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Education

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| 2011-2017 | Doctor of Philosophy , (Entomology, 2017), University of Kentucky
Dissertation: The xenobiotic transcription factor cap n collar c regulates expression of multiple insecticide resistant genes. |
| 2009-2011 | Master of Science (Entomology, 2011), University of Florida
Thesis: Potential predators of corn-infesting picture-winged flies (Diptera: Ulidiidae) in Homestead, Florida: seasonal abundance, distribution and functional response |
| 2004-2006 | Master of Science (Biotechnology, 2006), Garhwal University |
| 2001-2004 | Bachelor of Science (Botany Hons, 2004), Delhi University |

Professional Appointments/Experiences

Post-Doctoral Researcher: Insect physiology and molecular biology lab, Entomology Department, Ohio State University (April 2017-). **Advisor: Dr. Peter Piermarini**

- Project 1: **Carbon nanoparticle toxicity:** Testing different formulations of carbon nanoparticle toxicity as economical, environmentally friendly solutions to control mosquitoes and to study their mode of action. It is a collaborative project with the company named Valyenx LLC.
- Project 2: **Natural product toxicity:** Investigating effects of natural plant products on insecticide- susceptible and –resistant lines of mosquitoes (*Aedes aegypti*), to control mosquitoes. As well as looking at the mode of action of selected natural plant insecticides.
- Project 3: **Characterization of mosquito cation-chloride co-transporters:** Conducting research on the molecular physiology of mosquito cation-chloride cotransporters by expressing the mosquito proteins in frog oocytes.

Graduate Research Assistant: Insect physiology and molecular biology lab, Entomology Department, University of Kentucky (August 2011-April 2017). **Advisor: Dr. Subba Reddy Palli**

- **Understanding the regulation of insecticide resistance genes in the beetles *Tribolium castaneum* and *Leptinotarsa decemlineata*.** Investigated the cytochrome P-450 monooxygenase genes that are involved in insecticide resistance and the xenobiotic transcription factors regulating these genes. Further delineated the binding site for these transcription factors. Investigated other genes involved in insecticide resistance (Phase II and III detoxification) using RNA sequencing.
- ***Leptinotarsa decemlineata* genome annotation.** Cytochrome P-450 monooxygenase gene annotation using Web Apollo software. The i5K project, Baylor College of medicine and human genome sequencing center.

Graduate Research Assistant: Vegetable Integrated Pest Management Laboratory, TREC, University of Florida, Homestead, FL (Jan 2009- 2011). **Advisor: Dr. Dakshina R. Seal**

- **Abundance and distribution studies of *Euxesta* spp.** Reared different strains of corn silk flies, *Euxesta* spp. Studied its abundance and distribution in cornfields in south Florida.
- **Abundance and distribution studies of arthropod in corn.** Studied the abundance and distribution of arthropod associated with corn silk fly, *Euxesta* spp. in the cornfields in south Florida.
- **Biological control agent.** Found the biological control agents for cornsilkfly and studied predator-prey functional response.

Summer Internship: Allergy and Immunology Section, Institute of Genomics & Integrative Biology (CSIR), Delhi-7 (Feb 2006 – May 2006). **Advisor: Dr. A. B. Singh**

- **Estimation of total serum IgE & Molecular Characterization of fungal antigens:** The project mainly dealt with understanding the role of Total serum IgE as an important mediator of allergy and fungi as an important causative agent. Objectives accomplished under this project were: Comparison of Total serum IgE of allergic patients & healthy volunteers; Comparison of total serum IgE level in different age groups and different disease conditions of allergic patients; Molecular characterization of fungal allergens (*Aspergillus nidulans* & *Curvularia lunata*).

Summer Training: Department of Biochemistry, Jamia Hamdard, Delhi (July, 2005- August 2005) **Advisor: Dr. Salim Javed**

- **Basic Techniques of Molecular Biology:** Trained to be skilled in basic molecular biology techniques like plasmid isolation, restriction digestion, cloning, and transformation, SDS-Page etc.

Honors/ Awards and Grants

- 2017 **Publication Scholarship**, University of Kentucky.
- 2016 **Graduate Student Travel Grant**, University of Kentucky.
- 2015 **Graduate Student Travel Grant**, University of Kentucky.
- 2015 **Publication Scholarship**, University of Kentucky.
- 2012 **ESA Debate competition**, First Prize.
- 2010 **Travel Grant**, Florida Entomological Society.
- 2010 **MS Student paper Competition**, Second prize, Florida Entomological Society.
- 2010 **Travel Grant**, Graduate Student Council, University of Florida.
- 2009 **Travel Grant**, Graduate Student Council, University of Florida.

Peer-reviewed publications

1. **Kalsi, M.**, Gillen, C., and Piermarini, P.M. (2019). Heterologous expression of *Aedes aegypti* cation chloride cotransporter 2 (CCC2) in *Xenopus laevis* oocytes induces an enigmatic Na/Li conductance. *Insects* 2019, 10, 71.
2. **Kalsi, M.**, & Palli, S. R. (2017). Cap n collar transcription factor regulates multiple genes coding for proteins involved in insecticide detoxification in the red flour beetle, *Tribolium castaneum*. *Insect Biochemistry and Molecular Biology*, 90, 43-52.
3. **Kalsi, M.**, & Palli, S. R. (2017). Transcription factor cap n collar C regulates multiple cytochrome P450 genes conferring adaptation to potato plant allelochemicals and resistance to imidacloprid in *Leptinotarsa decemlineata* (Say). *Insect Biochemistry and Molecular Biology*, 83, 1-12.
4. **Kalsi, M.**, & Palli, S. R. (2015). Transcription factors, CncC and Maf, regulate expression of CYP6BQ genes responsible for deltamethrin resistance in *Tribolium castaneum*. *Insect Biochemistry and Molecular Biology*, 65, 47-56.
5. **Kalsi, M.**, Seal, D. R., Nuessly, G. S., Capinera, J. L., & Martin, C. G. (2014). Seasonal timing, abundance, and predatory status of arthropods associated with corn infested by picture-winged flies (Diptera: Ulidiidae) in south Florida. *Florida Entomologist*, 97(1), 168-178.
6. **Kalsi, M.**, Seal, D. R., Nuessly, G. S., Capinera, J. L., & Martin, C. G. (2014). Distribution of *Zelus longipes* (Hemiptera: Reduviidae) in South Florida corn fields and its functional response to corn-infesting picture-winged flies (Diptera: Ulidiidae). *Environmental Entomology*, 43(5), 1223-1234.
7. **Kalsi, M.**, Seal, D. R., Nuessly, G. S., Capinera, J. L., & Martin, C. G. (2014). Distribution of arthropod predators and their responses to *Euxesta* spp. (Diptera: Ulidiidae) in the laboratory and in corn fields in South Florida. *Florida Entomologist*, 97(3), 911-920.
8. Manwill, P., **Kalsi, M.**, Wu, S., Cheng, X., Piermarini, P., & Rakotondraibe (2019). Semi-synthetic Cinnamodial analogues: Structural insights into the insecticidal and antifeedant activities of drimane sesquiterpenes against the mosquito *Aedes aegypti*. (Under review).
9. Gaddelapati, S.C, **Kalsi, M.**, Roy, A., and Palli, S. R., 2018. Cap 'n' Collar C regulates imidacloprid resistance genes in the Colorado potato beetle, *Leptinotarsa decemlineata*. *Insect Biochemistry and Molecular Biology*, 99, 54-62.
10. Schoville, S.D., Chen, [...]**Kalsi, M.**, [...], Richards, S., 2018. A model species for agricultural pest genomics: the genome of the Colorado potato

beetle, *Leptinotarsa decemlineata* (Coleoptera: Chrysomelidae). Scientific Reports-Uk 8, 1931.

11. Shukla, J.N., **Kalsi, M.**, Sethi, A., Narva, K.E., Fishilevich, E., Singh, S., Mogilicherla, K. and Palli, S.R., 2016. Reduced stability and intracellular transport of dsRNA contribute to poor RNAi response in lepidopteran insects. *RNA Biology*, 13(7), pp.656- 669.
12. Curry, M. M, Crawley. S, **Kalsi. M**, Saeed. A, and Hunt, B. (2014). The single most promising solution to feeding the world's growing population is entomophagy: Rediscovering an ancient tradition to feed a contemporary society. In 2012 ESA Student Debate: Student Perspective on Scientific Global Issues. *American Entomologist*, 60(4), 212-222.

Extension publication

1. **Kalsi .M**, and D.R. Seal., 2016. *Zelus longipes*, Online publication. Featured Creatures. http://entnemdept.ufl.edu/creatures/beneficial/bugs/zelus_longipes.htm

Presentations

Invited speaker:

1. **Kalsi,M.**, and Piermarini,P. 2018: Carbon nanoparticle vs mosquitoes: A new potential eco-friendly tool to control mosquitoes. OARDC mosquito conference, Wooster,OH.
2. **Kalsi,M.**, Shukla, M., Sethi, M, Narva,K., Fishilevich, E and Palli, S.R. 2016: Identification of factors responsible for differential efficiency of RNAi between coleopteran and lepidopteran insects. Symposium: Public-Private Partnerships for Development of Next-Generation Pest Management Methods. XXV International Congress of Entomology, Orlando, Fl.
3. **Kalsi,M.**, 2016: Molecular Analysis of Insecticide Resistance in the Red Flour Beetle, *Tribolium castaneum*. Symposium: Early-career investigators in insect physiology, biochemistry, toxicology, and molecular biology. North Central Branch Entomological Society of America, Cleveland,OH.

Student competition presentations:

1. **Kalsi, M.**, 2015: Xenobiotic transcription factors initiate the cytochrome P450-mediated insecticide resistance in *Tribolium castaneum*. Student TMP competition. Entomological Society of America. Minneapolis, MN.
2. **Kalsi, M.**, 2015: The xenobiotic transcription factors, CncC and Maf regulate induction of deltamethrin resistance genes in *Tribolium castaneum*. Doctoral of Philosophy student paper competition. The Ohio Valley Entomological Association.
3. **Kalsi, M.**, Seal, D.R., Nuessly, G., and Capinera, J.L.,2011: Distribution pattern of natural enemies of cornsilk fly, *Euxesta stigmatias* (Diptera: Ulidiidae) in corn field. Student TMP competition. Entomological Society of

America. San Diego, FL

4. **Kalsi, M.**, Seal, D.R., Nuessly, G., and Capinera, J.L., 2010: Evaluating the predator for *Euxesta stigmatias* by investigating the microflora of corn ear. MS student paper competition. Florida entomological society. Jupiter beach, FL.
5. **Kalsi, M.**, Seal, D.R., Nuessly, G., and Capinera, J.L., 2009: Distribution of corn silk fly, *Euxesta* spp. and its suppression by *Orius insidiosus* in the corn field. MS student TMP competition. Entomological Society of America. Indianapolis, IN.

Poster presentations:

1. **Kalsi, M.**, Happel, K and P, Piermarini., 2019: Carbon nanoparticle vs mosquitoes: a new pesticide? The CFAES Annual Research Conference. Columbus, OH.
2. Gillen, C., Riley, G., Crow, J., DeBrosse, A., Sawyer, M., **Kalsi, M.**, and Piermarini, P. 2018. Sequence analysis, expression, and preliminary functional characterization of *Aedes aegypti* sodium-dependent cation-chloride cotransporters. Intersociety Meeting, Comparative Physiology: Complexity & Integration New Orleans, LA.

Mentoring experience

- **Andrew Delaat**, Undergraduate student, Independent study (IS) program, College of Wooster (2017- present).
- **Yamil Negron**, Intern with Summer Opportunity Research Program at Ohio State University (2018).
- **Katherina Happel**, German Academic Exchange Service (DAAD) Student (2018).
- **Rosalie Sepesy Ivory**, Lab Technician, Ohio State University (2017-2018)
- **Renata Rusconi Trigueros**, Lab Technician, Ohio State University (2018-present)
- **Erick Martinez**, Visiting Scholars, Ohio State University (2018-Present)
- **Anton Pit Walter**, German Academic Exchange Service (DAAD) Student (2019)

Teaching experience

- **Lecturer:** Pesticides (Biotechnology 2219T), Ohio State University Agriculture Technical Institute (Fall 2019). 3 Credit Course. Designed syllabus, course, exams and scored exams. The course was designed for students to learn the usage of pesticides safely, legally, and effectively. This involved integration of (1) the historical, philosophical, and biological context of pest control, (2) pesticide law, (3) technical understanding of pesticide toxicology and formulation, (4) conscientious attention to personal and environmental safety, and (5) competency in the techniques and protocols of pesticide application.

- **Teaching assistant:** Molecular Techniques and Data Analysis, (ENTMLGY 6703), Spring 2018. Teaching the lab for RNA extraction, cDNA synthesis and, qRT-PCR.
- **Guest Lecturer:** Insect-Plant Relationships (ENT/BIO 625), University of Kentucky, Spring 2017. Gave a lecture on introductory RNA interference technique in insects and its suggestive role in pest control; highlighting my Ph.D. research.
- **Teaching assistant:** Insect Physiology (Entomology 635), University of Kentucky, Spring 2012. Designed the handouts, conducted the insect physiology labs and scored the lab reports. The labs involved understanding different insect system such as reproductive, circulatory, respiratory, nervous system etc.
- **Assistant Lecturer:** Doon (PG) Paramedical College & Hospital, India(2006-2007). I taught undergraduates and graduates majoring in biotechnology as well as prepared and scored the exams. The courses taught were biotechnology, genomics, molecular biology, cell biology etc. I designed and conducted the lab for biotechnology such as nucleic acid extraction, protein estimation, cloning etc.

Professional service

Journals reviewed (# manuscripts)

- Insects (15)
- Molecules (1)
- Current Opinion in Insect Science (1)
- Florida Entomologist (1)
- Life (1)
- Pathogens (1)
- Pest Management Science (1)
- Journal of Fungi (1)
- Forests (5)
- Microorganisms (1)
- Agriculture (1)
- Toxins (1)
- Scientific Data (1)
- Agronomy (2)
- International Journal of Environmental Research and Public Health (1)
- Gene Expression Patterns (1)
- Chemosphere (1)
- Insect Science (1)

Student membership and activities

- Bug's world: Ohio State University, OARDC (2019)
- Outreach: Insect night walk, Kingsway Center, Mansfield (2018)
- Outreach: Insect night walk, OARDC (2018)
- Plant Science Symposium poster competition judge, Ohio State University (2018)
- DeLong student competition judge, Ohio State University (2018)
- Outreach: Insect night walk, OARDC (2018)
- Social Committee, Ohio State Postdoctoral Association (2018)
- Member of National Postdoctoral Association (2017-2018)
- Student competition judge, OVEA (2017)
- Treasurer, H. Garmin Club, University of Kentucky (2015-2016)
- A Career counselor at youth science summit (Lexington-2016)
- Social Committee, H. Garmin Club, University of Kentucky (2014-2016)
- A Student volunteer at the Entomological Society of America Annual Meeting (2012, 2015-16)
- Science Fair judge (grades K-12) Fayette County Science Fair, February (2012-2017)
- Outreach: Insect Night Walk at the Arboretum, September 2014
- Linnaean games at ESA (2011-2013)
- Member of Entomological Society of America (2009-present)
- Member of Florida Entomological Society (2010-2011)
- Member H. Garmin Club, University of Kentucky (2011-2017)
- Member of Departmental Entomology and Nematology Student Organization (ENSO), UF (2009-2011)
- Member of Departmental Entomology and Nematology, Seminar committee
- Student volunteer of ASHA, UF (2009-2011)

Technical Skills

Cloning, Transformation, Transfection, Isolation of plasmid, gDNA, and RNA, Protein estimation, Electrophoresis (SDS-PAGE & Agarose), Luciferase assay, Genome annotation, NGS-sequencing, dsRNA preparation using kit and HT115 bacteria, RNAi, qRT-PCR, ELISA, EMSA, Western blot, Cell culture, Insect microinjections, Frog oocyte microinjection, Insect rearing (*Euxesta* spp., *Tribolium castaneum*, *Leptinotarsa decemlineata*, *Aedes aegypti*), Insect dissections, Toxicity bioassays, Mosquito crop bioassays, Mosquito repellency assay, CLC genomics workbench, JMP, Prism.

References

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- **Dr. Subba Reddy Palli**
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