

Dr. Amol Sarjerao Phule



Designation: **Assistant Professor**

Email ID: **amol.phule@dpu.edu.in**

Qualification: **Ph.D. (Agriculture) Molecular Biology and Biotechnology**

Area of Specialization: **Molecular Biology and Biotechnology**

Experience: **6 Years Research Experience**

RESEARCH INTEREST

- Functional genomics of water deficient (aerobic and drought) tolerance in rice.
- Molecular breeding for biotic stress tolerance in cereal crops (MAS, MABB and GWAS).
- Functional genomics and genome editing for biotic and abiotic stress management in crop plants.
- Plant - Microbe (*Diazotrophs*) interaction for augmenting nitrogen needs in crop plants.
- Genome sequencing and annotation of important microbes for sustainable agriculture.
- Bioinformatics or computational based analysis of gene families in plants and microbes.

EDUCATIONAL QUALIFICATIONS

Ph.D. (Agriculture) Molecular Biology and Biotechnology (May, 2018)

✚ University: Professor Jayashankar Telangana State Agricultural University, Hyderabad and ICAR - Indian Institute of Rice Research, Hyderabad.

✚ Thesis Title: Molecular and Physiological Insights into the Response of Rice to Aerobic Conditions.

✚ Supervisor: **Dr. P. Ananda Kumar** (Scientist Emeritus, ICAR-IIRR; Former Director, ICAR-IIRR, Hyderabad and ICAR-NIPB, New Delhi).

M.Sc. Biotechnology (2012)

- ✚ **Thesis Title:** Molecular Marker-Assisted Selection for Biotic Stress Tolerance in Rice.
- ✚ **University:** Tamil Nadu Agricultural University, Coimbatore (Tamil Nadu).
- ✚ **Supervisor:** Dr. N. Kumaravadivel (Professor & Head, CPMB & B, TNAU, Coimbatore).

B.Sc. Agricultural Biotechnology (2010)

- ✚ **University:** Vasantao Naik Marathwada Krishi Vidyapeeth, Parbhani (Maharashtra)
- ✚ **Dissertation Title:** Expression of green fluorescent protein (GFP) in *E. coli*.

ACADEMIC AND RESEARCH EXPERIENCE

I. Academic experience

Assistant Professor (April, 2023 to Present)

- ✚ **University / Institute:** Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Dr. D. Y. Patil Vidyapeeth, Pune, India.
- ✚ **Role:** Academic and Research

II. Post-Doctoral Research Experience (June, 2018 to March, 2023)

Post-Doctoral Research Associate

- ✚ **Organization:** ICAR-Indian Institute of Rice Research, Hyderabad (Telangana State).
- ✚ **Role:** Research and Development
- ✚ **Research Project:** ICAR- Genetic modifications to improve biological nitrogen fixation for augmenting nitrogen needs of rice.

II. Doctoral Research (August, 2013 to May, 2018)

Ph.D. (Agriculture) Molecular Biology and Biotechnology

- ✚ **Thesis Title:** Molecular and physiological insights into the response of rice to aerobic conditions.

III. Senior Research Fellow (January, 2013 to August 2013)

- ✚ **Role:** Research and Development
- ✚ **Research Project:** Development of cotton varieties resistant to bacterial leaf blight (BLB) through marker assisted breeding.
- ✚ **Organization:** ICAR- Central Institute for Cotton Research, Nagpur (Maharashtra).

AWARDS AND ACHIEVEMENTS

1. Hold **All India 33th rank** and awarded fellowship for M.Sc. Agricultural Biotechnology programme by **Department of Biotechnology (DBT) and Jawaharlal Nehru University (JNU)** in the year 2010.
2. Hold **All India 36th rank** in ICAR-AIEEA-PG-2010 (JRF) for M.Sc. Agricultural Biotechnology programme by **Indian Council of Agricultural Research (ICAR)** in the year 2010.
3. Hold **State rank 6th rank** in MCAER-PG-2010 for M.Sc. Agricultural Biotechnology programme by **Maharashtra Council of Agriculture Education and Research (MCAER)** in the year 2010.
4. Qualified **ICAR-National Eligibility Test (NET)** in the year 2013.
5. Qualified **ICAR-AICE Senior Research Fellowship (AICE-SRF-PGS-2014)** for Ph.D. programme by **Indian Council of Agricultural Research (ICAR)** in the year 2014.
6. Awarded **UGC-National Fellowship for doctoral (Ph.D.)** programme by **University Grants Commission (UGC)** in the year 2014.
7. Awarded **UGC-National Junior Research Fellowship (NJRF)** for doctoral (**Ph.D.**) programme by **University Grants Commission (UGC)** in the year 2014.
8. Awarded **UGC-National Senior Research Fellowship (NSRF)** for doctoral (**Ph.D.**) programme by **University Grants Commission (UGC)** in the year 2016.

REVIEWER

- **International Journal of Plant and Soil Science**

SCIENTIFIC COMMITTEE MEMBER

- **Life member of the Society for Advancement of Rice Research (SARR), Hyderabad.**

PUBLICATIONS

I. Research Articles / Papers

1. Chaganti C*, **Phule AS***, Bandeppa S, Prasad Babu KV, Rajani G and Latha PC. **2023**. Silicate solubilizing and plant growth promoting endophytic bacteria interact with biogenic silica to impart heat stress tolerance in rice by modulating physiology and gene expression. *Frontiers in Microbiology* (IF: 6.06) (*Co-first author & equally contributed).
2. Revadi, Barbadikar, M, Magar, Balakrishnan, R, Channappa, Siddaiah, Madhav, M, Bharamappanavara, **Phule AS**, Diwan, D and Sundaram. **2023**. Genome-wide association studies in rice germplasm reveal significant genomic regions for root and yield-related traits under aerobic and irrigated conditions. *Frontiers in Plant Science*, 14. doi: 10.3389/fpls.2023.1143853 (IF: 6.62).
3. Saini MR, Chandran LP, Barbadikar KM, Sevanthi AMV, Chawla G, Kaushik M, Mulani E, **Phule AS**, Govindannagari R, Sonth B, Sinha SK, Sundaram RM and Mandal PK. **2022**. Understanding plant-microbe interaction of rice and soybean with two contrasting diazotrophic bacteria through comparative transcriptome analysis. *Frontiers in Plant Science*, 13:939395. <https://doi.org/10.3389/fpls.2022.939395> (IF: 6.62).
4. Padmashree R, Magar ND, Barbadikar KM, **Phule AS**, Honnappa, Senguttuvel P, Maganti SM, Anantha M Siddaiah, Balakrishnan D, Chanappa G, Manasa V and Lokesha R. **2022**. Phenotypic evaluation of seedling vigour-related traits in a set of rice lines. *Journal of Rice Research*. 15-(1). <https://doi.org/10.58297/PACY8180> (NAAS: 4.0).
5. Srija A, Latha PC, Tejashree M, Reddy KP, Triveni S, Bandeppa S, **Phule AS** and Venkatanna, B. **2022**. Identification and in vitro evaluation of environmental stress resilient plant growth promoting rhizobacterial consortia for rice (*Oryza sativa* L.). *International Journal of Environment and Climate Change*, 12(11), 3340-3354. <https://doi.org/10.9734/ijec/2022/v12i111384> (NAAS: 5.0).
6. Bandeppa S*, **Phule AS***, Barbadikar KM, Govindannagari R, Babu Prasad BMB, Kavuru VPB, Mandal PK, Sundaram RM and Chandran LP*. **2022**. Draft genome sequence of *Paenibacillus sonchi* IIRBNF1, a nitrogen-fixing and plant growth-promoting bacterium

- isolated from rice rhizosphere. *Microbiology Resource Announcements*, 19;11(5): e0012622. <https://doi.org/10.1128/mra.00126-22> (**IF: 1.0**) (*Co-first author & equally contributed).
7. Bandeppa S*, **Phule AS***, Rajani G, Babu KVP, Barbadikar KM, Babu, MBBP, Mandal PK, Sundaram RM and Latha PC. **2022**. Effect of nitrogen-fixing bacteria on germination, seedling vigour and growth of two rice (*Oryza sativa L.*) cultivars. *International Journal of Plant & Soil Science*, 34(16), 94-106. <https://doi.org/10.9734/ijpss/2022/v34i1631028> (**NAAS: 5.0**) (*Co-first author & equally contributed).
 8. **Phule AS**, Barbadikar KM, Sheshu Madhav M, Senguttuvel P, Subrahmanyam, D, Prasad Babu MBB and Ananda Kumar P. **2019**. RNA-seq reveals the involvement of key genes for aerobic adaptation in rice. *Scientific Reports*, 9: 5235. <https://doi.org/10.1038/s41598-019-41703-2> (**IF: 4.99**).
 9. **Phule AS**, Barbadikar KM, Sheshu Madhav M, Senguttuvel P, Subrahmanyam, D, Prasad Babu MBB and Ananda Kumar P. **2019**. Studies on root anatomy, morphology and physiology of rice grown under aerobic and anaerobic conditions. *Physiology and Molecular Biology of Plants*, 25: 192. <https://doi.org/10.1007/s12298-018-0599-z> (**IF: 3.02**).
 10. **Phule AS**, Barbadikar KM, Sheshu Madhav M, Senguttuvel P, Prasad Babu MBB and Ananda Kumar P. **2018**. Genes encoding membrane proteins showed stable expression in rice under aerobic condition: Novel set of reference genes for expression studies. *3 Biotech*, 8: 383. <https://doi.org/10.1007/s13205-018-1406-9> (**IF: 2.89**).
 11. Bandeppa S, Latha PC, **Phule Amol S**, Rajani G, Prasad Babu KV, Kalyani M Barbadikar, Chandrakala C, MBB Prasad Babu, Mandal PK and Sundaram RM. **2019**. Isolation, identification and characterization of efficient free-living nitrogen-fixing bacteria from rice ecosystem. *Journal of Rice Research*, 12(2): 38-44 (**NAAS: 4.05**, Citations: 2).
 12. Chandrakala C, Voleti SR, Bandeppa S, Rajani G, Prasad Babu KV, **Phule Amol S**, Sunil Kumar N and Latha P C. **2019**. Effect of ACC deaminase producing bacteria on germination and seedling growth of rice under heat stress. *Journal of Rice Research*, 12 (1): 45-51 (**NAAS: 4.05**).

13. Mote Kishor, **Phule Amol S**, Giri Yogesh and Thakur Harshad. **2016**. Effect of pre and post plant herbicidal weed management on growth analysis of transplanted rice (*Oryza sativa* L.). *Progressive Research: An International Journal*, 11: 2742-2745 (NAAS: **3.78**).
14. Mote Kishor, **Phule Amol S**, Giri Yogesh and Thakur Harshad. **2016**. Effect of pre and post plant herbicidal weed management on nutrient uptake of transplanted rice (*Oryza sativa* L.). *Progressive Research: An International Journal*, 11: 3084-3087 (NAAS: 3.78).
15. **Phule AS**, Kumaravadivel N, Krishnasamy V and Suresh S. **2014**. Genotypic screening of pyramided gall midge resistance genes using molecular marker-assisted selection in rice (*Oryza sativa* L.). *Progressive Research: An International Journal*, 9 (1): 320-322 (NAAS: **3.78**).
16. **Phule AS**, Kumaravadivel N, Krishnasamy V and Suresh S. **2014**. Genotypic screening of pyramided gall midge resistance genes (*Gm1* and *Gm4*) in rice (*Oryza sativa* L.). *Progressive Research: An International Journal*, 9 (2): 670-672 (NAAS: **3.78**).

II. Published Technical / Popular Articles

1. **Phule AS**, Rajani G, Latha PC, Bandeppa S. **2022**. Reverse breeding: A modern plant breeding approach for homozygous lines recreation. *Biomolecule Reports: An International eNewsletter*. BR/02/22/01.
2. **Bandeppa S**, **Phule AS**, Latha P. C, Manasa V, Gobinath R, Vijaya Kumar S and Samdhan Bagul. **2022**. Phosphate Solubilizing Microbes and Their Role in Sustainable Agriculture. *Biomolecule Reports: An International eNewsletter*. 6(4):1.
3. Barbadikar KM, Padamashree R, Magar ND, **Phule AS**, Sheshu Madhav M, Subrahmanyam D, Senguttuvel P, Ananda Kumar P. **2020**. Promising BPT-5204 mutant lines having robust root system architectures suitable for aerobic condition. *ICAR-IIRR Newsletter*. 18(2): 6-7.

BOOK CHAPTERS

1. Magar ND, Shah P, Harish K, Bosamia TC, Barbadikar KM, Shukla YM, **Phule Amol**, Zala HN, Madhav, MS, Mangrauthia SK, Neeraja CN and Sundaram RM. **2022**. Gene Expression and Transcriptome Sequencing: Basics, Analysis, Advances. In (Ed.), Gene Expression. *IntechOpen*. <https://doi.org/10.5772/intechopen.105929>.

2. Sonth Bandeppa, Kiran Kumar, Latha PC, Manjusha PGS, **Amol Phule**, Chandrakala C. **2022**. Phosphate-solubilizing microbial inoculants for sustainable agriculture, (Editors: Ravindra Soni, Deep Chandra Suyal, Ajar Nath Yadav, Reeta Goel), *In Developments in Applied Microbiology and Biotechnology*, Trends of Applied Microbiology for Sustainable Economy, Academic Press, pp 395-419, ISBN 9780323915953. <https://doi.org/10.1016/B978-0-323-91595-3.00010-0>.

CONFERENCE PROCEEDINGS

- Conference proceedings - 8

CERTIFICATIONS

- MS-CIT

EPIGEUM (Research Skill Courses)

- Plant Biotechnology
- Plant Tissue Culture
- Agricultural Biotechnology
- Molecular Biology
- Genomics, Transcriptomics and Proteomics
- Genetic Engineering
- Recombinant DNA Technology

CONFERENCES (Abstracts / Oral / Poster)

1. **Phule AS**, Kalyani M Barbadikar, Rajani G, Prasad Babu KV, Bandeppa S, Chandrakala C, Prasad Babu MBB, Mandal PK, Sundaram RM and Latha PC. **2019**. Transcriptome based identification of early responsive genes in rice root during interactions with *Gluconacetobacter diazotrophicus* and *Bradyrhizobium japonicum*. National Conference on Integrative Biochemistry and Biotechnology, November 8th - 9th . pp 113.
2. **Phule AS**, Rajani G, Prasad Babu KV, Kalyani M Barbadikar, Bandeppa S, Chandrakala C, Prasad Babu MBB, Mandal PK, Sundaram RM and Latha PC. **2019**. Expression profiling of SWEET gene family in rice (*Oryza sativa* L.) roots during early interactions with endophytic *Gluconoacetobacter diazotrophicus* and *Bradyrhizobium japonicum*. 4 International

- conference on Agriculture and Animal Husbandry (ICAAH-2019), August 28th -30th, 2019. pp. 113.
3. Rajani G, Prasad Babu KV, **Phule AS**, Chandrakala. C, Kalyani B, Bandeppa S, Mandal PK, Sundaram RM and Latha PC. **2018**. Interaction of rice with *G. diazotrophicus* and *B. japonicum*: Root colonization and effect on plant growth. International Symposium on Host-Pathogen Interaction, December 9th -12th, pp 454.
 4. **Phule AS**, Mote KJ and Shaikh, W. In Planta Transformation: A new approach for grain legume crops. In National conference, **2016**. Sep 10th -11th, Hyderabad ECOASPECT. pp 288.
 5. Kishor Mote, Praveen Rao V, Ramulu V, Avil Kumar K and **Amol Phule**. Effect of safe alternate wetting and drying method of water management on weed density of low land transplanted rice (*Oryza sativa L*). In National conference, **2016**. Sep 10th -11th, Hyderabad. ECOASPECT 2016. pp 182.
 6. **Phule AS** and Kumaravadivel N. Field screening of rice BC1F4 lines for resistance to gall midge (GM) *Orseolia oryzae*. In: International Rice Symposium, **2015**. Nov 18th-20th, Hyderabad. IRS 15. pp574.
 7. Attended international conference on '**Food Technology-Edition II-IICPT**' presented a poster entitled as 'Greening Food Processing Sector for Sustainable Safe Food Supply' on 30th-31st October, **2010**, Thanjavur.
 8. Attended international conference on '**Biotechnology and Global Warming**' ICBGW-2011 presented a poster entitled as 'Bioenergy: A Rope for Sustainable Future' on 10th -12th March, **2011**, Namakkal.

WORKSHOPS / TRAININGS

1. Training program on '**Metagenomic Data Analysis**' during September 19th-24th, 2022 organized by **ICAR-Indian Agricultural Statistics Research Institute (IASRI), New Delhi**.
2. Training program on '**Advanced Statistical Techniques for Data Analysis using R**' conducted during 3rd-15th January, 2022, organized by **ICAR-Indian Institute of Rice Research, Hyderabad**.
3. Training program on '**Transcriptomic Data Analysis**' during September 28th- 30th, 2021 organized by **ICAR-Indian Agricultural Statistics Research Institute (IASRI), New Delhi**.
4. Training program in '**Hands-On Training on CRISPR/Cas9 Mediated Gene-editing in**

Plants' during 3th -10th October, 2021, organized by Department of Plant Sciences, University of Hyderabad.

5. Participated in workshop on '**Gene Editing for Enhancing Plant Productivity and Stress Tolerance**' (10th -12th November, 2019) organized by **ICAR-IIRR, Hyderabad**.
6. Attended national workshop on '**Current Trends in Agricultural Bioinformatics**' during 22nd -24th September, 2015 organized by **ICAR-NAARM, Hyderabad**.
7. Participated in workshop on '**HACCP and GMP in Industries and ISO Certification**' at International conference on Food Technology-Edition II organized by **IICPT, Thanjavur** during 30th - 31st October, 2010.
8. Participated in workshop on '**Man and Medicinal Plants**' organized by Department of Botany, **Bharathiar University, Coimbatore** during 23rd - 24th February, 2012.

BIOINFORMATICS AND BIOTECHNOLOGY SKILLS

Biotechnology Skills

- Basic standard operating procedures of Molecular biology like DNA and RNA isolation, PCR, cDNA synthesis, Cloning, Agarose Gel Electrophoresis
- Tissue culture and Genetic transformation of crops or plants
- Proteomics studies and analysis
- Molecular Breeding (*viz.* MAS, MABB and GWAS) in crop plants
- Genotypic studies based on SSRs and SNPs (Molecular breeding) studies in crop plants
- Genome editing (CRISPR/Cas) in crop plants
- Next-generation sequencing analysis (*viz.* transcriptomics or RNA-seq, metagenomics and Whole genome sequencing) in crops
- Whole genome sequencing of bacteria's
- Quantitative Real-Time PCR (qPCR)

Bioinformatics Skills

- Primer designing and development of molecular markers.
- Cloning vector or construct designing.
- Genome editing (CRISPR-Cas) designing tools.
- Next-generation sequencing, transcriptome (RNA-seq), whole genome sequencing,

metagenomics analysis.

- Biological data analysis by using various bioinformatics or computational biology tools and software's.
- Analysis using Molecular and Plant Breeding, Biometrics and Statistics tools or software's.

DEVELOPED / IDENTIFIED GERMPLASM or BACTERIAL ISOLATES

- **Isolated & Identified promising bacterial isolates / strains - 34 Strains**
 - Nitrogen-fixing rhizospheric bacteria (diazotrophs) - 6 isolates**
 - Phosphate solubilizing bacterias (PSBs) - 13 isolates**
 - Bacillus thuringiensis* bacteria - 7 isolates**
 - Actinomycetes* bacteria - 4 isolates**
 - Methylobacterium* - 4 isolates**

TECHNOLOGY DEVELOPED

Sr. No.	Title	Identified Diazotrophic Bacteria	Description	Development year	Commercialization Year
1.	Exploitation of identified and characterized promising rice rhizospheric diazotroph viz. <i>Paenibacillus sonchi</i> IRRBNF1 identified for nitrogen supplement at field and them potential use for commercialization as a nitrogen-fixing biofertilizers	<i>Paenibacillus sonchi</i> IRRBNF1 GenBank accession: MZ905164 and Whole genome sequence accession: JAIFKC00000000	<i>Paenibacillus sonchi</i> IRRBNF1 to delineate its nitrogen-fixation and plant growth-promoting characteristics, for its potential use as plant growth-promoting rhizobacterial biofertilizer	2021 And Submitted application for Microbial registration to ICAR-NBAIM, Uttar Pradesh	In progress

GENETIC STOCKS
Identified Promising Bacterial Germplasm Deposition and Registration

Identified genetic stocks deposited at NAIMCC, ICAR-NBAIM, MAU			
Sr. No.	Bacterial isolates	NCBI GenBank accession	NAIMCC, ICAR-NBAIM (Accession Number)
<i>Nitrogen-fixing rhizospheric bacteria (diazotrophs)</i>			
1.	<i>Paenibacillus sonchi</i> IIRBNF1	MZ905164	-
<i>Phosphate solubilizing bacterias (PSBs)</i>			
1.	<i>Citrobacter amalonaticus</i> IIRRPSB1	MZ914591	NAIMCC-B-03140
2.	<i>Citrobacter amalonaticus</i> IIRRPSB4	MZ914685	NAIMCC-B-03141
3.	<i>Bacillus sp.</i> IIRRPSB6	MZ914689	NAIMCC-B-03137
4.	<i>Bacillus pumilus</i> IIRRPSB10	MZ914697	NAIMCC-B-03136
5.	<i>Bacillus xiamenensis</i> IIRRPSB11	OM212982	NAIMCC-B-03139
6.	<i>Bacillus sp.</i> IIRRPSB13	MZ919329	NAIMCC-B-03138

IDENTIFIED BACTERIAL ISOLATES AND NCBI SUBMISSIONS

(GenBank, Genome, BioProject, BioSample and SRA Submissions)

I. Genome submission- Whole genome sequence and assembly	
<i>Nitrogen-fixing rhizospheric bacteria (diazotrophs)</i>	
Identified Bacterial Isolates	NCBI GenBank accession
<i>Paenibacillus sonchi</i> IIRBNF1	JAIFKC000000000 BioProject: PRJNA753291 Biosample: SAMN20693057
<i>Phosphate solubilizing bacteria (PSBs)</i>	
Whole genome sequence of <i>Priestia flexa</i> IIRRPSB14	JARGMO000000000 BioProject: PRJNA942581 Biosample: SAMN33695179

II.GenBank submission- 16S ribosomal RNA gene-based identification of bacteria		
Nitrogen-fixing bacteria (diazotrophs)		
Sr. No.	Bacterial isolates	NCBI GenBank accession
1.	<i>Paenibacillus sonchi</i> IIRRBNF1	MZ905164
2.	<i>Burkholderia cepacia</i> IIRRFNF4	MZ914511
3.	<i>Burkholderia cepacia</i> IIRRFNF5	MZ914513
Endophytic nitrogen-fixing bacteria (diazotrophs)		
4.	<i>Bradyrhizobium sp.</i> IIRRFNF2	OM269525
5.	<i>Sphingomonas azotifigens</i> IIRRFNF9	OM270628
6.	<i>Klebsiella oxytoca</i> IIRRFNF11	OM272057
Phosphate solubilizing bacteria (PSBs)		
7.	<i>Citrobacter amalonaticus</i> IIRRPSB1	MZ914591
8.	<i>Priestia flexa</i> IIRRPSB3	OM281705
9.	<i>Citrobacter amalonaticus</i> IIRRPSB4	MZ914685
10.	<i>Priestia paraflexa</i> IIRRPSB5	OM283545
11.	<i>Bacillus sp.</i> IIRRPSB6	MZ914689
12.	<i>Rosellomorea oryzaecorticis</i> IIRRPSB7	OM281568
13.	<i>Bacillus aerius</i> IIRRPSB8	OM283596
14.	<i>Bacillus safensis</i> IIRRPSB9	OM230178
15.	<i>Bacillus pumilus</i> IIRRPSB10	MZ914697
16.	<i>Bacillus xiamenensis</i> IIRRPSB11	OM212982
17.	<i>Bacillus australimaris</i> IIRRPSB12	OM230184
18.	<i>Bacillus sp.</i> IIRRPSB13	MZ919329
19.	<i>Priestia flexa</i> IIRRPSB14	OQ594739
Bacillus thuringiensis bacteria		
20.	<i>Bacillus thuringiensis</i> IIRRBT1	OP160521
21.	<i>Bacillus thuringiensis</i> IIRRBT2	OP160522
22.	<i>Bacillus thuringiensis</i> IIRRBT3	OP160526

23.	<i>Bacillus thuringiensis</i> IIRRB T4	OP160528
24.	<i>Bacillus thuringiensis</i> IIRRB T5	OP160529
25.	<i>Bacillus thuringiensis</i> IIRRB T6	OP204093
26.	<i>Bacillus thuringiensis</i> IIRRB T7	OP204095
<i>Actinomycetes bacteria</i>		
27.	<i>Amycolatopsis</i> sp. IIRRA CT2	OP107009
28.	<i>Amycolatopsis lurida</i> IIRRA CT3	OP107013
29.	<i>Amycolatopsis keratiniphila</i> IIRRA CT5	OP107014
30.	<i>Amycolatopsis orientalis</i> IIRRA CT9	OP107016
<i>Methylobacterium</i>		
31.	<i>Methylobacterium aquaticum</i> IIRRSV22-1	OP748929
32.	<i>Methylobacterium phyllosphaerae</i> IIRRSV22-3	OP748930
33.	<i>Methylobacterium radiotolerans</i> IIRRSV22-4	OP748936
34.	<i>Methylobacterium</i> sp. IIRRSV22-5	OP748943
III. Sequence Read Archive (SRA) submission		
Sr. No.	SRA submission	NCBI SRA accession
1.	Genome sequence of <i>Paenibacillus sonchi</i> IIRRB NF1 delineating the nitrogen-fixation and plant growth-promoting traits	SRR17868980 Bioproject: PRJNA753291
2.	RNA-Seq based co-transcriptomic profiling of rice (cultivar BPT 5204) and diazotrophic bacteria (<i>Bradyrhizobium japonicum</i> and <i>Gluconacetobacter diazotrophicus</i>) interactions	SUB10564505 Bioproject: PRJNA776419
3.	<i>Priestia flexa</i> strain: IIRRPSB14 isolate: IIRRPSB14 Genome sequencing and assembly	SRR23814883 Bioproject: PRJNA942581