Sabin Khanal

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ACADEMIC QUALIFICATION

Doctor of Philosophy (Plant Pathology and Microbiology): In-progess (GPA 4.0) Texas A&M University, College Station, TX, USA
Chair: Dr. Xin-Gen Zhou; Co-Chair: Sanjay Antony-Babu
Dissertation title: "*Genetic Diversity, Fungicide Sensitivity, and Cultivar Resistance of Rice Kernel Smut, and The Potential Role of Rice Seed Endophytes Against Kernel Smut and Other Pathogens*"

Master of Science (Crop Science): (GPA 3.95)
University of Illinois at Urbana-Champaign (UIUC), Illinois, USA
Major Advisor: Dr. Mohammad Babdoost; Co-advisor: Dr. Sarah R. Hind
Thesis: "*Occurrence of Bacterial Spot Disease in Illinois Tomato Fields, Characterization of the Casual Agents, and Management of the Disease"*

Bachelor of Science (Agriculture): (Rank: Distinction) Institute of Agriculture and Animal Sciences, Tribhuvan University, Nepal
Thesis: "*Screening of Different Rice Genotypes against (Pyricularia grisea) Sacc. In Natural Epidemic Condition at Seedling Stage in Chitwan, Nepal*"

WORK EXPERIENCE

Graduate Research Assistant
Texas A&M University, College Station, TX (2020-Present)

- Isolate kernel smut fungus from seed collection in the sample, design and conduct laboratory and molecular test to differentiate genetic diversity.
- Establish baseline sensitivity to propiconazole to kernel smut fungus and understand the prevalence of fungicide resistance in the fungus.
- Investigate the differences in rice seed endophytic microbial population through amplicon sequencing and analyze the data with use of various bioinformatic software and R programs.
- Understanding the biocontrol activities of seed endophytic bacteria against rice seedling disease; experiments conducted on lab, greenhouse, and field.
- Assemble the genome of *Tilletia horrida*, first for the US, along with two bacterial species.
- Helped establish molecular facilities at rice pathology lab at Texas A&M research center, Beaumont.
- Mentored and supervised undergraduate and high school students on summer projects and basic microbiology techniques in rice pathology lab.
- Wrote various extension publication, along with peer-reviewed papers, to present findings to growers.
- Poster and Oral presentation in various scientific meetings.

Graduate Research Assistant
University of Illinois, Urbana, Illinois: May 2017- May 2020

- Conducted survey the occurrence of Bacterial spot of tomato in Illinois and characterization isolates.
- Identification of the copper resistant isolates in the Illinois tomato fields; first study from the state
- Participated in various vegetable disease management research.
- Poster presentation in various scientific meetings and symposiums.

Research Intern
Nepal Agricultural Research Council
National Potato Research program, Lalitpur, Nepal

- Participated in various ongoing research on the program related to potato on field and greenhouse conditions.

Undergraduate Student Research Assistant
Tribhuvan University and Agriculture and Forestry University, Nepal

- Screening of different rice genotypes against blast pathogen at natural epidemic condition and controlled condition at Chitwan, Nepal.
- Post-harvest evaluation through modified atmospheric packaging trails on cauliflower under Chitwan condition and market survey on packaging.
- Post-harvest evaluation through modified atmospheric packaging trails on tomato under Chitwan condition and market survey on packaging.
- Survey of the vulnerability of livestock farming system to impact of climate change in Terai of Western Nepal.
- Impact of Biochar application on soil properties, yield and yield attributing characteristics of *Raphanus sativus* L.

TEACHING AND MENTORING

Graduate Teaching Assistant: *Introductory plant pathology*, UIUC (Spring 2020).
Duties: Conduct lab portion of the lecture, familiarize students with lab section of plant pathology along with teaching basic microbiology techniques, grade all assignments. Number of students=25

Graduate Teaching Assistant: *Introductory Entomology,* UIUC (Fall 2020).
Duties: Conduct lab portion of the lecture, assist student in insect collection and preservation, help lecturer prepare for the lab. Number of students=50

Graduate Mentor: Rice pathology lab (2020-present) Texas A&M AgriLife Research Center, Beaumont.
Duties: Mentor undergraduate and high school student to learn basic microbiology techniques along with field research experience. Assists visiting scholar to set up and run experiments at the laboratory.

Graduate Mentor: Vegetable Pathology Lab (2017-2019), UIUC
Duties: Mentor visiting undergraduate from China to design and run short summer experiments along with collection of data, analysis, and preparation for the final presentation of the research.

PUBLICATIONS

Peer-review publications

1. **Khanal, S.**, Antony-Babu, S., and Zhou, X. G. 2023. Sensitivity of *Tilletia horrida* to Propiconazole and Characterization of Propiconazole Resistant Isolates. (*In-preparation.)*
2. **Khanal, S.**, Imran, M., Antony-Babu, S., and Zhou, X. G. 2023. Characterization of Differences in Seed Endophytic Microbiota between Conventional and Organic Rice by Amplicon-Based Sequencing and Culturing Methods. Phytobiomes Journal (*In-review*)
3. **Khanal, S.**, Antony-Babu, S., and Zhou, X. G. 2023. *De Novo* Whole Genome Sequence of Endophytic Biocontrol Strain *Bacillus* sp. ST24 Isolated from Rice Seed. Microbiology Resource Announcement (*In-press)*.
4. **Khanal, S.**, Antony-Babu, S., and Zhou, X. G. 2023. Multiple Biosynthetic Gene Pathways are Revealed in Whole-Genome Sequence of Endophytic Biocontrol Strain *Pantoea stewartii* subsp. *indologenes* ST25. Microbiology Resource Announcement e0042523
5. **Khanal, S.**, Zhou, X. G., and Gaire, S. P. 2023. Kernel Smut and False Smut: The Old-Emerging Diseases of Rice- A Review. Phytopathology (*In-Press)*.
6. **Khanal, S.**, Antony-Babu, S., and Zhou, X. G. 2023. Draft Genome Resources of Seven Strains of *Tilletia horrida*, Causal Agent of Kernel Smut of Rice. Phytofrontiers (*In-Press)*.
7. **Khanal, S.**, Antony-Babu, S., Gaire, S., P., and Zhou, X., G.2022. Multi-locus Sequence Analysis Reveals Genetic Diversity of Rice Kernel Smut Fungus Population in United States. Front. Microbial. 4:874120
8. Imran, M.*, **Khanal, S.***, Zhou, X. G., Antony-Babu, S., and Atiq, M. 2022. First Report of Sheath Rot of Rice Caused by *Fusarium incarnatum-equiseti* Species Complex in the United States. Plant Dis. 106 (12): 3206
9. Imran, M.*, **Khanal, S.***, Zhou, X. G., Antony-Babu, S., and Atiq, M. 2021. First Report of Brown Leaf Spot of Rice Caused by *Curvularia hawaiiensis* in the United States. Plant Dis. 106 (9): *2527*
10. Imran, M.*, **Khanal, S.***, Zhou, X. G., Antony-Babu, S., and Atiq, M. 2021. First Report of Leaf Spot of Rice Caused by *Epicoccum sorghinum* in the United States. Plant Dis. 106 (10): *2758*
11. **Khanal, S.**, Hind, S. R., and Babadoost, M. 2021. Occurrence of Bacterial Spot in Illinois Tomato Fields and Characteristics of the Causal Agents. Hortscience 56(1): 8-12
12. **Khanal., S.**, Hind, S. R., and Babadoost, M. 2020. Occurrence of Copper Resistant *Xanthomonas perforans* and *X. gardneri* in Illinois Tomato fields. Plant Health progress 21(4):338-344
13. **Khanal., S.**, Subedi, B., Bhandari, A., Giri, D., R., Shrestha, B., Neupane, P., Shrestha, S. M., and Gaire, S., P. 2016 Screening of Different Rice Genotypes against (Pyricularia grisea) Sacc. in Natural Epidemic Condition at Seedling Stage in Chitwan, Nepal. Adv. Crop Sci. Tech. 4: 4

Extension Publication

1. **Khanal, S.**, S. Antony-Babu, and X. G. Zhou. 2023a. Widespread Occurrence of Propiconazole Resistance in Rice Kernel Smut Across the United States. Texas Rice Special Section 2023: 34-35
2. **Khanal, S.**, S. Antony-Babu, and X. G. Zhou. 2023b. Understanding the Differences in Seed Endophytic Microbiome between Organically and Conventionally Grown Rice. Texas Rice Special Section 2023: 37-38
3. Zhou, X. G., S. Khanal, and G. Liu. 2023. Best Time of Fungicide Application for Control of Kernel Smut of Rice. Texas Rice Special Section 2023: 35-36
4. **Khanal, S.**, M. Imran, S. Antony-Babu, and X. G. Zhou. 2022. Seed Endophytic Bacteria: Potential Biocontrol Agents for Management of Seedling Blight of Rice. Texas Rice Special Section 2022: 26-27.
5. Zhou, X. G., **S. Khanal**, M. Imran, G. Liu, and S. Antony-Babu. 2022. Two New Rice Diseases Found in Texas. Texas Rice Special Section 2022:25-26.
6. **Khanal, S.**, X. G. Zhou, S. Antony-Babu, and S. Gaire. 2021. Genetic diversity of the rice kernel smut populations in the United States. Texas Rice Special Section 2021:28-29
7. Zhou, X.G., **Khanal, S.**, and Imran, M. (2021a). Texas rice: Severe outbreaks of kernel smut in 2021. Agfax.com-Online Ag News Source. September 10, 2021. https://agfax.com/2021/09/10/texas-rice-severe-outbreaks-of-kernel-smut-in-2021/
8. Zhou, X., G. Liu, L. Wang, and **S. Khanal.** 2021b. Timing of fungicide application for rice kernel smut and narrow brown leaf spot control in main and ratoon crops. Texas Rice Special Section 2021:26-27

Conference proceedings

1. Babadoost, M., **Khanal, S**. and Hind, S.R. (2021). Bacterial spot of tomato incited by *Xanthomonas* spp. in Illinois: occurrence and management. Acta Hortic. 1316, 81-88 DOI: 10.17660/ActaHortic.2021.1316.12

Abstract Publication

1. **Khanal, S.**, Antony-Babu, S., Gaire, S. P., and Zhou, X., G. 2021. Genetic diversity of rice kernel smut population in the United States. Plant Health online 2021.
2. **Khanal, S.**, Hind, S. R., and Babadoost, M. 2019. Assessing the occurrence of bacterial spot of tomatoes in Illinois and identifying species causing the disease. Plant health 2019.
3. **Khanal, S.**, Hind, S. R., and Babadoost, M. 2019. Copper-resistant strains of *Xanthomonas gardneri* and *X. perforans* from Illinois tomato fields. Plant health 2019.
4. Babadoost, M., **Khanal, S.**, and Hind, S. R. 2019. Bacterial Spot (*Xanthomonas* spp) of tomatoes in Illinois: Occurrence and Management. Acta horticulture, VI Internal Symposium on Tomato Diseases, Taiwan.

Plant disease management reports

1. Zhou, X. G., **Khanal, S.**, and Liu, G. 2023. Application timings of Amistar Top and Tilt for managing rice kernel smut in main and ratoon crops, 2022.
2. Babadoost, M., **Khanal, S.**, and Acheampong, F. 2020. Efficacy of selected chemical compounds and biocontrol agents for control of bacterial spot of tomato, Illinois, 2019. https://doi.org/10.1094/PDMR14
3. Babadoost, M., Sulley, S., and **Khanal, S.** 2020. Efficacy of selected fungicides for control of Phytophthora blight in summer squash in Illinois, 2019. https://doi.org/10.1094/PDMR14
4. Babadoost, M., Sulley, S., and **Khanal, S.** 2020. Efficacy of selected fungicides for control of Phytophthora blight in processing pumpkin, 2019. https://doi.org/10.1094/PDMR14

5. Babadoost, M. and **Khanal, S.** 2019. Effectiveness of selected fungicides for control of powdery mildew of pumpkin, 2018. https://doi.org/10.1094/PDMR13
6. Babadoost, M., Sulley, S., and **Khanal, S.** 2019. Efficacy of selected fungicides for control of Phytophthora blight in summer squash in Illinois, 2018. https://doi.org/10.1094/PDMR13
7. Babadoost, M., **Khanal, S.**, and Gulyiev, S. 2018. Effectiveness of selected fungicides for control of bacterial spot of pumpkin, 2017. https://doi.org/10.1094/PDMR12

Scientific Oral presentation

1. **Khanal, S**. 2023. Molecular Characterization of Propiconazole Resistance in *Tilletia horrida* Isolates. 38th Rice Technical Working Group, 2023, Hot Springs, Arkansas.
2. **Khanal, S**. 2023. Insights into Propiconazole Resistance of Kernel Smut (*Tilletia horrida*) in the United States. Department of Plant Pathology and Microbiology, Texas A&M University, College Station, Texas, USA.
3. **Khanal, S.** 2019. Occurrence of Bacterial Spot Disease in Illinois Tomato Fields, Characterization of the Casual Agents, and Management of the Disease. Seminar speaker. Department of Crop Sciences, University of Illinois, Urbana, Illinois.

Poster Presentations

1. **Khanal, S.**, Antony-Babu, S., and Zhou, X., G. 2023. Propiconazole Resistance of Kernel Smut (*Tilletia horrida*) in the United States. PLPA Annual Symposium, 2023, Department of Plant Pathology and Microbiology, Texas A&M University.
2. **Khanal, S.**, Imran, M, Zhou, X. G., and Antony-Babu, S. 2022. Seed endophytic microbial populations between organically and conventionally grown rice are taxonomically and functionally distinct. Plant Health 2022, American Phytopathological society annual meeting, Pittsburg.
3. **Khanal, S.**, Imran, M, Zhou, X. G., and Antony-Babu, S. 2022. Seed endophytic microbial populations between organically and conventionally grown rice are taxonomically and functionally distinct. 2022 Annual rice field day at Texas A&M AgriLife Research Center, Beaumont, Texas.
4. **Khanal, S.**, Antony-Babu, S., Gaire, S. P., and Zhou, X., G. 2021. Genetic diversity of rice kernel smut population in the United States. TAMU genome editing Symposium 2021(online).
5. **Khanal, S.**, Antony-Babu, S., Gaire, S. P., and Zhou, X., G. 2021. Genetic diversity of rice kernel smut population in the United States. Plant Health online 2021(online).
6. **Khanal, S.**, Antony-Babu, S., Gaire, S. P., and Zhou, X., G. 2021. Genetic diversity of rice kernel smut population in the United States. WSU Plant Science Symposium 2021.
7. **Khanal, S.**, Antony-Babu, S., Gaire, S. P., and Zhou, X., G. 2021. Genetic diversity of rice kernel smut population in the United States. 2021 PLPA symposium, Department of Plant Pathology and Microbiology, Texas A&M University
8. **Khanal, S.**, Hind, S. R., and Babadoost, M. 2019. Assessing the occurrence of bacterial spot of tomatoes in Illinois and identifying species causing the disease. Plant health 2019.
9. **Khanal, S.**, Hind, S. R., and Babadoost, M. 2019. Copper-resistant strains of *Xanthomonas gardneri* and *X. perforans* from Illinois tomato fields. Plant health 2019.

GRANTS

1. Xin-Gen Zhou and **Sabin Khanal.** 2021. Enhancing Texas Rice Plant Pathology Research through Equipping with PCR System and Plant Growth Chamber. Funded: $47, 915
2. Xin-Gen Zhou and **Sabin Khanal.** 2022. Rice Kernel Smut and Cercospora Management Research. Submitted: Texas Rice Research Foundation, Funding request: $79, 994.

AWARDS/SCHOLARSHIPS

- 3rd place on Annual rice field day at Texas A&M AgriLife Research Center, 2022, Student poster competition.
- Travel awards for registration in Plant Health 2021 (online), American Phytopathological Society.
- 3rd place position on graduate student poster competition, 2021, Department of Plant Pathology and Microbiology, Texas A&M University
- Merit stipend for six semesters for outstanding students of bachelor's degree, granted by Institute of Agriculture and Animal Sciences.

LEADERSHIPS AND SERVICE

- **Involvement in American Phytopathological Society (2017-present)**
- **Officer 2020-21**: International Student Association, Texas A&M University, College Station, USA
- **Excellent group leadership (2018, 2018-19):** Global Leaders Orange Blue and Engagement, Office of international and intercultural relations, University of Illinois, Urbana.
- **UIUC plant symposium organizer committee (2018)**
- **Group leader**: Undergraduate Practicum Assessment Group 2016. Developed research proposal, conducted trails, prepared report, and publication.
- **Student body president 2015-16:** Mechi-Koshi Vidyarthi Sangam, Rampur Campus, Chitwan, Nepal
- **Region Ambassador to Nepal, 2014**: Tunza Eco-generation Environment Networking Platform for Children and youth by Samsung Engineering and UNEP, Korea.

PEER REVIEWER

- Plant Disease (2)

SKILLS

- Knowledge of Linux and R programming language
- Bioinformatics knowledge to analyze next-generation sequencing including genome assembly, genome analysis, and RNA-seq analysis.
- Analysis of amplicon sequencing based microbial communities' data.
- Proficient with Microsoft office such as word, excel, powerpoint, etc.

References

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