JOLLY BASAK

ALEXANDER VON HUMBOLDT FELLOW

Associate Professor,
Department of Biotechnology, (DBT sponsored Biotechnology Programme)
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EDUCATION QUALIFICATION

Ph.D. (2005) Division of Plant Biology, Bose Institute, Kolkata, INDIA.
Ph.D. Supervisors: Prof. Amita Pal and Dr. Tapas Kumar Ghose.
Thesis title: Genetic analysis of Yellow Mosaic Virus-tolerance in *Vigna mungo*.

M.Sc (1999) Biochemistry, University of Calcutta.

B.Sc (1997) Chemistry(Major), Physics, Mathematics, University of Calcutta.

PROFESSIONAL APPOINTMENTS

1. Associate Professor (23/5/2021 – till date),
Department of Biotechnology, Visva Bharati, Santiniketan 731235, India.

2. Assistant Professor (23/5/2009 – 23/5/2021),
Department of Biotechnology, Visva Bharati, Santiniketan 731235, India.

3. Postdoctoral Research Fellow (Jan 2009 – March 2009)

Leibniz Institute of Plant Biochemistry, Weinberg 3, 06120 Halle (Saale), Germany.

4. Alexander von Humboldt Fellow (June 2006-Dec 2008)

Leibniz Institute of Plant Biochemistry, Weinberg 3, 06120 Halle (Saale), Germany.

5. Postdoctoral Research Fellow (Feb-May 2006)

Ecologie, Systematique, Evolution, UMR 8079, Bat 360, Universite Paris-Sud, Orsay 91405, France.

6. Postdoctoral Research Assistant, (Sept-Dec 2005)

Cell and Developmental Biology, School of Life Sciences, University of Dundee, Dundee, DD1 5EH.

RESEARCH INTEREST

Primarily to understand the molecular mechanism of highly complex host-pathogen interaction system in plants at the genomic and transcriptomic level. Specific aims are to unravel the molecular mechanism of leguminoseae-MYMIV interaction. Genomic techniques like SSH, NGS, MSAP are routinely done in the lab to identify and characterise differentially expressed genes and non-coding RNAs including miRNAs and lncRNAs. Identified genes and non-coding RNAs are characterized and validated. Use of gene editing technique like CRISPR-CAs to delineate the molecular mechanism of complex plant-pathogen interaction is underway.

TEACHING EXPERIENCE

At the Postgraduate level: Genomics, Biochemistry, Bioinformatics.

PROJECT AWARDED

1. Title of the project: cDNA-AFLP to identify differentially expressed genes in *Vigna mungo* upon inoculation with Mungbean yellow mosaic India virus

Funding Agency: **DST**, Duration: 24.3.2012-23.3.2015, Amount: Rs. 24 Lacs

2. Title of the project: Identification and characterization of *Phaseolus vulgaris* microRNAs differentially expressed in biotic stress condition by deep sequencing of small RNA transcriptomes

Funding agency: **DBT**, Duration: 01.07.2012-11.12.2015, Amount: Rs. 44 Lacs

3. Title of the project: Identification and characterization of *Phaseolus vulgaris* long non-coding RNAs responsive to mungbean yellow mosaic India virus infection

Funding agency: **CSIR**, Duration: 01.05.2017-30.04.2020, Amount: Rs. 31 Lacs

4. Title of the project: CRISPR/Cas9 mediated knock out of specific microRNAs in mungbean yellow mosaic India virus susceptible Phaseolus vulgaris to develop MYMIV tolerance.

Funding agency: **DST-SERB**, Duration:01.09.2021-31.08.2024, Amount: Rs. 38 Lacs

RESEARCH GUIDENCE

PhD completed 5, four PhD scholars pursuing their PhD research

M.Sc Project thesis: Completed 25 students.

HONOURS AND AWARDS

- Recipient of Alexander von Humboldt return Fellowship, 2016.
- Recipient of International Travel Scheme grant from DST-SERB to attend a Biophysical Society Conference in Istanbul, Turkey, 2014.
- Recipient of Alexander von Humboldt Travel Fellowship to attend a EPSO conference at Freiburg, Germany, 2012.
- Recipient of Young Scientist travel grant from DST to attend a EPSO Conference in Finland, 2010.
- Recipient of Alexander von Humboldt Fellowship, 2006.
- Recipient of Postdoctoral Fellowship, University Paris-Sud, Orsay, France, 2006 (declined).
- Recipient of Sir Nilratan Sarkar Best PhD Student Award of Bose Institute, 2004.
- National Eligibility Test (Council of Scientific and Industrial Research-INDIA), 2000.
- Graduate Aptitude Test in Engineering (Indian Institute of Technology-KGP), 1999.
- Recipient of National Scholarship (Govt. of India), 1994

LIST OF PUBLICATIONS

1. Venkatesan A, **Basak J** and Bahadur RP. 2025. pmiRScan: a LightGBM based method for prediction of animal premiRNAs. ***Functional & Integrative Genomics*** 25:9. **IF-3.9**

2. Roy Chowdhury M, Chatterjee C, Ghose D, Mukherjee J, Shaw S, **Basak J***. 2024. Deciphering miRNA-lncRNA-mRNA interaction through the experimental validation of miRNAs, lncRNAs and miRNA targets on mRNAs in *Cajanus cajan*. ***Plant Biology***. 26: 560–567. **IF-3.9.**

3. Chowdhury MR, Kumar A, Besra A, Bahadur RP, **Basak J***. 2024. Elucidating role of long noncoding RNAs of *Tamarindus indica* Linn. in post-transcriptional gene regulation. ***Plant Science Today***. https:/doi.org/10.14719/pst.3057. **IF-0.9**
4. Nithin C. Mukherjee S, **Basak J** and Bahadur RP. 2022. NCodR: A multi-class support vector machine classification to distinguish non-coding RNAs in Viridiplantae ***Quantitative Plant Biology***, 3:e23, 1–11; https://dx.doi.org/10.1017/qpb.2022.18. **IF-1.2**
5. Roy Chowdhury M, Bahadur RP and. **Basak J***. 2021. Genome-wide prediction of cauliflower miRNAs and lncRNAs and their roles in post-transcriptional gene regulation. ***Planta***. 254(4):72. **IF - 4.12**
6. Besra A, **Basak J***. 2021. Efficient regeneration protocol for callus and shoot induction from recalcitrant *Phaseolus vulgaris* L. explants under optimum growth conditions. ***Plant Science Today***. 8: 786-794. **IF-0.9**
7. Patwa N, Chatterjee C and **Basak J***. 2020. Differential responses of *Phaseolus vulgaris* cultivars following mungbean yellow mosaic India virus infection. ***Physiol Mol Biol Plants***. https://doi.org/10.1007/s12298-019-00741-w. **IF – 2.01**
8. Patwa N, Chakraborty B & **Basak J***. 2020. Expression study of an Amino Acid Permease-like gene in *Phaseolus vulgaris* L. ***Plant Science Today***, 7(2): 251-256. **IF-0.9**
9. Patwa N, Kumari V and **Basak J***. 2020. Identification of new strain of mungbean yellow mosaic virus infecting French bean (*Phaseolus vulgaris* L.) in Santiniketan. ***Indian Journal of Biotechnology***. Vol. 19, 113-117. **IF – 0.4**
10. Roy Chowdhury M, **Basak J*** and Bahadur RP*. 2020. Elucidating the functional role of predicted miRNAs in post-transcriptional gene regulation along with symbiosis in *Medicago truncatula*. ***Current Bioinformatics,*** 108-120. **IF – 2.1**
11. Roy Chowdhury M and **Basak J***. 2019. Tiny yet indispensable plant microRNAs are worth to explore as key components for combating genotoxic stresses. ***Frontiers in. Plant Science***, Vol 10, Pg 1-7. **IF – 4.1**
12. Besra A and **Basak J***. 2019. In silico protein-protein interactions: An emerging research area to study host-pathogen interaction. ***Research Journal of Biotechnology.*** Vol. 14 (7), 178-188.
13. Patwa N, Nithin C, Bahadur RP and **Basak J***. 2019. Identification and characterization of differentially expressed *Phaseolus vulgaris* miRNAs and their targets during mungbean yellow mosaic India virus infection reveals new insight into Phaseolus-MYMIV interaction. ***Genomics***. **Vol 111 (6), 1333-1342. IF 6.2**
14. Chakraborty N and **Basak J***. 2018. Comparative transcriptome profiling of a resistant vs. susceptible *Vigna mungo* cultivar in response to Mungbean yellow mosaic India virus infection reveals new insight into MYMIV resistance. ***Current Plant Biology.*** https://doi.org/10.1016/j.cpb.2018.11.001. Vol 15, 8-24. **IF-5.4**

15. Chakraborty N and **Basak J***. 2018. Exogenous application of methyl jasmonate induces defense response and develops tolerance against mungbean yellow mosaic India virus in *Vigna mungo*. ***Functional Plant Biology***, 46(1):69-81. doi: 10.1071/FP18168. **IF – 3.1**

16. Chakraborty N and **Basak J***. 2018. Molecular and biochemical characterization of mungbean yellow mosaic India virus resistance in leguminous host *Vigna mungo*. ***J Plant Biochem Biotech***. 27(3):318–330. **IF 1.03**

17. Patwa. N and **Basak. J***. 2018. Plant microRNAs - Tiny yet significant regulators of disease. Accepted in Research Journal of Biotechnology. ***Res J Biotech.*** 13 (6):85-92. **IF-0.2**

18. Nithin C, Thomas A, **Basak J*** and Bahadur RP*. 2017. Genome-wide identification of miRNAs and lncRNAs in Cajanus cajan. ***BMC Genomics***, 18:878. **IF 3.5**

19. Basak J*, Roy Chowdhury M and Bahadur RP. 2017. A Molecular Dissection of Non-Host Resistance in Plants. ***Res J Biotech,*** 12(10):73-83. **IF-0.2**

20. Chakraborty N and **Basak J***. 2017. Transcriptomics: A successful approach to unravel the molecular mechanism of plant-pathogen interaction in post-genomic era. ***Res J Biotech***. 12:90-100. **IF-0.2**

21. Bej S and **Basak J*.** 2016. Phylogenetic analysis of ATP-Binding Cassette (ABC) protein in the Fabaceae family. ***Res J Bioinfo***. Vol. 3, 1-11.

22. Basak J*. 2016. Tomato Yellow Leaf Curl Virus: A Serious Threat to Tomato Plants World Wide. ***J Plant Pathol Microbiol***, 7: 346. doi:10.4172/2157-7471.1000346.

23. **Basak J*** and Nithin C. 2015. Targeting non-coding RNAs in Plants with the CRISPR-Cas technology is a challenge yet worth accepting. ***Front. Plant Sci.*** 6:1001. doi:10.3389/fpls.2015.01001. **IF – 4.1**

24. Nithin C, Thomas A, Patwa N, Bahadur RP and **Basak J***. 2015. Computational prediction of miRNAs and their targets in *Phaseolus vulgaris* using simple sequence repeat signatures. ***BMC Plant Biology***. 15:140 **IF – 3.7.**

25. Bej S and **Basak J***. 2014. MicroRNAs: The Potential Biomarkers in Plant Stress Response. ***Am J Plant Sc***. 5: 748-759.

26. Bahadur RP and **Basak J*.** 2014. Molecular modeling of protein-protein interaction to decipher the structural mechanism of nonhost resistance in rice. ***J Bio Mol Str Dyn***. 32: 669-81. **IF – 3.3**

27. Singh J, Hembram P and **Basak J***. 2014. Potential of *Vigna Unguiculata* as a phytoremediation plant in the remediation of Zn from contaminated soil. ***Am J Plant Sc***. 5: 1156-1162.

28. Hinsinger DD, **Basak J**, Gaudeul M, Cruaud C, Bertolino P, Frascaria-Lacoste N and Bousquet J. 2013. The Phylogeny and Biogeographic History of Ashes (*Fraxinus*, Oleaceae) Highlight the Roles of Migration and Vicariance in the Diversification of Temperate Trees. ***PLOS ONE***. 8: 1-14. **IF – 2.8**

29. Lodha TD, Hembram P, Tep N and **Basak J***. 2013. Proteomics: A successful approach to understand the molecular mechanism of plant-pathogen interaction. ***Am J Plant Sc***. 4: 1212-1226.

30. Lodha T and **Basak J*.** 2012**.** Plant-pathogen interaction: What microarray tells about it? ***Mol Biotech***. **50**: 87-97. **IF – 1.7**

31. Kundagrami S, **Basak J**, Maiti S, Kundu A, Das B, Ghose TK and Pal A. 2009. Agronomic and Molecular Characterization of MYMIV Tolerant Mutant Lines of *Vigna mungo* and the Susceptible Cultivar T9: Inheritance Pattern Analysis of the Resistance Trait. ***Int J Plant Breed Genet***. **3:** 1-10.

32. Pal A, Chakrabarti A and **Basak J.** 2007. New motifs within the NB-ARC domain of R proteins: Probable mechanisms of integration of geminiviral signatures within the host species of Fabaceae family and implications in conferring disease resistance. ***J Theor Biol***. **246:** 564-73. **IF – 1.9**

33. Das M, Bhattacharya S, **Basak J**, and Pal A. 2007. Phylogenetic relationships among the bamboo species as revealed by morphological characters and polymorphism analyses. ***Biologia Plantarum***. **51:** 667-672. **IF – 1.4**

34. **Basak J**, Kundu S and Pal A. 2007. Phylogenetic analysis of divergent structural organization of nucleotide binding domain encoded by resistance genes and gene homologs in the family Fabaceae. ***Indian J Biotech***. **6:** 9-17. **IF – 0.34**

35. **Basak J*** and Bahadur RP. 2006. Theoretical model of the three dimensional structure of a disease resistance gene homolog encoding resistance protein in *Vigna mungo*. ***J Biomol Str Dyn*. 24:** 123-30. **IF – 3.3**

36. **Basak J**, Kundagrami S, Ghose TK and Pal A. 2004. Development of Yellow Mosaic Virus (YMV) resistance linked DNA marker in *Vigna mungo* from populations segregating for YMV reaction. ***Mol Breed***. **14:** 375-383. **IF – 1.9**

BOOK CHAPTERS

1. **Ghose D,** Roy Chowdhury M, **Basak J***. 2022. Non-coding RNAs are emerging as key players of gene regulation. Published in "**Topics on Biodiversity, Biotechnology and Bioinformatics**". 543-577 (Edited and published by Prof. Samit Roy). ISBN: 978-93-5620-397-6.

2. Chakrabarty N, Chakraborty P, Bandopadhyay R, **Basak J***. 2021. Deciphering the Molecular Mechanisms of Biotic Stress Tolerance Unravels the Mystery of Plant-Pathogen Interaction **Springer book 'Sustainable Agriculture Reviews 51: Legume Agriculture and Biotechnology. Vol 2'.** 978-3-030-68827-1, 508895. Praveen Guleria et al. (Eds)

3. Bej S and **Basak J***. 2017**.** Abiotic stress induced epigenetic modifications in plants: How much do we know? **Springer book 'Plant Epigenetics' Volume 8, Chapter 24**

(2017) (Editors Nikolaus Rajewsky, Stefan Jurga and Jan Barciszewski) of the Springer Series on "RNA Technologies". ISBN:978-3-319-55519-5.

4. Maiti S, **Basak J** and Pal A. 2014. Current understanding on plant R-genes/proteins and mechanisms of defense responses against biotic stresses. In: Review of plant pathology, Vol. 6, Indian Society of Mycology and Plant Pathology, Scientific Publishers (India), Jodhpur pp. 93-126

5. **Basak J**, Das M, Ghose TK and Pal A. 2004. An Efficient and High Yielding Method of PCR Compatible DNA Isolation for Biotechnological Investigations from Economically important Plants. *Biotechnology for a better future (L. D'Souza,M. Anuradha, N. Shashikiran, S. Hegde and K. Rajendra (Eds). SAC Publications, Mangalore, India.*107-113.

GENE & PROTEIN SEQUENCES SUBMITTED IN THE GenBank and PDB

1. *Vigna mungo* disease resistance protein CYR1 (CYR1) gene, partial cds.

   Maiti S, **Basak J**, Kundagrami S, Kundu A and Pal A.

   GenBank Accession No. **HQ704838** and **ADU57969**.

2. *Vigna mungo* cultivar WBU-108 putative disease resistance protein (YR4) gene, partial cds.

   Maiti S, **Basak J**, Kundagrami S, Kundu A and Pal A.

   GenBank Accession No. **EU258700** and **ABY27013**.

3. *Vigna mungo* cultivar WBU-108 disease resistance protein CYR1 (YR2) gene, partial cds

   Maiti S, **Basak J**, Kundagrami S, Kundu A and Pal A.

   GenBank Accession No. **EU258701** and **ABY27014**.

4. Partial resistance gene and protein (VMYR1) of *Vigna mungo* conferring resistance against yellow mosaic virus.

   Basak J, Kundagrami S, Ghose TK and Pal A.

   GenBank Accession No. **AY297425** and **AAQ63168**.

5. *Vigna mungo* yellow mosaic virus resistant gene candidate 2 and protein.

   Pal A, **Basak J** and Ghose TK.

   GenBank Accession No. **AY301991** and **AAQ75745**.

6. *Vigna radiata* yellow mosaic virus resistant gene candidate 1 and protein

   Basak J and Pal A.

   GenBank Accession No. **AY301990** and **AAP57566**.

7. *Vigna mungo* amino acid permease gene, partial CDS and protein

   Basak J and Pal A.

GenBank Accession No. **AY634621** and **AAT46463**.

8. High intra-species variation in PHANTASTICA gene sequence in *Fraxinus excelsior* L. and *Fraxinus angustifolia* Vahl (Oleaceae).

Basak J, Fernandez-Manjarres JF, Gerard PR and Frascaria-Lacoste N.
GenBank Accession Nos. **DQ679524**-**DQ679537** (**14 submissions**).

9. The phylogeny of the genus *Fraxinus* (Oleaceae) based on plastid, nuclear ribosomal and nuclear low-copy DNA sequences.

Hinsinger D, **Basak, J**, Gaudeul M, Cruaud C, Bertolino P, Frascaria-Lacoste N and Bousquet J.

GenBank Accession Nos. **HQ705200**-**HQ705604** (**405 submissions**), **HM242423-HM242650 (228 submissions), HM242719- HM242846 (128 submissions).**

THEORETICAL MODEL SUBMITTED IN THE PDB

Theoretical model of the three-dimensional structure of a disease resistance gene homolog encoding resistance protein from *Vigna mungo*

Basak J, Bahadur RP, Pal A and Mukhopadhyay C.

PDB code: **1W71**

MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES:

1. Life member of Indian Science Congress Association.
2. Life member of Indian Society of Mycology and Plant Pathology.
3. Life member of Alexander von Humboldt Foundation, Germany.

REVIEWER OF THE JOURNALS

Scientific Reports (NPG)

PLOS One (PLOS)

BMC Plant Biology (BMC)

Plant Biology (Wiley)

Frontiers in Plant Science (Frontiers)