

**UNIVERSITY OF HORTICULTURAL SCIENCES,
BAGALKOT, KARNATAKA**



**SELF STUDY REPORT FOR THE
Ph.D. IN PLANT PATHOLOGY
COH, BAGALKOT, 2014-15 to 2018-19**

SUBMITTED TO
**Indian Council of Agricultural Research,
Krishi Bhavan, New Delhi.**

SUBMITTED BY
**University of Horticultural Sciences,
Udyanagiri, Bagalkot – 587 104
Karnataka**

PREFACE

The growth of Indian agriculture sector has had its moments of glory. The green revolution has been major success story of free India to achieve surplus today, nonetheless frequently plagued by famines and chronic food shortage. From food grain production around 55 million tons at the time of independence, now boast the production of 284.83 million tons of food grains (2017-18). Indian agriculture has witnessed wide variations in growth performance after independence in India. The record horticulture production (306.8 million tonnes estimated) during 2017-18 will mark the sixth straight year of horticulture production outstripping that of food grains. Further, the percentage share of horticulture in agriculture GDP is 33 per cent which is quite impressive. The horticulture sector plays vital role in nutritional security, economic sustainability and employment generation. It was realized only in mid-80s about the importance of horticulture and thus the Government of India recognized Horticulture as a prominent sector. Horticulture appears to be a viable means of diversification for making agriculture more profitable through efficient land use, optimum utilization of natural resources while creating skilled employment for the rural masses. Horticulture has invariably enhanced the economic status of farming community besides, without disturbing invaluable natural resources. In general the growth of horticulture sector has created ripples which consequently resulted in a wide spectrum of processing industries. In this context, quality seed and planting material supply, surge for hi-tech horticulture, better prospects for contract farming as well as cooperative farming, participatory approach in production and marketing have attained magnanimous stature. The higher growth rate in horticulture sector suggests a structural change in Indian agriculture where farmers are increasingly growing perishable commercial crops due to a growing market and a quicker cash flow as these crops require less time from sowing to marketing. Thus, there is a growing awareness about the advantages of the horticultural crop production and this is bound to go up with the improvement in socio-economic status of the people.

In the recent past R & D programmes in horticulture received an impressive support from the government. As a result, the research infrastructure has increased many-fold with the setting up of a number of new institutes, national research centres for several crops, important both from domestic as well as export point of view. The

establishment of educational institutions in the field of horticulture play a pivotal role in developing human infrastructure, which would cater to the needs of the emerging horticulture industry.

To develop the quality human infrastructure in the field of horticulture in general and to cater to the needs of the farmers of Northern Karnataka in particular, the College of Horticulture was established at Bagalkot on 07.07.2008 under the University of Agricultural Sciences, Dharwad. With the establishment of the University of Horticultural Sciences at Bagalkot the college of Horticulture came under the administrative control of the said university from 2009-10. The college offers undergraduate, postgraduate and Ph.D. courses. The college has the admission capacity of about 120 students annually for undergraduate, about 55 students for Master' degree programme and 25 students for Ph.D. programme. The students of this college have excelled not only in studies but also in extra-curricular activities and National level competitive examinations. The college has been making efforts to improve the quality of education offered in this direction. Since the college is due for accreditation, the present self study report provides all the necessary information about the college activities performed during last five years (01-01-2014 to 31-12-2018).

The University Level Task Force and Steering Committee have also been gratefully acknowledged for their help, guidance and suggestions given in preparing the report.

The college level Steering Committee and Task Force have done a great job in compiling information and bringing out this report to be submitted to Accreditation Board of ICAR. My heartfelt thanks to all for providing valuable suggestions to improve the quality of presentation.

**College of Horticulture, Bagalkot
March, 2019.**


**Dean
(H.B.Patil)**

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6.4.1. BRIEF HISTORY OF THE DEGREE PROGRAMME

Bagalkot is hub of many important fruit and vegetable crops like grapes, pomegranate, banana, papaya, brinjal, tomato etc. At the same time there were long standing pathological problems in horticultural crops like bacterial blight of pomegranate, downy and powdery mildews of grapes, tip over of banana, koleroga of arecanut, wilt and murda of chilli *etc* were posing serious threat to these crops. There was a need to find solutions for these problems through doctoral research. At the same time the Dept of Plant Pathology at COH, Bagalkot was fully fledged with well developed laboratory and equipments along with experienced faculty. More over many M.Sc. (Horticulture) Plant Pathology post graduates of the university were interested to continue their research career in the field of Plant Pathology leading to Ph. D. In this context, the university started Ph. D. programme in Plant Pathology at College of Horticulture, Bagalkot in the year 2014-15.

Objectives

- Human resource development at master's levels having good knowledge of practical Plant Pathology.
- Systematic documentation of diseases, casual organisms and their economic importance in horticultural crops.
- Development of disease forecast models and integrated disease management modules.
- Research and development of eco friendly and low cost technologies for the plant disease management.
- Production and popularization of bio agents.
- Evaluation of newer molecules of fungicides and bactericides.
- Consultancy services to farmers through phone, discussions, demonstrations and field visits.

Accomplishments

Research Achievements of Ph. D students

| Sl. No. | Name of the student | Title of thesis | Year of completion | Achievement/ Finding |
|---------|-----------------------|--|--------------------|---|
| 1 | Pradnyarani Nidagundi | Etiology, epidemiology, molecular characterization and integrated disease management of tip over disease of banana caused by | March 2018 | 1. Tip over disease of banana is more severe in the tissue culture plantlets and found that 6 month old seedlings were more prone to disease infection 2. Maximum temperature and average humidity positively correlated with disease development. PM-2A |

| | | | | |
|---|------------------|--|----------------|--|
| | | <i>Pectobacterium carotovorum</i> subsp. <i>carotovorum</i> (Jones 1901) Hauben et al., 1999 | | (bacterial bio-agent) kokum extract were found effective. 4. Bronopol @500 ppm+COC @ 2gm/lit exhibited maximum disease control when drenched 4 times @15 days interval 5. Red banana, Yelakki bale and Hunuman genotypes showed resistant reaction |
| 2 | Priya I. Naganur | Development of advanced diagnostic tools, host transcriptome analysis and management of ToLCNDV associated with yellow mosaic disease of ridge gourd (<i>Luffa acutangula</i> (L.) Roxb.) | September 2018 | 1. Real time PCR assay showed Ridge gourd yellow mosaic virus multiplication begin in the host after 3 hrs of inculcation and estimated copy number of 2.74×10^2 per micro litre. 2. LAMP tool was standardized for the detection of ToLCNDV using CP gene at low concentration. 3. Transcriptome analysis using NGS platform revealed that host genes were modulated during ToLCNDV infection and gene expression changes at molecular , biological and cellular levels 4. Seed treatment with imidacloprid 600 FS @ 10 ml/ kg+ soil application of neem cake @ 250 kg/ha+ spraying with azadirachtin 10000 ppm @ 1 ml/ltr followed by Cyazopyre 10 OD @ 1.5 ml/litr, trizophos @ 2 ml/ltr and imidachlooprid 17.8 SL @ 0.3 ml/litr @ 15 days interval were found effective against ridge gourd yellow mosaic virus disease |

Publication of Ph. D. Students

| | |
|--|---|
| Research papers published in journals having NAAS ratings >4 | Research papers published in journals having NAAS ratings < 4 |
| 2 | 2 |

6.4.2. FACULTY STRENGTH

| Sl. No. | Cadre | Sanctioned strength | Faculty in place | Vacant position | Faculty recommended by ICAR* | Deviations from ICAR recommendation* |
|--|---------------------|---------------------|------------------|-----------------|------------------------------|--------------------------------------|
| 1. | Professor | 1 | 1 | 0 | 1 | Nil |
| 2. | Associate Professor | 2 | 1 | 1 | 2 | |
| 3. | Asst. Professor | 2 | 2 | 0 | 3 | |
| Faculty from other directorates and nearby colleges/ stations | | | | | | |
| 4. | Professor | - | 1 | - | - | - |

| | | | | | | |
|----|---|---|---|---|---|---|
| | Dean (PGS), UHSB | | | | | |
| 5. | Visiting Professor Dr. V.B. Hosagoudar Bio Research Foundation, Bilagi | - | 1 | - | - | - |
| 6. | Assistant Professor Directorate of Research | - | 1 | - | - | - |
| 7. | Assistant Professor Directorate of Extension | - | 1 | - | - | - |
| 8. | Assistant Professor KRCCH, Arabhavi | - | 1 | - | - | - |

*ICAR has recommended Department of Plant Protection (consisting Entomology, Plant Pathology and Nematology) with 1 Professor, 2 Associate Professor and 3 Assistant Professors. At this college total faculty strength put together Plant Pathology and Entomology accounts 1 Professor, 1 Associate Professor and 4 Assistant Professors.

6.4.3. TECHNICAL AND SUPPORTING STAFF

| Sl. No. | Cadre | Sanctioned strength | In place | Vacant position | Recommended by ICAR | Deviations from ICAR recommendation |
|---------|----------------------|---------------------|----------|-----------------|---------------------|-------------------------------------|
| 1 | Laboratory Assistant | 1 | 1 | Nil | 1 | Nil |
| 2 | Field Assistant | - | - | Nil | 1 | -1 |

6.4.4. CLASS ROOMS AND LABORATORIES

Class rooms

| Sl. No. | Class room No. | Area | Seating capacity | Other facilities (LED, projector, Computer, etc.) |
|---------|-------------------|---------------|------------------|---|
| 1 | Ph. D. Class room | 26 ft x 23 ft | 35 | LCD projector, Computer and smart board facility |

Laboratories

| Sl. No. | Name of the laboratory | Area | Seating capacity |
|---------|------------------------------|---------------|------------------|
| 1 | Post graduate laboratory | 36 ft x 26 ft | 35 |
| 2 | Ph. D. laboratory | 24 ft x 26 ft | 20 |
| 3 | Molecular biology laboratory | 26 ft x 20 ft | 05 |
| 4 | Inoculation chamber | 9 ft x 8 ft | 04 |
| 5 | Bio control laboratory | 25 ft x 25 ft | 08 |

Major equipments

| Sl. No. | Name of the equipment | Quantity | Sl. No. | Name of the equipment | Quantity |
|---------|------------------------|----------|---------|-----------------------------|----------|
| 1 | Laminar Air Flow | 02No | 17 | Hot Plate | 01 No. |
| 2 | Dissection Microscopes | 06 Nos | 18 | Quartz-Bi-Distillation Unit | 01 No. |
| 3 | Student microscopes | 20 Nos | 19 | Digital S.L.R. Camera | 01No. |

| Sl. No. | Name of the equipment | Quantity | Sl. No. | Name of the equipment | Quantity |
|---------|----------------------------------|----------|---------|---------------------------------------|----------|
| 4 | Pressure cookers | 02 No | 20 | Water bath (digital with 12 holes) | 01No. |
| 5 | Autoclaves | 03 Nos | 21 | Orbital shaking incubator | 01 No. |
| 6 | Refrigerators | 03No | 22 | Trinocular Microscopes | 04 Nos |
| 7 | Monocular Microscope | 02 Nos | 23 | Phatomicrography system. | 02Nos. |
| 8 | Binocular Microscope | 02 Nos | 24 | Microwave ovens | 02 No |
| 9 | Analytical Balance | 01 Nos | 25 | Automatic weather station with sensor | 01 No. |
| 10 | LCD Projector | 01 No | 26 | Global Positioning System | 01 No. |
| 11 | Analytical Balance | 01 No | 27 | Soil Moisture Meter | 01 No. |
| 12 | Automatic seed moisture analyzer | 01 No. | 28 | Rotary Shaker | 01 No. |
| 13 | Monocular Microscope | 02 No. | 29 | pH Meter | 01 No. |
| 14 | Heating Mantle 250 ML | 03 No | 30 | LCD Projector | 01 No |
| 15 | Colony Counter | 01 No. | 31 | Binocular Microscope | 02 Nos |
| 16 | Hot Air Oven | 01 No | | | |

(Miscellaneous: Filing cabinets (steel 4 drawer), Lab stools, Office tables, Office executive chairs, Assistant tables, , Pigeon hole steel Almeria, Almeria, Glass door Almeria, Slotted angle rack steel, Computers, Printers, Notice board, Hand lens 10x, Lab tables fixed with reagent racks , Glass block board(6X4)(8x4, Wooden key board, Air coolers, Acrylic display stands)

Farm facilities

| Sl. No. | Farm Area | Irrigated/ Non-Irrigated | Crops grown |
|---------|-----------|--------------------------|---|
| 1. | 2 Acre | Irrigated | Banana, Ridge gourd, Betelvine, Tomato, Onion, Brinjal, Ginger etc. |

6.4.5. CONDUCT OF PRACTICAL AND HANDS ON TRAINING

| Sl. No. | Course Number and Title | Skills / Method of Hands on training |
|---------|----------------------------|---|
| 1. | HPP 601, Advanced Mycology | Recording Morphological and cultural characteristics for identification of fungi. Preparation of semi-permanent slides of fungi belonging to various classes. Collection of herbarium, culturing and mass multiplication of various plant pathogenic fungi on various media Designing primers for identification of fungi species. |
| 2. | HPP 602, | Detection of plant viruses using different molecular techniques |

| | | |
|----|---|---|
| | Advanced Virology | Detection of plant viruses using different serological techniques |
| 3. | HPP- 603, Advances Plant Bacteriology | Detection and Characterization of bacterial pathogens through morphological, biochemical, staining, molecular and serological techniques. Plasmid profiling of PPB for variability studies. Siderophore production technique by <i>Pseudomonas</i> sp. Isolation, purification and preservation of bacterial endo-symbionts. <i>In-vitro</i> evaluation of chemicals and scoring techniques for bacterial diseases. |
| 4. | HPP- 604, Advances Plant Nematology | Molecular detection and characterization of major plant nematodes through PAGE. Histopathology studies by using microtome Proving pathogenicity and screening techniques for resistance assessment Biological management of nematodes under greenhouse condition using bioagents. Disease scoring in nematode diseases. |
| 5. | HPP-605 Molecular Basis of Host-Pathogen Interaction | Handling of PCR, q PCR to study qualitative and quantitative gene expressions Handling of spectrophotometer Documentation and interpretation of amplified gene products |
| 6. | HPP-613 Advances in Seed Pathology | Collection of seeds from different producing firms, Detection of seed borne infection through morphological techniques Detection of mycelium and other structures in seed. |
| 6. | HPP- 615, Advances in biological management of plant diseases | Isolation, purification and preservation of biological agents. Characterization of biocontrol agents using molecular tools viz., RAPD, SSR <i>In-vitro</i> evaluation of bioagents for their antagonism and antibiosis mechanism. Enumeration of CFU/gm of commercial products of bioagents- <i>Trichoderma, Pseudomonas, Bacillus</i> etc. |

6.4.6. SUPERVISION OF STUDENTS IN PH.D. PROGRAMMES

To allot the research topic and major advisor, the students are encouraged to search literature and come out with the appropriate research areas. The allotment will be made by the HOD/ Dean of the respective colleges.

Advisory Committee of Ph.D. student shall consist of at least five members including Major advisor among whom three members shall be from outside the major field of specialization. The members from the major field shall be chosen to form a closely knit team in the area of specialization giving a co-ordinated approach to help the student to complete the research work. At any given time, a PG teacher shall not be a major advisor for more than Six PG students, of whom not more than four may be Ph.D. students.

Student's plan of work shall be decided by the advisory committee taking into consideration of student's research, so as to provide courses from major and supporting disciplines for the Doctoral degree programmes. The programme of research of the students is thoroughly discussed by the advisory committee and approved by the Dean (PGS).

| Sl. No. | Academic year | Number of PG recognized teachers | Intake of Students | Students : Teachers |
|---------|---------------|----------------------------------|--------------------|---------------------|
| 1 | 2014-15 | 4+4* | 02 | 1:4 |
| 2 | 2015-16 | 4+4* | 05 | 1:1.6 |
| 3 | 2016-17 | 4+4* | 02 | 1:4 |
| 4 | 2017-18 | 4+4* | 03 | 1:2.7 |
| 5 | 2.18-19 | 4+4* | 02 | 1:4 |

*Faculty working in nearest stations

The PG recognised faculty available in the campus (including college as well as directorates of research and extension) is sufficient to run the Ph. D. classes and to guide the students. In addition to these, faculty from neighbouring colleges and research stations are also available to offer the courses. Further the university has made a MOU with Dr. V.B. Hosagoudar Bio Research Foundation, Bilgi, from where a visiting professor has offered a course HPP 601, Advanced Mycology for Ph. D. students.

6.4.7. FEEDBACK OF STAKEHOLDERS (STUDENTS, PARENTS, INDUSTRIES, EMPLOYERS, FARMERS ETC.)

Feedback from the students (Ph.D. passed out students)

| Sl. No. | Name | Year of completion | Important remarks/ feedback | Action taken |
|---------|-----------------------|--------------------|--|---|
| 1 | Pradnyarani Nidagundi | 2018 | Hands on session is required for the operation of instruments at molecular biology lab | Hands on session have been conducted. |
| | | | Demand of internet facilities | Internet facilities are provided in the department. |
| | | | Demanded separate reading room for PG students | A separate reading room for PG students is provided during 2018 |
| 2. | Priya Naganur | 2018 | Department provide opportunity to students to visit the field and helps to understand the field level problems by interacting with farmers | |
| | | | Department should provide greenhouse facilities for | The request has been made to university. Shortly the facility |

| Sl. No. | Name | Year of completion | Important remarks/ feed back | Action taken |
|---------|------|--------------------|---|---|
| | | | performing greenhouse/virology experiments | is expected. |
| | | | Teaching faculty gives the opportunity to the students to implement ideas regarding research and helps to do their best during research | |
| | | | Department should collaborate with other institutes so that students get exposed to other laboratories | A MOU with Dr. V.B. Hosagoudar Bio Research Foundation, Bilagi, was made and in coming years many such MOUs will be attempted |

6.4.8. STUDENT INTAKE AND ATTRITION IN THE PROGRAMME FOR LAST FIVE YEARS

| Academic year | Sanctioned seats | Actual intake | Attrition (No) | Attrition (%) |
|---------------|------------------|---------------|----------------|---------------|
| 2014-15 | 02 | 02 | 00 | 00 |
| 2015-16 | 05 | 05 | 03 | 60.0 |
| 2016-17 | 02 | 02 | 00 | 00 |
| 2017-18 | 03 | 03 | 00 | 00 |
| 2018-19 | 02 | 02 | 00 | 00 |

6.4.9. ICT APPLICATION AND CURRICULA

In the college the students pay the fees and register through Academic Management System (AMS). All PG correspondences like plan of work, programme of research and submission of all PG forms by the students were through AMS. Approvals by the head of the department, chairman and members of the advisory committee, Dean (PGS) and Registrar is processed through on line by using AMS in order to make paperless transactions.

ICT enabled teaching-learning encompasses a variety of techniques, tools, content and resources aimed at improving the quality and efficiency of the teaching-learning process. The very concept is adopted in the Department of Plant Pathology. Teachers will participate in selection and critical evaluation of digital content and resources. They will also be encouraged to develop their own digital resources, sharing them with colleagues and students through the digital repositories. For this each individual staff allotted with high configured Computer

System and connected with high speed Internet facilities for sharing digital contents. Teaching will be done by using PPT and smart boards

Internet and Wi-fi facility

The department is having computers with facility of internet to all the faculty and students. Internet facility in the main campus is available through IP based network, through which students and faculty members can browse CeRA and e-resources of the library in hostels and departments.

CeRA, e-books and other online e-resources:

Library is having CeRA facility which is ICAR Consortium of e-resources in Agriculture. This covers more than 3,000 scholarly journals pertaining to the Agriculture and allied sciences which are available in full text. Also library is having access to Springer e-books for the copy right for years 2014-16, which covers nearly 1900 books in virtual format with full text availability and at a time 25 users can open an e-book. In addition library has access to 200 Indian e-books.

Krishikosh

Krishikosh is database of theses submitted to the Agriculture universities and ICAR institutions, The UHS Library is member for Krishikosh and all the theses submitted to the UHS are being uploaded regularly.

Special achievements of PhD. Students

| Sl. No. | Name of the student | Name of the award | Date | Title of the paper/research work considered for award | Awarded during/ by/at |
|----------------|----------------------------|--------------------------|-------------|--|--|
| 1 | Pradnyarani Nidagundi | Best Poster | 08/03/2017 | Incidence of Tip over disease in major banana growing areas of Karnataka | Interactive PG poster seminar on Frontiers of Post Graduate Research Areas of UHS Bagalkot and Impact on Horticulture Development, held at UHS, Bagalkot |
| | | Best Researcher | 22/04/2017 | Contribution in the field of plant pathology | 2 nd International conference Indian Academic Researchers Association, Trichy, TN |
| 2 | Sanjeev | Best | 21/04/ | Identification and | 3 rd International |

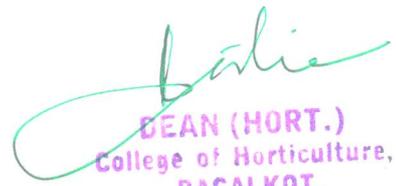
| Sl. No. | Name of the student | Name of the award | Date | Title of the paper/research work considered for award | Awarded during/ by/at |
|----------------|----------------------------|--------------------------|-------------|---|--|
| | Jakatimath | Research Scholar | 2018 | exploration of bio active antibacterial compounds from <i>Prosopis julifera</i> in management of bacterial blight of pomegranate | conference on quality enhancement in academic research organized by Indian Academic Researchers Association, Trichy, TN |
| | | Best Poster | 12/06/2018 | Identification and exploration of bio active antibacterial compounds from <i>Prosopis julifera</i> in Management of Bacterial blight of pomegranate | 1 st Post Graduate Research Conference, UAS, Raichur |
| 3 | Jayasudha S.M | Best oral presentation | 29/11/2008 | Management of bacterial blight using bacterial biocontrol agents | International conference on emerging issues in agricultural, environmental applied sciences for sustainable development organised by Agro environmental Development Society, at SHUATS, Alahabad, UP |

6.4.12.

CERTIFICATE

I the Dean, College of Horticulture, Bagalkot hereby certify that the information contained in the Section 6.4.1 to 6.4.9 are furnished as per the records available in the college and degree awarding university.

Date: March, 2019



DEAN (HORT.)
College of Horticulture,
BAGALKOT.