Department of Plant Pathology and Agricultural Microbiology
Post Graduate Institute
Mahatma Phule Krishi Vidyapeeth,
Rahuri-413 722, Dist. Ahmednagar (MS)

Preamble

The subject of Plant Pathology and Agricultural Microbiology being taught in this Department since the establishment of this Department in 1971 at MPKV., Rahuri. However as early as 1909, Plant Pathology was one of the important subjects for undergraduate programme at College of Agriculture, Pune in 1926, a full-fledged Department of Plant Pathology came in to existence at College of Agriculture, Pune. Agricultural Bacteriology was introduced as a separate subject under the Department of Plant Pathology for U. G. students in 1934 and from 1958 on words the Post Graduate studies in Plant Pathology and Agricultural Microbiology were started at College of Agriculture, Pune. In 1971, the Department of Plant Pathology and Agricultural Microbiology became one of the important Department of Mahatma Phule Krishi Vidyapeeth, Rahuri.

Initially there was Post Graduate programme for M. Sc. (Agri.) at College of Agriculture, Pune and Rahuri. However, since 1996, Ph. D. programme was started in the discipline of Plant Pathology and Agricultural Microbiology at this Department of Post Graduate Institute, Mahatma Phule Krishi Vidyapeeth Rahuri.

Mandate

1. To offer courses in the disciplines of Plant Pathology and Agricultural Microbiology for the Under Graduate degree programme in the faculties of Agriculture and Horticulture.
2. To offer courses in the discipline of Plant Pathology and Agricultural Microbiology for M.Sc. (Agri.) and Ph.D. Programmes.
3. To undertake basic and applied research programmes in plant disease management.
4. To conduct seminars, symposia, conferences, summer school etc. for exchange of information with other scientists.

5. To participate in extension activities organized by MPKV and Department of Agriculture or other NGOs, Maharashtra.
6. To render technical advice to farmers on specific problems of plant disease through All India Radio and Television and published literature.
7. Multiplication and distribution of biofertilizers and bio-control agents to farmers.

Faculty

Sr. No.	Name	Designation	Office Phone No.	Mobile No.	E-mail	
					Official	Personal
1.	Dr. T. K. Narute	Head	02426-243231	9422362370	hodpath.mpkv@gov.in	tknarute@gmail.com tknarute@yahoo.co.in
2.	Dr. A. M. Navale	Associate Professor		9822846671	hodppam.mpkv@gmail.com	annasahebnavale123@gmail.com annasahebnavale@yahoo.com
3.	Dr. K. S. Raghuwanshi	Associate Professor		9405008801		drksr63@gmail.com

Academic Programmes

- M.Sc. (Agri.) in Plant Pathology
- M.Sc. (Agri.) in Agricultural Microbiology
- Ph.D. in Plant Pathology
- Ph.D. in Agricultural Microbiology

Academic programme and intake capacity of PG student for Plant Pathology and Agriculture Microbiology

Sr. No.	Degree Programme	Location	Discipline		Total
			Plant Pathology	Agril. Microbiology	
1.	M.Sc. (Agri.)	Post Graduate Institute, Rahuri	16	7	23
		College of Agriculture, Pune	6	6	12
		College of Agriculture, Kolhapur	-	5	5
		College of Agriculture, Dhule	4	-	4
2.	Ph.D.	Post Graduate Institute, Rahuri	6	4	10
Total			**32**	**22**	**54**

Note: - above figures are excluding ICAR quota and In-service candidate

- **M.Sc. (Agri.) in Plant Pathology**

Course Layout
Minimum Credit Requirements

Sr. No.	Subject	Minimum credit (s)
1.	**Major**	**20**
2.	**Minor**	**09**
3.	**Supporting**	**06**
4.	**Seminar**	**01**
5.	**Research**	**20**
6.	**Total Credits**	**36+20=56**
7.	**Compulsory Non Credit Courses**	**06**

Sr. No.	Course Number	Course Title	Credits
Plant Pathology			
A) Major subjects (Min. 20 credits)			
I Semester			
1.	**PL.PATH.501**	**Mycology**	**2+1=3**
2.	**PL.PATH.502**	**Plant Virology**	**2+1=3**
3.	**PL.PATH.503**	**Plant Bacteriology**	**2+1=3**
II Semester			
4.	**PL.PATH.504**	**Principles of Plant Pathology**	**3+0=3**

5.	PL.PATH.506	Principles of Plant Disease Management	2+1=3
6.	PL.PATH.510	Seed Health technology	2+1=3
III Semester			
7.	PL.PATH.505	Detections and Diagnosis of Plant Diseases	0+2=2
		Total	13+7=20

B) Minor Subjects (Min. 09 credits)			
I Semester			
1.	MBB-501	Principles of Biotechnology	2+1=3
II Semester			
2.	MBB-505	Techniques in Molecular Biology	0+3=3
3.	GP-510	Breeding for Biotic and Abiotic Stress Resistance	2+1=3
		Total	4+5=09
C) Supporting Subjects (Min. 06 credits)			
I Semester			
1.	MICRO 503	Microbial Genetics	2+1=3
II Semester			
2.	STAT 507	Design of Experiments for Plant Protection	2+1=3
		Total	4+2=06
D) Seminar (Min. 01 credits)			
IV Semester			
1.	PL.PATH.591	Master's Seminar	1+ 0=1
		Total	1+0=01
E) Master's Research (Min. 20 credits)			
1.		Master's Research	20
F) Non Credit Compulsory Courses			
I Semester			
1.	PGS.501	Library and information services	0+1=1
2.	PGS.504	Basic concepts to laboratory technique	0+1=1
II Semester			
3.	PGS.502	Technical writing and communication skills	0+1=1
4.	PGS.503	Intellectual property and its management in Agriculture	1+0=1
III Semester			
5.	PGS.505	Agricultural Research Ethics and Rural Development Programme	1+0=1
6.	PGS.506	Disaster Management	1+ 0=1
		Total	3+3=06

- **M.Sc. (Agri.) in Agricultural Microbiology**

Course Layout
Minimum Credit Requirements

Sr. No.	Subject	Minimum credit (s)
1.	Major	20
2.	Minor	09
3.	Supporting	06
4.	Seminar	01
5.	Research	20
6.	Total Credits	36+20=56
7.	Compulsory Non Credit Courses	06

Sr. No.	Course Number	Course Title	Credits
Agricultural Microbiology			
A) Major subjects (Min. 20 credits)			
I Semester			
1.	MICRO 501	Principles of Microbiology	3+1=4
2.	MICRO 502	Microbial Physiology and Metabolism	3+1=4
3.	MICRO 503	Microbial Genetics	2+1=3
II Semester			
4.	MICRO 504	Soil Microbiology	2+1=3
5.	MICRO 505	Microbial Biotechnology	2+1=3
III Semester			
6.	MICRO 506	Food and Dairy Microbiology	2+1=3
		Total	14+6=20

B) Minor Subjects (Min. 09 credits)			
I Semester			
1.	BIOCHEM 501	Basic Biochemistry	2+1=3
II Semester			
2.	BIOCHEM 505	Techniques in Biochemistry	1+2=3
3.	SOILS 506	Soil Biology and Biochemistry	2+1=3
		Total	5+4=09
C) Supporting Subjects (Min. 06 credits)			
II Semester			
1.	STAT 507	Design of Experiments for Plant	2+1=3

		Protection	
III Semester			
2.	**BIOCHEM 510**	**Carbon and Nitrogen Metabolism**	**2+1=3**
		Total	**4+2=06**
D) Seminar (Min.01 credits)			
IV Semester			
1.	**MICRO 591**	**Master's Seminar**	**1+0=1**
		Total	**1+0=01**
E) Master's Research (Min. 20 credits)			
1.		**Master's Research**	**20**
F) Non Credit Compulsory Courses			
I Semester			
1.	**PGS 501**	**Library and Information Services**	**0+1=1**
2.	**PGS 504**	**Basic Concepts in Laboratory Techniques**	**0+1=1**
II Semester			
3.	**PGS 502**	**Technical Writing and Communication Skills**	**0+1=1**
4.	**PGS 503**	**Intellectual Property and its Management in Agriculture**	**1+0=1**
III Semester			
5.	**PGS 506**	**Disaster Management**	**1+0=1**
6.	**PGS 505**	**Agricultural Research Ethics and Rural Development Programmes**	**1+0=1**
		Total	**3+3=06**

- **Ph.D. in Plant Pathology**

Course Layout
Minimum Credit Requirements

Sr. No.	Subject	Minimum credit (s)
1.	**Major**	**18**
2.	**Minor**	**10**
3.	**Supporting**	**05**
4.	**Seminar**	**02**
5.	**Research**	**45**
6.	**Total Credits**	**35+45=80**
7.	**Compulsory Non Credit Courses**	**06**

Sr. No.	Course Number	Course Title	Credits
Plant Pathology			
A) Major subjects (Min. 18 credits)			
I Semester			
1.	**PL. PATH.601**	**Advanced Mycology**	**2+1=3**
2.	**PL. PATH.602**	**Advanced Virology**	**2+1=3**
3.	**PL. PATH.603**	**Advanced Bacteriology**	**2+1=3**
II Semester			
4.	**PL.PATH.518**	**Epidemiology and Forecasting of Plant Diseases**	**2+1=3**
5.	**PL. PATH.604**	**Molecular Basis of Host Pathogen Interaction**	**2+1=3**
III Semester			
6.	**PL. PATH.605**	**Principles and Procedures of Certification**	**1+0=1**
7.	**PL. PATH.606**	**Plant Biosecurity and Biosafety**	**2+0=2**
		Total	**13+5=18**
B) Minor Subjects (Min. 10 credits)			
I Semester			
1.	**GP 604**	**Molecular and Chromosomal Manipulations for crop Breeding**	**2+0=2**
2.	**BIOCHEM 607**	**Advanced Techniques in Biochemistry**	**0+2=2**
II Semester			
3.	**NEMA 603**	**Advances in Nematode Management**	**2+1=3**
4.	**GP 608**	**Advances in Breeding of major field crop**	**3+0=3**
		Total	**7+3=10**
C) Supporting Subjects (Min. 06 credits)			
II Semester			
1.	**BIOCHEM 603**	**Biochemistry of Biotic and Abiotic Stresses**	**3+0=3**
III Semester			
2.	**ENT 608**	**Advanced Host Plant Resistance**	**3+0=3**
		Total	**6+3=06**
D) Seminar (Min. 02 credits)			
III Semester			
1.	**PL. PATH.691**	**Doctoral Seminar-I**	**0+1=1**
IV Semester			
2.	**PL. PATH.692**	**Doctoral Seminar-II**	**1+0=1**
		Total	**1+1=02**
E) Doctoral Research (Min. 06 credits)			
1.		**Doctoral Research**	**45**
F) Non Credit Compulsory Courses			
I Semester			
1.	**PGS 501**	**Library and Information Services**	**0+1=1**
2.	**PGS 504**	**Basic concepts in Laboratory techniques**	**1+0=1**

II Semester			
3.	**PGS 502**	**Technical Writing and Communication Skill**	**0+1=1**
4.	**PGS 503**	**Intellectual Property and its Management in Agriculture**	**1+0=1**
III Semester			
5.	**PGS 505**	**Agricultural Research Ethics and Rural Development Programme**	**1+0=1**
6.	**PGS 506**	**Disaster Management**	**0+1=1**
		Total	**3+3=06**

- **Ph.D. in Agricultural Microbiology**

Course Layout
Minimum Credit Requirements

Sr. No.	Subject	Minimum credit (s)
1.	**Major**	**15**
2.	**Minor**	**08**
3.	**Supporting**	**05**
4.	**Seminar**	**02**
5.	**Research**	**45**
6.	**Total Credits**	**30+45=75**
7.	**Compulsory Non Credit Courses**	**06**

Sr. No.	Course Number	Course Title	Credits
Agricultural Microbiology			
A) Major subjects (Min. 15 credits)			
I Semester			
1.	**MICRO 509**	**Plant Microbe Interaction**	**3+0=3**
2.	**MICRO 510**	**Industrial Microbiology**	**2+1=3**
3.	**MICRO 601**	**Advances in Fermentation**	**2+1=3**
II Semester			
4.	**MICRO 602**	**Advanced Microbial Physiology**	**2+0=2**
5.	**MICRO 603**	**Regulation of Microbial Biosynthesis**	**2+0=2**
6.	**MICRO 604**	**Current Topics in Soil Microbiology**	**2+0=2**
		Total	**13+2=15**

B) Minor Subjects (Min. 08 credits)			
I Semester			
1.	**BIOCHEM 601**	**Advanced Enzymology**	**2+0=2**
2.	**BIOCHEM 602**	**Advanced Molecular Biology**	**3+0=3**
II Semester			
3.	**BIOCHEM 603**	**Biochemistry of Biotic and Abiotic Stresses**	**3+0=3**
		Total	**8+0=08**
C) Supporting Subjects (Min. 02 credits)			
I Semester			
1.	**BIOCHEM 607**	**Advanced Techniques in Biochemistry**	**0+2=2**
II Semester			
2.	**MBB 512**	**Immunology and Molecular Diagnostics**	**2+1=3**
		Total	**2+3=05**
D) Seminar (Min. 02 credits)			
III Semester			
1.	**MICRO 691**	**Doctoral Seminar I**	**1+0=1**
IV Semester			
2.	**MICRO 692**	**Doctoral Seminar II**	**1+0=1**
		Total	**1+1=02**
E) Doctoral Research (Min. 45 credits)			
1.		**Doctoral Research**	**45**
F) Non Credit Compulsory Courses			
I Semester			
1.	**PGS 501**	**Library and Information Services**	**0+1=1**
2.	**PGS 504**	**Basic Concepts in Laboratory Techniques**	**0+1=1**
II Semester			
3.	**PGS-502**	**Technical writing and Communication skills**	**0+1=1**
4.	**PGS 503**	**Intellectual Property and its Management in Agriculture**	**1+0=1**
III Semester			
5.	**PGS 505**	**Agricultural Research Ethics and Rural Development Programmes**	**1+0=1**
6.	**PGS 506**	**Disaster Management**	**1+0=1**
		Total	**3+3=06**

Laboratories

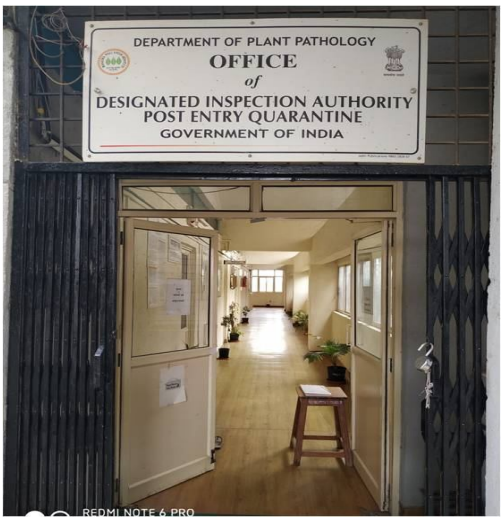
1. Eco friendly disease management and beneficial microbes research laboratory
2. Electron Microscopy
3. Post entry quarantine laboratory
4. Liquid biofertilizers production plant
5. PG Plant Pathology and Microbiology laboratory
6. Environment controlled poly-houses
7. Glass house facilities

Disease Diagnosis Laboratory

P.G. Laboratory

Eco Friendly Laboratory

Unique facility of Electron Microscope



Post Entry Quarantine Laboratory

Fermenters of Liquid Biofertilizer

Solid Biofertilizer Production Unit

Liquid Biofertilizer Production Unit

Research

Ongoing research:
(Research in M.Sc. / Ph.D. in Plant Pathology and Agricultural microbiology)

- **M.Sc. in Plant Pathology:**

1. Field testing of ayurvedic drugs against early blight of tomato
2. Efficacy of Bio-control Agents and Plant Extracts in Management of Early Blight of Cherry Tomato.
3. Field testing of homeopathic drugs against early blight of tomato.
4. Evaluation of Antibacterial activity of ayurvedic drugs against *Xanthomonas auxanopodis pv.punicae*
5. Study on antifungal activity of plant product on early blight of tomato
6. "Studies on seed borne micoflora of Pea (*Pisum sativum*)".
7. Effect of bio-priming on seed quality and management of seed borne pathogen in Dolichos bean (*Lablab purpureus*)
8. Studies on *Macrophomina* blight of Mung bean
9. Management of stem end rot of mango (*Mangifera indica* L.)
10. Efficacy of Rhizosheric and endophytic microflora against dry root rot of chickpea.
11. Studies on charcoal rot of maize caused by Macrophomina
12. Studies on management of powdery mildew of Mungbean.
13. Effect on bio-priming on seed quality and management of seed borne pathogens in pigeon pea (*Cajanus cajan* L.)
14. Management of wilt of bottle gourd.
15. Studies on root rot (*Fusarium solani*) disease of sweet orange.

- **Ph.D. in Plant Pathology:**

1. Studies on Seed borne Microflora of Soybean (*Glycine max* (L.) Merrill.
2. Epidemiology and Management of Tomato leaf curl virus disease.
3. Bio-efficacy of Silver nano particles against major fungal and bacterial plant pathogens.
4. Epidemiology and Management of Papaya Ring Spot Virus disease.
5. Pathogenic variability and Management of Yellow Sigatoka Leaf Spot of Banana.
6. Etiology and Management of Rhizome Rot of Turmeric.

- **M.Sc. in Agril. Microbiology:**

1. Studies on Pink Pigmented Facultative Methylotrophs in Cow Pea (*Vigna unguiculata*).
2. Characterization of Endophytic Bacteria from Roots of Safed Musli (*Chlorophytum borivilianum*).
3. Effect of Azotobacter and PSB with different levels of Nitrogen and Phosphorous on Growth and Yield of Asali (*Lepidium sativum* L.)
4. Effect of *Glucanacetobacter diazotrophicus* inoculation on Yield of Sweet Corn.
5. Combined Effect of Biofertilizers and Biopesticides under graded levels of fertilizers on Growth and Yield of Tomato (*Lycopersicon esculentum* M.) cv. *Phule kesari.*

- **Ph.D. in Agril. Microbiology:**

1. Studies on Pink Pigmented Facultative Methylotrophs in soybean (*Glycine max.* (L.) Merrill).
2. Studies on Enrichment of Compost with Biofertilizers and its Effect on Cotton.
3. Development of Microbial Consortium of Efficient Strains of Zinc and Iron Solubilizing Microorganisms as a Liquid Bio-inoculants and its Effect on Maize.
4. Sensory Microbial Technique to Detect Pesticide Residues and Heavy Metals in Marketable Fruits and Vegetables.

Extension Activities

I. **Plant Disease Diagnosis: -** Diseased samples received from farmers and development department of plant are diagnosed for their cause (about 1205 disease samples of fruits and vegetables) and remedial measured are suggested.

II. **Production Technology of Biofertilizers**: - Guidance is given to manufacturers, progressive cultivators and unemployed persons regarding production technology for Biofertilizers and Bio agents. However approximately 12,000 farmers purchased the

biofertilizer and bioagents from this department and could produced Rs. 22 lakh receipts.

III. Inspection of Post Entry Quarantine (PEQ) plant material at different location.

IV. Horticultural Crop Pest Surveillance Advisory Project (HORTSAP).

Projects / Schemes

1) "Network project on Mitigating bacterial blight disease of Pomegranate (Period 2008-2009 to 2012-2013)
2) Promotion and large scale production of biofertilizers developed by MPKV, Rahuri under Rashtriya Krishi Vikas Yojana.
3) Horticultural Crop Pest Surveillance Advisory Project (HORTSAP).
4) Post Entry Quarantine Project.
5) Disease Diagnosis centre
6) All India Coordinated Research Project on Medicinal and Aromatic Plants and Betelvine

Achievements

- **Number of students completed M.Sc. (Agri.) and Ph.D till date**

Sr. No.	Degree Programme	Discipline		Total
		Plant Pathology	Agril. Microbiology	
1.	M.Sc. (Agri.)	355	269	624
2.	Ph.D.	47	20	67

- **Fellowship:**

1. The students of M.Sc. (Agri.) and Ph.D Degree Programme in Plant Pathology and Agril. Microbiology got **Junior Research Fellowship (7), Rajiv Gandhi fellowship (2) Jain Irrigation(1), DSP Inspire (1).**
2. Two students are selected in ARS Examination.
3. Nineteen students and staff has passed NET Examination during 2012 to 2018.

- **Patent filled –** Utilization of granular formulations of yeast against post harvest losses of Mango and Papaya fruits.

- **Important strains identified:**

a) Potash Solubilizing bacteria	:- *Pseudomonas fluorescence*
b) Potash Solubilizing fungi	:- *Aspergillus niger*
c) Root inducing bacteria	: - *Agrobacterium rhizogenus*
d) Thermophillic bacteria	:- *Bacillus* spp.
e) Nitrogen fixing bacteria	:- *Glucanoacetobacter diazotrophicus*

- **Recommendation Deliver to farmers community**:

Twenty one Research recommendations were recommended farming community through University system i.e. Joint Agricultural Research Committee and Department of Agriculture during last five years.

Publications

Research papers, published in NAAS rated journal 6 and above during 2013-2014 to 2017-2018

Sr. No.	Title of Research paper	Name of journal along with Vol. No, page No and year	Authors	NAAS rating
1.	Isolation, Characterization, functional potential and molecular diversity of *Pseudomonas fluorescens* isolated from the soils of Maharashtra	Research Journal of Biotechnology 11 (1) : 18-29, 2014	Sonawane R. B., **Deokar C. D.** and Chimote V. P.	6.24
2.	Molecular diversity of different potassium solubilizing bacterial species old *Pseudomonas* through RAPD	Research Journal of Biotechnology Vol. No. 10 (9) P. 34-42, 2015	Gore N. S., **A. M. Navale** and Ghutukade K.S.	6.24
3.	Characterization of *Streptomyces*	Research Journal of	Sonawane R.	6.24

	sp. from soils of Maharashtra on the basis of their morphology, functional efficiency and molecular divergence	Biotechnology 11 (1) : 18-29, 2016	B., **Deokar C. D.** and Chimote V.P.	
4	Effect of consortia of potassium solubilizing bacteria and fungi on growth, nutrient uptake and yield of banana	Indian Journal of Horticulture 74(2) : 189-197, 2017	Gore N. S. and **A. M. Navale**	6.15
5.	Characterization of marine actinomycete having antiviral activity against cucumber mosaic virus.	Current Science, 113 (7): 1442-1447, 2017	**S. B. Latake** and S. G. Borkar	6.84
6.	Effect of temperature on germination and survival of *Uromyces viciae fabae* (Pers.) de Bary	Journal of Agro meteorology 20(2) : 144-148, 2018	P. E. More.,**C. D. Deokar** and B. C. Game	6.40

Research papers, published in NAAS rated journal 6 and below during 2013-2014 to 2017-2018

Sr. No.	Title of Research paper	Name of journal along with Vol No, page No and year	Authors	NAAS rating
1.	"Response of *ArbuscularMycorrhizal* Fungi and Phosphate solubilizing Bacteria on Rabi Sorhum Var. PhuleVasudha".	J. Agriculture Research and Technology Vol. No. 28 (2) P. 207-208, 2014	Gavade M. G., **A. M. Navale** and K. T. Suryawanshi	3.18
2.	Transmission of Watermelon mosaic virus (WMV-1) with aphid vectors.	J. Pl. Dis. Sci. Vol 9 (2) 170-173, 2014	**B. M. Ilhe**, D. M. Sawant and K. T. Suryawanshi	4.20
3.	Studies on Efficacy of Trichoderma Isolates Metabolites on Fusarium Wilt of Tomato (Lycopersicon esculentum) caused by Fusarium oxysporum if. Sp. Lycopersici	Trends in Biosciences 8 (20) : 5657-5665, 2015	K. S. Ghutukade, **C. D. Deokar**, S. G. Kamble and S. B. Latake	3.94
4.	Studies on ON-FARM production techniques of A.M. fungi	J. of Plant Disease Sciences (3.2) 10 (1) : 57-62, 2015	**C. D. Deokar**, Vijay Kumar Verma and R. B. Sonawane	4.20
5.	Cluster analysis of Aspergillus Flavus isolates based on Morphological diversity	BIOINFOLET, 12 (4 B) : 956-957, 2015	M. A. Gud, **C. D. Deokar**, and K.S. Raghuwanshi	3.75
6.	Molecular characterization of	IOSR – JAVS, 01-05,	K.S.Ghutukade,	3.10

	Trichoderma isolates by ISSR Marker	2015	**C. D. Deokar**, N. S. Gore, V. P. Chimote and S.G. Kamble	
7.	Screening of peanut cultivars against colonization of Aspergillus flavus	BIOINFOLET, 12 (4B) : 953-955 2015	M. A. Gud, **C. D. Deokar** and K.S. Raghuwanshi	3.75
8.	Isolation and screening of lactic acid bacteria from dairy and fermented	International Journal of Tropical Agriculture 33(4(Part III)) : 3405-3409, 2015	P. S. Sabnis, **A. M. Navale**, S. S. Thorat and C. D. Deokar	3.49
9.	Antifungal Activity of Camptothecin Extracted from *Mappiafoetida* against Disease causing Pathogens in Pomegranate (*Punicagranatum* L.)	J. of Pure and Applied Microbiology Vol. No. 9(1), P.329-334, 2015	K.D. Kulkarni, **K. S. Raghuwanshi**, R.M. Naik, S. G. Borkar and V.P. Chimote	4.00
10.	Management of *Fusarium* Wilt of Tomato By Bioagent, Fungicides and Varietal Resistance	International Journal of Plant Protection, Vol. No. 8,1 April 2015	**B.G. Barhate**, N.A. Musmade and T.A. Nikhate	4.10
11.	"Management of Chrysanthemum White Rust an Intercepted Quarantine Disease for India, Under Green House Condition".	International Journal of Plant Protection, Vol. No.8, 1 April 2015	**B. G. Barhate**, N. A. Musmade and J.B. Bahirat	4.10
12.	"Morphological and cultural variability of *Fusarium oxysporum* of sp. *ciceri* causing wilt of chickpea".	I.Pl. Dis. Sci, Vol.10 (1), 2015	M.K. Awachar and **B. G. Barhate**	2.65
13.	Management of wilt and root rot disease of sugarcane in nursery	ISSN 68 (23): 125-129, 2016	N. J. Deshmukh, **C. D. Deokar** and N.A. Musmade	3.40
14.	Composting of organic wastes using newly developed cellulolytic microbial consortium	IJAEB, 9 (4) : 525-534, 2016	Bhanudas Game, **C. D. Deokar** and **Annasaheb Navale**	4.75
15.	Isolation, characterization, functional potential and diversity of Pseudomonas fluorescens isolated from the Rhizosphere soils of Chickpea from Maharashtra	Advances in Life Sciences ISSN 5 (16) : 6170-6176, 2016	S. R. Zanjare, **C. D. Deokar**, A. V. Suryawanshi and S. B. Gawade	3.15

16.	Development of Bio formulation by using different carriers for Shelflife of Pseudomonas fluorescens	Advances in Life Sciences ISSN 5 (16) : 6444-6448, 2016	Zanjare S.R., **C. D. Deokar**, V.S. Shinde, A. V. Suryawanshi and S.B. Gawade	3.15
17.	In vitro screening of rhizospheric Aspergillus strains for potassium solubilizationfrom Maharashtra, India	South Asian Journal of Experimental Biology, Vol 6, Issue 6, P : 228-233 2016	Nileema S. Gore and **Annasaheb M. Navale**	4.79
18.	"Isolation characterization of potassium solubilizing bacteria from Rhizosporic soil of onion	Indian Phytopathology 69 (45) : 744-745, 2016	Jasmine M Nadaf and **A. M. Navale**	5.90
19.	Studies on screening techniques against Tomato Leaf Curl Virus Resistance in Tomato	Advances in Life Sciences Vol 5 (23) 11051-11053, 2016	M. A. Meshram, **B. M. Ilhe**, N.A. Musmade	3.15
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