



**Department of Agricultural Botany
(Agricultural Biotechnology)
State Level Biotechnology Centre,
Mahatma Phule Krishi Vidyapeeth, Rahuri
Tal. Rahuri 413 722, Dist. Ahmednagar (MS)**

Preamble

Mahatma Phule Krishi Vidyapeeth, Rahuri contributed in releasing crop varieties and hybrids using classical breeding methods. However, with developments in micro propagation, the University established independent Plant Tissue Culture Laboratory using funds received from Statutory Development Board for rest of Maharashtra in 1992. Consequently with the fast development in this science, the University established Biotechnology Centre in 2001 with the available resources and by bringing trained personnel under one umbrella. To support this centre, the grants were made available from the University revenue receipts during 2001-03. Looking to the contribution of research made by this centre and today its need for strengthening agricultural research, Dr. M.S. Swaminathan's committee recommended establishment of Biotechnology Research Centre at this University. Accordingly, Government of Maharashtra extended the financial support w.e.f. 2003-04 for construction of independent building, purchase of sophisticated instrument and furniture for carrying out research in the frontier areas of Biotechnology.

Sixty Seventh Meeting of Statutory Committee's held at MCAER, Pune on 31st Jan., 2006, recommended initiating Post Graduate Degree Programme in Agril. Biotechnology at this centre without additional staff and grants. Accordingly M.Sc. (Agril. Biotechnology) Degree Programme was initiated from the academic year 2007-08 with intake capacity of 8 students per year. The principal mandate of starting this Degree Programme was to cater the needs of the state in developing a skilled manpower required in Agril. Biotechnology for research activities in SAUs, Semi-Government public and private sector organization.

The centre is also engaged in undertaking basic and applied biotechnological research pertaining to transgenic development, marker assisted selection in relation to disease, pests

and drought resistance, QTL mapping, identification of the gene(s) responsible for biotic and abiotic stresses etc. in crop plants.

Plant Biotechnology Laboratory



Faculty

Sr. No.	Name	Designation
1.	Dr. A. A. Kale	Associate Professor of Biochemistry & Incharge
2.	Dr. V. P. Chimote	Associate Professor of Botany
3.	Dr. P. L. Kulwal	Associate Professor of Botany
4.	Dr. S. V. Pawar	Assistant Professor of Botany

Academic Programmes

A) M.Sc. (Agricultural Biotechnology)
Capacity of students: 8/Year
Year of start: 2007

Course Layout

1. M.Sc. (Agricultural Biotechnology)

Minimum Credit Requirements

Sr. No.	Subject	Minimum credit(s)
1.	Major	20
2.	Minor	09
3.	Supporting	05
4.	Seminar	01
5.	Research	20
	Total Credits	55
	Compulsory Non Credit Courses	06

A) Major Subjects (Min. 20 credits)

Sr. No.	Course No.	Course Title	Credits
1.	MBB 501	Principles of Biotechnology	3(2+1)
2.	MBB 502	Fundamentals of Molecular Biology	3(3+0)
3.	MBB 503	Molecular Cell Biology	3(3+0)
4.	MBB 504	Plant Tissue Culture & Genetic Transformation	3(1+2)
5.	MBB 505	Techniques In Molecular Biology	3(0+3)
6.	MBB 508	Genomics and Proteomics	2(2+0)
7.	MBB 555	Introduction to Bioinformatics	3(2+1)

B) Minor Subjects (Min. 09 credits)

Sr. No.	Course No.	Course Title	Credits
1.	MBB 507	Molecular Breeding	2(2+0)
2.	MBB 510	Biosafety, IPR & Bioethics	2(2+0)
3.	MBB 512	Immunology and Molecular Diagnostics	3(2+1)
4.	MBB 553	Biostatistics and Computers	3(2+1)

C) Supporting Subjects (Min. 5 credits)

Sr. No.	Course No.	Course Title	Credits
1.	PP 503	Physiological and Molecular Responses of Plants to Abiotic Stresses	3 (2+1)
2.	BIOCHEM 510	Carbon and Nitrogen Metabolism	3(2+1)

D) Seminar (1 credit)

Sr. No.	Course No.	Course Title	Credits
1.	MBB 591	Masters Seminar	1(0+1)

E) Masters Research (20 credits)

Sr. No.	Course No.	Course Title	Credits
1.	MBB 599	Masters Research	20(0+20)

F) Non Credit Compulsory Courses*

Sr. No.	Course No.	Course Title	Credits
1.	PGS 501	Library and Information Services	1(0+1)
2.	PGS 502	Technical Writing and Communications Skills	1(0+1)
3.	PGS 503 (e-Course)	Intellectual Property and its Management in Agriculture	1(1+0)
4.	PGS 504	Basic Concepts in Laboratory Techniques	1(0+1)
5.	PGS 505 (e-Course)	Agricultural Research, Research Ethics and Rural Development Programmes	1(1+0)

6.	PGS 506 (e-Course)	Disaster Management	1(1+0)
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List of equipment available at Biotechnology Centre

Sr. No.	Name of Equipment:
1	Deep Freezer (-80)
2	Deep Freezer (-40)
3	Deep Freezer (-20)
4	Refrigerator
5	Thermal cycler
6	Palm PCR machine
7	RT-PCR
8	Generator (35 KVA)
9	Mini and Maxi electrophoresis system including power supply
10	Electronic balance
11	Ice flanking system
12	Liquid nitrogen container with dispenser
13	High speed refrigerated centrifuge
14	Table top centrifuge
15	Elisa reader and Washer
16	Nano drop spectrophotometer
17	Spectrophotometer
18	Laminar Air flow
19	Autoclave
20	Rotary Shaker
21	Micropipettes
22	DNA concentrator
23	Hot plate magnetic stirrer
24	Vortex
25	Micro plate shaker
26	Water bath
27	UV transilluminator
28	Gel documentation system
29	Water purification system
30	Flow cytometer
31	Microarray
32	DNA sequencer (4 capillary)

Projects Completed by M.Sc. (Agril. Biotechnology) Students

Sr. No.	Name of M. Tech. Student	Name of Guide	Title of the M. Tech. Thesis	Year
1.	Mr. Wagh Dheeraj S	Dr. AA Kale	Molecular analyses of sugarcane F1s, their parents and some varieties in relation to salt stress tolerance	2009
2.	Mr. Salunke Dnyaneshwar S	Dr. AS Jadhav	Molecular and biochemical analysis in selected genotypes of tomato (<i>Lycopersicon esculentum</i> Mill.) for β -carotene.	2009
3.	Mr. Pawar Bhausaheb D	Dr. AS Jadhav	Development of an efficient Agrobacterium mediated transformation system for tomato (<i>Lycopersicon esculentum</i> Mill.)	2009
4.	Mr. Kale Prashant Bhaskar	Dr. VP Chimote	Characterization of microbial flora found in oily spot disease in pomegranate (<i>Punica granatum</i> L.)"	2009
5.	Miss Sadaphal Shubhangi V	Dr. SC Patil	Assessment of molecular diversity in custard apple. (<i>Annona squamosa</i>)	2009
6.	Mr. Kamble Varun A	Dr. AA Kale	Molecular analysis of cytoplasmic male sterility in pearl millet (<i>Pennisetum glaucum</i>)	2009
7.	Mr. Koskewar Sandeep U	Dr. SV Pawar	Micropropagation studies in Sarpagandha (<i>Rauvolfia serpentina</i> L)	2010
8.	Mr. Borse Nilesh B	Dr. VP Chimote	Stability of micropropagated <i>Musa acuminata</i> cv. Grande Naine: A molecular assessment.	2010
9.	Mr. Palan Bhavesh V	Dr. AA Kale	Molecular analysis of cytoplasmic male sterile system of sorghum.	2010
10.	Miss Thokale Suwarna J	Dr. SC Patil	Micropropagation studies in Ashwagandha (<i>Withania somnifera</i>)	2010
11.	Miss Takale Vidya V	Dr. AS Jadhav	Development of Bt-pigeonpea by Agrobacterium mediated transformation.	2010
12.	Mr. Newaskar Ganesh S	Dr. VP Chimote	Molecular characterization of cotton parent progeny combination (<i>Gossypium arboreum</i> x <i>Gossypium anomalum</i>) x <i>Gossypium hirsutum</i> differing for fiber traits.	2010
13.	Mr. Markad Nanasaheb R.	Dr. AA Kale	Identification of molecular marker/s associated with salt tolerance in sugarcane	2010
14.	Miss Gulve Dipali P.	Dr. AS Jadhav	Introduction and expression of <i>CryAbc</i> gene construct into tomato.	2010
15.	Mr. Bhat Sudarshan V.	Dr. AS Jadhav	Regeneration study in brinjal (<i>Solanum melongena</i>)	2011
16.	Miss Ghumatkar Reshma M	Dr. AA Kale	Molecular Characterization of sex in <i>Simarouba glauca</i> D.C. using RAPD and ISSR markers	2012

17.	Mr. Gosavi Gokul U	Dr. AS Jadhav	Assessment of heat shock proteins, biochemical constituents and molecular characterization in sorghum in relation to Heat Shock response	2011
18.	Miss Hinge Pushpalata N	Dr. AA Kale	Assessment of heat shock proteins, biochemical constituents and molecular characterization in sorghum in relation to drought response	2011
19.	Mr. Dhage Shishir S	Dr. VP Chimote	Regeneration studies in Fig (<i>Ficus carica</i>)	2011
20.	Mr. Deshmukh Krishna .S.	Dr. AA Kale	Construction of SCAR marker for salinity tolerance in sugarcane	2012
21.	Mr. Panpatil Amol .U.	Dr. VP Chimote	Characterization of gene encoding enzymes involved in reactive oxygen species tolerance during drought stress in sorghum.	2012
22.	Miss Ujjainkar Nayana R	Dr. VP Chimote	Characterization of gene encoding desiccation tolerance protein during drought stress in sorghum.	2012
23.	Miss Mahagaonkar Pooja N	Dr. AS Jadhav	Molecular analysis of sterile, maintainer, restorer and hybrid lines of <i>Gossypium</i> sp.	2013
24.	Mr. Rayate Shriram J	Dr. PL Kulwal	Quantitative trait loci mapping for yield and yield contributing traits in chickpea (<i>Cicer arietinum L.</i>)	2013
25.	Mr. Rahane Vijay B	Dr. SV Pawar	In vitro studies in Malkangoni (<i>Celastrus paniculatus Wild</i>) an endangered medicinal plant	2013
26.	Mr. Jadhav Amol A	Dr. PL Kulwal	Marker-trait association study for grain protein content in chickpea (<i>Cicer arietinum L.</i>)	2013
27.	Miss Bande Rashmi B	Dr. AS Jadhav	Characterization of genes involved during drought stress in pearl millet	2014
28.	Miss Chaudhari Priya G	Dr. AS Jadhav	<i>cryIAabc</i> gene expression study in T2 population of tomato	2013
29.	Mr. Band Naresh S	Dr. AA Kale	SSR and ISSR based DNA fingerprinting and assessment of quality parameters of the rice landraces collected from plain and Western Ghat Zone	2013
30.	Acharya BL	Dr. SV Pawar	Micropropagation studies in Stevia (<i>Stevia rebaudiana</i>)	2014
31.	Miss Hipparkar Maya	Dr. AS Jadhav	<i>cryIAabc</i> gene expression study in T3 population of tomato	2014
32.	Miss Shingare Rohini B	Dr. VP Chimote	Molecular characterization of candidate genes controlling seed coat colour in soybean	2014
33.	Mr. Mokate Yogesh	Dr. VP Chimote	Molecular diversity analysis in	2014

	S		Soybean (<i>Glycine max</i> L. Merill)	
34.	Miss. Borse Vaishali Vasantao	Dr. PL Kulwal	Marker based diversity in germplasm showing variation for seed weight in chickpea (<i>Cicer arietinum</i> L.)	2015
35.	Miss. Dere Supriya Sitaram	Dr. SV Pawar	Micropropagation studies in bedki (<i>Gymnema sylvestre</i> R.Br.) a rare medicinal plant.	2015
36.	Miss. Patil Nilam Prakashrao	Dr. VP Chimote	Development of molecular diagnosis technique for <i>Xanthomonas axonopodis</i> pv. <i>puniceae</i>	2015
37.	Miss. Pawar Kalyani R.	Dr. VP Chimote	Characterization of T2 population of transgenic tomato having antisense banana <i>ACC oxidase</i> gene	2015
38.	Mr. Nalge Swapnil Sunil	Dr. AS Jadhav	DNA fingerprinting of the soybean cultivars	2015
39.	Mr. Vyawahare Tushar Gajanan	Dr. AS Jadhav	Molecular marker study in the groundnut genotypes showing rust resistance	2015
40.	Mr. Kamble Abhijit Bhimrao	Dr. AA Kale	Validation of SCAR marker for salinity stress in sugarcane germplasm	2015
41.	Mr. Muthe Santosh Tukaram	Dr. PL Kulwal	Validation of known marker(s) linked with the gene <i>Lr34</i> conferring resistance against leaf rust in wheat (<i>Triticum aestivum</i> L.)	2016
42.	Miss Chavan Pooja Narayanrao	Dr. PL Kulwal	Marker assisted foreground selection of backcross genotypes for leaf rust resistance in wheat	2016
43.	Miss Chavan Priti Santosh	Dr. AS Jadhav	Genetic transformation for development of Bt-rice	2016
44.	Miss Barate Pallavi Laxman	Dr. VP Chimote	Evaluation of molecular markers for pod shattering in soybean (<i>Glycine max</i> L. Merill)	2016
45.	Mr. Shaikh Saddamhussain Aminbhai	Dr. AA Kale	Expression of salinity tolerant genes in sugarcane	2016
46.	Miss Dongare Manjushri Dinkar	Dr. VP Chimote	Molecular characterization of maturity loci in soybean	2017
47.	Miss Shinde Archana Vishwanath	Dr. PL Kulwal	Molecular marker based characterization of chickpea genotypes for wilt and collar rot resistance	2017
48.	Miss Salve Snehal Gorakh	Dr. SV Pawar	Molecular characterization of rabi sorghum genotypes using SSR markers	2017
49.	Mr. Gavhane Dnyaneshwar Bhagwan	Dr. PL Kulwal	Validation of markers for blast resistance in rice (<i>Oryza sativa</i> L.)	2017
50.	Kalanar Shivaji	Dr. AS Jadhav	Validation of novel markers for rust	2017

	Kisan		resistance in groundnut (<i>Arachis hypogea</i> L.)	
51.	Shirsat Dhananjay Vitthal	Dr. AA Kale	Gene expression profile of sugarcane (<i>Saccharum officinarum</i>) under drought stress	2017
52.	Miss Dudhabate Jayashri Goroba	Dr. PL Kulwal	QTL analysis for blast resistance in rice	2018
53.	Miss Kalunge Sonali Dattaraya	Dr. VP Chimote	Molecular characterization of genes imparting seed longevity in soybean	2018
54.	Prasad Dilip Shelke	Dr. AA Kale	Gene Expression profiling in sugarcane under salinity stress conditions	2019
55.	Tajne Sachin Arunrao	Dr. AS Jadhav	Isolation & cloning of antimicrobial gene from <i>Withania somnifera</i>	2018
56.	More Janardhan Dattaraya	Dr. AA Kale	Molecular and biochemical characterization of endophytic bacteria isolated from sugarcane in response to salinity	2019

Research Recommendations

1. Molecular markers csLV34 and cssfr5 either individually or in combination are recommended for detection and rapid screening of leaf rust resistance gene *Lr34* in aestivum (bread) wheat improvement programmes.
2. For quick and accurate identification of *Xanthomonas axonopodis* pv. *punicae* causing oily spot in pomegranate SCAR-XAP primer amplifying a specific 152 bp fragment is recommended.
3. For soybean rust resistance breeding complementary genes specific Satt 191-222bp (Rpp1b) and Satt 215-123bp (Rpp2) molecular markers simultaneous use is recommended.
4. Developed and validated 'SSScM1' and 'SSScM3' SCAR markers are recommended for early, rapid and precise selection of salinity tolerant plantlets in sugarcane improvement programme.

Institutional Projects (Theme Areas)

1. Transgenic Development
2. Marker Assisted Selection For Crop Improvement
3. Gene Mining
4. Plant Tissue Culture

Ad-hoc Projects (Ongoing)

Sr. No.	Title	Funding Agency
1	Delivering more produce and income to farmers through enhancing genetic gains for chickpea and pigeonpea	Ministry of Agriculture and Farmers Welfare, GOI
2	Bamboo Mission Project	Govt. of Maharashtra

Publications

Sr. No.	Name	Designation	Publication links
1.	Dr. A. S. Jadhav	Professor & Incharge	https://scholar.google.co.in/citations?hl=en&user=7PN63R0AAAAJ
2.	Dr. A. A. Kale	Associate Professor of Biochemistry	https://scholar.google.co.in/citations?hl=en&user=ImvMkiUAAAAJ
3.	Dr. V. P. Chimote	Associate Professor of Botany	https://scholar.google.co.in/citations?hl=en&user=OA25ieQAAAAJ
4.	Dr. P. L. Kulwal	Associate Professor of Botany	https://scholar.google.co.in/citations?hl=en&user=qNOuOvUAAAAJ
5.	Dr. S. V. Pawar	Assistant Professor of Botany	https://scholar.google.co.in/citations?hl=en&user=e7U5Or8AAAAJ

Contact Details

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