

1.3. Daftar Pustaka

- Amri, K., Supriadi, M., Dody, P., Nurjannah, N., & Mahatma, L., 2021. Impact of water turbidity to seagrass (*Enhalus acoroides*) morphology. IOP Conference Series: Earth and Environmental Science. 860, 012020. doi:10.1088/1755-1315/860/1/012020.
- Artika, S.R., Ambo-Rappe, R., Teichberg, M., Moreira-Saporiti, A., & Viana, I.G., 2020. Morphological and physiological responses of *Enhalus acoroides* seedlings under varying temperature and nutrient treatment. *Frontiers in Marine Science*. 7:325. doi: 10.3389/fmars.2020.00325.
- Asmawi, S., 2020. Kesehatan terumbu karang di perairan sekitar terminal batubara Kabupaten Tanah Bumbu. Disertasi Program Pasca Sarjana Universitas Lambung Mangkurat.
- [BPSP] Balai Pengelolaan Sumberdaya Pesisir dan Laut Pontianak. 2015. Laporan Akhir: Survey dan Monitoring Potensi Jenis Ikan yang Dilindungi di Kalimantan Selatan.
- [DKP] Dinas Kelautan Perikanan Provinsi Kalimantan Selatan. 2020. Laporan Akhir: Rencana Pengelolaan dan Zonasi Kawasan Konservasi Perairan; Taman Wisata Perairan Angsana, Sungai Loban, Pulau Laut-Pulau Sembilan, Kepulauan Sambargelap, dan Laut Sekitarnya di Provinsi Kalimantan Selatan.
- [DLH] Dinas Lingkungan Hidup Provinsi Kalimantan Selatan. 2018. Laporan Akhir: Identifikasi Potensi Kerusakan Pantai dan Laut Provinsi Kalimantan.
- Duarte, C.M., & Krause-Jensen, D., 2017. Export from seagrass meadows contributes to marine carbon sequestration. *Frontiers in Marine Science*. 4:1-7. doi: [10.3389/fmars.2017.00013](https://doi.org/10.3389/fmars.2017.00013).
- Hou, C., Jie, S., Jiaguo, Y., Kun, W., Chunhui, L., & Yujun, Y., 2020. Growth indicator response of *Zostera japonica* under different salinity and turbidity stresses in the Yellow River Estuary, China. *Marine Geology*. 424, 106169. doi: [10.1016/j.margeo.2020.106169](https://doi.org/10.1016/j.margeo.2020.106169).
- Jahnke, M., Daniela, D., Luigi, O., Antonella, L., Emanuela, D., Fabio, B., Silvia, M., Gabriele, P., & Luisa, O., 2019. Adaptive responses along a depth and a latitudinal gradient in the endemic seagrass *Posidonia oceanica*. *Heredity*. 122: 233-243. doi: [10.1038/s41437-018-0103-0](https://doi.org/10.1038/s41437-018-0103-0).
- Jamal, R., Zubair, H., Yanuarita, G., Budimawan, Rasyid, A., & Idrus, M.R., 2020. Strategy management area coral viewed from threat level in Tanah Bumbu Regency South Kalimantan. IOP Conference Series: Earth and Environmental Science. 473, 012053. doi:10.1088/1755-1315/473/1/012053.
- Jiang, Z., Zhao, C., Yu, S., Liu, S., Cui, L., Wu, Y., Fang, Y., & Huang, X., 2019. Contrasting root length, nutrient content and carbon sequestration of *Sargassum* growing in offshore carbonate and onshore terrigenous the South China Sea. *Science of the Total Environment*. doi: [10.1016/j.scitotenv.2019.01.175](https://doi.org/10.1016/j.scitotenv.2019.01.175)
- Uchi, H., Piyalap, T., & Anchana, P., 2017. A preliminary study on muss species composition and their relationship with salinity and mud, Trang Province, Thailand. *Proceeding of the 4th National Biodiversity Management in Thailand*. 4:11-16.



- Kuriandewa, T.E., Kiswara, W., Hutomo, M., & Soemodihardjo, S., 2003. The seagrasses of Indonesia. In: Green EP, Short FT (eds). World Atlas of Seagrasses. Prepared by UNEP World Conservation Monitoring Centre. University of California Press. Berkeley, USA.
- Kurniawan, F., Digdo, A.A., Darus, R.F., Anggraini, N.P., Ismet, M.S., Wicaksono, P., & Kiswara, W., 2024. First record of *Ruppia brevipedunculata* in Indonesia. Aquatic Botany. 195: 103806. Doi: 10.1016/j.aquabot.2024.103806.
- Kongrueang, P., Pimchanok, B., & Peerapat, R., 2018. Physiological responses of *Enhalus acoroides* to osmotic stress. Botanica Marina. doi: 10.1515/bot-2017-0108.
- Lamit, N., & Yasuaki, T., 2019. Species-specific distribution of intertidal seagrasses along environmental gradients in a tropical estuary (Brunei Bay, Borneo). Regional Studies in Marine Science. 29, 100671. doi: 10.1016/j.rsma.2019.100671.
- Li, C., Yan-Hao, Z., Xiao-Xiao, W., Yu-Shan, J., Wen-Tao, L., & Pei-Dong, Z., 2020. Changes in survival and growth in response to different combinations of turbidity and duration in eelgrass *Zostera marina* plants. Estuarine Coastal and Shelf Science. 249, 107108. doi: 10.1016/j.ecss.2020.107108.
- Mazarrasa, I., Samper-Villarreal, J., Serrano, O., Lavery, P.S., Lovelock, C.E., Marbà, N., Duarte, C.M., & Cortés, J., 2018. Habitat characteristics provide insights of carbon storage in seagrass meadows. Marine Pollution Bulletin. 134: 106-117. doi: 10.1016/j.marpolbul.2018.01.059
- McKenzie, L.J., Nordlund, L.M., Jones, B.L., Cullen-Unsworth, L.C., Roelfsema, C.M., & Unsworth, R.K.F., 2020. The global distribution of seagrass meadows. Environmental Research Letters. 15:1-13. doi: 10.1088/1748-9326/ab7d06.
- Meysick, L., Tom, Y., Anna, J., Francisc, M., Sebastian, V., Anna, V., Christoffer, B., Joanna, N., & Alf, N., 2019. Context-dependent community facilitation in seagrass meadows along a hydrodynamic stress gradient. Journal of Sea Research. 150-151: 8-23. doi: 10.1016/j.seares.2019.05.001.
- Mishra, A.K., & Deepak, A., 2021. The current status of *Halophila beccarii*: An ecologically significant, yet vulnerable seagrass of India. Ocean and Coastal Management. 200, 1055484. doi: 10.1016/j.ocecoaman.2020.105484.
- Murphy, G.E.P., Dunic, J.C., Adamczyk, E.M., Bittick, S.J., Côté, I.M., Cristiani, J., Geissinger, E.A., Gregory, R.S., Lotze, H.K., O'Connor, M.I., Araújo, C.A.S., Rubidge, E.M., Templeman, N.D., & Wong, M.C., 2021. From coast to coast to coast: ecology and management of seagrass ecosystems across Canada: A review. FACETS 6: 139-179. doi: 10.1139/facets-2020-0020.
- Ontoria, Y., Webster, C., Said, N., Ruiz, J.M., Perez, M., Romero, J., & McMahon, S., 2020. Interactive effects of high salinity can buffer the negative effects of warming on functional traits of the seagrass *Halophila ovalis*. Marine Pollution Bulletin. 158, 111404. doi: 10.1016/j.marpolbul.2020.111404.
- da, M.W., & Ismail, N.A., 2021. Hydro-meteorological aspects of the 2016 South Kalimantan flood: topography, tides, and precipitation.



- International Journal of Remote Sensing and Earth Science. 18(1): 73-90.
[doi: 10.30536/ijreses.2021.v18.a3539](https://doi.org/10.30536/ijreses.2021.v18.a3539).
- Proum, S., Santos, J.H., Lim, L.H., & Marshall, D.J., 2018. Tidal and seasonal variation in carbonate chemistry, pH and salinity for a mineral-acidified tropical estuarine system. *Regional Studies in Marine Science*. 17: 17-27.
[doi: 10.1016/j.rsma.2017.11.004](https://doi.org/10.1016/j.rsma.2017.11.004).
- Ruiz-Frau, A., Gelcich, S., Hendriks, I.E., Duarte, C.M., & Marba, N., 2017. Current state of seagrass ecosystem services: research and policy integration. *Ocean and Coastal Management*. 149: 107-115. [doi: 10.1016/j.ocecoaman.2017.10.004](https://doi.org/10.1016/j.ocecoaman.2017.10.004).
- Salim, D., Ambo-Rappe, R., Mashoreng, S., Kadir, N.N., Zakaria, M.H., & Kiswara, W., 2025. New distribution record of seagrass *Ruppia brevipedunculata* from intertidal cultivation ponds in South Kalimantan, Indonesia. *Biodiversitas*. 26(5): 2088-2096. doi: 10.13057/biodiv/d260507.
- Salim, D., Ambo-Rappe, R., Mashoreng, S., & Kadir, N.N., 2024. Short Communication: Potential threats to seagrass in the waters of Tanah Bumbu District, South Kalimantan, Indonesia. *Biodiversitas*. 25(5): 1882-1889. doi: 10.13057/biodiv/d250504
- Salim, D., Baharuddin, Hehanussa, G.M., Alkadrie, S.I.T., Saputra, A., & Prasetyo, D.E., 2016. Penemuan ekosistem lamun sebagai observasi habitat pakan dugong di perairan Kabupaten Tanah Bumbu Kalimantan Selatan. *Proceeding. Bunga Rampai*. IPB Press. Bogor.
- Suonan, Z., Kim, S.H., Qin, L.Z., Lee, K.S., 2017. Reproductive strategy of the intertidal seagrass *Zostera japonica* under different levels of disturbance and tidal inundation. *Estuarine Coastal and Shelf Science*. 197: 185–193.
[doi: 10.1016/j.ecss.2017.08.031](https://doi.org/10.1016/j.ecss.2017.08.031).
- Thangaradjou T, & Bhatt J.R. 2017. Status of seagrass ecosystems in India. *Ocean and Coastal Management*. 159:7-15. doi: [10.1016/j.ocecoaman.2017.11.025](https://doi.org/10.1016/j.ocecoaman.2017.11.025).
- Uhrin, A.V., & Turner, M.G., 2018. Physical drivers of seagrass spatial configuration: the role of thresholds. *Landscape Ecology* 33 : 2253–2272.
[doi: 10.1007/s10980-018-0739-4](https://doi.org/10.1007/s10980-018-0739-4).
- Unsworth, R.K.F., & Cullen-unsworth, L.C., 2018. A call for seagrass protection. *Science*. 361(6401): 446-448. [doi: 10.1126/science.aat7318](https://doi.org/10.1126/science.aat7318).
- Unsworth, R.K.F., Ambo-Rappe, R., Jones, B.L., La Nafie, Y.A., Irawan, A., Hernawan, U.E., Moore, A.M., & Cullen-Unsworth, L.C., 2018. Indonesia's globally significant seagrass meadows are under widespread threat. *Science of the Total Environment*. 634:279-286. [doi: 10.1016/j.scitotenv.2018.03.315](https://doi.org/10.1016/j.scitotenv.2018.03.315)
- Waycott, M., Duarte, C. M., Carruthers, T. J. B., Orth, R. J., Dennison, W. C., Calladine, A., Fourqurean, J. W., Heck, K. L., Hughes, A. R., Kenworthy, W. J., Short, F. T., & Williams, S.L., 2009. Loss of seagrasses across the globe threatens coastal ecosystems. *Proceedings of the National Academy of Sciences of the United States of America*. doi: 10.1073/pnas.0905620106



2.1. Daftar Pustaka

- Adams, M.P., Hovey, R.K., Hipsey, M.R., Bruce, L.C., Ghisalberti, M., Lowe, R.J., Gruber, R.K., RuizMontoya, L., Maxwell, P.S., Callaghan, D.P., Kendrick, G.A., & O'Brien, K.R., 2016. Feedback between sediment and light for seagrass: Where is it important? *Limnology and Oceanography*. 61(5): 1937-1953. doi: 10.1002/lno.10319.
- [APHA] American Public Health Association. 2017. *Standard Methods for the Examination of Water and Wastewater* (23rd ed.). American Public Health Association, American Water Works Association, Water Environment Federation.
- Artika, S.R., Ambo-Rappe, R., Samawi, M.F., Teichberg, M., Moreira-Saporiti, A., & Viana, I.G., 2021. Rising temperature is a more important driver than increasing carbon dioxide concentrations in the trait responses of *Enhalus acoroides* seedlings. *Applied Science*. 11: 2730. doi: 10.3390/app11062730.
- Artika, S.R., Ambo-Rappe, R., Teichberg, M., Moreira-Saporiti, A., & Viana, I.G., 2020. Morphological and physiological responses of *Enhalus acoroides* seedlings under varying temperature and nutrient treatment. *Frontiers in Marine Science*. 7:325. doi: 10.3389/fmars.2020.00325.
- Asdak, C., 2010. *Hidrologi dan Pengelolaan Daerah Aliran Sungai*. Penerbit: Gadjah Mada University Press.
- Asmawi, S., 2020. *Kesehatan terumbu karang di perairan sekitar terminal batubara Kabupaten Tanah Bumbu*. Disertasi Program Pasca Sarjana Universitas Lammbung Mangkurat.
- Azcarate-Garcia, T., Beca-Carretero, P., Villamayor, B., Stengel, D.B., & Winters, G., 2020. Responses of the seagrass *Halophila stipulacea* depth and spatial gradients in its native region (Red Sea): Morphology, in situ growth and biomass production. *Aquatic Botany*. 165: 103252. doi: 10.1016/j.aquabot.2020.103252.
- Bakri, T., Jackson, P., & Doherty, F., 2017. Along-channel winds in Howe Sound: climatological analysis and case studies. *Atmosphere-Ocean* 55, 12-30. doi:[10.1080/07055900.2016.1233094](https://doi.org/10.1080/07055900.2016.1233094).
- [BAPPEDA] Badan Perencanaan Pembangunan Daerah Kabupaten Kotabaru. 2024. *Laporan Akhir: Kajian Potensi Penanggulangan Abrasi Pantai Di Pulau Laut dan Pulau Sebuku*. Kabupaten Kotabaru.
- Berry, K.L., Hoogenboom, M.O., Flores, F., & Negri, A.P., 2016. Simulated coal spill causes mortality and growth inhibition in tropical marine organisms. *Scientific Reports*. 6 (1): 1 - 8.
- Browne, N.K., Yaakub, S.M., Tay, J.K.L., & Todd, P.A., 2017. Recreating the effects of ship wake induced turbidity to test acclimation responses of *Thalassia hemprichii*. *Estuarine, Coastal Shelf Science* 199 10.1016/j.ecss.2017.09.034
- Send, M., Drylie, T., & Lohrer, A.M., 2018. Elevated turbidity removal capacity of seagrass. *Frontiers in Marine Science*. 5: 39/fmars.2018.00462.



- Ceswaraningrat, I.B.G.Y., Aryashta, D., & Hermansyah, M., 2023. Analisis angin permukaan menggunakan diagram *wind rose* untuk keselamatan penerbangan di Bandara Internasional Juwata. Euler: Jurnal Ilmiah Matematika, Sains dan Teknologi. 12(1): 1-10.
- Cullen-Unsworth, L.C., & Unsworth, R., 2018. A call for seagrass protection. Science. 361 (6401): 446-448. doi: 10.1126/science.aat7318.
- Daswin, E.M., & Kumar, M., 2023. Coastline change rate estimation on the southern coastal districts of Tamil Nadu, India using the multi temporal google earth images and gis based statistical approach. Research Square. <https://www.researchsquare.com/article/rs-1916432/v1>.
- [DKP] Dinas Kelautan Perikanan Provinsi Kalimantan Selatan. 2020. Laporan Akhir: Rencana Pengelolaan dan Zonasi Kawasan Konservasi Perairan; Taman Wisata Perairan Angsana, Sungai Loban, Pulau Laut-Pulau Sembilan, Kepulauan Sambargelap, dan Laut Sekitarnya di Provinsi Kalimantan Selatan.
- Donatelli, C., Ganju, N.K., & Fagherazzi, S., 2018. Seagrass impact on sediment exchange between tidal flats and salt marsh, and the sediment budget of shallow bays. Geophysical Research Letters. 45(10): 4933 - 4943. doi:[10.1029/2018GL078056](https://doi.org/10.1029/2018GL078056)
- Duarte, C.M., & Krause-Jensen, D., 2017. Export from seagrass meadows contributes to marine carbon sequestration. Frontiers in Marine Science. 4:1-7. doi: 10.3389/fmars.2017.00013.
- Espel, D., Diepens, N.J., Boutron, O., Buffan-Dubau, E., Chérain, Y., Coulet, E., Grillas, P., Probst, A., Silvestre, J., & Elger, A., 2019. Dynamics of the seagrass *Zostera noltei* in a shallow Mediterranean lagoon exposed to chemical contamination and other stressors. Estuarine, Coastal Shelf Science. 222: 1-12.
- Fernando, R., Melani, R.W., & Kurniawan, D., 2019. Pengaruh laju sedimentasi terhadap kerapatan lamun di perairan Beloreng Kelurahan Tembeling Tanjung Kabupaten Bintan. Akuatiklestari. 3 (1) : 10-17. doi: [10.31629/akuatiklestari.v3i1.936](https://doi.org/10.31629/akuatiklestari.v3i1.936).
- Fortes, M.D., Ooi, J.L.S., Tan, Y.M., Prathep, A., Bujang, J.S., & Yaakub, S.M., 2018. Seagrass in Southeast Asia: a review of status and knowledge gaps, and a road map for conservation. Botanica Marina. 61(3): 269 - 288. doi: [10.1515/bot-2018-0008](https://doi.org/10.1515/bot-2018-0008).
- Gordon, A.L., Susanto, D.L., Ffield, A., Huber, B.A., Pranowo, W., & Wirasantosaet, S., 2008. Makassar strait throughflow, 2004 to 2006. Geophysical Research Letters. 35: L24605. doi: [10.1029/2008GL036372](https://doi.org/10.1029/2008GL036372).
- Hidayat, M., Ruswahyuni, & Widyorini, N., 2014. Analisis laju sedimentasi di daerah padang lamun dengan tingkat kerapatan berbeda di Pulau Kalimantan Barat. Management of Aquatic Resources Journal. 3 (3): 73-79.
- ...a D', Luigi, O., Antonella, L., Emanuela, D., Fabio, B., Silvia, P., & Luisa, O., 2019. Adaptive responses along a depth and gradient in the endemic seagrass *Posidonia oceanica*. : 233 - 243. doi: [10.1038/s41437-018-0103-0](https://doi.org/10.1038/s41437-018-0103-0).
- ...l., Yanuarita, G., Budimawan, Rasyid, A., & Idrus, M.R., 2020. Management area coral viewed from threat level in Tanah Bumbu



Regency South Kalimantan. IOP Conference Series: Earth and Environment Science. 473, 012053. doi:10.1088/1755-1315/473/1/012053.

- Jiang, Z., Zhao, C., Yu, S., Liu, S., Cui, L., Wu, Y., Fang, Y., & Huang, X., 2019. Contrasting root length, nutrient content and carbon sequestration of seagrass growing in offshore carbonate and onshore terrigenous sediments in the South China Sea. *Science of the Total Environment*. 662:151-159. doi: [10.1016/j.scitotenv.2019.01.175](https://doi.org/10.1016/j.scitotenv.2019.01.175).
- Keintjem, R.G., Baskoro, W.T., Buana, M.C., & Nurmalasari, N., 2023. Analisis arah dan kecepatan serta besar persentase fase angin menggunakan WRPLOT tahun 2015-2020 di Stasiun Klimatologi Kelas II Paniki Atas Minahasa Utara. *Kappa Journal*. 7(3): 531-537.
- Keputusan Menteri Negara Lingkungan Hidup Nomor 51 Tahun 2004 Tentang Baku Mutu Air Laut. Baku mutu air laut untuk biota laut.
- Li, C., Yan-Hao, Z., Xiao-Xiao, W., Yu-Shan, J., Wen-Tao, L., & Pei-Dong, Z., 2020. Changes in survival and growth in response to different combinations of turbidity and duration in eelgrass *Zostera marina* plants. *Estuarine Coastal and Shelf Science*. 249, 107108. doi:10.1016/j.ecss.2020.107108.
- Lu, D., Mausel, P., Brondizio, E., & Moran, E., 2004. Change detection techniques. *International Journal of Remote Sensing*, 25(12): 2365-2407.
- Magris, R.A., & Ban, N.C., 2019. A meta-analysis reveals global patterns of sediment effects on marine biodiversity. *Global Ecology and Biogeography* 00: 1-20. doi: 10.1111/geb.12990.
- Malarvizhi, K., Kumar, S.V., & Porchelvan, P., 2016. Use of high resolution *Google Earth* satellite imagery in landuse map preparation for urban related applications. *Procedia Technology* 24: 1835-1842.
- Masseran, N., 2015. Markov chain model for the stochastic behaviors of wind-direction data. *Energy Conversion and Management*. 92: 266-274. doi: 10.1016/j.enconman.2014.12.045.
- McKenzie, L.J., Nordlund, L.M., Jones, B.L., Cullen-Unsworth, L.C., Roelfsema C.M., & Unsworth, R.K.F., 2020. The global distribution of seagrass meadows. *Environmental Research Letters*. 15:1-13. doi: [10.1088/1748-9326/ab7d06](https://doi.org/10.1088/1748-9326/ab7d06).
- Meysick, L., Tom, Y., Anna, J., Francesc, M., Sebastian, V., Anna, V., Christoffer, B., Joanna, N., & Alf, N., 2019. Context-dependent community facilitation in seagrass meadows along a hydrodynamic stress gradient. *Journal of Sea Research*. 150-151: 8-23. doi: [10.1016/j.seares.2019.05.001](https://doi.org/10.1016/j.seares.2019.05.001).
- Mishra, A.K., & Deepak, A., 2021. The current status of *Halophila beccarii*: An ecologically significant, yet vulnerable seagrass of India. *Ocean and Coastal Management*. 200, 1055484. doi: [10.1016/j.ocecoaman.2020.105484](https://doi.org/10.1016/j.ocecoaman.2020.105484).



nic, J.C., Adamczyk, E.M., Bittick, S.J., Côté, I.M., Cristiani, E.A., Gregory, R.S., Lotze, H.K., O'Connor, M.I., Araújo, Ige, E.M., Templeman, N.D., & Wong, M.C., 2021. From coast coast: ecology and management of seagrass ecosystems ja: a review. *FACETS* 6: 139-179. doi:10.1139/facets-2020-

- Murphy, G.E.P., Wong, M.C., & Lotze, H.K., 2019. A human impact metric for coastal ecosystems with application to seagrass beds in Atlantic Canada. *FACETS* 4: 210-237. doi:10.1139/facets-2018-0044.
- Ontoria, Y., Webster, C., Said, N., Ruiz, J.M., Perez, M., Romero, J., & McMahon, K., 2020. Positive effects of high salinity can buffer the negative effects of experimental warming on functional traits of the seagrass *Halophila ovalis*. *Marine Pollution Bulletin*. 158, 111404. doi:10.1016/j.marpolbul.2020.111404.
- Prasetyo, B., 2014. Metode penelitian kuantitatif, teori dan aplikasi. Depok: PT Rajagrafindo Persada.
- Pratama, M.B., Rafida, M.W., & Ismail, N.A., 2021. Hydro-meteorological aspects of the 2021 South Kalimantan flood: topography, tides, and precipitation. *International Journal of Remote Sensing and Earth Science*. 18 (1): 73-90. doi: 10.30536/i.ijreses.2021.v18.a3539.
- Quiros, T.E.A., Croll, D., Tershy, B., Fortes, M.D., & Raimondi, P., 2017. Land use is a better predictor of tropical seagrass condition than marine protection. *Biological Conservation*. 209: 454 -463. doi: 10.1016/j.biocon.2017.03.011.
- Quiros, T.E.A., 2016. Linking terrestrial and marine protected areas at the coastal interface. PhD. University of California, Santa Cruz.
- Rindriawaty, Ramli, M., & Nur, A.I., 2025. Kondisi ekosistem lamun pada zona pemanfaatan kawasan konservasi daerah Teluk Moramo Provinsi Sulawesi Tenggara. *Jurnal Sains dan Inovasi Perikanan*. 9(1): 61 - 72.
- Roca, G., Romero, J., Columbu, S., Farina, S., Pages, J.F., Gera, A., Inglis, G., & Alcoverro, T., 2014. Detecting the impacts of harbour construction on a seagrass habitat and its subsequent recover. *Ecological Indicators*. 45: 9 - 17. doi:10.1016/j.ecolind.2014.03.020.
- Ruiz-Frau, A., Gelcich, S., Hendriks, I.E., Duarte, C.M., & Marba, N., 2017. Current state of seagrass ecosystem services: research and policy integration. *Ocean and Coastal Management*. 149: 107-115. doi: 10.1016/j.ocecoaman.2017.10.004.
- Schrameyer, V., York, P.H., Chartrand, K., Ralph, P.J., Kühl, M., Brodersen, K.E., & Rashee, M.A., 2018. Contrasting impacts of light reduction on sediment biogeochemistry in deep and shallow-water tropical seagrass assemblages (Green Island, Great Barrier Reef). *Marine Environmental Research*. 136: 38-47.
- Shinoda, T., Han, W., Metzger, E.J., & Hurlburt, H.E., 2012. Seasonal variation of the Indonesian throughflow in Makassar Strait. *Journal of Physical Oceanography*. 42(7): 1099 - 1123. doi: 10.1175/JPO-D-11-0120.1.
- Sprintall, J., Gordon, A.L., Koch-Larrouy, A., Lee, T., Potemra, J.T., Pujiana, K., & Wijffels, S.E., 2014. Indonesian seas and their role in the coupled ocean-m. *Nature Geoscience*. 7: 487 - 492. doi: 10.1038/ngeo2188.
- Metode penelitian kuantitatif kualitatif dan R&D. Bandung: Sositasari, R., & Iswari, M.Y., 2018. Dampak perubahan lahan terhadap kondisi padang lamun di perairan timur Pulau auan Riau. *Jurnal Segara*. 14(1): 1 – 10.
2. Metodologi Penelitian. Jakarta: PT Raja Grafando Persaja.



- Thangaradjou, T., & Bhatt, J.R., 2017. Status of seagrass ecosystems in India. *Ocean and Coastal Management*. 159:7-15. doi: [10.1016/j.ocecoaman.2017.11.025](https://doi.org/10.1016/j.ocecoaman.2017.11.025).
- Suwandana, E., 2019. Pemanfaatan data *Google Earth* resolusi spasial tinggi untuk pemetaan perubahan morfologi pantai. *Depik Jurnal Ilmu-Ilmu Perairan, Pesisir dan Perikanan*. 8(3): 193-206.
- Tarya, A., Hoitink, A.J.F., Van der Vegt, M., van Katwijk, M.M., Hoeksema, B.W., Bouma, T.J., Lamers, L.P.M., & Christianen, M.J.A., 2018. Exposure of coastal ecosystems to river plume spreading across a near-equatorial continental shelf. *Continental Shelf Research*. 153: 1-15. Doi: 10.1016/j.csr.2017.12.003.
- Tin, H.C., Tu Uyen, N., Chi Tu, N.H., Huu Binh, N., & Khanh Ni, T.N., 2023. Dynamics of seagrass beds and land use-land cover characteristics in Vietnamese Marine Protected Areas. *Regional Studies in Marine Science*. 59, 102794. doi: 10.1016/j.rsma.2022.102794.
- Tretyakova, M.O., Vardavas, A.I., Vardavas, C.I., Iatrou, E.I., Stivaktasis, P.D., Burykina, T.I., Mezhev, Y.O., Tsatsakis, A.M., & Golokhvast, K.S., 2021. Effects of coal microparticles on marine organisms: A review. *Toxicology Reports*. 8 : 1207-1219. doi: [10.1016/j.toxrep.2021.06.006](https://doi.org/10.1016/j.toxrep.2021.06.006).
- Uhrin, A.V., & Turner, M.G., 2018. Physical drivers of seagrass spatial configuration: the role of thresholds. *Landscape Ecology* 33 : 2253–2272. doi: [10.1007/s10980-018-0739-4](https://doi.org/10.1007/s10980-018-0739-4).
- Unsworth, R.K.F., Ambo-Rappe, R., Jones, B.L., La Nafie, Y.A., Irawan, A., Hernawan, U.E., Moore, A.M., & Cullen-Unsworth, L.C., 2018. Indonesia's globally significant seagrass meadows are under widespread threat. *Science of the Total Environment*. 634:279-286. doi: [10.1016/j.scitotenv.2018.03.315](https://doi.org/10.1016/j.scitotenv.2018.03.315).
- Van der Mheen, M., Pattiaratchi, C., Cosoli, S., & Wandres, M., 2020. Depth-dependent correction for wind-driven drift current in particle tracking applications. *Frontiers in Marine Science*. 7: 305. doi:10.3389/fmars.2020.00305.
- Wattimena, M., & Salamena, G., 2022. Karakteristik angin permukaan di Teluk Ambon Maluku. *Jurnal Laut Pulau* 1(2): 19-36.
- Wilson, K.L., & Lotze, H.K., 2019. Climate change projections reveal range shifts of seagrass *Zostera marina* in Northwest Atlantic. *Marine Ecology Progress Series*. 620: 47-62. doi: [10.3354/meps12973](https://doi.org/10.3354/meps12973).
- Yamamoto, T., & Nadaoka, K., 2018. Analyzing coastal turbidity under complex terrestrial loads characterized by a 'stress connectivity matrix' with an atmosphere watershed-coastal ocean coupled model. *Estuarine, Coastal Shelf Science* 203: 44-58. doi: 10.1016/j.ecss.2018.01.025.
- Yamamoto, T., Malingin, M.A.C.L., Pepino, M.M., Yoshikai, M., Campos, W., Watanabe, A., Tanaka, Y., Morimoto, N., Ramos, R., ... n, H., & Nadaoka, K., 2019. Assessment of coastal turbidity potential by terrigenous sediment load reduction and its on seagrass inhabitable area in Banate Bay, central science of the Total Environment. 656 : 1386–1400.
- Matheson, F.E., Manley-Harris, M., Davies-Colley, R.J., & Hawes, I., 2020. Effects of fine sediment on seagrass



meadows: A case study of *Zostera muelleri* in Pàuatahanui Inlet, New Zealand. *Journal of Marine Science and Engineering*. 8 (9): 645. doi: 10.3390/jmse8090645.

Zhou, Z., Ouyang, Y., Li, Y., Qiu, Z., & Moran, M., 2017. Estimating impact of rainfall change on hydrological processes in Jianfengling rainforest watershed, China using BASINS HSPF-CAT modeling system. *Ecological Engineering*. 105: 87-94. doi: 10.1016/j.ecoleng.2017.04.051.

3.1. Daftar Pustaka

Alexandre, A., Silva, J., Ferreira, R., Paulo, D., Serrao, E.A., & Santos, R., 2017. First description of seagrass distribution and abundance in Sao Tome and Principe. *Aquatic Botany*. 142: 48-52. doi:10.1016/j.aquabot.2017.06.008.

Alfeus, A., & Gabriel, N.N., 2023. *Applications of aquatic plants in the remediation of aquaculture wastewater: An opportunity for African Aquaculture*. In Gabriel, N.N., Omoregie, E., Abasubong, K.P. (eds). *Emerging Sustainable Aquaculture Innovations in Africa. Sustainability Sciences in Asia and Africa*. Chapter 13: 327-339. Springer, Singapore. doi: [10.1007/978-981-19-7451-9_13](https://doi.org/10.1007/978-981-19-7451-9_13).

Ansari, A.A., Naeem, M., Gill, S.S., & AlZuaibr, F.M., 2020. Phytoremediation of contaminated waters: An eco-friendly based on aquatic macrophytes application. *Egyptian Journal of Aquatic Research*. 46: 371-376. doi: [10.1016/j.ejar.2020.03.002](https://doi.org/10.1016/j.ejar.2020.03.002).

Barcelona, A., Colomer, J., & Serra, T., 2023. Spatial sedimentation and plant captured sediment within seagrass patches. *Marine Environment Research*. 188,105997. doi: 10.1016/j.marenvres.2023.105997.

Barcelona, A., Colomer, J., Soler, M., Gracias, N., & Serra, T., 2021. Meadow fragmentation influences *Posidonia oceanica* density at the edge of nearby gaps. *Estuarine, Coastal and Shelf Science*. 249, 107106. doi: [10.1016/j.ecss.2020.107106](https://doi.org/10.1016/j.ecss.2020.107106).

Benjamin, S., Adams, J.B., Human, L.R.D., & Rishworth, G.M., 2026. Integrated indicators of estuarine watershed pollution: Seagrass, epiphytes, sediment and benthic macrofauna. *Marine Pollution Bulletin*. 222, 118740. doi: [10.1016/j.marpolbul.2025.118740](https://doi.org/10.1016/j.marpolbul.2025.118740).

Bielmyer-Fraser, G., Llazar, K., Ward, A., Trent, T., & Goldberg, N., 2022. Metal analysis of submerged aquatic vegetation in the lower St. Johns River, Florida. *Environmental Monitoring Assessment*. 194, 492. doi: 10.1007/s10661-022-10159-9.

Bonanno, G., & Orlando-Bonaca, M., 2017. Trace elements in Mediterranean seagrasses: Accumulation, tolerance and biomonitoring. A review. *Pollution Bulletin*. 125(1-2): 8-18.

Alfeus, A., & Gabriel, N.N., 2023. *Applications of aquatic plants in the remediation of aquaculture wastewater: An opportunity for African Aquaculture*. In Gabriel, N.N., Omoregie, E., Abasubong, K.P. (eds). *Emerging Sustainable Aquaculture Innovations in Africa. Sustainability Sciences in Asia and Africa*. Chapter 13: 327-339. Springer, Singapore. doi: [10.1007/978-981-19-7451-9_13](https://doi.org/10.1007/978-981-19-7451-9_13).

s, R., & Santos, R., 2009. Individual and population plasticity of *Zostera noltii* along a vertical intertidal gradient. *Estuarine, Coastal and Shelf Science*. 82: 301-308. doi: 10.1016/j.ecss.2009.01.020.

hachitra, V., Nualchawee, K., & Buranapratheprat, A., 2018. Spatial mapping of seagrass distribution by using integrated remote



- sensing data in Kung Kraben Bay (KKB), Chanthaburi province, Thailand. *International Journal of Agricultural Technology*. 14(2): 161-170.
- Christianen, M.J.A., van Belzen, J., Herman, P.M.J., van Katwijk, M.M., Lamers, L.P.M., & van Leent, P.J.M., 2013. Low-canopy seagrass beds still provide important coastal protection services. *PLoS ONE*. 8: 1-8. doi: [10.1371/journal.pone.0062413](https://doi.org/10.1371/journal.pone.0062413)
- de los Santos, C.B., Olive, I., Moreira, M., Silva, A., Freitas, C., Luna, A.R., Quental-Ferreira, H., Martins, M., Costa, M.N., Silva, J., Cunha, M.E., Soares, F., Pousao-Ferreira, P., & Santos, R., 2020. Seagrass meadows improve inflowing water quality in aquaculture ponds. *Aquaculture* 528, 735502. doi: 10.1016/j.aquaculture.2020.735502.
- Doukari, M., Batsaris, M., & Topouzelis, K., 2021. UASea: A Data Acquisition Toolbox for Improving Marine Habitat Mapping. *Drones*. 5: 73. doi:[10.3390/drones5030073](https://doi.org/10.3390/drones5030073).
- Ermando, M., Sasono, N., & Susetyo, C., 2017. Analisis potensi perubahan pemanfaatan lahan berdasarkan model spasial harga lahan di Kecamatan Tembelang Kabupaten Jombang. *Jurnal Teknik ITS*. 6(2): 407-412.
- Gu, R., Lin, H., Zhou, Y., Song, X., Xu, S., Yue, S., Zhang, Y., Xu, S., & Zhang, X., 2021. Programmed responses of different life-stages of the seagrass *Ruppia sinensis* to copper and cadmium exposure. *Journal of Hazardous Materials*. 403,123875. doi: 10.1016/j.jhazmat.2020.123875.
- Hartati, R., Widianingsih, Santoso, A., Endrawati, H., Zainuri, M., Riniatsih, I., Saputra, W.L., & Mahendrajaya, R.R., 2017. Variasi komposisi dan kerapatan jenis lamun di perairan Ujung Piring, Kabupaten Jepara. *Jurnal Kelautan Tropis*. 20(2): 96-105. doi:[10.14710/jkt.v20i2.1702](https://doi.org/10.14710/jkt.v20i2.1702).
- Hernawan, U.E., Sjafrie, N.D.M., Supriyadi, I.H., Suyarso, Iswari, M.Y., Anggraini, K., & Rahmat. 2017. Status padang lamun Indonesia 2017. Pusat Penelitian Oseanografi-Lembaga Ilmu Pengetahuan Indonesia, Jakarta.
- Huang, C., Piñón, C., Mehrubeoglu, M., & Cammarata, K., 2023. Image analysis reveals environmental influences on the seagrass-epiphyte dynamic relationship for *Thalassia testudinum* in the northwestern Gulf of Mexico. *Frontiers in Marine Science*. 9: 1096307. doi: 10.3389/fmars.2022.1096307
- Jiang, Z., Zhao, C., Yu, S., Liu, S., Cui, L., Wu, Y., Fang, Y., & Huang X., 2019. Contrasting root length, nutrient content and carbon sequestration of seagrass growing in offshore carbonate and onshore terrigenous sediments in the South China Sea. *Science of the Total Environment*. 662: 151-159. doi: 10.1016/j.scitotenv.2019.01.175.
- Kafle, A., Timilsina, A., Gautam, A., Adhikari, K., Bhattarai, A., & Aryal, N., 2022. Phytoremediation: Mechanisms, plant selection and enhancement by natural and synthetic agents. *Environmental Advances*. 8: 100203. doi: [10.1016/j.envadv.2022.100203](https://doi.org/10.1016/j.envadv.2022.100203).



1. Wigeongrass (*Ruppia maritima* L): A Literature Review. Department of the Interior Fish and Wildlife Service, DC.
2. Ravitha, N.L.P.R., Nuarsa, I.W., Basher, A.K.K., & Wicaksono, H-Resolution Seagrass Species Mapping and Propeller Scars

- Detection in Tanjung Benoa, Bali through UAV Imagery. *Journal of Ecological Engineering*. 25(1): 161-174. doi: 10.12911/22998993/174943.
- Kawaroe M, Nugraha A.H, Juraij, & Tasabaramo I.A., 2016. Seagrass biodiversity at three marine ecoregions of Indonesia: Sunda Shelf, Sulawesi Sea and Banda Sea. *Biodiversitas* 17 (2): 585-591. doi:10.13057/biodiv/d170228.
- Komatsu, T., Hashim, M., Nurdin, N., Noiraksar, T., Prathep, A., Stankovic, M., Son, T.P.H., Thu, P.M., Luong, C.V., Wouthyzen, S., Phauk, S., Musli, A.M., Yahya, N.N., Terauchi, G., Sagawa, T., & Hayashi, K., 2020. Practical mapping methods of seagrass beds by satellite remote sensing and ground truthing. *Coastal Marine Science*. 43 (1): 1-25.
- Kristanti, R.A., & Hadibarata, T., 2023. Phytoremediation of contaminated water using aquatic plants, its mechanism and enhancement. *Current Opinion in Environmental Science & Health*. 32, 100451. doi: 10.1016/j.coesh.2023.100451.
- Kristiyanto, D. Y., Widiastuti, S., & Aryotejo, G., 2017. Pendekatan geoprosesing pada GIS untuk menentukan pembangunan infrastruktur bisnis di Kota Semarang. *Jurnal Ilmiah Komputasi*, 16(1): 1-10.
- Kurniawan, F., Digdo, A.A., Darus, R.F., Anggraini, N.P., Ismet, M.S., Wicaksono, P., & Kiswara, W., 2024. First record of *Ruppia brevipedunculata* in Indonesia. *Aquatic Botany*. 195: 103806. doi: 10.1016/j.aquabot.2024.103806.
- Maramis, M.A., Wagey, B., Rumengan, A.P., Sondak, C.F.A., Opa, E.T., & Kondoy, K.F. I., 2020. Karbon pada padang lamun di perairan Pulau Manado Tua. *Jurnal Pesisir dan Laut Tropis*. 8(2): 79–91. doi: 10.35800/jplt.8.2.2020.29950.
- Marsiglia, N., Bosch-Belmar, M., Mancuso, F. P., & Sarà, G., 2025. Epibionts and Epiphytes in Seagrass Habitats: A Global Analysis of Their Ecological Roles. *Sci*, 7(2), 62. doi: 10.3390/sci7020062.
- Mishra, A.K., & Farooq, S.H., 2022. Trace Metal accumulation in seagrass and saltmarsh ecosystem of India: comparative assessment and bioindicator potential. *Marine Pollution Bulletin*. 174, 113251. doi: 10.1016/j.marpolbul.2021.113251.
- Moussa, M.R., Frederic, B., Hendrikje, J., Camille, G., Viliame, P.Q., Valeriano, P., David, L., & Rene, G., 2020. Importance of intertidal seagrass beds as nursery area for coral reef fish juveniles (Mayotte, Indian Ocean). *Regional Studies in Marine Science*. 33: 100965. doi: 10.1016/j.rsma.2019.100965.
- Mustafa, H.M., & Hayder, G., 2021. Recent studies on applications of aquatic weed plants in phytoremediation of wastewater: A review article. *Ain Shams Engineering Journal*. 12: 355-365. doi: 10.1016/j.asej.2020.05.009.
- Nababan, B., Mastu, L.O.K., Idris, N.H., & Panjaitan, J.P. 2021. Shallow-water benthic habitat mapping using *drone* with Object Based Image Analyses. *Remote Sensing*, 13: 4452. Doi: [10.3390/rs13214452](https://doi.org/10.3390/rs13214452).



Djuwita, I., Budiharsono, S., Purbayanto, A., & Asmus, H., 2021. Remote sensing for seagrass management in Indonesia. *Journal of Ecological Engineering*. 15 (3): 234-242.

Mishra, A.K., Raju, N.J., & Mehmood, G., 2022. Coastal seagrass as bioindicators of trace metals in the Asia's largest lagoon. *Marine Pollution Bulletin* 178, 113576. doi: 10.1016/j.marpolbul.2022.113576.

- Nugraha, A.H., Tasarabamo, I.A., Hernawan, U.E., Rahmawati, S., Putra, R.D., & Darus, R.F., 2021. Diversity, coverage, distribution, and ecosystem services of seagrass in three small islands of northern Papua, Indonesia: Liki Island, Meossu Island and Befondi Island. *Biodiversitas*. 22: 5544-5549. doi: 10.13057/biodiv/d221238.
- Nugroho, A., Nababan, B., Panjaitan, J.P., & Agus, S.B., 2024. Pemetaan habitat bentik berbasis objek menggunakan *drone* di perairan Pulau Gili Labak, Sumenep. *Jurnal Kelautan*. 17(1): 29-42. doi: 10.21107/jk.v17i1.24518.
- Nur, M.M., Suryono, C.A., & Endrawati, H., 2024. Kerapatan Lamun di Perairan Pulau Panjang, Jepara. *Journal of Marine Research*. 13(3): 541-546. Doi: 10.14710/jmr.v13i3.35128.
- Putri, N., Darsiharjo, & Sugito, N.T., 2023. Analisis efektivitas metode Digitasi on Screen dan Object-Based Image Analysis (OBIA) melalui foto udara dalam pemetaan bidang tanah kawasan permukiman (studi kasus di Desa Ciwaruga, Kecamatan Parongpong, Kabupaten Bandung Barat). *Journal of Geodesy and Geometrics*. 19(1): 73-87.
- Rabbani, A.G., Siddiqui, M.N., Kumar, S., Rahman, S.H., & Uddin, M.N., 2006. Favourable abiotic environmental condition for the prevalence of *Ruppia maritima* (Wigeon Grass) in shrimp culture ponds. *South Asian Journal Agriculture*. 1(2): 28-31.
- Roelfsema, C.M., Phinn, S.R., Udy, N., & Maxwell, P., 2009. An integrated field and remote sensing approach for mapping seagrass cover, Moreton Bay, Australia. *Spatial Science*. 54 (1): 45-62. doi: [10.1080/14498596.2009.9635166](https://doi.org/10.1080/14498596.2009.9635166)
- Ruiz-Frau, A., Gelicich, S., Hendriks, I.E., Duarte, C.M., & Marba, N., 2017. Current state of seagrass ecosystem services: research and policy integration. *ocean and coastal management*. 149: 107-115. doi: [10.1016/j.ocecoaman.2017.10.004](https://doi.org/10.1016/j.ocecoaman.2017.10.004)
- Sahertian, D, E., & Wakano, D., 2017. Laju pertumbuhan daun *Enhalus acoroides* pada substrat berbeda di perairan pantai Desa Poka Pulau Ambon. *Biology Science & Education*. 62-68.
- Salim, D., Ambo-Rappe, R., Mashoreng, S., Kadir, N.N., Zakaria, M.H., & Kiswara, W., 2025. New distribution record of seagrass *Ruppia brevipedunculata* from intertidal cultivation ponds in South Kalimantan, Indonesia. *Biodiversitas*. 26(5): 2088-2096. doi: 10.13057/biodiv/d260507.
- Salim, D., Baharuddin, Hehanussa, G.M., Alkadrie, S.I.T., Saputra, A., & Prasetyo, D.E., 2016. Penemuan ekosistem lamun sebagai observasi habitat pakan dugong di perairan Kabupaten Tanah Bumbu Kalimantan Selatan. *Proceeding Bunga Rampai*. IPB Press. Bogor
- Saroinsong, H.S., Poekoel, V.C., & Manembu, P.D., 2018. Rancang bangun wahana pesawat tanpa awak (*fixed wing*) berbasis ardupilot. *Jurnal Teknik Elektro dan Komputer*. 7(1): 73-84. doi: [10.35793/jtek.v7i1.19195](https://doi.org/10.35793/jtek.v7i1.19195)
- N., & Hendriks, I. E., 2020. Fragmentation in Seagrass Can Alter Hydrodynamics and Sediment Deposition ; 12(12), 3473. doi: 10.3390/w12123473.
- Wahyono, E. B., & Suyudi, B., 2019. Hasil pemotretan *erial vehicle* pada variasi topografi untuk pengukuran dan *urnal Tunas Agraria*. 2(1): 21-44. doi: [10.31292/jta.v2i1.16](https://doi.org/10.31292/jta.v2i1.16)



- Sewiko, R., Damayanti, S.P., & Sagala, H.A.M.U., 2024. Aplikasi teknologi *drone* dan pendekatan OBIA dalam studi identifikasi habitat perairan dangkal. *Jurnal Kelautan*. 17(2): 129-137. doi: 10.21107/jk.v17i2.22313
- Short, F.T., Carruthers, W.D., & Waycott, M., 2007. Global seagrass distribution and diversity: A bioregional model. *Journal of Experimental Marine Biology and Ecology*. 350 (1-2): 3-20. doi: 10.1016/j.jembe.2007.06.012
- Strazisar, T., Koch, M.S., Santangelo, C.W., & Madden, C.J., 2021. Abiotic and biotic interactions control *Ruppia maritima* life history development within a heterogeneous coastal landscape. *Estuaries & Coasts*. 44: 1975-1993. doi: 10.1007/s12237-020-00870-6.
- Sjafrie, N.D.M., Hernawan, U.E., Prayudha, B., Supriyadi, I.H., Iswari, M.Y., Rahmat, Anggraini, K., Rahmawati, S., & Suyarso. 2018. Indonesia's seagrass meadow status 2018 [Status Padang Lamun Indonesia 2018]. Pusat Penelitian Oseanografi-Lembaga Ilmu Pengetahuan Indonesia, Jakarta.
- Strydom, S., Murray, K., Moustaka, M., Hyndes, G., & Wilson, S., 2026. Getting edgy: implications of fragmented seagrass meadows for fish assemblages. *Landscape Ecology*. doi:10.1007/s10980-025-02261-3.
- Timporok, J.J., Kumaat, J.C., & Tendean, M., 2024. Studi perubahan garis pantai Amurang pasca bencana abrasi melalui analisis *time-lapse* citra UAV. *Jurnal Episentrum*. 5(3): 39-50. doi: 10.36412/jepst.v5i3.3689.
- Unsworth, R.K.F., McKenzie, L.J., & Collier, C.J., 2019. Global challenges for seagrass conservation. [AMBIO A Journal of the Human Environment](#). 48(8): 801-815. doi:10.1007/s13280-018-1115-y.
- Unsworth, R.K.F., Ambo-Rappe, R., Jones, B.L., La Nafie, Y.A., Irawan, A., Hernawan, U.E., Moore, A.M., & Cullen-Unsworth, L.C., 2018. Indonesia's globally significant seagrass meadows are under widespread threat. *Science of the Total Environment*. 634:279-286. doi: [10.1016/j.scitotenv.2018.03.315](#)
- Wangkanusa, M, S., Kondoy, K, I, F., & Rondonuwu, A.B., 2017. Identifikasi kerapatan dan karakter morfometrik lamun *Enhalus acoroides* pada substrat yang berbeda di Pantai Tongkeina Kota Manado. *Platax*. 5(2): 210-220.
- Waycott, M., McMahon, K., Mellars, J, Calladine, A., & Kleine, D., 2004. A guide to tropical seagrasses of the Indo West Pacific. Townsville: James Cook University.

4.1. Daftar Pustaka

- Abe, M., Yokota, K., Kurashima, A., & Maegawa, M., 2009. High water tolerance in photosynthetic activity of *Zostera japonica* and graebner seedlings from ago bay, mie prefecture, central Japan. *Estuarine, Coastal and Shelf Science*. 75: 1117–1123. doi: 10.1007/s12562-009-0141-1

- J.M., Artigas, L.F., Moreira-Turcq, P., Benedetti, M.F., Vidal, T., Kim, J.H., Bernardes, M.C., Savoye, N., Deborde, J., Alberic, P., Landim de Souza, M.F., & Roland, F., 2014.

- Amazon river carbon dioxide outgassing fuelled by wetlands. *Nature* 505: 395-398. doi: 10.1038/nature12797.
- Ailstock, M.S., Shafer, D.J., & Magoun, A.D., 2010. Effects of planting depth, sediment grain size, and nutrients on *Ruppia maritima* and *Potamogeton perfoliatus* seedling emergence and growth. *Restoration Ecology*. 18: 574-583. doi: 10.1111/j.1526-100X.2010.00697.x
- Amale, D., Kondoy, K.I.F., & Rondonuwo, A.B., 2016. Struktur morfometrik lamun *Halophila ovalis* di perairan pantai Tongkaina Kecamatan Bunaken Kota. *Jurnal Ilmu Platax*. 4(2): 67-75.
- Ambo-Rappe, R., Yasir, I., 2015. The effect of storage condition on viability of *Enhalus acoroides* seedlings. *Aquatic Botany*. 127: 57-61. doi: 10.1016/j.aquabot.2015.07.004.
- Amri, K., Supriadi, M., Dody, P., Nurjannah, N., & Mahatma, L., 2021. Impact of water turbidity to seagrass (*Enhalus acoroides*) morphology. *IOP Conference Series: Earth and Environment Science*. 860, 012020. doi:10.1088/1755-1315/860/1/012020.
- Andika, Y., Kawaroe, M., Effendi, H., & Zamani, N.P., 2020. Pengaruh kondisi pH terhadap respons fisiologis daun lamun jenis *Cymodocea rotundata*. *Jurnal Ilmu dan Teknologi Kelautan Tropis*. 12(2): 487-495. doi: 10.29244/jitkt.v12i2.66565.
- Artika, S.R., Ambo-Rappe, R., Teichberg, M., Moreira-Saporiti, A., & Viana, I.G., 2020. Morphological and physiological responses of *Enhalus acoroides* seedlings under varying temperature and nutrient treatment. *Frontiers in Marine Science*. 7:325. doi: 10.3389/fmars.2020.00325.
- Bainbridge, Z., Lewis, S., Bartley, R., Fabricius, K., Collier, C., Waterhouse, J., Garzon-Garcia, A., Robson, B., Burton, J., Wenger, A., & Brodie, J., 2018. Fine sediment and particulate organic matter: a review and case study on ridge-to-reef transport, transformations, fates, and impacts on marine ecosystems. *Marine Pollution Bulletin*. 135, 1205-1220. doi: [10.1016/j.marpolbul.2018.08.002](https://doi.org/10.1016/j.marpolbul.2018.08.002).
- Barcelona, A., Colomer, J., Serra, T., Cossa, D., & Infantes, E., 2023. The role epiphytes play in particle capture of seagrass canopies. *Marine Environmental Research*. 192, 106238. doi: [10.1016/j.marenvres.2023.106238](https://doi.org/10.1016/j.marenvres.2023.106238).
- Ben Brahim, M., Mabrouk, L., Hamza, A., & Jribi, I., 2020. Comparison of spatial scale variability of shoot density and epiphytic leaf assemblages of *Halophila stipulacea* and *Cymodocea nodosa* on the Eastern Coast of Tunisia. *Plant Biosystems - An International Journal Dealing with all Aspects of Plant Biology* 154, 413-426. doi: 10.1080/11263504.2019.1674399.
- Benham, C.F., Beavis, S.G., Hendryr, A., & Jackson, E.L., 2016. Growth effects of shading and sedimentation in two tropical seagrass species: for port management and impact assessment. *Marine Environmental Research*. 109, 461-470. doi: [10.1016/j.marpolbul.2016.05.027](https://doi.org/10.1016/j.marpolbul.2016.05.027).
- ed, J.C., Nuutila, H.K., & Unsworth, R.K.F., 2020. The seagrass *Halodule wrightii* Ascherson to environmental tuarine Coastal Shelf Science. 238, 106693. doi: [s.2020.106693](https://doi.org/10.1016/j.cshs.2020.106693).



- Blott S. 2000. Gradistat 11.0. Department of Geology Royal Holloway University of London: Egham Surrey TW20 0EX.
- Boem, F.H.G., Rubio, G., Barbero, D., 2011. Soil phosphorus extracted by Bray 1 and Mehlich 3 soil test as affected by the soil/solution ratio in mollisols. *Communication in Soil Science and Plant Analysis*. 42(2): 220-230. doi: [10.1080/00103624.2011.535072](https://doi.org/10.1080/00103624.2011.535072).
- Borum, J., Pederson, O., Kotulo, L., Fraser, M.W., Statton, J., Colmer, T.D., & Kendrick, G.A., 2016. Photosynthetic response to globally increasing CO₂ of co-occurring temperate seagrass species. *Plant, Cell and Environment*, 39: 1240-1250. doi: 10.1111/pce.12658
- Brodersen, K.E., Hammer, K.J., Schrammeyer, V., Floytrup, A., Rasheed, M.A., Ralph, P.J., Kühl, M., & Pedersen, O., 2017. Sediment resuspension and deposition on seagrass leaves impedes internal plant aeration and promotes phytotoxic H₂S intrusion. *Frontiers in Plant Science*. 8, 1-13. doi: [10.3389/fpls.2017.00657](https://doi.org/10.3389/fpls.2017.00657).
- Brodersen, K.E., & Kühl, M., 2022. Effects of epiphytes on the seagrass phyllosphere. *Frontiers in Marine Science*. 9, 821614. doi: 10.3389/fmars.2022.821614.
- Browne, N.K., Yaakub, S.M., Tay, J.K.L., Todd, P.A., 2017. Recreating the shading effects of ship wake induced turbidity to test acclimation responses in the seagrass *Thalassia hemprichii*. *Estuarine, Coastal and Shelf Science*. 199, 87-95. doi: 10.1016/j.ecss.2017.09.034.
- Bujang, J.S., Muta, H.Z., & Frederick, T.S., 2018. Seagrass in Malaysia: Issues and challenges ahead. Chapter January. doi: 10.1007/978-94-007-4001-3_268.
- Bulmer, R.H., Townsend, M., Drylie, T., & Lohrer, A.M., 2018. Elevated turbidity and the nutrient removal capacity of seagrass. *Frontiers in Marine Science*. 5: 462. doi: 10.3389/fmars.2018.00462.
- Cabaco, S., Apostolaki, E.T., García-Marín, P., Gruber, R., Hernández, I., Martínez-Crego, B., Mascaró, O., Perez, M., Prathep, A., Robinson, C., Romero, J., Schmidt, A.L., Short, F.T., van Tussenbroek, B.I., & Santos, R., 2013. [Effects of nutrient enrichment on seagrass population dynamics: evidence and synthesis from the biomass-density relationships](https://doi.org/10.1111/1365-2745.12134). *Journal of Ecology*. 101:1552-1562. doi: [10.1111/1365-2745.12134](https://doi.org/10.1111/1365-2745.12134).
- Cai, Z., Chen, S., Wu, Z., Liang, D., Yin, F., Tong, Y.H., & Wang, D.R., 2017. Distribution differences and environmental effects of seagrasses between Bays and Lagoons of Hainan Island. *Transactions of Oceanology and Limnology*. 3, 74-84. doi: 10.13984/j.cnki.cn37 1141.2017.03.011.
- Cai, S., Lao, Q., Jin, G., Chen, C., Zhou, X., Zhu, Q., & Lu, X., 2022. Sources of nitrate in a heavily nitrogen pollution bay in Beibu Gulf, as identified using stable isotopes. *Frontiers Marine Science*. 9:956474. doi: [10.3389/fmars.2022.956474](https://doi.org/10.3389/fmars.2022.956474).
- Wu J., Moore S.S., Vamerali, T., Ye, F., & Wang Y., 2022. Nitrate increase the activity of microbial nitrogen removal in sediment. *Microorganisms*. 10, 1429. doi: [10.3389/microorganisms10071429](https://doi.org/10.3389/microorganisms10071429).
- Wang, D., Cai, Z., Wu, Z., Shen, J., Wang, D., & Chen, H., 2020. Distribution characteristics, health status, and influencing



factors of seagrass bed in Lian lagoon, Hainan Island. Marine Science. 44(11): 57-64. doi: 10.11759/hykh20200426004.

- Clarito, Q.Y., Suerte, N.O., Bontia, E.C., & Maestrecampo-Clarito, I., 2020. Determining seagrasses community structure using the Braun - Blanquet technique in the intertidal zones of Islas de Gigantes, Philippines. Journal of Environment and Sustainability. 4:1-15. doi: 10.22515/sustinere.jes.v4i1.97.
- [DKP] Dinas Kelautan dan Perikanan. 2020. Final Report: Rencana pengelolaan dan zonasi kawasan konservasi perairan; taman wisata perairan Angsana, Sungai Loban, Pulau Laut-Pulau Sembilan, Kepulauan Sambargelap, dan laut sekitarnya di Provinsi Kalimantan Selatan. Dinas Kelautan Perikanan, Provinsi Kalimantan Selatan, Banjarbaru. [Indonesian]
- Emmclan, L.S.H., Zakaria, M.H., Ramaiya, S.D., Natrah, I., & Bujang, J.S., 2022. Morphological and biochemical responses of tropical seagrasses (Family: Hydrocharitaceae) under colonization of the macroalgae *Ulva reticulata* Forsskål. PeerJ. 10, e12821. doi: 10.7717/peerj.12821.
- Enriquez, S., Olive, I., Cayabyab, & Helley, J.D., 2019. Structural complexity governs seagrass acclimation to depth with relevant consequences for meadow production, macrophyte diversity and habitat carbon storage capacity. Scientific Reports 9, 14657. doi: [10.1038/s41598-019-51248-z](https://doi.org/10.1038/s41598-019-51248-z).
- Entrambasaguas, L., Jahnke, M., Biffali, E., Borra, M., Sanges, R., Marin-Guirao, L., & Procaccini, G., 2017. Tissue-specific transcriptomic profiling provides new insights into the reproductive ecology and biology of the iconic seagrass species *Posidonia oceanica*. Marine Genomics. 35: 51-61. doi: 10.1016/j.margen.2017.05.006.
- Ertfemeijer, P.L.A., & Lewis III, R.R., 2006. Environmental impacts of dredging on seagrasses: a review. Marine Pollution Bulletin, 52(12): 1553-1572. doi: [10.1016/j.marpolbul.2006.09.006](https://doi.org/10.1016/j.marpolbul.2006.09.006).
- Fortes, M.D., 2013. A review: biodiversity, distribution and conservation of Philippine seagrasses. Philippine Journal of Science, 142: 95-111.
- Fu, M., Song, Y., Wang, Y., Fu, G., & Zhang, X. 2023. Effects of Shading on the Growth and Carbon Storage of *Enhalus acoroides*. Applied Sciences, 13(10), 6035. doi: [10.3390/app13106035](https://doi.org/10.3390/app13106035).
- Fu, M., Jiang, J., Wang, D., Fu, G., Song, Y., Wang, H., & Zhang, D., 2024. Assessment of the community status of seagrass bed and its relationship with environmental characteristics in Wenchang, Hainan Island, China. Frontiers Marine Science. 11:1433104. doi: 10.3389/fmars.2024.1433104.
- Fourqurean, J.W., Duarte, C.M., Kennedy, H., Marba, N., Holmer, M., Mateo, M.A., Apostolaki, E.A., Kendrick, G.A., Krause-Jensen, D., McGlathery, K.J., & Serrano, O., 2012. Seagrass ecosystems as a globally significant carbon stock. Nature Geoscience. 5(7): 505-509. doi: 10.1038/ngeo1477.
- Gu, B., Song, X., Zhou, Y., Zhang, X., Xu, S., Xu, S., Yue, S., Zhang, Y., & Zhu, *situ* investigation of the influence of desiccation on sediment and population recruitment of the seagrass *Ruppia sinensis* in river Delta, China. Marine Pollution Bulletin. 149: 110620. doi: [10.1016/j.marpolbul.2019.110620](https://doi.org/10.1016/j.marpolbul.2019.110620).
- Zhou, Y., Xu, S., Xu, S., Yue, S., Zhang, Y., & Zhang, X., 2021. Relationships between annual and perennial seagrass (*Ruppia sinensis*) and their sediment geochemical characteristics in the Yellow



River Delta. *Frontiers in plant science*. 12, 634199. doi: <https://doi.org/10.3389/fpls.2021.634199>.

- Halim, M., Bengen, D.G., & Partono, T., 2020. Influence of turbidity and water depth on carbon storage in seagrass, *Enhalus acoroides* and *Halophila ovalis*. *AACL-Bioflux*. 13(1): 309-317.
- Han, Q., & Liu, D., 2014. Macroalgae blooms and their effects on seagrass ecosystems. *Journal of Ocean University of China (Oceanic and Coastal Sea Research)*. 13 (5): 791-798. doi:10.1007/s11802-014-2471-2.
- Han, Q., Soissons, L.M., Liu, D., van Katwijk, M. M., & Bouma, T.J., 2017. Individual and population indicators of *Zostera japonica* respond quickly to experimental addition of sediment-nutrient and organic matter. *Marine Pollution Bulletin*. 114, 201-209. doi: 10.1016/j.marpolbul.2016.08.084.
- Haviland, K.A., Howarth, R.W., Marino, R., & Hayn, M., 2022. Variation in sediment and seagrass characteristics reflect multiple stressors along a nitrogen-enrichment gradient in a New England lagoon. *Limnology and Oceanography*. 67(3): 660-672. doi: [10.1002/lno.12025](https://doi.org/10.1002/lno.12025).
- Hernawan, U.E., Rahmawati, S., Ambo-Rappe, R., Sjafrie, N.D.M., Hadiyanto, Yusup, D.S., Nugraha, A.H., La Nafie, Y.A., Adi, W., Prayudha, B., Irawan, A., Rahayu, Y.P., Ningsih, E., Riniatsih, I., Supriyadi, I.H., & McMahon, K., 2021. The first nation-wide assessment identifies valuable blue carbon seagrass habitat in Indonesia is in moderate condition. *Science of the Total Environment*. 782: 146818. doi: 10.1016/j.scitotenv.2021.146818.
- Holmer, M., & Kendrick, G.A., 2013. High Sulfide Intrusion in Five Temperate Seagrasses Growing Under Contrasting Sediment Conditions. *Estuaries and Coasts* **36**, 116-126. doi: 10.1007/s12237-012-9550-7.
- Jamal, R., Zubair, H., Yanuarita, G., Budimawan, Rasyid, A., & Idrus, M.R., 2020. Strategy management area coral viewed from threat level in Tanah Bumbu Regency South Kalimantan. *IOP Conference Series: Earth and Environment Science*. 473: 012053. doi: 10.1088/1755-1315/473/1/012053.
- Jha, P., Biswas, A.K., Lakaria, B.L., Saha, R., Singh, M., & Rao, A.S., 2014. Predicting total organic carbon content of soils from Walkley and Black analysis. *Communications in Soil Science and Plant Analysis*, 45(6): 713-725. doi:10.1080/00103624.2013.874023.
- Jiang, Z., Liu, S., Zhang, J., Zhao, C., Wu, Y., Yu, S., Zhang, X., Huang, C., Huang, X., & Kumar, M., 2017. Newly discovered seagrass beds and their potential for blue carbon in the coastal seas of Hainan Island, South China Sea. *Marine Pollution Bulletin*. 125: 513-521. doi: 10.1016/j.marpolbul.2017.07.066.
- Jiang, Z., Huang, X., & Zhang, J., 2010. Effects of CO₂ enrichment on photosynthesis, growth, and biochemical composition of seagrass *Thalassia hemprichii* (Ehrenb.) Aschers. *Journal of integrative plant* 0): 904-913. doi: [10.1111/j.1744-7909.2010.00991.x](https://doi.org/10.1111/j.1744-7909.2010.00991.x).
- J., Cardenas, M.L., Geoghegan, H., & Shannon, V., 2021. Soil colour to estimate soil organic carbon using a large-scale image-based approach. *Sustainability* 13(19), 11029. doi: 10.3390/s131911029.
- J., Wigeongrass (*Ruppia maritima* L): A literature review. *Fish Res* 10: 1-58.



- Khairunnisa, K., Dewi, A.Z., Ramadhani, P., & Farahisah, H., 2025. Seagrass communities on the North Coast of Aceh. *BIO Web of Conferences*. 156, 02006. doi: [10.1051/bioconf/202515602006](https://doi.org/10.1051/bioconf/202515602006).
- Kilminster, K., McMahon, K., Waycott, M., Kendrick, G.A., Scanes, P., Mckenzie, L., O'Brien, K.R., Lyons, M., Ferguson, A., & Maxwell, P., 2015. Unravelling complexity in seagrass systems for management: Australia as a microcosm. *Science of the Total Environment*. 534: 97-109. doi: [10.1016/j.scitotenv.2015.04.061](https://doi.org/10.1016/j.scitotenv.2015.04.061).
- Kim, S.H., Kim, J-H., Park, S.R., & Lee, K-S., 2014. Annual and perennial life history strategies of *Zostera marina* populations under different light regimes. *Marine Ecology Progress Series*. 509: 1-13. doi: 10.3354/meps10899.
- Kongrueang, P., Buapet, P., & Roongsattham, P., 2018. Physiological responses of *Enhalus acoroides* to osmotic stress. *Botanica Marina*. 61(3): 257-267. doi: [10.1515/bot-2017-0108](https://doi.org/10.1515/bot-2017-0108).
- Kroetsch, D., & Wang, C., 2008. Particle size distribution. In: Carter, M.R. & Gregorich, E.G., eds. *Soil Sampling and Methods of Analysis*. 2nd ed. Boca Raton, FL: CRC Press, pp.713–725.
- La Nafie, Y.A., de los Santos, C.B., Brun, F.G., Mashoreng, S., van Katwijk, M.M., & Bouma T.J., 2013. Biomechanical response of two fast-growing tropical seagrass species subjected to in situ shading and sediment fertilization. *Journal of Experimental Marine Biology and Ecology*. 446:186-193. doi: 10.1016/j.jembe.2013.05.020.
- Lavery, P.S., Mateo, M-Á., Serrano, O., & Rozaimi, M., 2013. Variability in the carbon storage of seagrass habitats and its implications for global estimates of blue carbon ecosystem service. *PLoS ONE* 8(9): e73748. Doi: 10.1371/journal.pone.0073748.
- Lisdayanti, E., Ambo-Rappe, R., Asriani, N., Handayani, N.T., & Limbong, S.T., 2024. Seagrass growth at different turbidity levels. *Depik. Jurnal Ilmu-Ilmu Perairan, Pesisir dan Perikanan*. 13(1): 123-128. doi: 10.13170/depik.13.1.35173.
- Li, C., Yan-Hao, Z., Xiao-Xiao, W., Yu-Shan, J., Wen-Tao, L., & Pei-Dong, Z., 2020. Changes in survival and growth in response to different combinations of turbidity and duration in eelgrass *Zostera marina* plants. *Estuarine Coastal and Shelf Science*. 249, 107108. doi: [10.1016/j.ecss.2020.107108](https://doi.org/10.1016/j.ecss.2020.107108).
- Liu, D., Keesing, J.K., He, P., Wang, Z., Shi, Y., & Wang, Y., 2013. [The world's largest macroalgal bloom in the Yellow Sea, China: formation and implications](https://doi.org/10.1016/j.ecss.2013.05.021). *Estuarine, Coastal and Shelf Science*. 129: 2-10. doi: [10.1016/j.ecss.2013.05.021](https://doi.org/10.1016/j.ecss.2013.05.021).
- Longstaff, B.J., & Dennison, W.C., 1999. Seagrass survival during pulsed turbidity effects of light deprivation on the seagrasses *Halodule pinifolia* and *Halodule ovalis*. *Aquatic Botany*. 65(1-4): 105-121. doi: [04-3770\(99\)00035-2](https://doi.org/10.1016/0304-3770(99)00035-2).
- Wang, T., & Mogias, A., 2004. Annual versus perennial growth of *Zostera marina* L.: temporal variation in population characteristics



- in Mediterranean lagoons (Monolimni and Drana Lagoons, northern Aegean sea). *Botanica Marina*. 47: 357-366. doi: 10.1515/Bot.2004.052.
- Mannino, A.M., & Sara, G., 2006. The effect of *Ruppia cirrhosa* features on macroalgae and suspended matter in a Mediterranean shallow system. *Marine Ecology-An Evolutionary Perspective*. 27: 350-360. doi: 10.1111/j.1439-0485.2006.00127.x.
- Mannino, A.M., & Graziano, M., 2014. Differences in the growth cycle of *Ruppia cirrhosa* (petagna) grande in a Mediterranean shallow system. *Plant Biosystems*. 150: 54-61. doi: 10.1080/11263504.2014.906511.
- Martínez-Garrido J, Creed JC, Martins S, Almada CH, & Serrão EA. 2017. First record of *Ruppia maritima* in West Africa supported by morphological description and phylogenetic classification. *Botanica Marina* 60(5): 583-589. doi: 10.1515/bot-2016-0128.
- Massinelli, L., Astruch, P., Lasc Ève, M., & Boudouresque, C.F., 2020. Mapping of *Ruppia spiralis* meadows within the saltmarshes of Hyeres (Provence, France): a key species for an ecosystem-based approach. *Vie et Milieu / Life & Environment*. 70, hal-03342459.
- McCloskey, R.M., & Unsworth, R.K., 2015. Decreasing seagrass density negatively influences associated fauna. *PeerJ*. 3. e1053.
- McKenzie, L.J., Campbell, S.J., & Roder, C.A., 2003. *Seagrass-Watch: Manual for mapping and monitoring seagrass resources by community (citizen) volunteers*. 2nd Edition, QFS, NFC, Cairns.
- Medina-Go´mez, I., & Herrera-Silveira, J.A., 2003. Spatial characterization of water quality in a karstic coastal lagoon without anthropogenic disturbance: a multivariate approach. *Estuarine, Coastal and Shelf Science*. 58: 455-465. doi: [10.1016/S0272-7714\(03\)00112-4](https://doi.org/10.1016/S0272-7714(03)00112-4).
- Medina-Gomez, I., Madden, C.J., Herrera-Silveira, J., & Kjerfve, B., 2016. Response of *Thalassia testudinum* morphometry and distribution to environmental drivers in a Pristine tropical lagoon. *PLoS ONE*. 11(10): e0164014. doi: 10.1371/journal.pone.0164014.
- Mostafazadeh, B., Mohebbi, F., Seidgar, M., & Parnian, A., 2024. The occurrence of *Ruppia maritima* L. (Ruppiaceae, Tracheophyta) in the drainage waters of Yazd Province (Yazd, Iran). *Plant, Algae, and Environment*. 8(2): 1455-1461. doi: 10.48308/jpr.2024.237239.1090.
- Mutlu, E., Karaca, D., Duman, G.S., Şahin, A., Ozvarol, Y., & Olguner, C., 2022. Seasonality and phenology of an epiphytic calcareous red alga, *Hydrolython boreale*, on the leaves of *Posidonia oceanica* (L) Delile in the Turkish water. *Environmental Science and Pollution Research*. 30, 17193-17213. doi: [10.1007/s11356-022-23333-w](https://doi.org/10.1007/s11356-022-23333-w).
- Mvungi, E.F., & Pillay, D., 2019. Eutrophication overrides warming as a stressor for a temperate African seagrass (*Zostera capensis*). *PLOS ONE* 14 (4): e0215129. doi: [10.1371/journal.pone.0215129](https://doi.org/10.1371/journal.pone.0215129).



erjacks, A., Malcolm-Mckay, A., Garcia, M.M., Macrina, L., &)24. Tracing localised nutrient pollution events to *Posidonia* phyte community assemblages, in the Eastern Aegean Sea. [3/rs.3.rs-4885955/v1](https://doi.org/10.1371/journal.pone.0215129).

ani, 2023. Analysis of Relations Organic Carbon in Sediment Rate of Seagrass *Enhalus acoroides* and *Thalassia* *International Journal of Applied Biology*. 7(2): 54-64.

- Nelson, D.W., & Sommers, L.E., 1996. Total carbon, organic carbon, and organic matter. In Sparks, D.L., Page, A.L., Helmke, P.A., Loeppert, R.H., Soltanpour, P.N., Tabatabai, M.A., Johnston, C.T., & Sumner, M. E., (Eds.), *Methods of soil analysis: Part 3. Chemical methods* (5): 961-1010. Soil Science Society of America. doi: [10.2136/sssabookser5.3.c34](https://doi.org/10.2136/sssabookser5.3.c34).
- Niu, S., Zhang, P., Liu, J., Guo, D., & Zhang, X., 2012. The effect of temperature on the survival, growth, photosynthesis, and respiration of young seedlings of eelgrass *Zostera marina* L. *Aquaculture* 350-353: 98-108. doi: 10.1016/j.aquaculture.2012.04.010.
- Nugraha, A.H., Nurasihkin, & Karlina, I., 2022. Struktur anatomi dan kandungan klorofil pada lamun jenis *Enhalus acoroides* di pesisir timur Pulau Bintan dan Pulau Dompok, Kepulauan Riau. *Oseanologi dan Limnologi*. 7(1): 23-32. doi: 10.14203/oldi.2022.v7i1.368.
- Ow, Y.X., Collier, C.J., & Uthicke, S., 2015. Response of three tropical seagrass species to CO₂ enrichment. *Marine Biology*. 162: 1005-1007. doi: 10.1007/s00227-015-2644-6.
- Palacio-Lopez, K., Beckage, B., Scheiner, S., & Molofsky, J., 2015. The ubiquity of phenotypic plasticity in plants: a synthesis. *Ecology and Evolution*. 5(16): 3389-3400. doi: 10.1002/ece3.1603.
- Paz-Alberto, A.M., Pakaique-Hechanova, M., & Sigua, G.C., 2015. Assessing diversity and phytoremediation potential of seagrass in tropical region. *International Journal of Plant, Animal and Environmental Sciences*. 5(4): 25-35.
- Peralta, G., Godoy, O., Egea, L.G., de los Santos, C.B., Jimenez-Ramos, R., Lara, M., Brun, F.G., Hernandez, I., Olive, I., Vergara, J.J., Gonzalez-Ortiz, V., Moreno-Marina, F., Morris, E.P., Villazan, B., & Perez-Lioren, J.L., 2021. The morphometric acclimation to depth explains the long-term resilience of the seagrass *Cymodocea nodosa* in a shallow tidal lagoon. *Journal of Environmental Management*. 299, 113452. doi: [10.1016/j.jenvman.2021.113452](https://doi.org/10.1016/j.jenvman.2021.113452).
- Peralta, G., Perez-Lioren, J.L., Vergara, J.J., Bartual, A., Galvez, & Garcia, C.M., 2000. Morphological and physiological differences between two morphotypes of *Zostera noltii* Hornem. From the south-western Iberian Peninsula. *Helgoland Marine Research*. 54: 80-86. doi: 10.1007/s101520050005.
- Proum, S., Santos, J.H., Lim, L.H., & Marshall, D.J., 2018. Tidal and seasonal variation in carbonate chemistry, pH and salinity for a mineral-acidified tropical estuarine system. *Regional Studies Marine Science*. 17: 17-27. doi: [10.1016/j.rsma.2017.11.004](https://doi.org/10.1016/j.rsma.2017.11.004).
- Qu, F., Shao, H., Meng, L., Yu, J., Xia, J., Sun, J., & Li, Y., 2018. Forms and vertical distributions of soil phosphorus in newly formed coastal wetlands in the Yellow River Delta estuary. *Land Degradation & Development*. 29: doi: 10.1002/ldr.3132.
- Rajiqi, M.N., Kumar, S., Rahman, S.H., & Uddin, M.N., 2006. Abiotic environmental condition for the prevalence of *Ruppia* (Green Grass) in shrimp culture ponds. *South Asian Journal* (2):28-31.



- Rahmawati, S., Irawan, A., & Supriyadi, I. H., 2017. Panduan pemantauan penilaian kondisi padang lamun edisi 2 Pusat Penelitian Oseanografi-LIPI. January.
- Ralph, P.J., Durako, M.J., Enriquez, C.J., & Doblin, M.A., 2007. Impact of light limitation on seagrass. *Journal of Experimental Marine Biology and Ecology*. 350(1-2): 176-193. doi: [10.1016/j.jembe.2007.06.017](https://doi.org/10.1016/j.jembe.2007.06.017).
- Rattanachot, E., Short, F.T., & Prathep, A., 2016. *Enhalus acoroides* responses to experimental shoot density reductions in Haad Chao Mai National Park, Trang Province, Thailand. *Marine Ecology* 37: 411-418. doi: 10.1111/maec.12294.
- Salim, D., Baharuddin, Hehanussa, G.M., Alkadrie, S.I.T., Saputra, A., & Prasetyo, D.E., 2016. Penemuan ekosistem lamun sebagai observasi habitat pakan dugong di perairan Kabupaten Tanah Bumbu Kalimantan Selatan. *Proceeding. Bunga Rampai*. IPB Press. Bogor
- Salim, D., Ambo-Rappe, R., Mashoreng, S., & Kadir, N.N., 2024. Short Communication: Potential threats to seagrass in the waters of Tanah Bumbu District, South Kalimantan, Indonesia. *Biodiversitas*. 25(5): 1882-1889. doi: 10.13057/biodiv/d250504.
- Samper-Villarreal, J., Lovelock, C.E., Saunders, M.I., Roelfsema, C., Mumby, P.J., 2016. Organic carbon in seagrass sediments is influenced by canopy complexity, turbidity, wave height, and water depth. *Limnology and Oceanography*. 61(3): 938-952. doi: [10.1002/lno.10262](https://doi.org/10.1002/lno.10262).
- Sarinawaty, P., Idris, F., & Nugraha, A.H., 2020. Karakteristik morfometrik lamun *Enhalus acoroides* dan *Thalassia hemprichii* di Pesisir Pulau Bintan. *Journal of Marine Research*, 9 (4): 478-484. doi: [10.14710/jmr.v9i4.28432](https://doi.org/10.14710/jmr.v9i4.28432).
- Sato, M., Horinouchi, M., Fujita, M., & Sano, M., 2016. Responses of fish assemblage structures to annual and perennial life cycles of seagrass *Zostera marina* in lake Hamana, central Japan. *Ichthyological Research*. 63: 445-459. doi: 10.1007/s10228-016-0514-y.
- Schrammeyer, V., York, P.H., Chartrand, K., Ralph, P.J., Kühl, M., Brodersen, K.E., & Rashee, M.A., 2018. Contrasting impacts of light reduction on sediment biogeochemistry in deep and shallow-water tropical seagrass assemblages (Green Island, Great Barrier Reef). *Marine Environmental Research*. 136, 38-47. doi: [10.1016/j.marenvres.2018.02.008](https://doi.org/10.1016/j.marenvres.2018.02.008)
- Seguro, I., García, C.M., Papaspyrou, S., Gálvez, J.A., García-Robledo, E., Navarro, G., Soria-Píriz, S., Aguilar, V., Lizano, O.G., Morales-Ramírez, A., Corzo, A., 2015. Seasonal changes of the microplankton community along a tropical estuary. *Regional Studies Marine Science*. 2: 189-202. doi: [10.1016/j.rsma.2015.10.006](https://doi.org/10.1016/j.rsma.2015.10.006)
- Short, F.T & Robert G. Coles (eds.). 2001. *Global seagrass research methods*. Elsevier Science B.V., Amsterdam.
- Silvi, M.V., Rediaki, S., & Riniatsih, I., 2022. Kandungan nutrisi dan fosfat a ekosistem padang lamun di Teluk Awur dan Pulau Panjang, *Journal of Marine Research*. 11: 420-428. doi: [10.1113.32219](https://doi.org/10.1113.32219).
- Ward, R., & Takeda, K., 2003. *Hidrologi untuk pengairan*. Pradnya kartika, 336 hlm.



- Strazisar, T., Koch, M.S., Dutra, E., & Madclen, C.J., 2013a. *Ruppia maritima* L. seed bank viability at the Everglades-Florida bay ecotone. *Aquatic Botany*. 111: 26-34. doi: 10.1016/j.aquabot.2013.08.003.
- Strazisar, T., Koch, M.S., Madden, C.J., Filina, J., Lara, P.U., & Mattair, A., 2013b. Salinity effects on *Ruppia maritima* L. seed germination and seedling survival at the Everglades-Florida bay ecotone. *Journal of Experimental Marine Biology and Ecology*. 445: 129-139. doi:10.1016/j.jembe.2013.02.045.
- Strazisar, T., Koch, M.S., Santangelo, C.W., & Madden, C.J., 2021. Abiotic and biotic interactions control *Ruppia maritima* life history development within a heterogeneous coastal landscape. *Estuaries and Coasts*. 44: 1975-1993. doi: 10.1007/s12237-020-00870-6.
- Subiakto, A.Y., Santosa, G.W., Suryono, S., & Riniatsih, I., 2019. Hubungan kandungan nitrat dan posfat dalam substrat terhadap kerapatan lamun di perairan pantai Prawean, Jepara. *Journal of Marine Research*. 8(1): 55-61. doi: [10.14710/jmr.v8i1.24329](https://doi.org/10.14710/jmr.v8i1.24329).
- Sun, D., Huang, J., Luo, M., Chen, C., Lan, X., & Hu, W., 2022. Dissimilatory nitrate reduction processes in surface sediments of shrimp ponds during the culture period. *Frontiers Marine Science*. 9:1082768. doi: 10.3389/fmars.2022.1082768.
- Suonan, Z., Kim, S.H., Qin, L-Z., Kim, H., Zhang, F., & Lee, K-S., 2022. Increased coastal nutrient loading enhances reproductive intensity of *Zostera marina*: Implications for seagrass meadow resilience. *Frontiers in Marine Science*. 9: 832035. doi: 10.3389/fmars.2022.832035.
- Swadling, D.S., Taylor, S.L., Gruber, R.K., & Glasby T.M., 2025. Sediment properties and seagrass density influence the morphological plasticity of seagrass *Zostera muelleri* more than elevated temperatures. *Estuaries and Coasts*. 48, 52. doi: 10.1007/s12237-025-01485-5.
- Takahashi, A., Kumagai, T.O., Kanamori, H., Fujinami, H., Hiyama, T., & Hara, M., 2017. Impact of tropical deforestation and forest degradation on precipitation over Borneo island. *Journal of Hydrometeorology*. 18(11): 2907–2922. doi: [10.1175/JHM-D-17-0008.1](https://doi.org/10.1175/JHM-D-17-0008.1).
- Touchette, B.W., & Burkholder, J.M., 2000. Review of nitrogen and phosphorus metabolism in seagrass. *Journal of Experimental Marine Biology and Ecology*. 250(1-2): 133-167. doi: 10.1016/s0022-0981(00)00195-7.
- Unsworth, R.K.F., Rasheed, M.A., Chartrand, K.M., & Roelofs, A.J., 2012. Solar radiation and tidal exposure as environmental drivers of *Enhalus acoroides* dominated seagrass meadows. *PLoS One*. 7: 1-8. doi: [10.1371/journal.pone.0034133](https://doi.org/10.1371/journal.pone.0034133)
- Unsworth, R.K.F., Collier, C.J., Waycott, M., Mckenzie, L.J., & Cullen-Unsworth, L.C., 2015. A framework for the resilience of seagrass ecosystems. *Marine Pollution Bulletin*. 100 (1): 34-46. doi: 10.1016/j.marpolbul.2015.08.016.
- Ambo-Rappe, R., Jones, B.L., La Nafie, Y.A., Irawan, A., .E., Moore, A.M., & Cullen-Unsworth, L.C., 2018. Indonesia's significant seagrass meadows are under widespread threat. *Journal of the Total Environment*. 634:279-286. doi: [totenv.2018.03.315](https://doi.org/10.1016/j.totenv.2018.03.315).
- Unsworth, R.K.F., Bos, A.R., Hermus, D.C.R., & Suykerbuyk, W., 2010. Muddification by seagrass beds: Muddification and sandification



- induced by plant cover and environmental conditions. *Estuarine, Coastal and Shelf Science*. 89(2): 175-181. doi: [10.1016/j.ecss.2010.06.008](https://doi.org/10.1016/j.ecss.2010.06.008).
- Vonk, J.A., Christianen, M.J.A. Stapel, J., & O'Brien, K.R., 2015. What lies beneath: why knowledge of belowground biomass dynamic is crucial to effective seagrass management. *Ecological Indicators*, 57: 259-267. Doi: 10.1016/j.ecolind.2015.05.008.
- Wangkanusa, M.S., Kondoy, K.I.F., & Rondonuwu, A.B., 2017. Identifikasi kerapatan dan karakter morfometrik lamun *Enhalus acoroides* pada substrat yang berbeda di Pantai Tongkeina Kota Manado. *Jurnal Ilmiah Platax*. 5 (2) :210- 220.
- Waycott, M., McMahon, K., Mellars, J., Calladine, A., & Kleine, D., 2004. A guide to tropical seagrasses of the Indo West Pacific. Townsville: James Cook University.
- Waycott, M., Lewis, R., O'Loughlin, E., Urgl, C., van Dijk, K., Calladine, A., Collier, C., Mosley, L., Priestley, S., Leterme, S., Conran, J., Thornhill, A., Hipsey, M., Nicol, J., 2022. Growth, phenology, nutrient responses and ecological limits of the *Ruppia* community and associated filamentous algal blooms of the southern Coorong. Goyder Institute for Water Research Technical Report Series No. 23/01. pp. 1-107.
- Wibowo, R., Taufik-SPJ, N., & Riniatsih, I., 2020. Korelasi nitrat posfat sedimen terhadap ekosistem lamun di Pulau Sintok dan Bengkoang, Karimunjawa, Jawa Tengah. *Journal of Marine Research*. 9(3): 303-310. doi: 10.14710/jmr.v9i3.27686.
- Wicks, E.C., Koch, E.W., O'Neil, J.M., & Elliston, K., 2009. Effects of sediment organic content and hydrodynamic conditions on the growth and distribution of *Zostera marina*. *Marine Ecology Progress Series*. 378: 71-80. doi: [10.3354/meps07885](https://doi.org/10.3354/meps07885).
- Wirachwong, P., & Holmer, M., 2010. Nutrient dynamic in 3 morphological different tropical seagrasses and their sediments. *Aquatic Botany*. 93(3): 170-178. doi: [10.1016/j.aquabot.2010.06.004](https://doi.org/10.1016/j.aquabot.2010.06.004).
- Xu, S., Wang, P., Zhou, Y., Zhang, X., Gu, R., Liu, X., Liu, B., Song, X., Xu, S., & Yue, S., 2018). New insights into different reproductive effort and sexual recruitment contribution between two geographic *Zostera marina* L. populations in temperate China. *Frontiers in Plant Science*. 9: 15. doi: 10.3389/fpls.2018.00015.
- Yu S, & den Hartog, C., 2014. Taxonomy of the genus *Ruppia* in China. *Aquatic Botany*. 119: 66-72. DOI: 10.1016/j.aquabot.2014.08.003.
- Zhang, Y-H., Yu, B., Liu, Y-C., Ma, W., Li, W-T., & Zhang, P-D., 2022. The influence of decreased salinity levels on the survival, growth and physiology of eelgrass *Zoster marina*. *Marine Environmental Research*. 182, 105787. doi: [10.1016/j.marenvres.2022.105787](https://doi.org/10.1016/j.marenvres.2022.105787).



staka

aria, M.H., 2003. The seagrasses of Malaysia. In: Green, E.P., (eds). *World Atlas of Seagrasses*. University of California Press, Berkeley, USA.

- Chaabani, E., Rebey, I.B., Wannas, W.A., Ksouri, R., & Shili, A., 2023. Variability on the phytochemical composition, antioxidant, and antimicrobial activities of *Ruppia cirrhosa* extract using two different methods of extraction. *Avicenna Journal Clinical Microbiology and Infection*. 10 (2): 65-69. doi: 10.34172/ajcmi.3472.
- Coles, R., McKenzie, L., & Campbell, S., 2003. The seagrasses of Eastern Australia. In: Green EP, Short FT (eds). *World Atlas of Seagrasses*. University of California Press, Berkeley, USA.
- de los Santos, C.B., Olive, I., Moreira, M., Silva A., Freitas, C., Luna, A.R., Quental-Ferreira, H., Martins, M., Costa, M.M., Silva, J., Cunha, M.E., Soares, F., Pousao-Ferreira. P., & Santos, R., 2020. Seagrass meadows improve inflowing water quality in aquaculture ponds. *Aquaculture*. 528: 735502. doi: 10.1016/j.aquaculture.2020.735502.
- DellaGreca, M., Fiorentino, A., Isidori, M., Monaco, P., & Zarrelli, A., 2000. Antialgal *ent*-labdane diterpenes from *Ruppia maritima*. *Phytochemistry*. 55 (8): 909-913. doi: 10.1016/S0031-9422(00)00253-3.
- den Hartog, C., & Triest, L., 2020. A profound view and discourse on the typification and status of three confused taxa: *Ruppia maritima*, *R. spiralis* and *R. cirrhosa*. *Botanica Marina*. 63 (3): 229-239. doi: 10.1515/bot-2019-0045.
- den Hartog, C., van Tussenbroek, B.I., Wong, J.G.R., Ruaro, P.M., & Guzman, J.G.M., 2016. A new *Ruppia* from Mexico: *Ruppia mexicana* n.sp. *Aquatic Botany*. 131: 38-44. doi: 10.1016/j.aquabot.2016.02.005.
- Edo, G.I., Nwosu, L.C., Samuel, P.O., Akpoghelie, P.O., Onoharigho, F.O., Emakpor, P.O., Emakpor, O.L., Akpoghelie, E.O., Ugbune, U., & Agbo, J.J., 2023. Assessment of the physicochemical-water quality parameters and distribution of aquatic macrophytes present in Goenyeli Dam, Nicosia district, North Cyprus. *Journal Analytical & Pharmaceutical Research*. 12 (1): 19-24. doi: 10.15406/japlr.2023.12.00419.
- Emmclan, L.S.H., Zakaria, M.H., Ramaiya, S.D., Natrah, I., & Bujang, J.S., 2022. Morphological and biochemical responses of tropical seagrasses (Family: Hydrocharitaceae) under colonization of the macroalgae *Ulva reticulata* Forsskål. *PeerJ*. 10: e12821. doi: 10.7717/peerj.12821.
- Enerstvedt, K.H., Lundberg, A., & Jordheim, M., 2017. Characterization of polyphenolic content in the aquatic plants *Ruppia cirrhosa* and *Ruppia maritima*-A source of nutritional natural products. *Molecules*. 23 (1): 16. doi: 10.3390/molecules23010016.



The seagrasses of the Philippines and Viet Nam. In: Green, F.T. (eds). *World Atlas of Seagrasses*. University of California Press, Berkeley, USA.

Wu, Y., Song, X., Xu, S., Yue, S., Zhang, Y., Xu, S., & Zhang, Y., 2023. Programmed responses of different life-stages of the seagrass

- Ruppia sinensis* to copper and cadmium exposure. Journal of Hazardous Materials. 403: 123875. doi: 10.1016/j.jhazmat.2020.123875.
- Ito, Y., Ohi-Toma, T., Nepi, C., Santangelo, A., Stinca, A., Tanaka, N., & Murata, J., 2017. Towards a better understanding of the *Ruppia maritima* complex (Ruppiaceae): Notes on the correct application and typification of the names *R. cirrhosa* and *R. spiralis*. Taxon. 66 (1): 167-171. doi: 10.12705/661.11.
- Jiang, J., Deangelis, D.L., Teh, S., Krauss, K.W., Wang, H., Li, H., Smith III, T.J., & Koh, H., 2016. Defining the next generation modeling of coastal ecotone dynamics in response to global change. Ecological Modelling. 326: 168-176. doi: 10.1016/j.ecolmodel.2015.04.013.
- Kadarsah, A., Salim, D., & Husain, S., 2020. Study of water and sediment quality and heavy pollution (Pb) at South Kalimantan mangrove ecosystem. IOP Conference Series: Earth Environmental Science. 499 (1): 012001. doi: 10.1088/1755-1315/499/1/012001.
- Kafle, A., Timilsina, A., Gautam, A., Adhikari, K., Bhattarai, A., & Aryal, N., 2022. Phytoremediation: Mechanisms, plant selection and enhancement by natural and synthetic agents. Environmental. Advances. 8: 100203. doi: 10.1016/j.envadv.2022.100203.
- Kantrud, H.A., 1991. Wigeongrass (*Ruppia maritima* L): A Literature Review. United States Department of the Interior Fish and Wildlife Service, Washington DC.
- Koch, M.S., Coronado, C., Miller, M.W., Rudnick, D.T., Stabenau, E., Halley, R.B., & Sklar, F.H., 2015. Climate change projected effects on coastal foundation communities of the greater Everglades using a 2060 scenario: Need for a new management paradigm. Environmental Management. 55: 857-875. doi: 10.1007/s00267-014-0375-y.
- Kumar, S., Stecher, G., Li, M., Knyaz, C., & Tamura, K., 2018. MEGA X: Molecular Evolutionary Genetics Analysis across computing platforms. Molecular Biology and Evolution. 35: 1547. doi: 10.1093/molbev/msy096.
- Kuriandewa, T.E., Kiswara, W., Hutomo, M., & Soemodihardjo, S., 2003. The seagrasses of Indonesia. In: Green, E.P., Short, F.T. (eds). World Atlas of Seagrasses. University of California Press, Berkeley, USA.
- Kurniawan, F., Digdo, A.A., Darus, R.F., Anggraini, N.P., Ismet, M.S., Wicaksono, P., & Kiswara, W., 2024. First record of *Ruppia brevipedunculata* in Indonesia. Aquatic Botany. 195: 103806. doi: 10.1016/j.aquabot.2024.103806.



Lawy, D.A.H., & Hammadi, N.S., 2023. Assessment of water quality organic pollution index in some marshes north of Basra. IOP Conference Series: Earth Environmental Science. 1158 (3): 032005. doi: 10.1088/1755-1315/1158/3/032005.

- Mannino, A.M., Menendez, M., Obrador, B., Sfriso, A., & Triest, L., 2015. The genus *Ruppia* L (Ruppiaceae) in the Mediterranean region: An overview. *Aquatic Botany*. 124: 1-9. doi: 10.1016/j.aquabot.2015.02.005.
- Martin, C.W., Hollis, L.O., & Turner, R.E., 2015. Effects of oil-contaminated sediments on submerged vegetation: An experimental assessment of *Ruppia maritima*. *Plos One*. 10 (10): e0138797. doi: 10.1371/journal.pone.0138797.
- Martínez-Garrido, J., Creed, J.C., Martins, S., Almada, C.H., & Serrão, E.A., 2017. First record of *Ruppia maritima* in West Africa supported by morphological description and phylogenetic classification. *Botanica Marina*. 60 (5): 583-589. doi: 10.1515/bot-2016-0128.
- Munari, C., Casoni, E., Cozzula, C., Pasculli, A., Pezzi, M., Sciuto, K., Sfriso, A.A., Sfriso, A., & Mistri, M., 2023. The ecological role of *Ruppia cirrhosa* (Petagna) grande in a Choked Lagoon. *Water*. 15: 2162. doi: 10.3390/w15122162.
- Mustafa, H.M., & Hayder, G., 2021. Recent studies on applications of aquatic weed plants in phytoremediation of wastewater: A review article. *Ain Shams Engineering Journal*. 12: 355-365. doi: 10.1016/j.asej.2020.05.009.
- POWO., 2024. Plants of the World Online. <http://www.plantsoftheworldonline.org/>. [Accessed 08 May 2024]
- RochaDutraNobre, A., 2024. Phytochemical Screening and Guided Natural Products Isolation Facilitated by Liquid Chromatography and Mass Spectrometry. [Dissertation]. University of Tasmania, Hobart. [Australia].
- Saitou, N., & Nei, M., 1987. The neighbor-joining method: A new method for reconstructing phylogenetic trees. *Molecular Biology Evolution*. 4 (4): 406-425. doi: 10.1093/oxfordjournals.molbev.a040454.
- Salim, D., Ambo-Rappe, R., Mashoreng, S., Kadir, N.N., 2024. Short communication: Potential threats to seagrass in the waters of Tanah Bumbu District, South Kalimantan, Indonesia. *Biodiversitas*. 25 (5): 1882-1889. doi: 10.13057/biodiv/d250504.
- Saood, Al., Al-Sultan, E.Y.A., & Abdallah, B.H., 2022. Morphological and molecular diagnosis of *Ruppia maritima* in the Basrah Governorate Sothern of Iraq. *Annals of Forest Research*. 65 (1): 475-486. doi: 10.5281/zenodo.7185731.
- Saragih, H.T., Fauziah, I.N., Saputri, D.A., & Chasani, A.R., 2024. Dietary : *Chaetomorpha linum* supplementation improves morphology estine and pectoral muscle, growth performance, and meat broilers. *Veterinary World*. 17 (2): 470-479. doi: etworld.2024.470-479.



- Sayers, E.W., Cavanaugh, M., Clark, K., Ostell, J., Pruitt, K.D., & Karsch-Mizrachi, I., 2019. GenBank. Nucleic Acids Research. 48: D84-D86. doi: 10.1093/nar/gkz956.
- Strazisar, T., Koch, M.S., & Madden, C.J., 2014. Seagrass (*Ruppia maritima* L.) life history transitions in response to salinity dynamics along the Everglades-Florida Bay ecotone. *Estuaries and Coasts*. 38: 337-352. doi: 10.1007/s12237-014-9807-4.
- Strazisar, T., Koch, M.S., Santangelo, C.W., & Madden, C.J., 2021. Abiotic and biotic interactions control *Ruppia maritima* life history development within a heterogeneous coastal landscape. *Estuaries and Coasts*. 44: 1975-1993. doi: 10.1007/s12237-020-00870-6.
- Tamura, K., Stecher, G., & Kumar, S., 2021. MEGA 11: Molecular Evolutionary Genetics Analysis version 11. *Molecular Biology Evolution*. 38 (7): 3022-3027. doi: 10.1093/molbev/msab120.
- Triest, L., Dierick, J., Phan, T.T.H., Luong, Q.D., Huy, N.Q., & Sierens, T., 2021. Low genetic connectivity of strongly inbred *Ruppia brevipedunculata* in aquaculture dominated lagoons (Viet Nam). *Frontiers in Conservation Science*. 2: 723376. doi: 10.3389/fcosc.2021.723376.
- Triest, L., & Sierens, T., 2014. Seagrass radiation after messinian salinity crisis reflected by strong genetic structuring and out of-Africa scenario (Ruppiaceae). *Plos One*. 9: e104264. doi: 10.1371/journal.pone.0104264.
- Triest, L., & Sierens, T., 2013. Is the genetic structure of Mediterranean *Ruppia* shaped by bird-mediated dispersal or sea currents?. *Aquatic Botany*. 104: 176-184. doi: 10.1016/j.aquabot.2011.09.009.
- Waycott, M., Lewis, R., O'Loughlin, E., Urgl, C., van Dijk, K., Calladine, A., Collier, C., Mosley, L., Priestley, S., Leterme, S., Conran, J., Thornhill, A., Hipsey, M., & Nicol, J., 2022. Growth, Phenology, Nutrient Responses, and Ecological Limits of The *Ruppia* Community and Associated Filamentous Algal Blooms of The Southern Coorong. [Report]. Goyder Institute for Water Research, South Australia.
- Yu, S., & den Hartog, C., 2014. Taxonomy of the genus *Ruppia* in China. *Aquatic Botany*. 119: 66-72. doi: 10.1016/j.aquabot.2014.08.003.
- Yu, S., Shi, M.M., & Chen, X.Y., 2014. Species diversity and distribution of *Ruppia* in China: Potential roles of long-distance dispersal and environmental factors. *Journal of Systematics and Evolution*. 52(2): 231-239. doi: 10.1111/j.1365-3113.2014.00469.x.



Xu, X., & Yu, D., 2023. *Ruppia mongolica* (Ruppiaceae), a new species from inner Mongolia (China), based on morphological and molecular data. *Ecology and Evolution*. 13, e9989. doi: 10.1002/ece3.9989.

- Arnall, J., Hashim, A.S., Ganeshram, R.S., Moosa, H., Wilson, A.M.W., & Tudhope, A.W., 2024. Seagrass is an early responder to nitrogen enrichment in oligotrophic oceanic coral atoll environments. *Marine Pollution Bulletin*. 209, 117224. doi: 10.1016/j.marpolbul.2024.117224.
- Elma, E., Gaulton, R., Chudley, T.R., Scott, C.L., East, H.K., Westoby, H., & Fitzsimmons, C., 2024. Evaluating UAV-based multispectral imagery for mapping an intertidal seagrass environment. *Aquatic Conservation: Marine and Freshwater Ecosystems*. 34(8), e4230. doi: 10.1002/aqc.4230.
- Hensel, M.J.S., Patrick, C.J., Orth, R.J., & Lefcheck, J.S., 2023. Rise of *Ruppia* in Chesapeake Bay: Climate change-driven turnover of foundation species creates new threats and management opportunities. *PNAS*. 120(23) e2220678120. doi: [10.1073/pnas.2220678120](https://doi.org/10.1073/pnas.2220678120).
- Kurniawan, F., Digdo, A.A., Darus, R.F., Anggraini, N.P., Ismet, M.S., Wicaksono, P., & Kiswara, W., 2024. First record of *Ruppia brevipedunculata* in Indonesia. *Aquatic Botany*. 195: 103806. doi: 10.1016/j.aquabot.2024.103806.
- Salim, D., Ambo-Rappe, R., Mashoreng, S., Kadir, N.N., Zakaria, M.H., & Kiswara, W., 2025. New distribution record of seagrass *Ruppia brevipedunculata* from intertidal cultivation ponds in South Kalimantan, Indonesia. *Biodiversitas*. 26(5): 2088-2096. doi: 10.13057/biodiv/d260507.
- Simpson, J., Davies, K.P., Barber, P., & Bruce, E., 2024. Mapping fine-scale seagrass disturbance using bi-temporal UAV-acquired images and multivariate alteration detection. *Scientific Reports*. 14, 19083. doi: 10.1038/s41598-024-69695-8
- Wang, X., Bai, J., Yan, J., Cui, B., & Shao, D., 2022. How Turbidity Mediates the Combined Effects of Nutrient Enrichment and Herbivory on Seagrass Ecosystems. *Frontiers in Marine Science*. 9:787041. doi: 10.3389/fmars.2022.787041
- Yu, S., Li, X., Jiang, K., & Shi, M., 2020. The complete plastid genome of *Ruppia brevipedunculata* Shuo Yu & den Hartog. *Mitochondrial DNA Part B, Resources*. 5(1): 474-475. doi: [10.1080/23802359.2019.1704653](https://doi.org/10.1080/23802359.2019.1704653).
- Yu, S., & den Hartog, C., 2014. Taxonomy of the genus *Ruppia* in China. *Aquatic Botany*. 119: 66-72. doi: 10.1016/j.aquabot.2014.08.003.
- Zhu, Q., Wiberg, P.L., & Reidenbach, M.A., 2021. Quantifying seasonal seagrass effects on flow and sediment dynamics in a Back-barrier Bay. *Journal of Research: Oceans*, 126, e2020JC016547. doi: 10.1029/2020JC016547.

