



**Department of Agricultural Botany**  
**Post Graduate Institute**  
**Mahatma Phule Krishi Vidyapeeth, Rahuri- 413 722**  
**Dist. Ahmednagar (MS)**



### **Preamble**

The Department of Agricultural Botany is a century age old and has outstanding contribution at its credit during this era. Especially the condition of the state and country before 1960s of feeding burgeoning population with begging bowl was totally transformed to self sufficiency by green revolution across the country with pivotal role in crop improvement. It is responsible for evolving new high yielding varieties/hybrids of the crops, the very back bone of agriculture which are responsible for agricultural revolution. There are four disciplines covering Genetic and Plant Breeding, Plant Physiology, Seed Science and Technology and Agricultural Biotechnology which have their respective teaching, research and extension education activities. The department has been strengthened for advanced research ventures to meet the challenges of the 21<sup>st</sup> century by establishing of well equipped State Level Biotechnology Centre.

### **Mandates**

- To offer courses of Agricultural Botany for the undergraduate degree programmes in the Faculty of Agriculture. In the faculty of Agriculture.
- To offer courses of Agricultural Botany for M.Sc. (Agri.) and Ph. D in Genetics and Plant Breeding, Plant Physiology, Seed Sci. & Technology and Agricultural Biotechnology.
- To undertake basic, strategic applied research programmes through post graduate students in the department.
- Crop improvement programme planning for increasing the productivity and strengthening the concepts of Agricultural Botany.
- Conventions of seminars, symposia and conferences for exchange of Scientific Information.
- To cater the technological needs of the State Agriculture Departments in respect of transfer of advanced technology, improved crop varieties, seed production and distribution etc. through training, AIR and TV programmes, farmer's rallies, field demonstrations and published literature.

## Faculty

Sr. No.	Name	Designation	Specialization
1	Dr. A .S. Jadhav	Head	Plant Biotechnology, Molecular Biology, Sorghum Breeding
2	Dr. A.P. Padhye	Professor	Plant Breeding, Genetics
3	Dr. R.S. Wagh	Professor	Plant Physiology, Cotton Breeding
4	Dr. V. D. Shende	Professor	Plant Physiology
5	Dr. P. L. Badhe	Associate Professor	Genetics and Plant Breeding
6	Prof. A. H. Sonone	Associate Professor	Forage Breeding, Molecular Genetics
7	Dr. N. S. Kute	Associate Professor	Pulses Breeding, Resistance Breeding & Quantitative Genetics
8	Dr. C. B. Salunkhe	Associate Professor	Seed Production
9	Dr. B. R. Najan	Associate Professor	Plant Breeding/ Agro forestry
10	Dr. M. T. Bhingarde	Associate Professor	Potential crops Breeding, Seed Science
11	Dr. V. R. Shelar	Associate Professor	Seed Science & Technology
12	Dr. S. R. More	Associate Professor	Plant Physiology, Groundnut Breeding
13	Dr. V. P. Chimote	Associate Professor	Molecular Biology
14	Dr. P. K. Kulwal	Associate Professor	Molecular Biology
15	Dr. A. A. Kale	Associate Professor	Plant Biochemistry
16	Prof. L. B. Mhase	Assistant Professor	Chickpea Breeding
17	Dr. M. S. Shinde	Assistant Professor	Sorghum Breeding
18	Prof. P. P. Surana	Assistant Professor	Grass Breeding
19	Prof. S. V. Nirmal	Assistant Professor	Sorghum Physiology
20	Dr. S. K. Ransing	Assistant Professor	Seed Physiology
21	Dr. S. V. Pawar	Assistant Professor	Plant Tissue Culture
22	Dr. G. C. Shinde	Assistant Professor	Plant Breeding, Quantitative Genetics
23	Dr. T. J. Bhor	Assistant Professor	Jute Breeding, Genetics
24	Dr. D. V. Deshmukh	Assistant Professor	Crop Physiology
25	Dr. S. R. Dhonde	Assistant Professor	Maize Breeding
26	Dr. K. C. Gagare	Assistant Professor	Seed Production

## Academic Programmes Annual Intake Capacity of P.G. Students

Locations	Discipline				Total
	Genetics and Plant Breeding	Plant Physiology	Seed Sci. & Technology	Agril. Biotechnology	
<b>A) M.Sc. (Agri.)</b>					
Post Graduate Institute, Rahuri	15	6	10	8	<b>39</b>
College of Agriculture, Pune	6	-	-	-	<b>6</b>
College of Agriculture, Dhule	4	-	-	-	<b>4</b>
College of Agriculture, Kolhapur	6	-	-	-	<b>6</b>

<b>B ) Ph. D</b>					
Post Graduate Institute. Rahuri	6	4	4	-	<b>14</b>

### Course Layout

#### Number of Courses and Course Credits for Teaching

Programme	No. of Courses	Course Credits
<b>Undergraduate</b>		
a. B.Sc. (Agri.)	9	20
b. B.Sc. (Horti.)	3	8
<b>Postgraduate</b>		
i. Genetics and Pl. Breeding	9	22
ii. Plant Physiology	9	24
iii. Seed Sci. & Technology	9	22
iv. Agril. Biotechnology	10	24
<b>Ph.D.</b>		
i. Genetics and Pl. Breeding	8	20
ii. Plant Physiology	11	25
iii. Seed Sci. & Technology	9	23

### Minimum Credit Requirements

#### 1. M. Sc.(Agri.)- Genetics and Plant Breeding

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

Sr. No.	Course Number	Course Title	Credits
<b>A) Major Subjects (Min. 20 credits)</b>			
1.	GP-501*	Principles of Genetics	2+1=3
2.	GP-502*	Principles of Cytogenetics	2+1=3
3.	GP-503*	Principles of Plant Breeding	2+1=3
4.	GP-504*	Principles of Quantitative Genetics	2+1=3
5.	GP-508*	Cell Biology and Molecular Genetics	2+1=3
6.	GP-510*	Breeding for Biotic and Abiotic Stress Resistance	2+1=3
7.	GP-515	Maintenance Breeding, Concepts of Variety Release and Seed Production.	1+1=2
<b>B) Minor Subjects (Min. 9 credits)</b>			
1	BIOCHEM-501	Basic Biochemistry	2+1=3
2.	MBB-501	Principles of Biotechnology	2+1=3

3.	MBB-504	Plant Tissue culture and genetic transformation	1+2=3
<b>C) Supporting Subjects (Min. 5 credits)</b>			
1.	STAT-511	Statistical Methods for Applied Sciences	2+1=3
2.	STAT-506	Design of Experiment for Genetics and Plant Breeding	2+1=3
<b>D) Seminar (1 credit)</b>			
1.	GP-591	Master Seminar	0+1=2
<b>E) Master's Research (20 credits)</b>			
1.		Master's Research	0+20=20
<b>F) Non Credit Compulsory Courses</b>			
1.	PGS-501	Library and Information Services	0+1=1
2.	PGS-504	Basic concepts in Laboratory techniques	0+1=1
3.	PGS-502	Technical Writing and Communication Skill	0+1=1
4.	PGS-503	Intellectual Property and its Management in Agriculture	1+0=1
5.	PGS-505	Agriculture Research Ethics and Rural Development Programmes	1+0=1
6.	PGS-506	Disaster Management	1+0=1

\*\* Compulsory course

## 2. Ph. D. (Genetics and Plant Breeding) Minimum Credit Requirements

Sr. No.	Subject	Minimum credit(s)
1.	Major	15
2.	Minor	08
3.	Supporting	05
4.	Seminar	02
5.	Research	45
	<b>Total Credits</b>	<b>75</b>
	Compulsory Non Credit Courses	06

Sr. No.	Course Number	Course Title	Credits
<b>A) Major Subjects (Min. 15 credits)</b>			
1.	GP-601	Plant Genetic Resources and Pre Breeding	2+0=2
2.	GP-602	Advanced Biometrical and Quantitative Genetics	2+1=3
3.	GP-603**	Genomics in Plant Breeding	2+1=3
4.	GP-604**	Molecular and Chromosomal Manipulations for Crop Breeding	2+0=2
5.	GP-605**	Advances in Plant Breeding Systems	2+0=2
6.	GP-608	Advances in Breeding of Major Field Crops	3+0=3
<b>B) Minor Subjects (Min. 8 credits)</b>			
1.	Bio-Chem-602	Advances in Molecular Biology	3+0=3
2.	BIOCHEM-603	Biochemistry of Biotic and Abiotic Stress	3+0=3
3.	ENTO-608	Advance Host plant resistance	1+1=2
<b>C) Supporting Subjects (Min. 05 credits)</b>			
	STAT-604	Genetical Statistics	1+2=3
	SST-604	DUS Testing for Plant Variety Protection	2+1=3

<b>D) Seminar (2 credits)</b>			
1.	GP-691	Doctoral Seminar-I	0+1=1
2.	GP-692	Doctoral Seminar-II	0+1=1
<b>E) Doctoral Research (45 credits)</b>			
		Doctoral Research	0+45=45
<b>F) Non Credit Compulsory Courses</b>			
1.	PGS-501	Library and Information Services	0+1=1
2.	PGS-504	Basic concepts in Laboratory Techniques	0+1=1
3.	PGS-502	Technical Writing and Communication Skill	0+1=1
4.	PGS-503	Intellectual Property and its Management in Agriculture	1+0=1
5.	PGS-505	Agriculture Research Ethics and Rural Development Programmes	1+0=1
6.	PGS-506	Disaster Management	1+0=1

**\*\* Compulsory course**

**Note:** Ph. D. students may be exempted from NCCC, if already completed during Master's degree.

### 3) M.Sc. (Agri.) - Plant Physiology Minimum Credit Requirements

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

Sr. No.	Course Number	Course Title	Credits
<b>A) Major Subjects (Min. 20 credits)</b>			
1.	PP-501*	Principles of Plant Physiology	3+1=4
2.	PP -508*	Morphogenesis, Tissue Culture and Transformation	2+1=3
3.	PP-511	Mineral Nutrition	2+1=3
4.	PP-502*	Plant Developmental Biology, Physiological and Molecular Basis	2+0=2
5.	PP-503*	Physiological and Molecular Responses of Plants to Abiotic Stresses	2+1=3
6.	PP-504*	Hormonal Regulation of Plant Growth and Development	2+1=3
7.	PP -506*	Physiology of Growth, Yield and Modeling	1+1=2
<b>B) Minor Subjects (Min. 9 credits)</b>			
1	BIOCHEM-501	Basic Biochemistry	2+1=3
2.	AGRO-505	Agro Meteorology and Crop Weather Forecasting	2+1=3
3.	MBB-505	Techniques in Molecular Biology	0+3=3
<b>C) Supporting Subjects (Min. 5 credits)</b>			
1.	STAT-512	Experimental Design	2+1=3

2.	BIOCHEM-510	Carbon and Nitrogen Metabolism	2+1=3
<b>D) Seminar ( 1 credit)</b>			
1.	PP-591	Master Seminar	0+1=2
<b>E) Master's Research ( 20 credits)</b>			
1.		Master's Research	0+20=20
<b>F) Non Credit Compulsory Courses</b>			
1.	PGS-501	Library and Information Services	0+1=1
2.	PGS-504	Basic concepts in Laboratory Techniques	0+1=1
3.	PGS-502	Technical Writing and Communication Skill	0+1=1
4.	PGS-503	Intellectual Property and its Management in Agriculture	1+0=1
5.	PGS-505	Agriculture Research Ethics and Rural Development Programmes	1+0=1
6.	PGS-506	Disaster Management	1+0=1

\*\* Compulsory course

#### 4) Ph.D. Plant Physiology Minimum Credit Requirements

Sr. No.	Subject	Minimum credit(s)
1.	Major	15
2.	Minor	08
3.	Supporting	05
4.	Seminar	02
5.	Research	45
	<b>Total Credits</b>	<b>75</b>
	Compulsory Non Credit Courses	06

Sr. No.	Course Number	Course Title	Credits
<b>A) Major Subjects (Min. 15 credits)</b>			
1.	PP-604**	Techniques in Plant Physiology	1+2=3
2.	PP-609**	Advances in Crop Physiology	2+0=2
3.	PP-610**	Nitrogen Metabolism	2+1=3
4.	PP-605	Climate Change and Crop Growth	2+0=2
5.	PP-606	Post Harvest Physiology	1+1=2
6.	PP-607	Weed Physiology and Herbicide Action	1+1=2
7.	PP-608	Seed Physiology	2+1=3
<b>B) Minor Subjects (Min. 8 credits)</b>			
1.	BIOCHEM-607	Advance Techniques in Biochemistry	0+2=2
2.	BIOCHEM-603	Biochemistry of Biotic and Abiotic Stresses	3+0=3
3.	SST-607	Seed Germination	2+1=3
<b>C) Supporting Subjects (Min. 05 credits)</b>			
	SST-606	Seed Development and metabolism	2+0=2
	SST-604	DUS Testing for Plant Variety Protection	2+1=3
<b>D) Seminar (2 credits)</b>			
1.	PP-691	Doctoral Seminar-I	0+1=1
2.	PP-692	Doctoral Seminar-II	0+1=1

<b>E) Doctoral Research ( 45 credits)</b>			
1.		Doctoral Research	0+45=45
<b>F) Non Credit Compulsory Courses</b>			
1.	PGS-501	Library and Information Services	0+1=1
2.	PGS-504	Basic concepts in Laboratory Techniques	0+1=1
3.	PGS-502	Technical Writing and Communication Skill	0+1=1
4.	PGS-503	Intellectual Property and its Management in Agriculture	1+0=1
5.	PGS-505	Agriculture Research Ethics and Rural Development Programmes	1+0=1
6.	PGS-506	Disaster Management	1+0=1

**\*\* Compulsory course**

**Note:** Ph. D. students may be exempted from NCCC, if already completed during Master's degree.

### 5) M.Sc. (Agri.) Seed Science and Technology Minimum Credit Requirements

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

Sr. No.	Course Number	Course Title	Credits
<b>A) Major Subjects (Min. 20 credits)</b>			
1.	SST-501*	Floral Biology, Seed Development and Maturation	1+1=2
2.	SST-506*	Seed Legislation and Certification	2+1=3
3.	SST-509	Seed Physiology	2+1=3
4.	SST-502*	Principles of Seed Production	2+0=2
5.	SST-503*	Seed Production in Field Crops	2+1=3
6.	SST-507*	Seed Processing and Storage	2+1=3
7.	SST-508*	Seed Quality Testing	2+1=3
8.	SST-515	Emerging Trends in Seed Quality Enhancement.	1+1=2
<b>B) Minor Subjects (Min. 9 credits)</b>			
1	PP-501	Principles of Plant Physiology	3+1=4
2.	BIOCHEM-501	Basic Biochemistry	2+1=3
3.	PL.PATH-510	Seed Health Technology	2+1=3
<b>C) Supporting Subjects (Min. 5 credits)</b>			
1.	MBB-501	Principles of Biotechnology	2+1=3
2.	Stat-512	Experimental Design	2+1=3
<b>D) Seminar (1 credit)</b>			
1.	SST-591	Master Seminar	0+1=2

<b>E) Master's Research ( 20 credits)</b>			
1.		Master's Research	0+20=20
<b>F) Non Credit Compulsory Courses</b>			
1.	PGS-501	Library and Information Services	0+1=1
2.	PGS-504	Basic concepts in Laboratory Techniques	0+1=1
3.	PGS-502	Technical Writing and Communication Skill	0+1=1
4.	PGS-503	Intellectual Property and its Management in Agriculture	1+0=1
5.	PGS-505	Agriculture Research Ethics and Rural Development Programmes	1+0=1
6.	PGS-506	Disaster Management	1+0=1

**\*\* Compulsory course**

**6) Ph.D. Seed Science and Technology  
Minimum Credit Requirements**

Sr. No.	Subject	Minimum credit(s)
1.	Major	15
2.	Minor	08
3.	Supporting	05
4.	Seminar	02
5.	Research	45
	<b>Total Credits</b>	<b>75</b>
	Compulsory Non Credit Courses	06

Sr. No.	Course Number	Course Title	Credits
<b>A) Major Subjects (Min. 15 credits)</b>			
1.	SST-601**	Hybrid Seed Production	2+1=3
2.	SST-603	Testing for Genuineness and Purity of Cultivars	1+1=2
3.	SST-605**	Advances in Seed Sciences Research	2+0=2
4.	SST-606 @	Seed Development and Metabolism	2+0=2
5.	SST-604**	DUST Testing for Plant Variety Protection	2+1=3
6.	SST-607@	Seed Germination	2+1=3
<b>B) Minor Subjects (Min. 8 credits)</b>			
1.	BIOCHEM-607	Advanced Techniques in Biochemistry	0+2=2
2.	VSP-605	Seed Certification, Processing and Storage of Vegetable Crops	2+1=3
3.	PP-605	Climate Change and Crop Growth	2+0=2
4.	PP-608	Seed Physiology	2+1=3
<b>C) Supporting Subjects (Min. 05 credits)</b>			
1.	BIOCHEM-602	Advanced Molecular Biology	3+0=3
2.	BIOCHEM-603	Biochemistry of Biotic and Abiotic Stresses	3+0=3
<b>D) Seminar (2 credits)</b>			
1.	SST-691	Doctoral Seminar-I	0+1=1
2.	SST-692	Doctoral Seminar-II	0+1=1



<b>E) Doctoral Research (45 credits)</b>			
<b>F) Non Credit Compulsory Courses</b>			
1.	PGS-501	Library and Information Services	0+1=1
2.	PGS-504	Basic concepts in Laboratory Techniques	0+1=1
3.	PGS-502	Technical Writing and Communication Skill	0+1=1
4.	PGS-503	Intellectual Property and its Management in Agriculture	1+0=1
5.	PGS-505	Agriculture Research Ethics and Rural Development Programmes	1+0=1
6.	PGS-506	Disaster Management	1+0=1

**\*\* Compulsory course; @ Courses from Old syllabus**

**Note:** Ph. D. students may be exempted from NCCC, if already completed during Master's degree.

### Laboratory Facilities and Equipments

- Phytotron
- Carbonated poly houses
- Rainout shelter
- IRGA
- Binocular Microscope
- Intra-red thermometer
- Sap flow meter
- Leaf area meter
- SPAD meter
- Gene Bank
- Root-scanner
- Psychomotor
- NIR spectrometer
- Stereo zoom microscope
- Porometer
- Soil moisture meter
- Soil water console
- Line quantum sensor
- Root Scanner



Rain out shelter

**Rain Out Shelter**



**State Level Biotechnology Centre**



**Biodiversity Conservation Centre**



**Carbonated poly houses**



**Phytotron**



**Laboratory equipments**

## Organizational Profile

Head

**Teaching**

**Extension**

### Under Graduate

Agriculture College, Pune  
 Agriculture College, Kolhapur  
 Agriculture College, Dhule  
 Agriculture College, Nandurbar  
 Agriculture College, Karad  
 Agriculture College, Muktainagar  
 Agriculture College, Halgaon

### Post Graduate

PGI, MPKV, Rahuri  
 Agriculture College, Pune  
 Agriculture College, Dhule  
 Agriculture College, Kolhapur

### Statutory Bodies

Agriculture Research Council  
 Council for Co-ordination &  
 Review of seed production &  
 development programme.  
 Agricultural Extension Programme  
 Board of Studies in Agril. Botany  
 Faculty of Agriculture  
 Academic Council

- Organization of trainings for State Departments of Agriculture Farmers & N G O s
- Publication of literature in local, National and international languages
- Organization of field demonstrations farmers rallies, adaptive trials, Front line demonstrations Technology
- Transfer of Agricultural through AIR and T V Programmes, website on internet
- Production and supply of quality seed

## Research

Crop	Main Res. Station	Sub. Res. Station
Oilseed	Jalgaon	Rahuri, Digraj, Karad, Kopargaon, Solapur, Igatpuri, Pandharpur
Wheat	Niphad	Mahabaleshwar, Kolapur
Sugarcane	Padegaon	Kolhapur
Sorghum	Rahuri	Mohol, Karad, Gadhinglaj, Chas Jeur, Kopargaon, Jalgaon, Dhule
Bajra	Dhule	Rahuri, Niphad, Chas
Rice	Vadgaon (Maval)	Igatpuri, Lonavala, Radhanagari, Rahuri
Maize	Kolhapur	
Pulses	Rahuri	Jalgaon Dhule, Padegaon, Pune.
Cotton	Rahuri	Jalgaon, Dhule, Padegaon, Pune
Jute Mesta	Rahuri	
Forage and Grasses	Rahuri	Dhule
Seed Research	Rahuri	---
Medicinal and Aromatic Plants	Rahuri	Pune, Igatpuri, Kolhapur, Dhule
Plant Tissue Culture	Rahuri	Padegaon, Pune, Dule, Kolhapur
Agril. Biotechnology	Rahuri	

## Major Achievements

### A) Academic :

So far 1014 M.Sc. (Agri.) and 169 Ph. D. students of this Department obtained academic degrees.

Discipline	Number of Students		Total
	M.Sc. (Agri.)	Ph. D	
Genetics & Plant Breeding	536	99	635
Plant Physiology	237	46	283
Seed Sci. & Technology	188	24	212
Agril. Biotechnology	53	--	53
<b>Total</b>	<b>1014</b>	<b>169</b>	<b>1183</b>

### B) Research:

This Department has contributed significantly in crop improvement and release of varieties / hybrids in various crops.

Sr. No.	Crops	No. of Varieties Hybrids released	Most popular varieties
1	Sorghum	12	Phule Yeshoda, Phule Mauli, Phule Chitra, Phule Vasudha, Phule Uttara, CSV 22, Phule Anuradha, Phule Revati, Phule Panchami, Phule Suchitra, Phule Madhu, Phule Rohini
2	Bajra	08	Shradha, * Saburi, * Shanti* ICTP 8203, Phule Dhanashakti*, Phule Mahashakti*, Adishakti
3	Rice/ Paddy	09	Radhnagari ,Indrayani, Pavana , Kundlika, Phle Maval, Bhogawati, Phule Radha, Phule Samruddhi , Phule RDN-6,
4	Wheat	07	NIAW 9947, Panchwati, NIAW 34, Godawari, Trimbak, Tapovan, Netravati, Samadhan
5	Maize	02	Karveer, Rajashri, Phule Maharshri, Phule Madhu
6	Chickpea	09	Vijay, Vishal, PG 12, Digvijay, Rajas, Virat, Vihar, Kripa, Himali, Phule Vikram
7	Pigeon pea	02	Vipula, Phule Rajeshwari,
8	Mungbean	02	Phule M-2, Vaibhav,
9	Urdbean	01	TPU-4
10	Horse gram	02	Man, Seena, Phule Sakas
11	Moth bean	01	MBS-27
12	Rajmabeen	03	Mutha, Waghya, Varun, Phule Rajma
13	Cowpea	01	Phule Pandhari, Phule Vithai
14	Rajgira	01	Phule Kartki
15	Finger millet	01	Phule Nachani, KOPN-493
16	Barnyard millet	01	Phule Barti
17	Groundnut	09	Phule Pragati, Phule Vyas, TPG41, JL-501, Phule RHRG-6021, Phule Unap, Phule Varana, Phule Unnati, Phule Bharati, Phule Dhani
18	Safflower	07	Bhima Girana, Phule Kusuma, SSF-658, SSF-708, Phule SSF-733, Phule Chandrabhaga
19	Sunflower	03	SS 56, Bhanu, Phule Raviraj*
20	Soybean	04	Phule Kalyani, KS-103, Phule Agrani, Phule Snagam



21	Mustard	01	TPM-1
22	Sesamum	04	Phule Til-1 Tapi, Padma, JLT-408
23	Niger	02	Sahyadri, Phule Karala,
24	Forage crops & Grasses	15	African Tall, Giant Bajra, Ruchira, RL 88, Harita, Phule Surabhi, Phule Amruta, SPV-2057, Stylo-Phule Kranti, Phule Jaywant, Phule Gunvant, Phule Marvel -06-40, Phule Govardhan, Phule Marvel-06-1, Phule Madras Anjan-1
25	Sugarcane	04	Co 86032, Co 94012, Phule-265, Co92005,MS-10001, Phule-9057
26.	Cotton	18	Y1, JLH 168,JLA-505, Phule Anmol, Phule Dhanwantari, Phule-688, , Phule Yamuna, Phule Rukhamai, Phule 492*, Phule Tarang*, Phule Asmita*, Phule Shwetambari*, Phule Suman*, Phule 388*, Phue Dhara*, Phule Prabha*, Phule Mahi

\*Hybrids

## Research Publications

### Books:

Sr. No.	Name of the book	Name of the publisher / Year	Authors
<b>A</b>	<b>English Books</b>		
1	Principles of Plant Breeding	Agri. Biovet Press, New Delhi 013/	Dr.N.S.Kute and Dr.A.R.Aher
2	Principles of Biometrical Genetics	Daya Publishing Hous, New Delhi /2016	Dr.Nandakumar Kute and Dr.Gorakshanath Shinde
3	A. Textbook of Principles of Seed Technology	MPKV, ISBN-978-81-87552-43-7/ 2013.	Dr. Sukhdev Ransing Mr. Aniket Kalhapure
4	Compendium of Varieties Released by Mahatma Phule Krishi Vidyapeeth	ISBN 978-93-5126-277-0 MPKV/ Res Pub/ No. 67/2012	Dr. R. W. Bharud, Dr. v. R. Shelar Dr. M. R. Manjre, Shri. A. V. Suryawanshi, Shri. . P. karjule
5	Variety Registration & Provisions under Protetion of Plant Varieties and farmers' Rights Act, 2001	ISBN 978-93-5126-278-7 MPKV/ Res Pub/ No. 56/2012	Dr. Vijay R. Shelar Dr. Raosaheb W. Bharud Mr. Avinash P. Karjule Dr. balawant S. Mundhe
6	40 Years (1973-2013)-Pulses research at Mahatma Phule Krishi Vidyapeeth, Rahuri	MPKV/ Res/ Pub No. 121/ 2014	Dr. P. N. Harer, Prof. L. B. Mhase Dr. G.. P. Deshmukh, Dr. M.R. Bedis Dr. D. d. Dudhade, Prof. S. B. Latake Prof. A. p. Chavan, Dr. P. U. Bhosale
7	44 Years Sorghum Research at MPKV, Rahuri.	MPKV/ Extn/ Pub/ N0.2086/ 2016-17	Dr. S. R. Gadakh, Dr. M. S. Shinde, Dr. V. R. Awari, Dr. V. R. Patil Prof. S. V. Nirmal, Dr. D. B. Pawar Smt. R. S. bhoge, Dr. U. S. Dalvi Dr. U. D. Chavan

<b>B.</b>	<b>Marathi Books</b>		
8	Kad dhanyachi Lagawad	MPKV/ Res/ Pub No. 72/ 2012 (Marathi)	Dr. Pandurang Harer, Prof. Laxman Mhase, Dr. Ganesh Deshmukh Prof. Depak Dudhade, Prof. Ashok chavan
9	Kad dhanya Pikanvaril Rog v Kidinche Niyantaran	MPKV/ Res/ Pub No. 70/ 2012 (Marathi)	Dr. Pandurang Harer, Dr. Ganesh Deshmukh, Prof. Ashok chavan Dr. Madhukar Bedis
10	Darjedar Sathavnuk ani Kalaji	MPKV/ Res Pub/ No. 58/2012 (Marathi)	Dr. Suresh Zanjare, Dr. Sanjay Gawade, Dr. Anil Suryawanshi, Dr. Vivek Shinde, Dr. Vijay Shelar, Dr. Uttam Kadam , Dr. Sukhdev Ransing , Dr. Ganesh Bansode , Mr. Avinash Karjule , Dr. Madhukar Dhonde
11	Bt Kapashivaril Pramukh Kidinche Ekamkik Vyavasthapan	MPKV/ Res/ Pub No. 83/ 2013	Dr. Uttam Hole, Dr. Raosaheb Bharud Mr. Shaligram Gangurde
12	Integrated Pest Management in Bt Cotton	MPKV/ Res/ Pub No. 127/ 2014	Dr. Uttam Hole, Dr. Raosaheb Bharud Mr. Shaligram Gangurde
13	Phule Biyane	MPKV/ Res Pub/ No. 166/2015 (Marathi)	Dr. Vijay Shelar , Dr. Suresh Zanjare, Dr. Anil Suryawanshi , Mr. Avinash Karjule, Dr. Madhukar Dhonde
14	Beejjanya Rog Niyantaran	MPKV/ Res Pub/ No. 170/2015 (Marathi)	Dr. Suresh Zanjare, Dr. Sanjay Gawade, Dr. Anil Suryawanshi, Dr. Vivek Shinde, Dr. Vijay Shelar , Dr. Utta, Kadam, Dr. Sukhdev Ransing, Dr. Ganesh Bansode, Mr. Avinash Karjule, Dr. Madhukar Dhonde
15	Biyane Kadhani Pashat Tantradnyan	MPKV/ Res Pub/ No. 171/2015 (Marathi)	Dr. Suresh Zanjare, Dr. Sukhdev Ransing, Dr. Vijay Shelar Mr. Avinash Karjule, Dr. Suresh Zanjare, Dr. Madhukar Dhonde, Dr. Sanjay Gawade, Dr. Uttam, Kadam Dr. Anil Suryawanshi , Dr. Ganesh Bansode, Dr. Vivek Shinde,
16	Bt Kapus: prasnawali	MPKV/ Res/ Pub No. 192/ 2016	Dr. Raosaheb Bharud, Dr. Subhash Ghadge, Dr. Sudarshan Latke Dr. Adhir Aher, Mr. Shaligram Gangurde, Dr. Rajendra Mane Miss. Aswini Darekar
17	Rabi jowari lagwadiche Sudharit Tantranyan	MPKV/ Univ. N0 2016-17 /2017 (Marathi)	Dr. Sharad Gadakh, Dr. Manaji Shinde, Dr. Vitthal Patil and Dr. Vilas Awari, Prof. Sudam Nirmal, Dr. Uttam Chavan Dr. Uday Dalvi, Mr. Bajarang Solunke Prof. Rashmi Bhoge
18	Rabi jowari Utpadan Tantrydnyan:	MPKV/ Extn/ Pub/ N0 2170 /2018 (Marathi)	Dr. Sharad Gadakh, Dr. Ahok Jadhav Dr. Uttam Chavan, Mr. Ganesh pawar

Shetkaryancha Sahbhag v Pratisad	Dr. Manaji Shinde, Prof. Sudam Nirmal Dr. Sunil Kamble, Dr. Uday Dalvi Dr. Vitthal Patil, Dr. Vilas Awari, Mr. Bajarang Solunke
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### Book Chapters:

Sr. No.	Title of Book Chapter	Name of the book, authors and publisher	Author(s)	Year
1	QTL Mapping: Methodology and Applications in Cereal Breeding	In: Gupta PK and Varshney RK (eds.) <u>Cereal Genomics II</u> , Springer pp 275-318	Gupta PK, Kulwal PL, Mir RR	2013
2	Association Mapping and Genomic Selection—Where Does Sorghum Stand?	In: Rakshit, Sujay, Wang, Yi-Hong (Eds.) <u>The Sorghum Genome</u> , Springer pp 137-148	Dr. Kulwal PL	2016
3	Trait Mapping Approaches Through Linkage Mapping in Plants.	In: Adv Biochem Eng Biotechnol. DOI: 10.1007/10_2017_49	Dr. Kulwal PL	2017
4	Physiology of drought resistance in fruit crops	Biotic and Abiotic stress Management in Fruit crops: MPKV/EDN/ Pub. No.85 Pub. Director, CAFT, MPKV, Rahuri	Dr. Wagh, R.S.	2013
5	Leaf sap flow Chlorophyll, Water potential, transpiration and Photosynthetic rate under stresses in fruit crops	Biotic and Abiotic stress Management in Fruit crops : MPKV/EDN/ Pub. No 85 Pub. Director, CAFT, MPKV, Rahuri	Dr. Wagh, R.S.	2012
6	Germination	Souvenir on Hands on training in Seed Science & Technology	Dr. Ransing, S.K.	2014
7	Dormancy	Souvenir on Hands on training in Seed Science & Technology	Dr. Ransing, S.K.	2014
8	Role of plant growth regulators in fruit culture	In: Advances in Production technology of fruit crops: Advanced Faculty Training in Horticulture (Fruits), Dept. of Horticulture, MPKV, Rahuri-413 722,	Dr. Bharud, R. W. D. V. Deshmukh	2013
9	Plant adaptation to water stress	In: Dry land Agriculture: Kadlag, A. D., More, T. A. and Mate, S. N. Published by Agri-Biovet Press, 2/40, 1 <sup>st</sup> Floor, Ansari Road, Daryaganj, New Delhi-110 002.	Dr. Mate, S. N. Dr. Kadlag, D. V. Deshmukh S. D. Kale	2014

**Research Papers published in International /National Journal (NASS rating above 6.0)**

Sr. No.	Title of the Research paper	Authors	Name of Journal Vol. No. page no& Year	NASS rating
1	Association mapping for pre-harvest sprouting resistance in white winter wheat.	Kulwal P, Ishikawa G, Benscher D, Feng Z, Yu L-X, Jadhav A, Mehetre S, Sorrells ME	Theoretical and Applied Genetics 125:793–805 (2012)	10.13
2	Notification of crop varieties and registration of germplasm : Sorghum RSV 1006 (Phule Revati)	Shinde M.S, Gaikwad A.R and Gadakh S.R,	Indian J. Genet. 73(3) : 347-352 (2013)	6.28
3	Notification of crop varieties and registration of germplasm : Sorghum RPOSV 3 (Phule Panchami)	Shinde M.S, Gaikwad A.R and Gadakh S.R,	Indian J. Genet. 73(3) : 347-352 (2013)	6.28
4	Inheritance of blast resistance and identification of SSR marker associated with it in rice cultivar RDN 98-2.	Kumbhar SD, Kulwal PL, Patil JV, Gaikwad AP, Jadhav AS	Journal of Genetics 92:317-321 (2013)	7.5
5	Diversity for cell morphology, nitrogenase activity and DNA profile of <i>Azospirillum</i> species present in rhizosphere soils of six different physiographic regions of Maharashtra	Murumkar DR, Borkar SG & Chimote VP	Research Journal of Biotechnology 8(4): 16-25; (2013)	6.7
6	Interspecific hybridization in <i>Gossypium</i> L.: characterization of progenies with different ploidy levels confirmed multigenomic backgrounds	Newaskar GS, Chimote VP, Mehetre SS & Jadhav AS	Plant Breeding 132(3): 211-216; (2013)	7.5
7	<i>In vitro</i> plant regeneration in brinjal ( <i>Solanum melongena</i> L.) using cotyledon, hypocotyl and root explants	B. D. Pawar, A.S. Jadhav, A. A. Kale, V.P. Chimote and S. V. Pawar	Vegetos 26(02):312-317 (2013).	6.2
8	Association mapping in crop plants: Opportunities and challenges.	Gupta PK, Kulwal PL, Jaiswal V	Advances in Genetics 85:109-147 (2014)	11.43
9	Legume genetics and genomics: recent advances (A report on VI ICLGG Conference).	Mir RR, Kulwal PL	National Academy Science Letters India 37:1-3 (2014)	6.37
10	Effect of heat stress on proline, chlorophyll content, heat shock proteins and antioxidant enzyme activity in sorghum ( <i>Sorghum bicolor</i> ) at seedlings stage	Gosavi GU , Jadhav AS, Pawar BD, Kale AA, Chimote VP & Gadakh SR.	Indian Journal of Biotechnology 13:356-363 (2014)	6.48
11	Isolation, characterization, functional potential and molecular diversity of	Sonawane RB, Deokar CD,	Research Journal of Biotechnology	6.29



	<i>Pseudomonas fluorescens</i> isolated from the soils of Maharashtra	Chimote VP	9(11): 93-103 (2014)	
12	Diversity in phosphate solubilizing fungi ( <i>Aspergillus awamori</i> and <i>Penicillium digitatum</i> ) present in soils of Maharashtra	Murumkar DR, Borkar SG & Chimote VP	Research Journal of Biotechnology 9(8): 20-26; (2014)	6.29
13	Determination of morphometric, biochemical and genetic variation in <i>Sclerotium delphinii</i> isolates	Gawande SP, Borkar SG, Chimote VP, Nagrale DT & Sharma AK	African Journal of Microbiology Research 8(16): 1696-1703 (2014)	**--
14	Spatial diversity of free living rhizobia present in Rhizosphere soils of six different physiographic regions of Maharashtra, India	Murumkar DR, Borkar SG & Chimote VP	Legume Research 37(2): 165-174 (2014)	6.12
15	Molecular analysis of cytoplasmic male sterile system of sorghum ( <i>Sorghum bicolor</i> (L.) Moench) By RAPD and ISSR markers.	Palan, B. V., Kale, A. A., Pawar, B. D., Jadhav, A. S., Gadakh, S. R., & Chimote, V. P.	Vegetos, 27(2), 207-212 (2014).	6.02
16	Effect of PEG induced osmotic stress on peroxidase and superoxide dismutase isozymes in sorghum seedlings.	Damame, S. V., Lokhande, P. K., Kale, A. A., & Munjal, S. V.	Vegetos, 27(2), 272-278 (2014).	6.02
17	Effect of PEG induced water stress on chlorophyll content, membrane injury index, osmoprotectants and antioxidant enzymes activities in sorghum ( <i>Sorghum bicolor</i> (L.) Moench)	Hinge P, Kale A, Pawar B, Jadhav A, Chimote V and S Gadakh	Maydica 60(1): (2015)	6.38
18	Molecular tagging of Asiatic soybean rust resistance in elite genotype EC 241780 reveals complementation of two genes	Bhor TJ, Chimote VP & Deshmukh MP	Plant Breeding 134(1): 1 to 8 (2015)	7.34
19	Notification of crop varieties and registration of germplasm : Sorghum RSV 1098 (Phule Suchitra)	Shinde M.S., Patil V.R. Awari V.R. and Gadakh S.R.,	Indian J. Genet. 75(4) : 532 (2015)	6.28
20	Notification of crop varieties and registration of germplasm : Sorghum CSV 30 F	Shinde M.S., Patil V.R. Awari V.R. and Gadakh S.R.,	Indian J. Genet. 75(4) : 532 (2015)	6.28
21	Marker-trait association study for protein content in chickpea ( <i>Cicer arietinum</i> L.).	Jadhav AA, Rayate SJ, Mhase LB, Thudi M, Chitikineni A, Harer PN, Jadhav AS, Varshney RK, Kulwal PL	Journal of Genetics 94:279–286 (2015)	7.00
22	Antifungal, Antibacterial Activity of Camptothecin Extracted from	Kulkarani KD, Raghuwanshi KS,	Journal of Pure and Applied	6.05

	<i>Mappia foetida</i> .	RM Naik, SG Borkar, VP Chimote	Microbiology 9(1): 329-334 (2015).	
23	Activity Profile of defense related enzymes in chickpea ( <i>Cicer arietinum</i> L.) against fusarium wilt ( <i>Fusarium oxysporum</i> f. sp. <i>ciceris</i> ) at different growth stages.	Dalvi US, Naik RM, Chimote VP and Harer PN	Journal of Pure and Applied Microbiology 9(spl): 463-474 (2015).	6.05
24	Involvement of some of defense responsive enzymes against Fusarium wilt in chickpea cultivars	Jadhav RR, Kale AA & Mhase LB	Journal of Pure and Applied Microbiology 9(spl2): 229-241	6.05
25	Protein content exhibits significant positive correlation with seed weight in chickpea germplasm collection.	Kulwal PL, Mhase LB	Plant Genetic Resources: Characterization and Utilization (Cambridge) 1-3 (2016)	6.61
26	Molecular marker based detection of leaf rust resistance gene <i>Lr34</i> in Indian bread wheat ( <i>Triticum aestivum</i> L.)	Muthe ST, Kulwal PL, Gadekar DA, Jadhav AS	Australasian Plant Pathology 45:369-376 (2016)	7.09
27	Characterization of <i>Streptomyces</i> sp. from soils of Maharashtra on the basis of their morphology, functional efficiency and molecular divergence	Sonawane RB, Deokar CD, Chimote VP	Research Journal of Biotechnology 11(1): 18-29 (2016)	6.24
28	Different cellulose synthase genes are prominently expressed during fiber elongation in <i>Gossypium arboreum</i> and <i>G. hirsutum</i>	Newaskar GS, Chimote VP, Jadhav AS, Pawar BD & Kale AA	Indian Journal of Biochemistry & Biophysics 54(5): 200-206 (2017)	6.96
29	Molecular tagging of pod shattering tolerance trait in soybean [ <i>Glycine max</i> (L.) Merrill] genotype MACS-450	Thakre D, Chimote VP, Adsul A, Deshmukh MP & Pulate SC	Legume Research 40(2): 224-231 (2017)	6.12
30	Characterization of F7 introgression lines from interspecific crosses in cotton for sucking pest tolerance and improved fibre quality	Parde NS, Chimote VP & Mehetre SS	Multilogic in Science 7(23): 108-113 (2017)	7.15

### Practical Manuals:

S.N.	Name of Course	Publication No.	Name of Teachers
1	Introduction to Bioinformatics (MBB 555)	MPKV, Rahuri/ Education Pub. 17/2013	Mr. B.D. Pawar, Dr. P.L. Kulwal Dr. A.S. Jadhav
2	Techniques in Molecular Biology-I (MBB 505)	MPKV, Rahuri/ Education Pub. 15/2013	Mr. B.D. Pawar, Dr. V.P. Chimote Dr. A.S. Jadhav

3	Principles of Biotechnology (MBB-501)	MPKV, Rahuri/ Education Pub. 14/2013	Mr. B.D Pawar Dr. A. A Kale Dr. A.S. Jadhav
4	Principles of Plant Breeding (GP-501)	MPKV, Rahuri/ Education Pub .No 13/2012	Dr. N.S.Kute Dr. A.R.Aher
5	Principles of Quantitative Genetics (GP-501)	MPKV, Rahuri/ Education Pub .No 121/2016	Dr. N.S.Kute Dr. G. C. Shinde
6	Principles of Plant Physiology (PP-501)	MPKV/EDU/PUBL.No./20/2013)	Dr. R. S. Wagh Prof. S. V.Nirmal
7	Physiological and Molecular responses of plants to abiotic stresses (PP-503)	MPKV/EDU/PUBL.No./23/2013)	Dr. R. S. Wagh Dr. V. R. Awari
8	Mineral Nutrition (PP-511)	MPKV/EDU/PUBL.No./24/2013)	Dr. R. S. Wagh Dr. S. R. More
9	Nitrogen Metabolism (PP-610)	MPKV/EDU/PUBL.No./21/2013)	Dr. R. S. Wagh
10	Techniques in Plant Physiology (PP-604)	MPKV/EDU/PUBL.No./123/2016)	Dr. R. S. Wagh Dr. D. V. Deshmukh
11	Post Harvest Physiology (PP-606)	MPKV/EDU/PUBL.No./126/2016)	Dr. R. S. Wagh Dr. D. V. Deshmukh

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