

Muhamad Syaifudin

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Muhamad Syaifudin is a postdoctoral fellow at the College of Science, Shantou University (China). Interdisciplinary Environmental Scientist with a foundational background in **Plant Nutrition** and Soil Systems applied to modern ecological challenges. Expertise focuses primarily on Marine Environmental Ecology, investigating the impacts of elemental stressors (e.g., heavy metals, altered nutrients) on **macroalgae (seaweed) ecosystems**. Specialized in elucidating physiological function and underlying molecular mechanisms (including Transcriptome Analysis) that govern **stress response** and **element accumulation**. Proven capability to conduct advanced elemental analysis and bridge research across terrestrial (**soil-plant nutrient dynamics**, soil amendments) and aquatic environments. Seeking roles that leverage interdisciplinary expertise in elemental analysis, 'omics' techniques, and the development of sustainable solutions in both **plant-soil and marine environments**.

EDUCATION HISTORY

2021 – 2024 **Ph.D. in Plant Nutrition,**

Graduate School of Agriculture, Hokkaido University, Japan (*Funded by Japanese Government*)

Advisor: Dr. Takuro Shinano

Thesis: Strontium behavior from soil to plants.

Radio-caesium (RCs) and radio-strontium (RSr) with relatively long half-lives raise concerns about enduring environmental and human effects post-nuclear accidents. Past countermeasures were mainly carried out by expanding conventional agricultural practice for major contaminants, like potassium (K) for RCs and calcium (Ca) for RSr, respectively, which are known to be effective. However, there is a lack of information regarding how that countermeasure impacts the other elements, which may also have undesirable impacts. This study found that increased K application as a countermeasure against RCs did not affect Sr absorption in soybeans but did decrease the translocation of RCs to the seeds and reduce Sr absorption in Komatsuna. In soybeans, the reduction of Sr uptake by increased Ca application and no effect on Cs uptake was observed. I concluded that applying counter-cation for RCs can also alleviate Sr uptake and/or distribution and vice versa.

2017 – 2020 **M.Sc. in Plant Nutrition,** College of Resources and Environment, Huazhong Agricultural

University, China (*Funded by Huazhong Agricultural University Scholarships*)

Advisor: Dr. Sun Xuecheng

Thesis: Effect of nano-molybdenum on growth, yield and pollen development of wheat and oilseed rape.

Rapid developments in nanotechnology for agriculture focus on nano-fertilizers, enhancing controlled nutrient delivery for improved crop yield. However, their controlled release of nano-fertilizers for reducing the risk of nutrient leaching and helping avoid nutrient wastage could adversely affect potential environmental impacts such as soil, water systems, and non-target organisms. Moreover, molybdenum (Mo) is essential for proper nitrogen metabolism for plants. This study evaluates the efficiency of nano-Molybdenum (nano-Mo) applied foliar to winter wheat and oilseed rape. I found that nano-Mo improved Mo accumulation in grain and enhanced various growth-related parameters, such as chlorophyll content and gas exchange stomatal conductance, dry weight, and grain yield of winter wheat. Nano-Mo fertilizers can effectively replace non-nano-Mo fertilizers for winter wheat and oilseed rape, without adversely affecting growth and yield in acidic soils.

2010 – 2017 **B.Agr. in Agronomy,** Faculty of Agriculture, Brawijaya University, Indonesia

Advisor: Dr. Agung Nugroho

Thesis: Growth response and yield of soybean on various nitrogen and phosphorus fertilizer combination.

To minimize the excessive use of chemical fertilizers in Indonesia, this study aims to find the right combination of nitrogen (N) and phosphorus (P) fertilizers for soybean cultivation. We cultivated local varieties of soybeans with various combinations of N and P fertilizers in the field experiments. We found that the combination of high N fertilizer and without P fertilizer improved the physiology of soybean plants. However, the combination of half N fertilizer with regular P fertilizer increased yield components such as the number of filled pods, filled pod weight, number of seeds, seed weight, yield tons per hectare, and harvest index.

SCHOLARSHIPS AND AWARDS

- eLife Community Ambassadors 2025/26 cohort (2025)

- MEXT Scholarships – Japanese Government Scholarships, Hokkaido University, Japan (2021 – 2024)
- Recreational and Sports Activities Activist Award, HZAU - China (2019)
- HZAU Full Scholarships – Chinese Government Scholarships (2017 – 2020)
- Top 35 Best Essay – Indonesian Society of Scientists and Technologists Student Cluster (2016)
- 8th Place of National Essay Competition, Gadjah Mada University, Indonesia (2016)
- BNI Scholarships, Brawijaya University, Indonesia (2012)
- BBM Scholarships, Brawijaya University, Indonesia (2011)
- Favorite Winner of Photography Competition Eco Defense with Economics, Brawijaya University, Indonesia (2011)

RESEARCH PUBLICATIONS

As corresponding author:

- Chen, J., **Syaifudin, M.**, Zhong, C., Li, T., Du, H. (2026). The combined effects of marine heatwaves and heavy metals on metal accumulation in macroalgae. *Mar. Environ. Res.* 213, 107681. <https://doi.org/10.1016/j.marenvres.2025.107681>

As first author:

- **Syaifudin, M.**, Xu, J., Fan, W., Moussa, M. G., Zhong, C., Li, T., Du, H. (2026). Future directions of seaweed-based bioeffectors and biofertilizer. *Journal of Soil Science and Plant Nutrition*. <https://doi.org/10.1007/s42729-025-02977-w>
- **Syaifudin, M.**, Moussa, M. G., Du, H., Li, T. (2025). The impact of salinity on heavy metal accumulation in seaweed. *Marine Pollution Bulletin*. 214, 117819. <https://doi.org/10.1016/j.marpolbul.2025.117819>
- **Syaifudin, M.**, Moussa, M.G., Shoaib, M., Bhandana, P., Wang, Y., Hu, C., Sun, X., 2025. Comparative effects of nano and conventional molybdenum fertilizers on oilseed rape growth and yield under acidic soil conditions. *Biocatal. Agric. Biotechnol.* 70, 103857. <https://doi.org/10.1016/j.bcab.2025.103857>
- **Syaifudin, M.**, Moussa, M.G., Wang, Y., Rana, M.S., Wei, W., Hu, C., Sun, X. (2024). Effects of nano-molybdenum fertilizers on mo-inefficient winter wheat grown in acidic soil. *J. Plant Nutr.* 47, 762–775. <https://doi.org/10.1080/01904167.2023.2280146>
- **Syaifudin, M.**, Suzuki, M., Maruyama, H., Kubo, K., Watanabe, T., & Shinano, T. (2023). Potassium applications reduced cesium uptake and altered strontium translocation in soybean plants. *Soil Science and Plant Nutrition*, 1–11. <https://doi.org/10.1080/00380768.2023.2166776>

As co-author:

- Wu, Y., Wu, Q., Luo, Yi., Syaifudin, M., Tang, X., Li, T., Chen, J., Du, H. (2025). Regulation of Vegetative Propagation by Exogenous α -NAA and GA1 Signaling in *Sargassum hemiphyllum* var. chinense. *Algal Res.* 104497. <https://doi.org/10.1016/j.algal.2025.104497>
- Li, K., Lin, W., Zhou, J., Liu, C., **Syaifudin, M.**, Huang, J., Pei, P., Du, H., Li, T., 2025. Complete genome sequencing of 18 urea-utilizing *Vibrio* strains isolated from coral. *Sci. Data.* 12, 1–10. <https://doi.org/10.1038/s41597-025-06001-9>
- Chen, Y., Pei, P., Aslam, M., **Syaifudin, M.**, Bi, R., Li, P., Du, H. (2025). Microorganisms in Macroalgae Cultivation Ecosystems: A Systematic Review and Future Prospects Based on Bibliometric Analysis. *Microorganisms* 13. <https://doi.org/10.3390/microorganisms13051110>
- Fan, W., Yang, C., Song, D., Ye, P., Liang, H., Huang, C., **Syaifudin, M.**, Zhong, C., Li, T., Du, H. (2025). Remarkable metabolic reconfiguration due to three classical nitrogen sources in *Gracilariopsis lemaneiformis* (Rhodophyta). *Algal Res.* 89, 104069. <https://doi.org/10.1016/j.algal.2025.104069>
- Suzuki, M., Eguchi, T., Azuma, K., Nakao, A., Kubo, K., Fujimura, S., **Syaifudin, M.**, Maruyama, H., Watanabe, T., & Shinano, T. (2023). The ratio of plant ¹³⁷Cs to exchangeable ¹³⁷Cs in soil is a crucial factor in explaining the variation in ¹³⁷Cs transferability from soil to plant. *Science of The Total Environment*, 159208. <https://doi.org/10.1016/j.scitotenv.2022.159208>
- Moussa, M. G., Hu, C., Elyamine, A. M., Ismael, M. A., Rana, M. S., Imran, M., **Syaifudin, M.**, Tan, Q., Marty, C., & Sun, X. (2021). Molybdenum-induced effects on nitrogen uptake efficiency and recovery in wheat (*Triticum aestivum* L.) using ¹⁵N-labeled nitrogen with different N forms and rates. *Journal of Plant Nutrition and Soil Science*, August, 1–9. <https://doi.org/10.1002/jpln.202100040>
- Moussa, M. G., Sun, X., Ismael, M. A., Elyamine, A. M., Shoaib Rana, M., **Syaifudin, M.**, & Hu, C. X. (2021). Molybdenum - Induced Effects on Grain Yield, Macro - micro - nutrient Uptake, and Allocation in Mo - Inefficient Winter Wheat. *Journal of Plant Growth Regulation*, 0123456789. <https://doi.org/10.1007/s00344-021-10397-0>

- Bhantana, P., Rana, M. S., Sun, X., Moussa, M. G., Saleem, M. H., **Syaifudin, M.**, Shah, A., Poudel, A., Pun, A. B., Bhat, M. A., Mandal, D. L., Shah, S., Zhihao, D., Tan, Q., & Hu, C.-X. (2021). Arbuscular mycorrhizal fungi and its major role in plant growth, zinc nutrition, phosphorous regulation, and phytoremediation. *Symbiosis*. <https://doi.org/10.1007/s13199-021-00756-6>
- Rana, M. S., Hu, C. X., Shaaban, M., Imran, M., Afzal, J., Moussa, M. G., Elyamine, A. M., Bhantana, P., Saleem, M. H., **Syaifudin, M.**, Kamran, M., Shah, M. A., & Sun, X. (2020). Soil phosphorus transformation characteristics in response to molybdenum supply in leguminous crops. *Journal of Environmental Management*, 268, 110610. <https://doi.org/10.1016/j.jenvman.2020.110610>
- Rana, M. S., Sun, X., Imran, M., Khan, Z., Moussa, M. G., Abbas, M., Bhantana, P., **Syaifudin, M.**, Din, I. U., Younas, M., Shah, M. A., Afzal, J., & Hu, C. (2020). Mo-Inefficient Wheat Response Toward Molybdenum Supply in Terms of Soil Phosphorus Availability. *Journal of Soil Science and Plant Nutrition*. <https://doi.org/10.1007/s42729-020-00298-8>

ORAL PRESENTATIONS

- **Syaifudin, M.** (2025). Physiological and Biochemical Collapse of *Gracilaria lemaneiformis* under Cesium Stress. The First Symposium on Autotrophic Microorganisms of the Chinese Society for Microbiology, held at Hainan University, Haikou, China, Nov 29 – Dec 1, 2025.
- **Syaifudin, M.** (2025). Environmental Influences on Heavy Metal Accumulation in Macroalgae: A Bibliometric Review of Recent Trends and Research Gaps. The 1st International Online Conference on Marine Science and Engineering: Current State and Future Trends. Online, 24-26 November 2025. <https://sciforum.net/paper/view/27213>
- **Syaifudin, M.** (2025). Effect of environmental factors on heavy metal accumulation in seaweed: bibliometric analysis of 20 years of research publications. 17. International Conference on Agriculture, Animal Science & Rural Development (ISPEC), April 25-27, 2025. Kırşehir Ahi Evran University, Türkiye.
- **Syaifudin, M.** (2024). Impact of potassium application on cesium and strontium transport from soil to plants. The 1st Youth Ecology Forum, April 12-15, 2024. Shenyang Institute of Applied Ecology and The Chinese Academy of Ecology.

POSTER PRESENTATIONS

- **Syaifudin, M.**, Suzuki, M., Maruyama, H., Kubo, K., Watanabe, T., & Shinano, T. (2022). A study on potassium application's effect on cesium and strontium uptake in soybean. Japanese Society of Soil Science and Plant Nutrition Conference 2022 in Tokyo University of Agriculture, Tokyo, Japan. https://doi.org/10.20710/dohikouen.68.0_111_3

SUPERVISION EXPERIENCE

- 2024 – 2027 C.J.H., Master student, Shantou University

PROFESSIONAL MEMBERSHIP

- Scholars of Indonesia-China Networks – SINO (2025 – Present)
- Young and Early Career Scientists Working Group by International Union of Soil Sciences (2022 – Present)
- Plant Health Student Network (2022 – Present)
- Japanese Society of Soil Science and Plant Nutrition (2022 – 2024)
- International Indonesian Scholars Association I-4 (2020 – Present)

SKILLS

- Language: **English** – Full professional proficiency, Bahasa and Javanese – Native or bilingual proficiency
- Software: SPSS, Origin Pro, VOSviewer, R Studio, Microsoft office, Procreate, Adobe Photoshop, Adobe Audition, and Adobe Lightroom.

PERSONAL INTERESTS

In my spare time, I like to spend time with my family and visit friends. Additionally, I enjoy travelling, hiking, bouldering, singing, outdoor activities, and being involved in youth movements.

REFEREES

Full academic and professional references supplied on request.