

Jiaxu Wu

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Summary

How to enhance crop yield in the face of climate change and a growing population is an important topic in plant science. I am a doctoral student that conduct graduate research in plant disease resistance - focusing on understanding the clubroot resistance in canola through a multidisciplinary approach that encompasses genetics, biochemistry, and bioinformatics. Our primary objective is to assist the Canadian canola industry in effectively managing clubroot disease while maintaining sustainability. In the post-genomic era, I want to learn more about the advanced biological tools, such as NGS and CRISPR-Cas editing technology to understand plant response and regulate mechanisms under disease stresses.

I am a highly enthusiastic, self-motivated, and cooperative team player with a strong focus on research, excellent written and oral communication, computer skills, and ability to work under tight deadlines. Being nice with all the surrounding people at every step of my life.

Education

PhD student

2022-present

Plant Biology,

Faculté des Sciences de L'agriculture et de L'alimentation, Université Laval, QC, Canada

Research topic: Understanding the clubroot resistance mechanisms in Canola (*Brassica napus* L.)

Master of Science (MSc Thesis-based)

2019-2022

Boreal Ecosystem and Agricultural Sciences (BEAS)

School of Science of the Environment, Memorial University of Newfoundland, NL, Canada

GPA: 4.0/4.0

Courses: Graduate Research Seminar, Advanced Quantitative Research Methods for the Natural Sciences, Management of Crop Nutrition, Issues in Boreal Ecosystems and Agricultural Sciences

Research thesis: "Evaluating role of phosphatidic acid in cold stress tolerance in silage-corn."

Funding: SGS Scholarship and Research Grant, Memorial University, St. John's, NL, Canada

Bachelor of Science (BSc)

2014-2018

Horticulture

Henan University of Science and Technology, Luoyang, Henan, China

GPA: 4.1/5.0

Courses: Plant Physiology, Genetics, Agricultural Meteorology, Fertilizer Science, Horticultural Plant Cultivation, Horticultural Plants Breeding, Biochemistry, and Biotechnology, etc.

Research topic: "Effects of Interaction between Arbuscular Mycorrhizal and Phoxim on Growth of Chinese Chive (*Allium tuberosum* Rottl. ex Spreng.)"

Publications

- Nadeem, M*, Thomas, R*, Adigun, O., Manful, C., **Wu, J.**, Pham, T.H., Zhu, X., Galagedara, L. and Cheema, M* (2020), Root membrane lipids as potential biomarkers to discriminate silage-corn genotypes cultivated on podzolic soils in boreal climate. *Physiol Plant*. <https://doi.org/10.1111/ppl.13181>
- **Wu, J***, Nadeem, M., Galagedara, L., Thomas, R., & Cheema, M. (2022). Recent insights into cell responses to cold stress in plants: Signaling, defence, and potential functions of phosphatidic acid. *Environ. Exp. Bot.* 105068. <https://doi.org/10.1016/j.envexpbot.2022.105068>
- **Wu, J***, Nadeem, M., Galagedara, L., Thomas, R., and Cheema, M. (2022). Effects of Chilling Stress on Morphological, Physiological, and Biochemical Attributes of Silage Corn Genotypes during Seedling Establishment. *Plants*, **11(9)**, 1217. <https://doi.org/10.3390/plants11091217>
- Nadeem, M*, **Wu, J.**, Ghaffari H., Kadir, A J., Saleem, S., Mollier, A., Singh, J. and Cheema, M* (2022), Understanding the adaptive mechanisms of plants to enhance phosphorus use efficiency on podzolic soils in boreal agroecosystem. *Front. Plant Sci.*, <https://doi.org/10.3389/fpls.2022.804058>
- Javed, M.A., Schwelm, A., Zamani-Noor, N., Salih, R., Silvestre Vañó, M., **Wu, J.** et al. (2023) The clubroot pathogen *Plasmodiophora brassicae*: A profile update. *Mol. Plant Pathol.*, 24, 89– 106. <https://doi.org/10.1111/mpp.13283>
- **Wu, J.**, Pérez-López, E* (2023). A multilayer strategy is needed to uncover the clubroot pathogen mysteries. *Physiol. Mol. Plant Pathol.*, 101971. <https://doi.org/10.1016/j.pmpp.2023.101971>
- **Wu, J***, Nadeem, M., Galagedara, L., Thomas, R and Cheema, M*. Lipidomics remodelling: a strategy to enhance cold stress tolerance in silage corn. (Submitted, under review)

Posters & Presentations

- **Jiaxu Wu**. Low temperature stress tolerance in silage-corn: role of phosphatidic acid. *Agriculture and Agri-Food (AAFC) - Grenfell Graduate Student Session 2: Plant Growth and Health*, Memorial University of Newfoundland, NL, April 27th, 2021.
- **Jiaxu Wu**, Muhammad Nadeem, Dmitry Sveshnikov, Raymond Thomas, Lakshman Galagedara, Mumtaz Cheema. Effects of low temperature stress on physiological and biochemical processes of silage-corn genotypes. *Tri-Society Virtual Conference (CPS, CSA and CSHS)*, July 8th, 2021. (Winner of the 2nd position in the poster competition) <https://doi.org/10.1080/07060661.2021.2009254>
- **Jiaxu Wu**. Understanding the molecular basis of NLR-mediated clubroot resistance in *Brassica napus*. *3MT, Faculty of Agriculture and Food Sciences*, Université Laval, QC, March 15th, 2023. (Winner of the 1st position in the presentation competition)
- **Jiaxu Wu**, Soham Mukhopadhyay, Edel Pérez-López, Unveiling the clubroot-resistant canola (*Brassica napus* L.) NL Rome. *2023 CSPB Annual General Meeting*, QC, June 18th, 2023.
- **Jiaxu Wu**, Unveiling the clubroot-resistant canola (*Brassica napus* L.) NL Rome. *2023 IBIS Student Day*. Université Laval, QC, August 25th, 2023.

Research Experiences & Training

- **Biological Characterization and Toxicity Assay of *Fusarium Oxysporum* of *Albizia julibrissin***
04/2016-05/2017 | Volunteer
In this study, we surveyed and collected related plant materials and extracted wilt samples in Luoyang, China. Then, we isolated and purified pathogenic fungus in medium and conducted morphological and molecular identification to verify *Fusarium Oxysporum*. We also analyzed the control pharmacology of *Fusarium*.
- **Project on Degradation of Vegetable Pesticide via Arbuscular Mycorrhizal Fungi Application**

12/2015-08/2016 | Research Assistant

After the inoculation with arbuscular mycorrhizal fungi, the expression level of the genes involved in pesticide degradation (e.g., *P450* and *GST*) and related enzyme activity all improved. It revealed that the synthetic protease under these genes' "guidance" can transfer pesticide into water soluble substances and lower toxicity of pesticides, and some of which can be excreted from the body.

- **miRNA Analysis Related to the Resistance against *Fusarium oxysporum* Induced by *Trichoderma* in Cucumber**

12/2015-08/2016 | Volunteer

We constructed the small RNA library of cucumber and used Illumina sequencing to analyze the small RNA library. A total of 92 known miRNAs were screened and 63 new miRNAs were predicted.

- **Analysis on the Effect of *Trichoderma* Against *Fusarium* Wilt in Cucumber**

12/2017-06/2018 | Volunteer

In this study, cucumbers inoculated with *Trichoderma* significantly increased the plant height, fresh weight, dry weight, root to shoot ratio, dry/fresh weight, and water content compared with the non-inoculated treatment. Moreover, pre-inoculated treatment significantly increased the contents of AsA, AsA/DHA, GSH and the activities of GaLLDH, γ -GCS and GSNOR while H_2O_2 , O_2^- , MDA, NO, SNOs and GSNO accumulations were significantly decreased in the roots.

- **Construction of Recombinant Gene Viral Vector pTRV2-*Fom-2***

07/2018-10/2018 | Research Assistant

In this study, specific primers were designed based on the published *Fom-2* gene in cucumber (GenBank accession number: AY619647.1) and the amplified fragment was 245 bp in length. VIGS technology was applied in this experiment. pMD18-T was used as the vector to construct the recombinant gene viral vector pTRV2-*Fom-2* in order to quickly identify the function of *Fom-2* gene in cucumber.

Skills

- **Computational skills**

Microsoft Office

Shell

Python

Data Analysis Softwares: "R", GraphPad-Prism, SPSS, Minitab, Sigma Plot.

- **Bioinformatic skills**

Genome sequencing analysis: Sanger, Illumina and Oxford Nanopore

Transcriptome analysis

Gene family identification and alignment

Genome assembly

- **Gathered experience in plant genetics, including molecular cloning, plant transformation for RNAi and overexpression, chemical analysis (HPLC), tissue culture, qRT-PCR, western blot etc.**

Awards

March 2023

Université Laval

First Prize of English Section, *3MT*, Faculty of Agriculture and Food Sciences,
250 CAD

October 2022

Fellow of the School of Graduate Studies 2022-2023, Memorial University of

Newfoundland

<https://www.mun.ca/sgs/media/production/memorial/academic/school-of-graduate-studies/school-of-graduate-studies/media-library/Fellows%202022-2023%20Website%20v2.pdf>

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| July 2021 | Second Prize of Poster Award, <i>2021 Tri-Society Virtual Conference</i> | 100 CAD |
| November 2016 | <i>State Study Grant of China</i> , Government of China | 3,000 CNY |
| November 2014 and Technology | First Prize, <i>College Student English Speaking Contest</i> , Henan University of Science | |
| October 2014 | <i>University Freshman Scholarships</i> , Henan University of Science and Technology | 1,000 CNY |

Other Information

• Extracurricular Activities

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| January 2023-Now | Member, Canadian Society of Plant Biologists |
| May 2023-Now | Member, Canadian Phytopathological Society |
| May 2019-May 2022 | Member, Canadian Society of Agronomy |
| October 2014-October 2016 | Vice Chair, Recreation Department, Student Union, Henan University of Science of Technology |
| May 2017-November 2017 | Volunteer, HAUST Library |

• Internship and Work Experiences

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| March 2017-July 2017 | Intern, Floriculture, Sui Tang City Botanical Garden, China |
| September 2017-December 2017 | Intern, Luoyang Sixin Vegetable Cultivation, China |
| July 2018-November 2018 | Research Assistant, the Laboratory of Vegetable Stress Tolerance, Henan University of Science and Technology, China |
| January 2019-January 2021 | Research Assistant, Boreal Ecosystem Research Initiative Lab (BERI), Memorial University of Newfoundland, Canada |
| September 2021-December 2021 | Research Assistant, Biology Department, Plaxton lab, Queen's University, Canada. |

Declaration, the above information is given from best of my knowledge and all are correct.