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DAFTAR PUSTAKA

Ahmed, K., Saqib, A. I., Naseem, A. R., Qadir, G., Nawaz, M. Q., Khalid, M., Warraich, I. A., & Arif, M. (2020). Use of Hyacinth compost in salt-sffected soils. *Pakistan Journal of Agricultural Research*, *33*(4). https://doi.org/10.17582/journal.pjar/2020/33.4.720.728

Aji, D. R., & Cahyadi, M. N. (2015). Analisa karakteristik kecepatan angin dan tinggi gelombang menggunakan data satelit Altimetri (Studi kasus : Laut Jawa). *Geoid*, *11*(1), 75. https://doi.org/10.12962/j24423998.v11i1.1102

Akter, S., Yasmeen, R., Ahmed, H., Sarker, M., & Rahman, M. (2015). Salinity tolerance of some elite rice breeding lines at reproductive stage. *Bangladesh Rice Journal*, *18*(1–2), 33–37. https://doi.org/10.3329/brj.v18i1-2.22998

Alhasnawi, A. N. (2019). Role of proline in plant stress tolerance: A mini review. *Research on Crops*, *20*(1), 223–229. https://doi.org/10.31830/2348-7542.2019.032

Ali, M. A., Sattar, M. A., Islam, M. N., & Inubushi, K. (2014). Integrated effects of organic, inorganic and biological amendments on methane emission, soil quality and rice productivity in irrigated paddy ecosystem of Bangladesh: Field study of two consecutive rice growing seasons. *Plant and Soil*, *378*(1–2), 239–252. https://doi.org/10.1007/s11104-014-2023-y

Ardón, M., Helton, A. M., & Bernhardt, E. S. (2018). Salinity effects on greenhouse gas emissions from wetland soils are contingent upon hydrologic setting: a microcosm experiment. *Biogeochemistry*, *140*(2), 217–232. https://doi.org/10.1007/s10533-018-0486-2

Arifiani, F. N., Kurniasih, B., & Rohlan, R. (2018). *Pengaruh bahan organik terhadap pertumbuhan dan hasil padi (Oryza sativa L.) tercekam salinitas* (Vol. 7, Issue 3).

Bano, A., & Fatima, M. (2009). Salt tolerance in Zea mays (L). following inoculation with rhizobium and pseudomonas. *Biology and Fertility of Soils*, *45*(4), 405–413. https://doi.org/10.1007/s00374-008-0344-9

Baruah, K. K., Gogoi, B., & Gogoi, P. (2010). Plant physiological and soil characteristics associated with methane and nitrous oxide emission from rice paddy. *Physiology and Molecular Biology of Plants*, *16*(1), 79–91. https://doi.org/10.1007/s12298-010-0010-1

Bayabil, H. K., Li, Y., Tong, Z., & Gao, B. (2021). Potential management practices of saltwater intrusion impacts on soil health and water quality: A review. *Journal of Water and Climate Change*, *12*(5), 1327–1343. https://doi.org/10.2166/wcc.2020.013

Bernstein, N. (2019). Plants and salt: plant response and adaptations to salinity. In *Model Ecosystems in Extreme Environments*. Elsevier Inc. https://doi.org/10.1016/b978-0-12-812742-1.00005-2

UNIVERSITAS
GADJAH MADA
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Bhattacharyya, P., Dash, P. K., Swain, C. K., Padhy, S. R., Roy, K. S., Neogi, S., Berliner, J., Adak, T., Pokhare, S. S., Baig, M. J., & Mohapatra, T. (2019). Mechanism of plant mediated methane emission in tropical lowland rice. *Science of the Total Environment*, *651*, 84–92. https://doi.org/10.1016/j.scitotenv.2018.09.141

BPS-Statistic of Demak. (2022). Demak dalam angka 2022. In *BPS Kabupaten Demak*.

Byrt, C. S., Munns, R., Burton, R. A., Gilliham, M., & Wege, S. (2018). Root cell wall solutions for crop plants in saline soils. *Plant Science*, *269*(September 2017), 47–55. https://doi.org/10.1016/j.plantsci.2017.12.012

Cedeño, Á., Olmo, M., Cedeño, G., Lucas, M., Saldarriaga, V., & Villar, R. (2024). Effects of different biochar types on the growth and functional traits of rice (Oryza sativa L.). *Journal of Ecological Engineering*, *25*(3), 282–290. https://doi.org/10.12911/22998993/182868

Cha-um, S., Pokasombat, Y., & Kirdmanee, C. (2014). *Remediation of salt-affected soil by gypsum and farmyard manure − Importance for the production of Jasmine rice Remediation of salt-affected soil by gypsum and farmyard manure − Importance for the production of Jasmine rice*. *April 2011*.

Chang, J., Cheong, B. E., Natera, S., & Roessner, U. (2019). Morphological and metabolic responses to salt stress of rice (Oryza sativa L.) cultivars which differ in salinity tolerance. In *Plant Physiology and Biochemistry*. Elsevier. https://doi.org/10.1016/j.plaphy.2019.10.017

Chernousenko, G. I., Khitrov, N. B., & Pankova, E. I. (2023). Magnesium in saline gypsum-bearing soils of Russia. *Eurasian Soil Science*, *56*(7), 854–867. https://doi.org/10.1134/S1064229323600537

Chu, L., Zhang, Y., Qian, L., Zhu, D., & Sun, H. (2020). Influence of biochar on nitrogen use efficiency and root morphology of rice-seedling in two contrasting paddy soils. *Phyton*, *89*(4), 1035–1042. https://doi.org/10.32604/phyton.2020.014506

Chun, J. A., Lim, C., Kim, D., & Kim, J. S. (2018). Assessing impacts of climate change and sea-level rise on seawater intrusion in a coastal aquifer. *Water (Switzerland)*, *10*(4), 1–11. https://doi.org/10.3390/w10040357

Coca, L. I. R., García González, M. T., Gil Unday, Z., Jiménez Hernández, J., Rodríguez Jáuregui, M. M., & Fernández Cancio, Y. (2023). Effects of sodium salinity on rice (Oryza sativa L.) cultivation: a Review. *Sustainability (Switzerland)*, *15*(3), 1–18. https://doi.org/10.3390/su15031804

Dąbkowska-Naskręt, H., & Bartkowiak, A. (2018). Magnesium status in soils under the impact of the soda industry. *Journal of Elementology*, *23*(1), 299–308.

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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https://doi.org/10.5601/jelem.2017.22.1.1419

Dajic, Z. (2006). *Physiology and molecular biology of stress tolerance. Chapter 3: salt stress*. Springer.

Dam, T. H. T., Amjath-Babu, T. S., Zander, P., & Müller, K. (2019). Paddy in saline water: analysing variety-specific effects of saline water intrusion on the technical efficiency of rice production in Vietnam. *Outlook on Agriculture*, *48*(3), 237–245. https://doi.org/10.1177/0030727019850841

Danindra, D., Setiawan, R. P. A., Desrial, Solahudin, M., Astika, I. W., & Widodo, S. (2022). Mapping of soil EC in relation with selected chemical properties of soil. *IOP Conference Series: Earth and Environmental Science*, *1038*(1). https://doi.org/10.1088/1755-1315/1038/1/012050

Darmanto, D., & Cahyadi, A. (2013). Kajian intrusi air laut melalui sungai di pesisir Kabupaten Demak Jawa Tengah. *Majalah Geografi Indonesia*, *27*(1), 1–10. https://doi.org/10.22146/mgi.13431

Dasgupta, S., Hossain, M. M., Huq, M., & Wheeler, D. (2018). Climate change, salinization and high-yield rice production in coastal Bangladesh. *Agricultural and Resource Economics Review*, *47*(1), 66–89. https://doi.org/10.1017/age.2017.14

Datta, A., Yeluripati, J. B., Nayak, D. R., Mahata, K. R., Santra, S. C., & Adhya, T. K. (2013). Seasonal variation of methane flux from coastal saline rice field with the application of different organic manures. *Atmospheric Environment*, *66*, 114–122. https://doi.org/10.1016/j.atmosenv.2012.06.008

Deshmukh, Y., & Khare, P. (2017). Effect of salinity stress on growth parameters and metabolites of medical plants: A review. In *Soil Salinity Management in Agriculture: Technological Advances and Applications* (pp. 197–234). https://doi.org/10.1201/9781315365992

Dong, D., Feng, Q., McGrouther, K., Yang, M., Wang, H., & Wu, W. (2015). Effects of biochar amendment on rice growth and nitrogen retention in a waterlogged paddy field. *Journal of Soils and Sediments*, *15*(1), 153–162. https://doi.org/10.1007/s11368-014-0984-3

El-Naggar, A., Lee, S. S., Rinklebe, J., Farooq, M., Song, H., Sarmah, A. K., Zimmerman, A. R., Ahmad, M., Shaheen, S. M., & Ok, Y. S. (2019). Biochar application to low fertility soils: a review of current status, and future prospects. *Geoderma*, *337*(September 2018), 536–554. https://doi.org/10.1016/j.geoderma.2018.09.034

El Moukhtari, A., Cabassa-Hourton, C., Farissi, M., & Savouré, A. (2020). How does proline treatment promote salt stress tolerance during crop plant development? *Frontiers in Plant Science*, *11*(July), 1–16. https://doi.org/10.3389/fpls.2020.01127

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Eviati, & Sulaeman. (2009). Analisis kimia tanah, tanaman, air dan pupuk. In *News.Ge*.

Eviati, Sulaeman, Herawaty, L., Anggria, L., Usman, Tantika, H. E., Prihantini, R., & Wuningrum, P. (2023). Analisis kimia tanah, tanaman, air, dan pupuk. In *Kementrian Pertanian Republik Indonesia*. https://tanahpupuk.bsip.pertanian.go.id

FAO. (2018). Handbook for saline soil management. In *Published by the Food and Agriculture Organization of the United Nations and Lomonosov Moscow State University*. http://www.fao.org/3/i7318en/I7318EN.pdf

Farooq, M., Asif, S., Jang, Y. H., Park, J. R., Zhao, D. D., Kim, E. G., & Kim, K. M. (2022). Effect of Different Salts on Nutrients Uptake, Gene Expression, Antioxidant, and Growth Pattern of Selected Rice Genotypes. *Frontiers in Plant Science*, *13*(June), 1–16. https://doi.org/10.3389/fpls.2022.895282

Febriarta, E., & Widyastuti, M. (2020). Kajian kualitas air tanah aampak intrusi di sebagian pesisir Kabupaten Tuban. *Jurnal Geografi : Media Informasi Pengembangan Dan Profesi Kegeografian*, *17*(2), 39–48. https://doi.org/10.15294/jg.v17i2.24143

Gharaibeh, M. A., Rusan, M. J., Eltaif, N. I., & Shunnar, O. F. (2014). Reclamation of highly calcareous saline-sodic soil using low quality water and phosphogypsum. *Applied Water Science*, *4*(3), 223–230. https://doi.org/10.1007/s13201-014-0189-3

Gu, W., Wang, Y., Feng, Z., Wu, D., Zhang, H., Yuan, H., Sun, Y., Xiu, L., Chen, W., & Zhang, W. (2022). Long-term effects of biochar application with reduced chemical fertilizer on paddy soil properties and Japonica rice production system. *Frontiers in Environmental Science*, *10*(June), 1–13. https://doi.org/10.3389/fenvs.2022.902752

Gu, X., Weng, S., Li, Y., & Zhou, X. (2022). Effects of Water and Fertilizer Management Practices on Methane Emissions from Paddy Soils: Synthesis and Perspective. *International Journal of Environmental Research and Public Health*, *19*(12). https://doi.org/10.3390/ijerph19127324

Gupta, A., Tiwari, R. K., Shukla, R., Singh, A. N., & Sahu, P. K. (2023). Salinity alleviator bacteria in rice (Oryza sativa L.), their colonization efficacy, and synergism with melatonin. *Frontiers in Plant Science*, *13*(January), 1–16. https://doi.org/10.3389/fpls.2022.1060287

Ha, L. T. T., An, N. T., Ha, N. T., Zhou, M., Brüggemann, N., & Cong, V. H. (2023). Greenhouse gas emissions from agricultural land use in the coastal area of Red River Delta. *International Journal of Environmental Science and Technology*, *0123456789*. https://doi.org/10.1007/s13762-023-04847-3

Hafiidh, A. A., Saptomo, S. K., & Arif, C. (2018). Sebaran intrusi air laut di Kabupaten Indramayu, Jawa Barat. *Jurnal Teknik Sipil Dan Lingkungan*, *3*(2), 69–76.

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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https://doi.org/10.29244/jsil.3.2.69-76

Hailegnaw, N. S., Mercl, F., Pračke, K., Száková, J., & Tlustoš, P. (2019). Mutual relationships of biochar and soil pH, CEC, and exchangeable base cations in a model laboratory experiment. *Journal of Soils and Sediments*, *19*(5), 2405–2416. https://doi.org/10.1007/s11368-019-02264-z

Hariadi, Y. C., Nurhayati, A. Y., Soeparjono, S., & Arif, I. (2015). Screening six varieties of rice (Oryzasativa) for salinity tolerance. *Procedia Environmental Sciences*, *28*, 78–87. https://doi.org/10.1016/j.proenv.2015.07.012

Hasan, R., & Miyake, H. (2017). Salinity stress alters nutrient uptake and causes the damage of root and leaf anatomy in maize. *KnE Life Sciences*, *3*(4), 219. https://doi.org/10.18502/kls.v3i4.708

Hazelton, P., & Murphy, B. (2019). Interpreting Soil Test Results. *Interpreting Soil Test Results*. https://doi.org/10.1071/9781486303977

Hazman, M., Hause, B., Eiche, E., Nick, P., & Riemann, M. (2015). Increased tolerance to salt stress in OPDA-deficient rice ALLENE OXIDE CYCLASE mutants is linked to an increased ROS-scavenging activity. *Journal of Experimental Botany*, *66*(11), 3339–3352. https://doi.org/10.1093/jxb/erv142

He, K., He, G., Wang, C., Zhang, H., Xu, Y., Wang, S., Kong, Y., Zhou, G., & Hu, R. (2020). Biochar amendment ameliorates soil properties and promotes Miscanthus growth in a coastal saline-alkali soil. *Applied Soil Ecology*, *155*(October 2019), 103674. https://doi.org/10.1016/j.apsoil.2020.103674

Hendri, J., & Saidi, B. B. (2020). Pengaruh ameliorasi lahan yang terkena intrusi air laut terhadap pertumbuhan dan produksi padi. *Prosiding Seminar Nasional Lahan Suboptimal Ke-8 Ke-8 Tahun 2020, Palembang 20 Oktober 2020 "Komoditas Sumber Pangan Untuk Meningkatkan Kualitas Kesehatan Di Era Pandemi Covid -19,"* 978–979.

Hoo, K. Y., Shim, I. S., Kobayashi, K., & Usui, K. (1999). Relationship between Na Content in Several or K / Na Ratio in Shoots and Salt Tolerance Gramineous Plants. *J. Weed Sci. Tech*, *44*(4), 293–299.

Houmani, H., Palma, J. M., & Corpas, F. J. (2023). High salinity stimulates the adaptive response to potassium deficiency through the antioxidant and the NADPH-generating systems in the roots and leaves of the halophyte Cakile maritima. *Journal of Plant Growth Regulation*, *42*(10), 6286–6306. https://doi.org/10.1007/s00344-022-10819-7

Hu, J., Bettembourg, M., Xue, L., Hu, R., Schnürer, A., Sun, C., Jin, Y., & Sundström, J. F. (2024). A low-methane rice with high-yield potential realized via optimized carbon

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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partitioning. *Science of the Total Environment*, *920*(January). https://doi.org/10.1016/j.scitotenv.2024.170980

Huang, J., Zhu, C., Kong, Y., Cao, X., Zhu, L., Zhang, Y., Ning, Y., Tian, W., Zhang, H., Yu, Y., & Zhang, J. (2022). Biochar Application Alleviated Rice Salt Stress via Modifying Soil Properties and Regulating Soil Bacterial Abundance and Community Structure. *Agronomy*, *12*(2). https://doi.org/10.3390/agronomy12020409

Huang, M., Yin, X., Chen, J., & Cao, F. (2021). Biochar application mitigates the effect of heat stress on rice (Oryza sativa L.) by regulating the root-zone environment. *Frontiers in Plant Science*, *12*(August). https://doi.org/10.3389/fpls.2021.711725

Husen, E., Surono, Pratiwi, E., & Widowati, L. R. (2022). Metode analisis biologi tanah edisi 2. In *Balai Penelitian Tanah* (Vol. 3, Issue February).

Hussain, M., Ahmad, S., Hussain, S., Lal, R., Ul-Allah, S., & Nawaz, A. (2018). Rice in saline soils: physiology, biochemistry, genetics, and management. In *Advances in Agronomy* (1st ed., Vol. 148). Elsevier Inc. https://doi.org/10.1016/bs.agron.2017.11.002

Hussain, S., Cao, X., Zhong, C., Zhu, L., Khaskheli, M. A., Fiaz, S., Zhang, J., & Jin, Q. (2018). Sodium chloride stress during early growth stages altered physiological and growth characteristics of rice. *Chilean Journal of Agricultural Research*, *78*(2), 183–197. https://doi.org/10.4067/S0718-58392018000200183

Ibrahim, M., Mahmoud, E., & Ibrahim, D. (2020). Assessing the impact of water treatment residuals and rice straw compost on soil physical properties and wheat yield in saline sodic Soil. *Communications in Soil Science and Plant Analysis*, *51*(18), 2388–2397. https://doi.org/10.1080/00103624.2020.1836206

IPCC. (2019). IPCC special report on the ocean and cryosphere in a changing climate. *Intergovernmental Panel on Climate Change*, undefined. https://www.ipcc.ch/srocc/chapter/summary-for-policymakers/

Iqbal, T. (2018). Rice straw amendment ameliorates harmful effect of salinity and increases nitrogen availability in a saline paddy soil. *Journal of the Saudi Society of Agricultural Sciences*, *17*(4), 445–453. https://doi.org/10.1016/j.jssas.2016.11.002

Islam, F., Farooq, M. A., Gill, R. A., Wang, J., Yang, C., Ali, B., Wang, G. X., & Zhou, W. (2017). 2,4-D attenuates salinity-induced toxicity by mediating anatomical changes, antioxidant capacity and cation transporters in the roots of rice cultivars. *Scientific Reports*, *7*(1), 1–23. https://doi.org/10.1038/s41598-017-09708-x

Islam, M. M., Faruqe, M. H., Rana, M. S., Akter, M., & Karim, M. A. (2018). Screening of rice (Oryza sativa L.) genotypes at reproductive stage for their tolerance to salinity. *The*

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Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Agriculturists, *16*(1), 65–77. https://doi.org/10.3329/agric.v16i1.37535

Islam, S. F. ul, Sander, B. O., Quilty, J. R., de Neergaard, A., van Groenigen, J. W., & Jensen, L. S. (2020). Mitigation of greenhouse gas emissions and reduced irrigation water use in rice production through water-saving irrigation scheduling, reduced tillage and fertiliser application strategies. *Science of the Total Environment*, *739*, 140215. https://doi.org/10.1016/j.scitotenv.2020.140215

Islam, S. M. M., Gaihre, Y. K., Islam, M. R., Khatun, A., & Islam, A. (2022). Integrated Plant Nutrient Systems Improve Rice Yields without Affecting Greenhouse Gas Emissions from Lowland Rice Cultivation. *Sustainability (Switzerland)*, *14*(18). https://doi.org/10.3390/su141811338

Ismawan, M. F., Budi Sanjoto, T., & Setyaningsih Jurusan Geografi, W. (2016). Kajian intrusi aor laut dan dampaknya terhadap masyarakat di pesisir kota Tegal. In *Geo Image* (Vol. 5, Issue 1). http://journal.unnes.ac.id/sju/index.php/geoimage

Jin, F., Piao, J., Miao, S., Che, W., Li, X., Li, X., Shiraiwa, T., Tanaka, T., Taniyoshi, K., Hua, S., & Lan, Y. (2024). Long-term effects of biochar one-off application on soil physicochemical properties, salt concentration, nutrient availability, enzyme activity, and rice yield of highly saline-alkali paddy soils: based on a 6-year field experiment. *Biochar*, *6*(1). https://doi.org/10.1007/s42773-024-00332-3

Kargas, G., Londra, P. A., Koka, D., & Sgoubopoulou, A. (2023). Relationships between saturated paste and 1:1 or 1:5 soil/water extract sodium adsorption ratios. *Irrigation and Drainage*, *72*(2), 503–514. https://doi.org/10.1002/ird.2775

Karimi, A., Moezzi, A., Chorom, M., & Enayatizamir, N. (2019). Chemical fractions and availability of Zn in a calcareous soil in response to biochar amendments. *Journal of Soil Science and Plant Nutrition*, *19*(4), 851–864. https://doi.org/10.1007/s42729-019-00084-1

Kartika, A. G. D., Septian, H., Nuzula, N. I., & Pratiwi, W. S. W. (2023). Potassium and calcium content in Padelegan water which is used as the raw water for making salt. *IOP Conference Series: Earth and Environmental Science*, *1250*(1), 0–9. https://doi.org/10.1088/1755-1315/1250/1/012010

Kartikawati, R., Ariani, M., Wihardjaka, A., & Setyanto, P. (2017). Characteristic of Rice Variety for Low Greenhouse Gases (Ghgs) Emission in Facing the Challenges of Climate Change and National Food Security. *Proceedings of PERIPI. Bogor. Indonesia*, 55–60.

Kato, Y., Collard, B. C. Y., Septiningsih, E. M., & Ismail, A. M. (2019). Increasing flooding tolerance in rice: Combining tolerance of submergence and of stagnant flooding. *Annals of Botany*, *124*(7), 1199–1209. https://doi.org/10.1093/aob/mcz118

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Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Khalifa, T., Elbagory, M., & Omara, A. E. D. (2021). Salt stress amelioration in maize plants through phosphogypsum application and bacterial inoculation. *Plants*, *10*(10), 1–23. https://doi.org/10.3390/plants10102024

Khan, M. A., Asaf, S., Khan, A. L., Adhikari, A., Jan, R., Ali, S., Imran, M., Kim, K. M., & Lee, I. J. (2019). Halotolerant rhizobacterial strains mitigate the adverse effects of NaCl stress in soybean seedlings. *BioMed Research International*, *2019*. https://doi.org/10.1155/2019/9530963

Khan, S. K., Iqbal, J., & Saeed, M. (2014). Comparative study of agronomic traits of different rice varieties grown under saline and normal conditions. *Journal of Animal and Plant Sciences*, *24*(2), 634–642.

Khatun, L., Ali, M. A., Sumon, M. H., Islam, M. B., & Khatun, F. (2021). Mitigation Rice Yield Scaled Methane Emission and Soil Salinity Stress with Feasible Soil Amendments. *Journal of Agricultural Chemistry and Environment*, *10*(01), 16–36. https://doi.org/10.4236/jacen.2021.101002

Kim, W. J., Bui, L. T., Chun, J. B., McClung, A. M., & Barnaby, J. Y. (2018). Correlation between methane (CH4) emissions and root aerenchyma of rice varieties. *Plant Breeding and Biotechnology*, *6*(4), 381–390. https://doi.org/10.9787/PBB.2018.6.4.381

Kim, Y. J., Choo, B. K., & Cho, J. Y. (2017). Effect of gypsum and rice straw compost application on improvements of soil quality during desalination of reclaimed coastal tideland soils: Ten years of long-term experiments. *Catena*, *156*(March), 131–138. https://doi.org/10.1016/j.catena.2017.04.008

Koc, Y. E., Aycan, M., & Mitsui, T. (2024). Self-defense mechanism in rice to salinity: proline. *J*, *7*(1), 103–115. https://doi.org/10.3390/j7010006

Kooyers, N. J. (2015). The evolution of drought escape and avoidance in natural herbaceous populations. *Plant Science*, *234*, 155–162. https://doi.org/10.1016/j.plantsci.2015.02.012

Krishnamurthy, S. L., Lokeshkumar, B. M., Rathor, S., Warraich, A. S., Yadav, S., Gautam, R. K., Singh, R. K., & Sharma, P. C. (2022). *Development of Salt-Tolerant Rice Varieties to Enhancing Productivity in Salt-Affected Environments*. 30. https://doi.org/10.3390/environsciproc2022016030

Kuanar, S. R., Ray, A., Sethi, S. K., Chattopadhyay, K., & Sarkar, R. K. (2017). Physiological Basis of Stagnant Flooding Tolerance in Rice. *Rice Science*, *24*(2), 73–84. https://doi.org/10.1016/j.rsci.2016.08.008

Kumawat, C., Kumar, A., Parshad, J., Sharma, S. S., Patra, A., Dogra, P., Yadav, G. K., Dadhich, S. K., Verma, R., & Kumawat, G. L. (2022). Microbial diversity and adaptation

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

under salt-affected soils: a review. *Sustainability (Switzerland)*, *14*(15), 1–24. https://doi.org/10.3390/su14159280

Kurniasih, B., Greenway, H., & Colmer, T. D. (2013). Tolerance of submerged germinating rice to 50-200mM NaCl in aerated solution. *Physiologia Plantarum*, *149*(2), 222–233. https://doi.org/10.1111/ppl.12029

Kwon, Y., Lee, J. Y., Choi, J., Lee, S. M., Kim, D., Cha, J. K., Park, H., Kang, J. W., Kim, T. H., Chae, H. G., Kabange, N. R., Oh, K. W., Kim, P. J., Kwak, Y. S., Lee, J. H., & Ryu, C. M. (2023). Loss-of-function gs3 allele decreases methane emissions and increases grain yield in rice. *Nature Climate Change*, *13*(12), 1329–1333. https://doi.org/10.1038/s41558-023-01872-5

Lakitan, B., Alberto, A., Lindiana, L., Kartika, K., Herlinda, S., & Kurnianingsih, A. (2018). The benefits of biochar on rice growth and yield in tropical riparian wetland, South Sumatra, Indonesia. *Chiang Mai University Journal of Natural Sciences*, *17*(2), 111–126. https://doi.org/10.12982/CMUJNS.2018.0009

Lamb, W. F., Wiedmann, T., Pongratz, J., Andrew, R., Crippa, M., Olivier, J. G. J., Wiedenhofer, D., Mattioli, G., Khourdajie, A. Al, House, J., Pachauri, S., Figueroa, M., Saheb, Y., Slade, R., Hubacek, K., Sun, L., Ribeiro, S. K., Khennas, S., De La Rue Du Can, S., … Minx, J. (2021). A review of trends and drivers of greenhouse gas emissions by sector from 1990 to 2018. *Environmental Research Letters*, *16*(7). https://doi.org/10.1088/1748-9326/abee4e

Lee, J. H., Lee, J. Y., Kang, Y. G., Kim, J. H., & Oh, T. K. (2023). Evaluating methane emissions from rice paddies: a study on the cultivar and transplanting date. *Science of the Total Environment*, *902*(July), 166174. https://doi.org/10.1016/j.scitotenv.2023.166174

Lee, J. M., Jeong, H. C., Gwon, H. S., Lee, H. S., Park, H. R., Kim, G. S., Park, D. G., & Lee, S. Il. (2023). Effects of biochar on methane emissions and crop yields in East Asian paddy fields: a regional scale meta-analysis. *Sustainability (Switzerland)*, *15*(12), 19–21. https://doi.org/10.3390/su15129200

Leogrande, R., Vitti, C., Leogrande, R., & Vitti, C. (2018). Use of organic amendments to reclaim saline and sodic soils : a review soils : a review. *Arid Land Research and Management*, *0*(0), 1–21. https://doi.org/10.1080/15324982.2018.1498038

Li, R., Li, M., Ashraf, U., Liu, S., & Zhang, J. (2019). Exploring the relationships between yield and yield-related traits for rice varieties released in china from 1978 to 2017. *Frontiers in Plant Science*, *10*(May). https://doi.org/10.3389/fpls.2019.00543

Li, X., Yao, T., Huang, X., Li, X., Li, P., Du, S., Wang, W., Miao, S., Wang, D., Jin, F., & Shao, X.

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

(2022). Biochar increase rice yield by improving root morphological and root pphysiological functions in heavily saline-sodic paddy soil of Northeast China. *Bioresources*, *17*(1), 1241–1256.

Li, X., & Zhang, W. S. (2008). Salt-avoidance tropism in Arabidopsis thaliana. *Plant Signaling and Behavior*, *3*(5), 351–353. https://doi.org/10.4161/psb.3.5.5371

Li, Y., Ai, Z., Mu, Y., Zhao, T., Zhang, Y., Li, L., Huang, Z., Nie, L., & Khan, M. N. (2023). Rice yield penalty and quality deterioration is associated with failure of nitrogen uptake from regreening to panicle initiation stage under salinity. *Frontiers in Plant Science*, *14*(March), 1–18. https://doi.org/10.3389/fpls.2023.1120755

Li, Z., Zhou, T., Zhu, K., Wang, W., Zhang, W., Zhang, H., Liu, L., Zhang, Z., Wang, Z., Wang, B., Xu, D., Gu, J., & Yang, J. (2023). Effects of Salt Stress on Grain Yield and Quality Parameters in Rice Cultivars with Differing Salt Tolerance. *Plants*, *12*(18). https://doi.org/10.3390/plants12183243

Ligate, E. J., Martin Kitila, M., Chen, C., & Wu, C. (2017). Impacts of salt water intrusion on maize (Zea mays) and rice (Oryza sativa) production under climate change scenarios in Bagamoyo District-Tanzania. *Universal Journal of Agricultural Research*, *5*(2), 148–158. https://doi.org/10.13189/ujar.2017.050210

Linh, D. T. T., Khoi, C. M., Ritz, K., Van Sinh, N., Phuong, N. T. K., My, H. M. T., Linh, T. B., Minh, D. D., Linh, T. T., & Toyota, K. (2023). Effects of Rice Husk Biochar and Compost Amendments on Soil Phosphorus Fractions, Enzyme Activities and Rice Yields in Salt-Affected Acid Soils in the Mekong Delta, Viet Nam. *Agronomy*, *13*(6). https://doi.org/10.3390/agronomy13061593

Mahi, H. El, Hormaeche, J. P., Luca, A. De, Villalta, I., Espartero, J., Arjona, F. G., Fernández, J. L., Bundó, M., Mendoza, I., Mieulet, D., Lalanne, E., Lee, S. Y., Yun, D. J., Guiderdoni, E., Aguilar, M., Leidi, E. O., Pardo, J. M., & Quintero, F. J. (2019). A critical role of sodium flux via the plasma membrane na+/h+ exchanger sos1 in the salt tolerance of rice. *Plant Physiology*, *180*(2), 1046–1065. https://doi.org/10.1104/pp.19.00324

Mahmoodabadi, M., & Heydarpour, E. (2014). Sequestration of organic carbon influenced by the application of straw residue and farmyard manure in two different soils. *International Agrophysics*, *28*(2), 169–176. https://doi.org/10.2478/intag-2014-0005

Marklund, S., & Marklund, G. (1974). Involvement of the superoxide anion radical in the autoxidation of pyrogallol and a convenient assay for superoxide dismutase. *European Journal of Biochemistry*, *47*(3), 469–474. https://doi.org/10.1111/j.1432-1033.1974.tb03714.x

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Maucieri, C., Zhang, Y., McDaniel, M. D., Borin, M., & Adams, M. A. (2017). Short-term effects of biochar and salinity on soil greenhouse gas emissions from a semi-arid Australian soil after re-wetting. *Geoderma*, *307*(August), 267–276. https://doi.org/10.1016/j.geoderma.2017.07.028

Miller, J. (2016). Soil pH affects nutrient availability. *University of Maryland Extension*, *December*, 1–5.

Mimura, N. (2013). Sea-level rise caused by climate change and its implications for society. In *Proceedings of the Japan Academy Series B: Physical and Biological Sciences* (Vol. 89, Issue 7, pp. 281–301). Japan Academy. https://doi.org/10.2183/pjab.89.281

Minamikawa, K., Tokida, T., Sudo, S., Padre, A., & Yagi, K. (2015). *Guidelines for Measuring CH 4 and N 2 O Emissions from Rice Paddies by a Manually Operated Closed Chamber Method*.

Minarsih, S., Karyaningsih, S., Samijan, Supriyo, A., Hindarwati, Y., Husna, N., & Winarto, B. (2021a). Effect of ameliorant on growth and yield of rice at tidal paddy field. *Indonesian Journal of Agricultural Science*, *22*(2), 85–91. https://doi.org/10.21082/IJAS.V22N2.2021.P85-91

Minarsih, S., Karyaningsih, S., Samijan, Supriyo, A., Hindarwati, Y., Husna, N., & Winarto, B. (2021b). Effect of Ameliorant on Growth and Yield of Rice At Tidal Paddy Field. *Indonesian Journal of Agricultural Science*, *22*(2), 85–91. https://doi.org/10.21082/IJAS.V22N2.2021.P85-91

Mokrani, S., Nabti, E. H., & Cruz, C. (2020). Current advances in plant growth promoting bacteria alleviating salt stress for sustainable agriculture. *Applied Sciences (Switzerland)*, *10*(20), 1–27. https://doi.org/10.3390/app10207025

Mondal, M. M. ., Puteh, A. B., & Razzaque, A. H. . (2015). Salinity Stress Effect on Ion Uptake and Yield Attributes in Rice. *Glob. J. Plant Ecophysiology*, *5*(1), 1–4. http://www.lifesciencesite.comonline

Moore, W. S., & Joye, S. B. (2021). Saltwater intrusion and submarine groundwater discharge: acceleration of biogeochemical reactions in changing coastal aquifers. *Frontiers in Earth Science*, *9*(April), 1–14. https://doi.org/10.3389/feart.2021.600710

Mulyani, A., Nursyamsi, D., & Syakir, M. (2020). Strategi Pemanfaatan Sumberdaya Lahan untuk Pencapaian Swasembada Beras Berkelanjutan. *Jurnal Sumberdaya Lahan*, *11*(1), 11. https://doi.org/10.21082/jsdl.v11n1.2017.11-22

Munns, R., & Tester, M. (2008). Mechanisms of salinity tolerance. *Annual Review of Plant Biology*, *59*, 651–681. https://doi.org/10.1146/annurev.arplant.59.032607.092911

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Nakamura, C., Takenaka, S., Nitta, M., Yamamoto, M., Kawazoe, T., Ono, S., Takenaka, M., Inoue, K., & Kawai, S. (2021). High sensitivity of roots to salt stress as revealed by novel tip bioassay in wheat seedlings. *Biotechnology and Biotechnological Equipment*, *35*(1), 246–254. https://doi.org/10.1080/13102818.2020.1852890

Narjary, B., Sheoran, P., Jat, H. S., Joshi, P. K., Chinchmalatpure, A. R., & Yadav, G. (2018). *Effect of Rice straw compost and mineral fertilizers on yield and nutrient*. *9*(1), 10–16.

Nemer, N., El Beyrouthy, M., Lahoud, C., Mnif, W., Bashour, I., & Kawar, N. (2014). Microbial a nd physico-chemical changes in tomato juice subjected to pulsed electric field treatment. *African Journal of Agricultural Research*, *6*(30), 6348–6353. https://doi.org/10.5897/A

Nguyen, B. T., Trinh, N. N., & Bach, Q. V. (2020). Methane emissions and associated microbial activities from paddy salt-affected soil as influenced by biochar and cow manure addition. *Applied Soil Ecology*, *152*(July 2019), 103531. https://doi.org/10.1016/j.apsoil.2020.103531

Niamat, B., Naveed, M., Ahmad, Z., Yaseen, M., Ditta, A., Mustafa, A., Rafique, M., Bibi, R., Sun, N., & Xu, M. (2019). Calcium-enriched animal manure alleviates the adverse effects of salt stress on growth, physiology and nutrients homeostasis of zea mays L. *Plants*, *8*(11), 1–17. https://doi.org/10.3390/plants8110480

Nur, A. A., Soegianto, A., Sugiharto, A. N., & Nafisah, N. (2024). Evaluasi toleransi salinitas beberapa genotipe padi (Oryza sativa L) menggunakan nilai indeks. *Agro Bali : Agricultural Journal*, *7*(1), 179–193. https://doi.org/10.37637/ab.v7i1.1499

Olsson, L., Ye, S., Yu, X., Wei, M., Krauss, K. W., & Brix, H. (2015). Factors influencing CO2 and CH4 emissions from coastal wetlands in the Liaohe Delta, Northeast China. *Biogeosciences*, *12*(16), 4965–4977. https://doi.org/10.5194/bg-12-4965-2015

Omisun, T., Sahoo, S., Saha, B., & Panda, S. K. (2018). Relative salinity tolerance of rice cultivars native to North East India: a physiological, biochemical and molecular perspective. *Protoplasma*, *255*(1), 193–202. https://doi.org/10.1007/s00709-017-1142-8

Othaman, N. N. C., Isa, M. N., Ismail, R. C., & Ahmad, M. I. (2020). *Factors that affect soil electrical conductivity (EC) based system for smart farming application*. *020055*.

Pandey, A., Mai, V. T., Vu, D. Q., Bui, T. P. L., Mai, T. L. A., Jensen, L. S., & de Neergaard, A. (2014). Organic matter and water management strategies to reduce methane and nitrous oxide emissions from rice paddies in Vietnam. *Agriculture, Ecosystems and Environment*, *196*, 137–146. https://doi.org/10.1016/j.agee.2014.06.010

Parkash, V., & Singh, S. (2020). Potential of biochar application to mitigate salinity stress in eggplant. *HortScience*, *55*(12), 1946–1955. https://doi.org/10.21273/HORTSCI15398-20

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Phan, L. T. H., & Kamoshita, A. (2020). Salinity intrusion reduces grain yield in coastal paddy fields: case study in two estuaries in the Red River Delta, Vietnam. *Paddy and Water Environment*, *18*(2), 399–416. https://doi.org/10.1007/s10333-020-00790-y

Phuong, N. T. K., Khoi, C. M., Ritz, K., Linh, T. B., Minh, D. D., Duc, T. A., Sinh, N. Van, Linh, T. T., & Toyota, K. (2020). Influence of rice husk biochar and compost amendments on salt contents and hydraulic properties of soil and rice yield in salt-affected fields. *Agronomy*, *10*(8). https://doi.org/10.3390/agronomy10081101

Ponce, K. S., Guo, L., Leng, Y., Meng, L., & Ye, G. (2021). *Advances in sensing , response and regulation mechanism of salt tolerance in rice*.

Pranata, M., & Kurniasih, B. (2019). *Pengaruh pemberian pupuk kompos jerami padi terhadap pertumbuhan dan hasil padi (Oryza sativa L.) pada kondisi salin* (Vol. 8, Issue 2).

Prasertsuk, S., & Wijitkosum, S. (2020). Biochar Application for Rice Cultivation in Salt-Affected Soils. *Research Square*, *105*, 1–17. https://doi.org/10.21203/rs.3.rs-81012/v1

Prisco, J. T., Gomes-Filho, E., & Miranda, R. S. (2016). Physiology and biochemistry of plants growing under salt stress. *Manejo Da Salinidade Na Agricultura: Estudos Básicos e Aplicados*, *December 2016*, 163–180.

Puvanitha, S., & Mahendran, S. (2017). Effect of salinity on plant height, shoot and root dry weight of selected rice cultivars. *Scholars Journal of Agriculture and Veterinary Sciences*, *4*(4), 126–131. https://doi.org/10.36347/sjavs.2017.v04i04.001

Qin, H., Li, Y., & Huang, R. (2020). Advances and challenges in the breeding of salt-tolerant. *International Journal of Molecular Sciences*, *21*(8385), 1–15. https://doi.org/doi:10.3390/ijms21218385

Rad, H. E., Aref, F., & Rezaei, M. (2012). Rice growth and yield components respond to changes in water salinity stress. *World Applied Sciences Journal*, *20*(7), 997–1007. https://doi.org/10.5829/idosi.wasj.2012.20.07.157

Radanielson, A. M., Angeles, O., Li, T., Ismail, A. M., & Gaydon, D. S. (2018). Describing the physiological responses of different rice genotypes to salt stress using sigmoid and piecewise linear functions. *Field Crops Research*, *220*, 46–56. https://doi.org/10.1016/j.fcr.2017.05.001

Rahman, A., Nahar, K., Hasanuzzaman, M., & Fujita, M. (2016). Calcium supplementation improves Na+/K+ ratio, antioxidant defense and glyoxalase systems in salt-stressed rice seedlings. *Frontiers in Plant Science*, *7*(MAY2016), 1–16. https://doi.org/10.3389/fpls.2016.00609

Rajendran, S., Park, H., Kim, J., Park, S. J., Shin, D., Lee, J. H., Song, Y. H., Paek, N. C., & Kim,

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

C. M. (2024). Methane emission from rice fields: necessity for molecular approach for mitigation. *Rice Science*, *31*(2), 159–178. https://doi.org/10.1016/j.rsci.2023.10.003

Razzaq, A., Ali, A., Safdar, L. Bin, Zafar, M. M., Rui, Y., Shakeel, A., Shaukat, A., Ashraf, M., Gong, W., & Yuan, Y. (2020). Salt stress induces physiochemical alterations in rice grain composition and quality. In *Journal of Food Science* (Vol. 85, Issue 1, pp. 14–20). Blackwell Publishing Inc. https://doi.org/10.1111/1750-3841.14983

Rezaie, N., Razzaghi, F., & Sepaskhah, A. R. (2019). Different Levels of Irrigation Water Salinity and Biochar Influence on Faba Bean Yield, Water Productivity, and Ions Uptake. *Communications in Soil Science and Plant Analysis*, *50*(5), 611–626. https://doi.org/10.1080/00103624.2019.1574809

Robin, A. H. K., Matthew, C., Uddin, M. J., & Bayazid, K. N. (2016). Salinity-induced reduction in root surface area and changes in major root and shoot traits at the phytomer level in wheat. *Journal of Experimental Botany*, *67*(12), 3719–3729. https://doi.org/10.1093/jxb/erw064

Robins, L., Crimp, S., Monica van Wensveen, R. G. A., R. Michael Bourke, James Butler, Michaela Cosijn, F. D., Aparna Lal, John F. McCarthy, Andrew McWilliam, A. S. M. P., & Nicholas Thomson, P. W. and M. W. (2020). *COVID-19 and foodsystems in the Indo-Pacific: an assessment of vulnerabilities, impacts and opportunities for action* (Issue 29).

Romano-Armada, N., Yañez-yazlle, M. F., Irazusta, V. P., Rajal, V. B., & Moraga, N. B. (2020). Potential of bioremediation and PGP traits in streptomyces as strategies for bio-reclamation of salt-affected soils for agriculture. *Pathogens*, *9*(2). https://doi.org/10.3390/pathogens9020117

Rumanti, I. A., Hairmansis, A., Nugraha, Y., Nafisah, Susanto, U., Wardana, P., Subandiono, R. E., Zaini, Z., Sembiring, H., Khan, N. I., Singh, R. K., Johnson, D. E., Stuart, A. M., & Kato, Y. (2018). Development of tolerant rice varieties for stress-prone ecosystems in the coastal deltas of Indonesia. *Field Crops Research*, *223*, 75–82. https://doi.org/10.1016/j.fcr.2018.04.006

Rumanti, I. A., Sitaresmi, T., & Nugraha, Y. (2020). Rice tolerance variation to long-term stagnant flooding and germination ability under an-aerobic environment. *IOP Conference Series: Earth and Environmental Science*, *423*(1). https://doi.org/10.1088/1755-1315/423/1/012048

Saifullah, Dahlawi, S., Naeem, A., Rengel, Z., & Naidu, R. (2018). Biochar application for the remediation of salt-affected soils: Challenges and opportunities. *Science of the Total Environment*, *625*, 320–335. https://doi.org/10.1016/j.scitotenv.2017.12.257

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
Rina Kartikawati, Ir. Budiastuti Kurniasih, PhD; Eka Tarwaca Susila Putra, SP, MP, PhD; Dr. Ir. Eko Hanudin, MP
Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Saini, S., Kaur, N., & Pati, P. K. (2018). Reactive oxygen species dynamics in roots of salt sensitive and salt tolerant cultivars of rice. *Analytical Biochemistry*, *550*(February), 99–108. https://doi.org/10.1016/j.ab.2018.04.019

Sao, S., Praise, S., & Watanabe, T. (2023). Effect of flood duration on water extractable dissolved organic matter in flood plain soils: A laboratory investigation. *Geoderma*, *432*(February), 116392. https://doi.org/10.1016/j.geoderma.2023.116392

Schneider, P., & Asch, F. (2020). Rice production and food security in Asian Mega deltas—a review on characteristics, vulnerabilities and agricultural adaptation options to cope with climate change. *Journal of Agronomy and Crop Science*, *206*(4), 491–503. https://doi.org/10.1111/jac.12415

Seifikalhor, M., Aliniaeifard, S., Shomali, A., Azad, N., Hassani, B., Lastochkina, O., & Li, T. (2019). Calcium signaling and salt tolerance are diversely entwined in plants. *Plant Signaling and Behavior*, *14*(11). https://doi.org/10.1080/15592324.2019.1665455

Sembiring, H., Subekti, N. A., Erythrina, Nugraha, D., Priatmojo, B., & Stuart, A. M. (2020). Yield gap management under seawater intrusion areas of Indonesia to improve rice productivity and resilience to climate change. *Agriculture (Switzerland)*, *10*(1), 1–14. https://doi.org/10.3390/agriculture10010001

Sen, T. T. H., Nhi, T. P., & Shen, T. T. (2017). Salinity effect at seedling and flowering stages of some rice lines and varieties (Oryza sativa L.). *Journal of Agricultural Science and Technology A*, *7*(10), 32–39. https://doi.org/10.17265/2161-6256/2017.10.005s

Sharma, P., Jha, A. B., Dubey, R. S., & Pessarakli, M. (2012). Reactive oxygen species, oxidative damage, and antioxidative defense mechanism in plants under stressful conditions. *Journal of Botany*, *2012*, 1–26. https://doi.org/10.1155/2012/217037

Sheng, R. T. C., Huang, Y. H., Chan, P. C., Bhat, S. A., Wu, Y. C., & Huang, N. F. (2022). Rice growth stage classification via RF-based machine learning and image processing. *Agriculture (Switzerland)*, *12*(12), 1–23. https://doi.org/10.3390/agriculture12122137

Sheoran, P., Basak, N., Kumar, A., Yadav, R. K., Singh, R., Sharma, R., Kumar, S., Singh, R. K., & Sharma, P. C. (2021). Ameliorants and salt tolerant varieties improve rice-wheat production in soils undergoing sodification with alkali water irrigation in Indo–Gangetic Plains of India. *Agricultural Water Management*, *243*(August 2020), 106492. https://doi.org/10.1016/j.agwat.2020.106492

Singh, Y. P., Mishra, V. K., Singh, S., Sharma, D. K., Singh, D., Singh, U. S., Singh, R. K., Haefele, S. M., & Ismail, A. M. (2016). Productivity of sodic soils can be enhanced through the use of salt tolerant rice varieties and proper agronomic practices. *Field Crops Research*, *190*,

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82–90. https://doi.org/10.1016/j.fcr.2016.02.007

Singh Yadav, S. P., Bhandari, S., Bhatta, D., Poudel, A., Bhattarai, S., Yadav, P., Ghimire, N., Paudel, P., Paudel, P., Shrestha, J., & Oli, B. (2023). Biochar application: a sustainable approach to improve soil health. *Journal of Agriculture and Food Research*, *11*(December 2022), 100498. https://doi.org/10.1016/j.jafr.2023.100498

Solis, C. A., Yong, M. T., Vinarao, R., Jena, K., Holford, P., Shabala, L., Zhou, M., Shabala, S., & Chen, Z. H. (2020). Back to the wild: on a quest for donors toward salinity tolerant rice. *Frontiers in Plant Science*, *11*(March), 1–14. https://doi.org/10.3389/fpls.2020.00323

Son, J. K., Shin, W. T., Lee, S. H., Ryu, J. H., & Cho, J. Y. (2017). Reclamation of a coastal reclaimed tidal land soil by gypsum and rice straw. *Archives of Agronomy and Soil Science*, *63*(6), 761–770. https://doi.org/10.1080/03650340.2016.1241393

Sripinyowanich, S., Klomsakul, P., Boonburapong, B., Bangyeekhun, T., Asami, T., Gu, H., Buaboocha, T., & Chadchawan, S. (2013). Exogenous ABA induces salt tolerance in indica rice (Oryza sativa L.): The role of OsP5CS1 and OsP5CR gene expression during salt stress. *Environmental and Experimental Botany*, *86*, 94–105. https://doi.org/10.1016/j.envexpbot.2010.01.009

Srivastava, A. K., Shankar, A., Chandran, A. K. N., Sharma, M., Jung, K. H., Suprasanna, P., & Pandey, G. K. (2020). Emerging concepts of potassium homeostasis in plants. *Journal of Experimental Botany*, *71*(2), 608–619. https://doi.org/10.1093/jxb/erz458

Statistik, B. P. (2024). *Kabupaten Demak dalam angka 2024* (B. K. Demak (ed.)).

Subekti, N. A., Sembiring, H., Erythrina, Nugraha, D., Priatmojo, B., & Nafisah. (2020). Yield of different rice cultivars at two levels of soil salinity under seawater intrusion in West Java, Indonesia. *Biodiversitas*, *21*(1), 14–20. https://doi.org/10.13057/biodiv/d210103

Suhartono, E., Purwanto, &, Suripin. (2013). Faktor penyebab intrusi air laut terhadap air tanah pada akuifer dalam di kota Semarang. *Wahana Teknik Sipil*, *18*(2), 76–87.

Sun, M., Zhang, H., Dong, J., Gao, F., Li, X., & Zhang, R. (2018). A comparison of CH4 emissions from coastal and inland rice paddy soils in China. *Catena*, *170*(April 2017), 365–373. https://doi.org/10.1016/j.catena.2018.06.035

Supparattanapan, S., Saenjan, P., Quantin, C., Maeght, J. L., & Grünberger, O. (2009). Salinity and organic amendment effects on methane emission from a rain-fed saline paddy field. *Soil Science and Plant Nutrition*, *55*(1), 142–149. https://doi.org/10.1111/j.1747-0765.2008.00330.x

Tabassum, R., Tahjib-Ul-Arif, M., Hasanuzzaman, M., Sohag, A. A. M., Islam, M. S., Shafi, S. M. S. H., Islam, M. M., & Hassan, L. (2021). Screening salt-tolerant rice at the seedling and

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

reproductive stages: An effective and reliable approach. *Environmental and Experimental Botany*, *192*(June), 104629. https://doi.org/10.1016/j.envexpbot.2021.104629

Takakai, F., Kominami, Y., Ohno, S., & Nagata, O. (2020). Effect of the long-term application of organic matter on soil carbon accumulation and GHG emissions from a rice paddy field in a cool-temperate region, Japan. -I. Comparison of rice straw and rice straw compost -. *Soil Science and Plant Nutrition*, *66*(1), 84–95. https://doi.org/10.1080/00380768.2019.1609335

Taolin, R. I. C. O., Impron, I., Hidayati, R., & Budianto, B. (2017). Profil cuaca dan parameter nisbah Bowen di areal persawahan Kabupaten Indramayu saat periode kering musim tanam II. *Savana Cendana*, *2*(01), 15–18. https://doi.org/10.32938/sc.v2i01.80

Thamrin, M., Suprihanto, Hasmi, I., Ardhiyanti, S. D., Suhartini, Nugroho, N., Wening, R. H., Pramudyawardani, E. F., Nafisah, Usyati, N., Hikmah, Z. M., Handoko, D. D., & Norvyani, M. (2023). *Deskripsi varietas unggul*.

Thi Nhung, T., Le Vo, P., Van Nghi, V., & Quoc Bang, H. (2019). Salt intrusion adaptation measures for sustainable agricultural development under climate change effects: A case of Ca Mau Peninsula, Vietnam. *Climate Risk Management*, *23*, 88–100. https://doi.org/10.1016/j.crm.2018.12.002

Trihatmoko, E., Wiguna, Husein, S., Sanjoto, B. T., Juhadi, Hariyadi, Widada, S., Josanova, David, M., Mukhlas, A. B., & Taqy, M. (2020). Penelitian pendahuluan (preliminary research) intrusi air laut di Desa Sriwulan, Demak, Indonesia. *Indonesian Journal of Oceanography*, *02*(04).

Trinugroho, M. W., Bhatta, B., & Babur, M. (2020). The seawater intrusion under dam failure in the Cimanuk River Estuary, Indonesia. *Regional Studies in Marine Science*, *36*(March), 101267. https://doi.org/10.1016/j.rsma.2020.101267

Tully, K., Gedan, K., Epanchin-Niell, R., Strong, A., Bernhardt, E. S., Bendor, T., Mitchell, M., Kominoski, J., Jordan, T. E., Neubauer, S. C., & Weston, N. B. (2019). The invisible flood: the chemistry, ecology, and social implications of coastal saltwater intrusion. *BioScience*, *69*(5), 368–378. https://doi.org/10.1093/biosci/biz027

Vázquez-Glaría, A., Eichler-Löbermann, B., Loiret, F. G., Ortega, E., & Kavka, M. (2021). Root-system architectures of two cuban rice cultivars with salt stress at early development stages. *Plants*, *10*(6), 1–19. https://doi.org/10.3390/plants10061194

Wakeel, A. (2013). Potassium-sodium interactions in soil and plant under saline-sodic conditions. *Journal of Plant Nutrition and Soil Science*, *176*(3), 344–354. https://doi.org/10.1002/jpln.201200417

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Wang, D., Gao, Y., Sun, S., Lu, X., Li, Q., Li, L., Wang, K., & Liu, J. (2022). Effects of salt stress on the antioxidant activity and malondialdehyde, solution protein, proline, and chlorophyll contents of three Malus species. *Life*, *12*(11). https://doi.org/10.3390/life12111929

Wang, H., Zheng, C., Ning, S., Cao, C., Li, K., Dang, H., Wu, Y., & Zhang, J. (2023). Impacts of long-term saline water irrigation on soil properties and crop yields under maize-wheat crop rotation. *Agricultural Water Management*, *286*(May), 108383. https://doi.org/10.1016/j.agwat.2023.108383

Wang, S., Luo, S., Zhou, X., Chang, C., Tian, L., Li, X., Yu, H., Gao, Q., & Tian, C. (2019). Soil ameliorants alter physicochemical properties and fungal communities in saline-sodic soils of Northeast China. *Archives of Agronomy and Soil Science*, *65*(8), 1147–1159. https://doi.org/10.1080/03650340.2018.1555707

Wang, X., Ding, J., Han, L., Tan, J., Ge, X., & Nan, Q. (2024). Biochar addition reduces salinity in salt-affected soils with no impact on soil pH: A meta-analysis. *Geoderma*, *443*(May 2023), 116845. https://doi.org/10.1016/j.geoderma.2024.116845

Wati, H. S., Rayhana, E., & Pratikno, B. (2020). Studi intrusi air laut di Tegal - Jawa Tengah menggunakan isotop stabil Oksigen-18 (18 O) dan Deuterium (2 H). *Jurnal Ilmiah Aplikasi Isotop Dan Radiasi*, *16*(1), 23–30.

White, E., & Kaplan, D. (2017). Restore or retreat? saltwater intrusion and water management in coastal wetlands. *Ecosystem Health and Sustainability*, *3*(1), 1–18. https://doi.org/10.1002/ehs2.1258

Wijitkosum, S. (2020). Applying Rice Husk Biochar to Revitalise Saline Sodic Soil in Khorat Plateau Area-A Case Study for Food Security Purposes. In *Biochar Applications in Agriculture and Environment Management* (Issue April, pp. 1–272). https://doi.org/10.1007/978-3-030-40997-5

Win, E. P., Win, K. K., Bellingrath-Kimura, S. D., & Oo, A. Z. (2021). Influence of rice varieties, organic manure and water management on greenhouse gas emissions from paddy rice soils. *PLoS ONE*, *16*(6 June), 1–22. https://doi.org/10.1371/journal.pone.0253755

Wu, S., He, H., Inthapanya, X., Yang, C., Lu, L., Zeng, G., & Han, Z. (2017). Role of biochar on composting of organic wastes and remediation of contaminated soils—a review. *Environmental Science and Pollution Research*, *24*(20), 16560–16577. https://doi.org/10.1007/s11356-017-9168-1

Xu, Y., Bu, W., Xu, Y., Fei, H., Zhu, Y., Ahmad, I., Nimir, N. E. A., Zhou, G., & Zhu, G. (2024). Effects of salt stress on physiological and agronomic traits of rice genotypes with contrasting salt tolerance. *Plants*, *13*(8). https://doi.org/10.3390/plants13081157

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Universitas Gadjah Mada, 2025 | Diunduh dari http://etd.repository.ugm.ac.id/

Yahya, K. E., Jia, Z., Luo, W., YuanChun, H., & Ame, M. A. (2022). Enhancing salt leaching efficiency of saline-sodic coastal soil by rice straw and gypsum amendments in Jiangsu coastal area. *Ain Shams Engineering Journal*, *13*(5), 101721. https://doi.org/10.1016/j.asej.2022.101721

Yin, D., Li, H., Wang, H., Guo, X., Wang, Z., Lv, Y., Ding, G., Jin, L., & Lan, Y. (2021). Impact of different biochars on microbial community structure in the rhizospheric soil of rice grown in albic soil. *Molecules*, *26*(16). https://doi.org/10.3390/molecules26164783

Yuan, Y., Liu, Q., Zheng, H., Li, M., Liu, Y., Wang, X., Peng, Y., Luo, X., Li, F., Li, X., & Xing, B. (2023). Biochar as a sustainable tool for improving the health of salt-affected soils. *Soil and Environmental Health*, *1*(3), 100033. https://doi.org/10.1016/j.seh.2023.100033

Zayed, B. ., Saleem, A. E. azeem K., & Ali, O. A. . (2014). Physiological characteristic of Egyptian salt tolerant rice varieties under different salinity levels. *Life Science Journal*, *1*(11(10)), 1364–1372. https://doi.org/10.7537/marslsj111014.199.Key

Zhang, J., Bai, Z., Huang, J., Hussain, S., Zhao, F., Zhu, C., Zhu, L., Cao, X., & Jin, Q. (2019). Biochar alleviated the salt stress of induced saline paddy soil and improved the biochemical characteristics of rice seedlings differing in salt tolerance. *Soil and Tillage Research*, *195*(March), 104372. https://doi.org/10.1016/j.still.2019.104372

Zhang, J., & Shen, J. L. (2022). Effects of biochar on soil microbial diversity and community structure in clay soil. *Annals of Microbiology*, *72*(1), 1–14. https://doi.org/10.1186/s13213-022-01689-1

Zhang, R., Wang, Y., Hussain, S., Yang, S., Li, R., Liu, S., Chen, Y., Wei, H., Dai, Q., & Hou, H. (2022). Study on the effect of salt stress on yield and grain quality among different rice varieties. *Frontiers in Plant Science*, *13*(May), 1–14. https://doi.org/10.3389/fpls.2022.918460

Zhang, X., Zuo, Y., Wang, T., & Han, Q. (2024). *Salinity effects on soil structure and hydraulic properties : implications for pedotransfer functions in coastal areas*.

Zhang, Y., Fang, J., Wu, X., & Dong, L. (2018). Na + /K + balance and transport regulatory mechanisms in weedy and cultivated rice (Oryza sativa L.) under salt stress. *BMC Plant Biology*, *18*(1), 1–14. https://doi.org/10.1186/s12870-018-1586-9

Zhang, Y., Wang, W., Yuan, W., Zhang, R., & Xi, X. (2021). Cattle manure application and combined straw mulching enhance maize (Zea mays l.) growth and water use for rain-fed cropping system of coastal saline soils. *Agriculture (Switzerland)*, *11*(8). https://doi.org/10.3390/agriculture11080745

Zhao, D., Gao, S., Zhang, X., Zhang, Z., Zheng, H., Rong, K., Zhao, W., & Khan, S. A. (2021).

UNIVERSITAS
GADJAH MADA
Status salinitas, varietas padi (Oryza Sativa L.) dan macam pembenah tanah untuk lahan sawah terdampak intrusi air laut di pantai utara Demak
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Impact of saline stress on the uptake of various macro and micronutrients and their associations with plant biomass and root traits in wheat. *Plant, Soil and Environment*, *67*(2), 61–70. https://doi.org/10.17221/467/2020-PSE

Zheng, H., Fu, Z., Zhong, J., & Long, W. (2018). Low methane emission in rice cultivars with high radial oxygen loss. *Plant and Soil*, *431*(1–2), 119–128. https://doi.org/10.1007/s11104-018-3747-x

Zheng, H., Wang, X., Chen, L., Wang, Z., Xia, Y., Zhang, Y., Wang, H., Luo, X., & Xing, B. (2018). Enhanced growth of halophyte plants in biochar-amended coastal soil: roles of nutrient availability and rhizosphere microbial modulation. *Plant Cell and Environment*, *41*(3), 517–532. https://doi.org/10.1111/pce.12944

Zhu, H., Yang, J., Yao, R., Wang, X., Xie, W., Zhu, W., Liu, X., Cao, Y., & Tao, J. (2020). Interactive effects of soil amendments (biochar and gypsum) and salinity on ammonia volatilization in coastal saline soil. *Catena*, *190*(71), 104527. https://doi.org/10.1016/j.catena.2020.104527