**Gurpreet Kaur**

Graduate Research and Teaching Assistant

Department of Animal Science

Cornell University

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**EDUCATION**

**Ph.D. in Animal Science** Start date: Fall 2022

Department of Animal Science, Cornell University, USA.

Advisor: Quirine Ketterings, Ph.D.

Expected Completion: 2026.

Dissertation focus: *Soil health assessment and nutrient management for climate resilient forage production.*

**Integrated Master of Science in Microbiology** **(Hons.)** July 2016 – October 2021

Major: Microbiology, Minor: Biochemistry GPA: 3.5 / 4.0.

Department of Microbiology, Punjab Agricultural University, India.

Advisor: Jupinder Kaur, Ph.D.

Thesis: *Effect of biofertilizer and organic fertilizer on soil health, growth and yield of Cowpea* (*Vigna unguiculata* L*.*).

**RESEARCH EXPERIENCE**

**Master’s Research Student** July 2018- October 2021

Punjab Agricultural University – Department of Microbiology

Advisor- Dr. Jupinder Kaur (Department of Microbiology, PAU)

* Managed the field experiment conducted for master’s research.
* Collected soil samples, and recorded plant growth attributes.
* Conducted enumeration of microbes from soil samples amended with different fertilizer combinations (bacteria, fungi, diazotrophs, phosphate solubilizing bacteria and actinomycetes)
* Analyzed soil enzyme activities viz. dehydrogenase, alkaline phosphatase and urease and physicochemical properties (viz. soil pH, electrical conductivity, N, P, K and organic carbon).
* Analyzed soil and plant samples for nutrient content.
* Acquired hands-on training for basic analysis of soil samples for texture, structure, pH, electrical conductivity, moisture content, particle and bulk density.
* Analyzed data with Statistical Package for Social Sciences (SPSS) and GraphPad prism software.
* Assessed water samples for dissolved oxygen, pH, temperature, salinity and nutrients.
* Trained in handling of laboratory equipment like autoclave, incubators (chemical and biological oxygen demand), laminar air flow bench, hot air oven and other commonly used equipment.
* Prepared culture media, inoculations and incubations, sterilization and staining techniques
* Practiced maintenance and preservation of microbial cultures.
* Worked on composting of organic residues and mushroom cultivation.
* Gained knowledge and experience in production of microbial biomass and protein estimation.
* Versed with spectrophotometry, chromatography, pH meter, electrophoresis, lab scale fermenter.
* Skilled at use of microscopy- phase contrast, fluorescent, electron microscope and hemocytometry.

**ACADEMIC WORK EXPERIENCE**

**Soil Microbiology**

Punjab Agricultural University (PAU) January 2020- May 2020

Research groups: Dr. Poonam Sharma (Plant Breeding) and Dr. Jupinder Kaur (Microbiology)

* Worked on isolation, identification and characterization of symbiotic, non-symbiotic nitrogen fixers, P-solubilizing microorganisms, PGPRs and pesticide resistant soil bacteria.
* Observed decomposition studies in soil and determined soil microbial biomass.
* Isolated and performed staining of vesicular arbuscular mycorrhizae and its spores.
* Observed and measured important soil microbial processes such as ammonification, nitrification, N2 fixation, S oxidation, P solubilization and mineralization of other micro-nutrients.
* Performed detection of hydrogen uptake system in *Rhizobium.*
* Delivered credit seminar on “Symbiotic nitrogen fixation in non-legumes”.

**Biofertilizer Technology** September 2020- January 2021

Punjab Agricultural University (PAU)

Research groups: Dr. Poonam Sharma (Plant Breeding) and Dr. Jupinder Kaur (Microbiology)

* Performed isolation and purification of nitrogen fixing (*Azotobacter*, *Rhizobium*) and phosphate solubilizing microorganisms (*Azospirillum*).
* Isolated and performed staining of VA mycorrhizae and its spores.
* Enumeration of spores and inoculum production of VAM fungi.
* Training in inoculum preparation and mass multiplication techniques.
* Studied various carrier materials for biofertilizers and population dynamics in broth and carrier materials in storage.
* Aware of Bureau of Indian Standards (BIS) biofertilizers requirements.

**Environmental Microbiology**  January 2019- June 2019

Punjab Agricultural University (PAU)

Research group:Dr. Suman Kumari (Microbiology)

* Performed microorganism enrichment from polluted environment-air, water, sewage for microbial diversity studies.
* Studied microbial transformations (C, N, S, and P cycle), biochemistry and energy production.
* Observed the microbial relationships under *in situ* conditions by making and use of Winogradsky’s column.
* Determined biological and chemical oxygen demand of water, analyzed biochemical and microbiological parameters of drinking water and studied BIS standards of drinking water.
* Studied growth characteristics of extreme microbes-halophiles and thermophiles.
* Worked on biogas production in laboratory.

**Biochemistry** February 2021- June 2021

Punjab Agricultural University (PAU)

Research groups:Dr. Vikramjit Kaur Zhavar and Dr. Yadhu Suneja (Biochemistry)

* Experienced in performance of general qualitative tests for carbohydrates, proteins and amino acids, determination of total protein, total soluble protein as well as total free amino acids.
* Performed extraction and determination of sugars in cereal grains and lipids from lipid samples, paper chromatography of sugars, Thin Layer Chromatography (TLC) for lipids and Gas Liquid Chromatography (GLC).
* Extracted and purified acid phosphatase from moong bean seeds; studied effects of temperature, pH, substrate concentration, enzyme concentration, and time on acid phosphatase activity.
* Measured chlorophyll, carotenoid and phytic acid content in tomato, estimated vitamin C from lemon and orange juice, and vitamin E from leaf samples.
* Extracted nucleic acids from the plant tissue and analyzed DNA and RNA calorimetrically.

**Biotechnology**

Punjab Agricultural University (PAU)

***Nanobiotechnology***August 2018- December 2018

Research groups: Dr. Kiran Jeet Kaur and Dr. Gurkirat Kaur (Soil Science)

* Studied biological based nanosystems like molecular motors, biosensorsand other devices and nanomanipulations through STM and AFM, lithography and nano-indentation.
* Studied the use of biosensors in biomedicine and agriculture and DNA nanotechnology and biomimetics.

***Bioinformatics***  January 2018- June 2018

Research group: Dr. Navin Gupta (School of Agricultural Biotechnology)

* Studied sequence information resources and their practical use through EMBL, GENBANK, Entrez, UniGene, PDB, SWISSPORT.
* Interpreted results and multiple sequence alignment using BLAST and ClustalW.

**Information and Communication technology in Agriculture** January 2017- June 2017

Punjab Agricultural University (PAU)

Research group: Er. Harpreet Kaur (Electrical Engineering and Information Technology, PAU)

* Researched dissemination of Agri-Information using mobile apps and use of geospatial technology for generating valuable information for agriculture.
* Studied Decision Support System and preparation of contingent crop-planning.

**Technical writing**  September 2020- January 2021

Punjab Agricultural University (PAU)

Research group: Dr. Sumedha Bhandari (Agricultural Journalism, Languages and Culture, PAU)

* Studied and performed editing and proof-reading of technical articles; using language tools for effective writing; preparation of bibliography.
* Researched current awareness and SDI services; tracing information from reference sources; library survey.
* Studied and practices the se of Online Public Access Catalogue; use of CD-ROM databases and other computerized library services, CeRA, J-Gate.

**PUBLICATIONS**

Published manuscripts:

* Kaur, J. and **G. Kaur** (2021). Dehydrogenase activity as a biological indicator of soil health. Chemical Science Review and Letters 10 (39), 326-329.

Submitted manuscripts:

* **Kaur, G.**, J. Kaur, and S.S. Walia (in review). Effect of integrated nutrient management on soil health, growth and yield of Cowpea (*Vigna unguiculata*L*.*). Submitted to: Journal of Plant Nutrition
* Kaur, J., S. Singla, S. Garcha, and **G. Kaur** (in review). Screening of bacterial cultures for plant growth promoting traits and their effect on yield of rice crop. Submitted to: International Journal of Agriculture and Biology

Manuscripts under development:

Khipla, N., **G. Kaur**, A.L. Vishnu, J. Kaur, and S.S. Walia (under development). Organic farming in shaping soil microbiome: prospects and perspectives of green manures. For consideration by: Agronomy Journal

**AWARDS**

* Awarded merit certificate for having obtained an OCPA above 8.0/10.
* Certificate of excellence in an E-Quiz organized by the Delhi Student’s Unit, Microbiologists’ Society of India.
* Scored 95/100 in an E-Quiz on “Ecosystem Restoration” organized by Faculty of Life Sciences, Mandsaur University, Madhya Pradesh, India.
* Scored 95/100 in an E-Quiz on “Virology” organized by Faculty of Life Sciences, Mandsaur University, Madhya Pradesh, India.
* Scored 118/150 in a national level online quiz on “Malaria” organized by Ponda Education Society’s Ravi S. Naik College of Arts and Sciences, Famagudi, Ponda-Goa.

**SKILLS**

* **Software, data interpretation and presentation:** Use of MS Office to create spreadsheets, graphs, documents, presentations. Experience with SPSS and GraphPad Prism
* **Maintain work standards:** Comprehension and execution of strict guidelines ensuring healthy and safe work environment.
* **Linguistic skills:**
  + English (cleared YLE Starters 2007, YLE Movers 2008 and PET- Preliminary English Test 2012 organized by University of Cambridge ESOL Examinations)

**IELTS**- Listening- 8.5/9, Reading- 8/9, Writing- 7/9 and Speaking- 6.5/9

* + Punjabi (Native) and Hindi.

**CO-CURRICULAR ACTIVITIES**

**Member of the** **Placement Awareness group:** August 2018- October 2021

* Ensured keeping the students updated with new jobs and applications.
* Gathered information about education and job fairs.
* Monitored in organizing pre-placement works for soft skills for students.
* Monitored and updated database of students.

**Gender Champion:** August 2020- October 2021

* Monitored progress towards gender justice, a joint initiative taken by Ministry of Women and Child Development and Ministry of Human Resource Development, India.
* Ensured to spread awareness about gender barriers and ways of combating it.
* Volunteered to encourage students to take part in various competitions and workshops to promote equity.

**Volunteered for** **the National Service Scheme (NSS):** July 2016- July 2018

(An Indian government-sponsored public service program, Department of Youth Affairs and Sports, Government of India)

* Organized cleanliness drives for the ‘Clean India Campaign’ by the Government of India.
* Painted PAU campus trees with water-based latex paint to prevent cracking and splitting of bark.
* Promoted participation in institutional lectures by guest speakers on overall wellbeing of students.

**Volunteered in ‘Kisan Melas’ or ‘Farmer Fairs’:** September 2016- October 2021

* Participated in dialogues with farmers about agricultural problems
* Actively participated to promote the use and supply of biofertilizers for various crops.
* Exhibited various microbiologically fermented products like Kanji, vinegar and pickles.
* Aided with testing of water, food and milk, raising awareness among farmers.
* Demonstrated the supply of mushroom spawn and compost bags to promote the future of mushroom production technology.
* Participated in preparation of bacteriological water testing kit for personal use by the farmers.