

Muhamad Syaifudin

HOKKAIDO UNIVERSITY • LAB OF PLANT NUTRITION • GRADUATE SCHOOL OF AGRICULTURE

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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-cesium (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

- 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

- **Syaifudin, M.**, Moussa, M. G., Bhantana, P., Rana, M. S., Wang, Y., Hu, C., & Sun., X. (2024). Molybdenum nanoparticles enhance molybdenum accumulation, growth, and yield of oilseed rape (*Brassica napus* L.). *Journal of Plant Growth Regulation*. (Submitted/Major Revision).
- **Syaifudin, M.**, Suzuki, M., Maruyama, H., Watanabe, T., & Shinano, T. (2024). Effect of potassium fertilizer on cesium and strontium transport from soil to komatsuna plants grown in two different soil types. (In preparation).
- **Syaifudin, M.**, Maruyama, H., Watanabe, T., & Shinano, T. (2024). Co-application of potassium and calcium effect on cesium and strontium transport from soil to soybean plants. (In preparation).
- **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. *Journal of Plant Nutrition*. <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>
- 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>

ABSTRACTS IN CONFERENCE PROCEEDINGS

- **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*. https://doi.org/10.20710/dohikouen.68.0_111_3

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*.

RESEARCH AND INDUSTRIAL EXPERIENCES

- **Lab of Plant Nutrition, Hokkaido University, Japan** **2021-2024**
 - Determine elemental analysis (exchangeable, non-exchangeable, and water-soluble) and evaluate using inductively coupled plasma mass spectroscopy (ICP-MS).
 - Nitrogen analysis using the Kjeldahl method.
 - Inorganic N analysis (ammonium and nitrate in the soil) using a microplate spectrophotometer.

- Measure soil pH with a pH meter, EC using an electrical conductivity meter, humus content using a microplate spectrophotometer, and growth performance (SPAD).
- Measure particle size distribution (sand, silt, and clay) with pipette method.
- **Microelement Research Center, Huazhong Agricultural University, China** **2017-2020**
 - Analyze plant growth with approaches ranging from determining photosynthesis using a portable photosynthesis analysis system (CIRAS-3), determining chlorophyll and carotenoid content with a fluorescence intensity system (Infinite M200 PRO), and calculating dry weight biomass.
 - Elemental analysis using inductively coupled plasma mass spectroscopy (ICP-MS).
 - Analyze Pollen structures using the H&E (hematoxylin and eosin) staining method and protocol was carried out with Mayer's hematoxylin-eosin method and analysis under a light microscope (BX51; Olympus, Tokyo, Japan).
 - Analyze the morphology of pollen grains measured using a scanning electron microscope (JEOL JSM-6390 / LV SEM - JEOL - Japan) at 20 kV.
 - Calculates viability of pollen grains measured using I2/KI solution.
- **Radio Tidar Sakti FM, Batu, East Java, Indonesia** **2014-2017**
 - A radio announcer and a program producer.
 - Be responsible for the youth program and run the program properly and correctly.
 - Responsible for the creative division.
 - Responsible for producing a program's jingles, smashes, advertisements, and audio back sounds.
 - Production (Adobe Photoshop, adobe audition, and Jazler radio automation).
- **Kebon Agung Sugar Factory, Malang, Indonesia (Internship)** **2013**
 - Work under the plantation division. Learn and understand the process of cultivating sugarcane from land preparation to harvesting. Also learn about the use of waste from sugar factories as organic fertilizer for sugarcane cultivation.
- **Lab of Environmental Resources, Brawijaya University, Indonesia** **2013**
 - Guiding 80 students in lectures on plant production technology. Be a mentor for students in cultivating soybeans and maize. Ensure that the practicum runs correctly.

PROFESSIONAL MEMBERSHIP

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

LEADERSHIP/TEAMWORK EXPERIENCES

- 2023-2024, Public Relations Officer, Hokkaido University International Students Association, Japan
- 2021 – 2022, Chief Executive of Overseas Indonesian Students Association Alliance in Japan, Hokkaido Region
- 2020 – Present, Huazhong Agricultural University Alumni Liaison, Indonesia Coordinator.
- 2020 – Present, Founder of Tunas Bertumbuh
- 2018 – 2019, Committee of Culture Exchange Department, Volunteer Center of the International College (VCIC), Huazhong Agricultural University, Wuhan, China.
- 2018 – 2019, Head of Scholarship Data Collection, Festival Luar Negeri, Overseas Indonesian Students Association Alliance / PPI Dunia.

SKILLS

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