




Faculty Details proforma for DU Web-site

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cc: director@ducc.du.ac.in)

Title	Dr.	First Name	RAMAN	Last Name	RAJAGOPAL	Photograph
Designation	Professor					
Address	Gut Biology Laboratory Lab No 117, Department of Zoology University of Delhi					
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Educational Qualifications						
Degree	Institution				Year	
Ph.D.	Indian Agricultural Research Institute, New Delhi				1995	
PG	Indian Agricultural Research Institute, New Delhi				1991	
UG	Kerala Agricultural University				1988	
Any other qualification						
Career Profile						
University of Delhi						
<i>Associate Professor</i>		New Delhi, India.		Feb 2009 – Feb. 2015		
<i>Professor</i>				Feb 2015 - continuing		
ICGEB		New Delhi, India				
<i>Staff Research Scientist, Insect Resistance Group</i>				2000 – 2009		
<i>National Associate, DBT, Govt. of India</i>				1999-2000		
Indian Council for Agricultural Research (ICAR)				1996-2000		
<i>Scientist,</i>						
Central Potato Research Institute		Shimla, India				
Central Plantation Crops Research Institute		Kasaragod, India				
Areas of Interest / Specialization						
Gut Microbiology						
Vector Biology						
Subjects Taught						
<ol style="list-style-type: none"> 1. Biology of Parasitism 2. Insect Diversity, Society and Evolution 3. Principles of Gene Manipulation 						
Time table of the subjects taught during the current semester						
S.No.	Subject	Days	Time	Classroom		
1	Insect Diversity, Society and Evolution	Tuesday	13.00 – 16.55	Entomology lab		
		Thursday	09.30 – 10.30			
		Friday	10.30 – 11.30			

Research Guidance

List against each head (If applicable)

1. Supervision of awarded Doctoral Thesis: **Eleven**
2. Supervision of Doctoral Thesis, under progress: **Five**
3. Supervision of awarded M.Phil dissertations: **Ten**
4. Supervision of M.Phil dissertations, under progress: **Two**

Publications Profile

1. Rana, V.S., Popli, S., Saurav, G.K., Raina, H.S., Jamwal, R., Chaubey, R., Ramamurthy, V. V., Natarajan, K. and **Rajagopal, R.** (2019). Implication of the Whitefly, *Bemisia tabaci*, Collagen Protein in Begomoviruses Acquisition and Transmission. *Phytopathology* **109**(8), 1481-1493.
2. Pandey, N., **Rajagopal, R.** (2019). Comparative Analysis of the Difference in the Midgut Microbiota between the Laboratory Reared and the Field-caught Populations of *Spodoptera litura*. *Microbiol. Biotechnol. Lett.*; Vol.47(3): 423-433.
3. Saurav, G.K., Rana, V.S., Popli, S., Daimei, G. and **Rajagopal R.** (2019). A thioredoxin-like protein of *Bemisia tabaci* interacts with coat protein of begomoviruses. *Virus Genes* **55**: 356. <https://doi.org/10.1007/s11262-019-01657-z>
4. Singh, A. and **Rajagopal, R.** (2018). Lumen anatomy and localization of *Wolbachia* sp. in the thrips, *Plicothrips apicalis* (Bagnall). *Current Science* **115** (7): 1297 – 1304.
5. Datta, D., Khatri, P., Singh, A., Saha, D.R., Verma, G., **Rajagopal R.**, and Mazumder, S. (2018). *Mycobacterium fortuitum*-induced ER-Mitochondrial calcium dynamics promotes calpain/caspase-12/caspase-9 mediated apoptosis in fish macrophages. *Cell Death Discovery* **4**:30 DOI 10.1038/s41420-018-0034-9
6. Raina, H.S. and **Rajagopal R.** (2018). Bacterial endosymbionts in life stages of Asia II-1 genetic group of *Bemisia tabaci*. *Indian Journal of Entomology* **80** (3): 623 – 629.
7. Raina, H.S., Daimei, G and **Rajagopal R.** (2018). Reproductive potential of parthenogenetic *Bemisia tabaci* with different bacterial endosymbionts. *Indian Journal of Entomology* **80** (3): 598 – 604.
8. Pandey N. and **Rajagopal R.** (2017). Tissue damage induced midgut stem cell proliferation and microbial dysbiosis in *Spodoptera litura*. *FEMS Microbiol Ecol.* **93** (11): 1 November 2017, fix132. doi: 10.1093/femsec/fix132.
9. Bandyopadhyay U., Chadha A., Gupta P., Tiwari B., Bhattacharyya K., Popli S., **Rajagopal R.**, Brahmachari V., Singh Y., Malhotra P. and Natarajan K. (2107). Suppression of Toll-like receptor 2-mediated proinflammatory responses by *Mycobacterium tuberculosis* protein Rv3529c. *J Leukoc Biol.* **102**(5):1249-1259. DOI: 10.1189/jlb.4A0217-042R.
10. Shelly A., Banerjee C., Saurav GK., Ray A., Rana VS., **Rajagopal R.** and Mazumder S. (2107). *Aeromonas hydrophila* induced alterations in cytosolic calcium activate pro-apoptotic cPKC-MEK1/2-TNF α axis in infected head kidney macrophages of *Clarias gariepinus*. *Dev Comp Immunol.* **76**:392-402. doi: 10.1016/j.dci.2017.07.015.
11. Daimei G., Raina H.S., Devi P.P, Saurav G.K., Renukadevi P., Malathi V.G., Senthilraja C., Mandal B., and **Rajagopal R.** (2017). Influence of groundnut bud necrosis virus on the life history traits and feeding preference of its vector, *Thrips palmi*. *Phytopathology* **107** (11): 1440-1445. DOI: <https://doi.org/10.1094/PHYTO-08-16-0296-R>
12. Daimei G., Devi P.P., Saurav G.K., Raina H.S. and **Rajagopal R.** (2017). First report of the natural occurrence of groundnut bud necrosis virus on *Catharanthus roseus* in India. *Plant Disease* **101**(7): 1333. DOI: <https://doi.org/10.1094/PDIS-01-17-0108-PDN>
13. Naveen N.C., Chaubey R., Kumar D., Rebijith K.B., **Rajagopal R.**, B Subrahmanyam B and Subramanian S. (2017) Insecticide resistance status in the whitefly *Bemisia tabaci* genetic groups Asia-I, Asia II-1 and Asia II-7 on the Indian subcontinent. *Scientific Reports* **7**: 40634. Doi: [10.1038/srep40634](https://doi.org/10.1038/srep40634)
14. Saurav G.K., Daimei G., Rana V.S., Poopli S. and **Rajagopal R.** (2016) Detection and localization of *Wolbachia* in *Thrips palmi* Karny (Thysanoptera: Thripidae). *Ind. J. Microbiol.* **56** (2): 167-171. Doi:[10.1007/s12088-016-0567-7](https://doi.org/10.1007/s12088-016-0567-7)
15. Rana V.S., Popli S., Saurav G.K., Raina H.S., Chaubey R., Ramamurthy V.V. and **Rajagopal R.** (2015) A *B. tabaci* midgut protein interacts with begomoviruses and plays a role in virus transmission. *Cellular Microbiol.* **18** (5): 663-678. DOI: 10.1111/cmi.12538
16. Raina H.S., Singh A., Popli S., Pandey N, **Rajagopal R.** (2015) Infection of Bacterial Endosymbionts in Insects: A Comparative Study of Two Techniques viz PCR and FISH for Detection and Localization of Symbionts in Whitefly, *Bemisia tabaci*. *PLoS ONE* **10**(8): e0136159. doi:10.1371/journal.pone.0136159

17. R. Chaubey, R. J. Andrew, N. C. Naveen, **R. Rajagopal**, B. Ahmad and V. V. Ramamurthy (2015) Morphometric Analysis of Three Putative Species of *Bemisia tabaci* (Hemiptera: Aleyrodidae) Species Complex From India. *Annals of Entomol. Soc. America* DOI <http://dx.doi.org/10.1093/aesa/sav028>
18. Chadha A, Mehto S, Selvakumar A, Vashishta M, Kamble SS, Popli S, **R. Rajagopal**, Singh Y, Natarajan K.(2015) Suppressive role of neddylation in dendritic cells during *Mycobacterium tuberculosis* infection. *Tuberculosis (Edinb)*. 95:599-607.
19. Ellango R. Singh S.T., Rana V.S., Priya N.G., Raina H.S., Chaubey R., Naveen N.C., Mahmood R., Ramamurthy V.V., Asokan R., **Rajagopal R.** 2015. Distribution of *Bemisia tabaci* Genetic Groups in India. *Environ. Entomol.* 44 (4) 1258-1264. DOI: <http://dx.doi.org/10.1093/ee/nvv062>
20. Pandey N., **Rajagopal R.** 2016. Molecular characterization and diversity analysis of bacterial communities associated with *Dialeurolonga malleiswaramensis* (Hemiptera: Aleyrodidae) adults using 16S rDNA amplicon pyrosequencing and FISH. *Insect Science*, 23 (5) 704-711. DOI: [10.1111/1744-7917.12220](https://doi.org/10.1111/1744-7917.12220)
21. Raina, H.S. Rawal V., Singh, S., Daimei G., Shakarad, M., **Rajagopal R.** 2015. Elimination of *Arsenophonus* and decrease in the bacterial symbionts diversity by antibiotic treatment leads to increase in fitness of whitefly, *Bemisia tabaci*. *Infect Genet Evol* **32**: 224-230. DOI:[10.1093/ee/nvv062](https://doi.org/10.1093/ee/nvv062)
22. R Chaubey, RJ Andrew, NC Naveen, **Rajagopal R.**, VV Ramamurthy -, 2015 Life history traits of three cryptic species Asia I, Asia II-1 and Asia II-7 of *Bemisia tabaci* (Hemiptera: Aleyrodidae) reconfirm their genetic identities. *Florida Entomologist*. **98**: 254-259. DOI: <http://dx.doi.org/10.1653/024.098.0142>
23. Goswami,R., Mukherjee S., Rana V.S., Saha D.R., **Rajagopal R.**, Padhy P.K., Mazumder. S. 2015 Isolation and Characterization of Arsenic-Resistant Bacteria from Contaminated Water-Bodies in West Bengal, India. *Geomicrobiology Journal* **32**: 17-26. DOI:10.1080/01490451.2014.920938
24. Banerjee C, Singh A., Das TK, **Rajagopal R.**, Shrivastava A., Mazumder S. 2014. Ameliorating ER-stress attenuates *Aeromonas hydrophila*-induced mitochondrial dysfunctioning and caspase mediated HKM apoptosis in *Clarias batrachus*. *Scientific Reports* **4**, Article nu: 5820 doi:10.1038/srep05820
25. Banerjee C, Khatri P, **Rajagopal R**, Bhatia H, Datta M, Mazumder S. 2014. Role of Calmodulin-Calmodulin Kinase II, cAMP/Protein Kinase A and ERK 1/2 on *Aeromonas hydrophila*-Induced Apoptosis of Head Kidney Macrophages. *PLoS Pathog* 10(4): e1004018. doi:10.1371/journal.ppat.1004018
26. Pandey, N., Singh, A., Rana, V.S. and **Rajagopal, R.** 2013. Molecular Characterization and Analysis of Bacterial Diversity in *Aleurocanthus woglumi* (Hemiptera: Aleyrodidae). *Environmental Entomol.* 42(6): 1257 – 1264. DOI: <http://dx.doi.org/10.1603/EN13110>
27. Singh, S.T., Kumar, J. Thomas, A., Ramamurthy, V.V. and **Rajagopal, R.** 2013. Detection and Localization of *Rickettsia sp* in Mealybug. *Environmental Entomol.* 42(4): 711 – 716. DOI: <http://dx.doi.org/10.1603/EN13032>
28. Adlakha N., Kushwaha H., **Rajagopal R.**, and Yazdani S.S. 2013. Draft Genome Sequence of the *Paenibacillus* sp. ICGEB2008 (MTCC 5639) isolated from the gut of *Helicoverpa armigera*. *Genome Announcements*. 1 (1) e00026-12. <http://genomea.asm.org/content/1/1/e00026-12.full.pdf+html>
29. Sangwan N, Lata P, Dwivedi V, Singh A, Niharika N, Kaur J., Anand S., Malhotra J., Jindal S., Nigam A., Lal D., Dua A., Saxena A., Garg N., Verma M., Kaur J., Mukherjee U., Gilbert J.A., Dowd S.E., **Rajagopal R.**, Khurana P., Khurana J.P. and Lal R. 2012. Comparative Metagenomic Analysis of Soil Microbial Communities across Three Hexachlorocyclohexane Contamination Levels. *PLoS ONE* 7(9): e46219. <http://dx.plos.org/10.1371/journal.pone.0046219>
30. Rana, V.S., Singh, S.T., Gayatri Priya, N., Kumar, J. and **Rajagopal, R.** 2012. *Arsenophonus* GroEL interacts with CLCuV and is localized in midgut and salivary gland of whitefly *B. tabaci*. *PLoS ONE* 7(8): e42168. <http://dx.plos.org/10.1371/journal.pone.0042168>
31. Malhotra, J., Dua, A., Saxena, A., Sangwan, N., Mukherjee, U., Pandey, N., **Rajagopal, R.**, Khurana, P., Khurana J.P. and Lal R. 2012. Draft Genome Sequence of *Acinetobacter sp.* HA isolated from Gut of Polyphagous Insect Pest *Helicoverpa armigera*. *J. Bacteriol.* 194 (18), 5156-5156. doi: [10.1128/JB.01194-12](https://doi.org/10.1128/JB.01194-12)
32. Gayatri Priya, N., Pandey, N. and **Rajagopal, R.** 2012. LNA probes substantially improve detection of bacterial endosymbionts in whole mount of insects by fluorescent in-situ hybridization. *BMC Microbiology* 12 (1), 81. <http://www.biomedcentral.com/1471-2180/12/81/abstract>
33. Singhal, J., Agrawal, N., Vashishta, M., Gayatri Priya N., Tiwari, B.K., Singh, Y., **Rajagopal, R** and Natarajan, N. 2012. Suppression of Dendritic Cell Mediated Responses by Genes in the Calcium and Cysteine Protease Pathways During *Mycobacterium tuberculosis* Infection. *J. Biol. Chem.* (In Press). <http://www.jbc.org/cgi/doi/10.1074/jbc.M111.300319>
34. Singh, S.T., Gayatri Priya, N., Kumar, J., Rana, V.S., Ellango, R., Joshi, A., Priyadarshini, G., Asokan, R., **Rajagopal, R.** 2012. Diversity and Phylogenetic Analysis of Endosymbiotic Bacteria from Field Caught *Bemisia tabaci* from Different Locations of North India Based on 16S rDNA Library Screening. *Infection Genetics &*

Evolution. <http://dx.doi.org/10.1016/j.meegid.2012.01.015>

35. Malhotra, J., Anand, S., Jindal, S., **Rajagopal R**, Lal, R. 2012. Acinetobacter indicus sp. nov., isolated from hexachlorocyclohexane (HCH) dumpsite. *Int J Syst Evol Microbiol*. 10.1099/ijs.0.037721-0
36. Gayatri Priya, N., Ojha, A., Kajla, M.K., Raj, A., **Rajagopal, R**. 2012. Host Plant induced variation in gut bacteria of *Helicoverpa armigera*. *PLoS ONE*. 7(1): e30768. <http://dx.plos.org/10.1371/journal.pone.0030768>.
37. Banerjee, C., Goswami, R., Datta, S., **Rajagopal, R**, Mazumder, S. 2011. Arsenic-induced alteration in intracellular calcium homeostasis induces head kidney macrophage apoptosis involving the activation of Calpain 2 and ERK in *Clarias batrachus*. *Toxicol. Appl. Pharmacol*. doi:10.1016/j.taap.2011.07.007
38. Kapoor, M., **Rajagopal, R**. 2011. Enzymatic bioremediation of organophosphorus insecticides by recombinant organophosphorous hydrolase. *International Biodeterioration & Biodegradation*, doi:10.1016/j.ibiod.2010.12.017
39. Adlakha, N., **Rajagopal, R**, Kumar, S., Reddy, V.S., Yazdani, S.S. 2011. Synthesis and characterization of chimeric proteins based on cellulase and xylanase from an insect gut bacterium. *Appl Environ Microbiol*. 77(14): 4859-66.
40. Arora, N., Hoque, M.E., **Rajagopal, R**, Sachdev, B., Bhatnagar, R.K. 2009. Expression, purification and characterization of pro-phenol oxidase activating serine protease from *Spodoptera litura*. *Arch Insect Biochem Physiol*. 72, 61-73
41. Rani A., Sharma A., **Rajagopal R**, Adak T. and Bhatnagar R.K. (2009) Bacterial diversity analysis of larvae and adult midgut micro-flora using culture-dependent and culture-independent methods in lab-reared and field-collected *Anopheles stephensi*-an Asian malarial vector. *BMC Microbiology* 9: 96. doi:10.1186/1471-2180-9-96
42. **Rajagopal R**, Arora N., Sivakumar S., Rao NGV, Nimbalkar S.A. and Bhatnagar R.K. (2009) Resistance of *Helicoverpa armigera* to Cry1Ac toxin from *Bacillus thuringiensis* is due to improper processing of the protoxin. *Biochemical J*. 419: 309 – 316.
43. Sivakumar S., **Rajagopal R**, Raja Venkatesh, G. , Srivastava A. & Bhatnagar R.K. (2007) Knockdown of Aminopeptidase-N from *Helicoverpa armigera* larvae and in transfected Sf21 cells by Rna Interference reveals its functional interaction with *Bacillus thuringiensis* insecticidal protein Cry1Ac. *J. Biol. Chem*. 282 7312-7319.
44. **Rajagopal R**, Mohan S. and Bhatnagar, R.K. (2006). Direct Infection of *Spodoptera litura* by *Photobacterium luminescens* Encapsulated in Alginate Beads. *J. Invet. Pathol*. 93: 50 – 53.
45. **Rajagopal, R**,Thamilarasi, K., Raja Venkatesh, G. Srinivas, P., and Bhatnagar, R.K. (2005). Immune cascade of *Spodoptera litura*: cloning, expression and characterization of inducible pro-phenol oxidase. *Biochem Biophys. Res. Commu*. 337: 394 - 400.
46. Ahmad, T., **Rajagopal, R** and Bhatnagar, R.K. (2003). Molecular characterization of chitinase from polyphagous pest *Helicoverpa armigera*. *Biochem. Biophys. Res. Commu*. 310: 188 – 195.
47. Arora, N., Ahmad, T., **Rajagopal R** and Bhatnagar, R.K. (2003). A constitutively expressed 36kDa exochitinase from *Bacillus thuringiensis* HD-1. *Biochem. Biophys. Res. Commu*. 307: 620 – 625.
48. **Rajagopal R**, Agrawal N., Selvapandian A., Ahmad S. & Bhatnagar R. K. (2003) Recombinantly expressed isozymic aminopeptidases from *Helicoverpa armigera* midgut display differential interaction with closely related cry proteins. *Biochemical J*. 370: 971 - 978
49. Mohan S., **Rajagopal R** and Gaur H.S. (2003) Foliar application of *Photobacterium luminescens*, symbiotic bacteria from entomopathogenic nematode *Heterorhabditis indica*, to kill cabbage butterfly *Pieris brassicae*. *Current Science*. 84 (11): 1397.
50. **Rajagopal R**, Sivakumar S., Agrawal N., Malhotra P.& Bhatnagar R.K. (2002) Silencing of midgut aminopeptidase N of *Spodoptera litura* by dsRNA establishes its role as Bt toxin receptor. *J. Biol. Chem*. 277 46849-46851.
51. **Rajagopal R** and Bhatnagar R.K.(2002) Insecticidal toxic proteins produced by *Photobacterium luminescens akhurstii*, the symbiont of *Heterorhabditis indica*. *J. Nematology* 34 (1) 23 – 27.
52. Reddy VS, Leelavathi S, Selvapandian A, **Rajagopal R**, Giovanni F, Shukla V and Bhatnagar RK. (2002) Analysis of chloroplast transformed tobacco plants with Cry1 Ia5 under rice psbA transcriptional elements reveal high level expression of Bt toxin without imposing yield penalty and stable inheritance of transplastome. *Molecular Breeding* 9: 259 – 269.
53. **Rajagopal R**, Sirohi A and Dasgupta DR (2002) Pathogenesis related proteins induced by *Meloidogyne incognita* and *Heterodera cajani* in Cowpea. *Indian J. Nematology*. (accepted, in press)
54. Selvapandian A, Arora N, **Rajagopal R**, Jalali SK, Venkatesan T, Singh SP and Bhatnagar RK (2001) Toxicity analysis of N- and C- terminus-deleted vegetative insecticidal protein from *Bacillus thuringiensis*. *Appl & Env. Microbiol*. 67 (12): 5855-5858.
55. Dasgupta DR, Ganguly,AK, Sirohi A, Pankaj and **Rajagopal R**. (1995) Plant parasitic nematode management: physiological and molecular approaches. In Swarup. Dasgupta & Gill (Ed) *Nematode pest management, an*

<p><u>appraisal of eco-friendly approaches</u>, pp 12 – 27. Nematological Society of India, New Delhi.</p> <p>56. Ganguly AK, Rajagopal R. and Dasgupta DR. (1993) Studies on two oxidoreductases and polyphenol oxidase from cowpea infected by <i>M. incognita</i> Race 1. <u>Indian J. Nematol.</u> 22: 139-145.</p> <p>57. Rajagopal R., Ganguly AK and Dasgupta DR. (1992) Qualitative and quantitative changes in protein in cowpea inoculated with the root knot nematode <i>M. incognita</i> <u>Indian J. Nematol</u> 21: 113 – 122.</p>
<p>Publications in the Last one year</p>
<p>1. Rana, V.S., Popli, S., Saurav, G.K., Raina, H.S., Jamwal, R., Chaubey, R., Ramamurthy, V. V., Natarajan, K. and Rajagopal, R. (2019). Implication of the Whitefly, <i>Bemisia tabaci</i>, Collagen Protein in Begomoviruses Acquisition and Transmission. <u>Phytopathology</u> 109(8), 1481-1493.</p> <p>2. Saurav, G.K., Rana, V.S., Popli, S., Daime, G. and Rajagopal R. (2019). A thioredoxin-like protein of <i>Bemisia tabaci</i> interacts with coat protein of begomoviruses. <u>Virus Genes</u> 55: 356. https://doi.org/10.1007/s11262-019-01657-z</p>
<p>Conference Organization/ Workshop/ Presentations (in the last three years)</p>
<p>Research Projects (Major Grants/Research Collaboration)</p>
<p>1. World Bank – NAIP project “Studies on the ecology and taxonomy of whitefly <i>Bemisia tabaci</i> in India, its symbiosis with various obligate and facultative bacterial symbionts.” 2009 – 2014.</p> <p>2. DU/ DST – PURSE Grant from 2009-2012. “Understanding Individual & Community Genomes of Bacteria using New Generation Sequencing Technologies”</p> <p>3. NFBSFAR-ICAR project “The role of bacterial endosymbionts in shaping the insect-virus relationship in <i>Bemisia tabaci</i>” 2013-2016</p> <p>4. DST project “Understanding Insect Vector-Pathogen Interaction: Identification of Dengue Virus Envelope Protein Receptor in <i>Aedes aegypti</i>..” 2017-2020</p>
<p>Awards and Distinctions</p>
<p>1. Third Colman Lecture, 2016. (UAS, GKVK, Bangalore)</p> <p>2. Indian Agricultural Research Institute Junior Research Fellowship</p> <p>3. Indian Agricultural Research Institute Senior Research Fellowship</p> <p>4. National Associateship, Department of Biotechnology, Govt. of India</p> <p>5. Selected for the MR4 International bioinformatics workshop on Malaria Vectors 2003, (sponsored by NIAID, NIH, USA), at John’s Hopkins University, Baltimore, Maryland.</p> <p>6. Scopus Young Scientist Award, 2008.</p>

Signature of Faculty Member

- You are also requested to also give your complete resume as a DOC or PDF file to be attached as a link on your faculty page.