclassification of *Rhizobium tropici* type A strains as *Rhizobium leucaenae* sp. nov. International Journal of Systematic and Evolutionary Microbiology 62 : 1179 – 1184.

Ruekaewma, N., S. Piyatiratitivorakul. Dan S. Powtongsook. 2015. Culture system for *Wolffia globosa* L. (Lemnaceae) for hygiene human food. Songklanakarin J. Sci. technol 37 : 575 – 580.

Said, A. 2006. Pengaruh komposisi *Hydrilla verticillate* dan *Lemna minor* sebagai pakan harian terhadap pertumbuhan dan sintasan ikan nila merah (*Oreochromis niloticus* X *Oreochromis mossambicus*) dalam keramba jaring apung di perairan umum dan musi. Prosiding Seminar Nasional Ikan IV, Jatiluhur, 29 – 30 Agustus 2006.

Shaw, J., H. F. Shafer., O. R. Leonard. M. J. Kovach., M. Schorr., dan A. B. Morris. 2014. Chloroplast DNA sequence utility for the lowest phylogenetic and phylogeographic inferences in angiosperms: the tortoise and the hare IV. American Journal of Botany 101 : 1987 – 2004.

Shoukry, A. A., H. H. El-Sebaay., dan A. E. El-Ghomary. 2018. Assessment of indole acetic acid production from *Rhizobium leguminosarum* galur. Current Science International 7 : 60 – 69.

Sulawesty, F., T. Chrismadha., dan E. Mulyana. 2014. Laju pertumbuhan ikan mas (*Cyprinus carpio* L.) dengan pemberian pakan lemna (*Lemna perpusilla* Torr.) segar pada kolam sistem aliran tertutup. LIMNOTEK 21 : 177 – 184.

Takimoto, A. 1973. Flower initiation of *Lemna perpusilla* under continuous low-intensity light. Plant Cell Physiol 14 : 1217 – 1219.

Tang, J., Y. Li., X. Wang., dan M. Daroch. 2017. Effective adsorption of aqueous Pb2+ by dried biomass of *Landoltia punctata* and *Spirodela polyrhiza*. Journal of Cleaner Production 145 : 25 -34.

Tang, Y., L. Chen., X. Wei., Q. Yao., dan T. Li. 2013. Removal of lead ions from aqueous solution by the dried aquatic plant, *Lemna perpusilla* Torr. Journal of Hazardous Materials 244 : 603 – 612.

Tarangnini, K., dan S. Mishra. 2013. Production, characterization, and analysis of melanin from isolated marine *Pseudomonas* sp. using vegetable waste. Research Journal of Engineering Sciences 2 : 40 – 46.

Tipnee, S., A. Jutiviboonsuk. dan P. Wongtrakul. 2017. The bioactivity study of active compounds in *Wolffia globose* extract for an alternative source of bioactive substances. Cosmetics 53 : 1 – 10.

Toyama, T., M. Kuroda., Y. Ogata., Y. Hachiya., A. Quach., K. Tokura., Y. Tanaka., K. Mori., M. Morikawa., dan M. Ike. 2017. Enhanced biomass production of *duckweed*s by inoculating a plant growth-promoting bacterium, *Acinetobacter calcoaceticus* P23, in sterile medium and non-sterile environmental waters. Water Science & Technology 76 : 1418 – 1428.

UK Standards for Microbiology Investigations. 2015. Identification of *Pseudomonas* species and Other non-glucose fermenters. Public Health England.

Vejan, P., R. Abdullah., T. Khadiran., S. Ismail., dan A. N. Boyce. 2016. Role of plant growth promoting rhizobacteria in agricultural sustainability – A Review. Molecules 21 : 1 – 17.

Vermaat, J. E. dan M. H. Khalid. 1998. Performance of common *duckweed* species (*Lemnaceae)* and the waterfern *Azolla filiculoides* on different types of waste water. Water Research 32 : 2569 – 2576.

Voytas, D. 2001. Agarose gel electrophoresis. Current Protocols in Molecular Biology 51 : 2 – 5.

Wang, Q., L. Ma., Q. Zhou., B. Chen., X. Zhang., Y. Wu., F. Pan., L. Huang., X. Yang.,dan Y. Feng. 2019. Inoculation of plant growth promoting bacteria from hyperaccumulator facilitated non-host root development and provided promising agents for elevated phytoremediation efficiency. Chemosphere 234 : 769 – 776.

Witztum, A. 1979. Morphogenesis of asymmetry and symmetry in *Lemna perpusilla* Torr. Annalas of Botany 43 : 423 – 430.

Xu, J., H. Zhao., A. M. Stomp., J. J. Cheng. 2012. The production of *duckweed* as a source of biofuels. Biofuel 3 : 589 – 601.

Yamakawa, Y., R. Jog. dan M. Morikawa. 2018. Effects of co-inoculation of two different plant growth-promoting bacteria on *duckweed*. Plant Growth Regulation 86 : 287 – 296.

Zayed, A., S. Gowthaman., dan N. Terry. 1998. Phytoaccumulation of trace elements by wetland plants: I. *Duckweed*. Journal of Environment Quality 27 : 1 – 7.

Zhang, S. Q., J. F. Li., S. L. Shi., P. H. Huo., W. W. Wen., J. Yin., S. Zhou., Q. Liu., dan Y. Gao. 2013. Phosphate solubilizing microorganisms and phosphate solubilizing Rhizobium. Applied Mechanics and Materials 295 : 2328 – 2332.