

**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

Evolution of the P.G. programme:

Establishment of a Post-Graduation degree programme covering Plant Biotechnology, Genetics, Plant Breeding, Seed Science and Biochemistry disciplines, in the name of 'Biotechnology and Crop Improvement' was started at the College of Horticulture, Bagalkot of University of Horticultural Sciences, Bagalkot during the academic year 2013-14. The primary aim of the degree programme was training the students and meeting the trained man power requirement in the sector for horticulture biotechnology and crop improvement and applications of cutting edge molecular biology and biotechnology tools in horticulture. Immediate next year, in 2014-15 the doctoral programme in the discipline of 'Biotechnology and Crop Improvement; was started during the year 2014-15, at College of Horticulture, Bagalkot with an initial intake of three students.

Change of Nomenclature

Realizing the drawbacks of the non-acceptance of the nomenclature as M.Sc. (Horti) and/Ph.D in Biotechnology and Crop Improvement by either the State Agriculture Universities or ICAR NewDelhi for considering the eligibility of the degree program for recruitment to Assistant Professors or ARS scientists either in GPB or plant biotechnology, the nomenclature had to be changed. Finally, by the recommendations of 5th Deans committee and ICAR guidelines to initiate the PG programs in the recognized disciplines of ICAR, the Biotechnology and Crop Improvement programs in M.Sc. and Ph.D was separated in to 2 PG programs such as M.S.c &Ph.D in Genetics and Plant breeding (GPB) and M.S.c and PhD in Plant Biotechnology (PBT) from the academic year 2017-18. Presently the PG programs are running in the name of above 2 disciplines. At present, the following doctoral degree programs have been offered at Department of Biotechnology and crop improvement:

1. Ph. D. Plant Biotechnology
2. Ph.D. Genetics and Plant Breeding

Objectives

1. To provide the intellectually and trained human resource for the public and private sector to develop the strategies of horticulture crops breeding and development of varieties/hybrids suitable to climate change, biotic and abiotic stresses, better quality and productivity to meet the demands and requirements of the farmers and consumers.
2. Conduct applied research in basic and translational biotechnology and fosters interactions and collaboration between faculty, researchers and industry.

3. Promote a supportive learning environment for life through implementing continuous **Accomplishments:**

1. **P.G. student's research outcomes which are helpful for the farming community and further research:**

Sl.No	Name of Student	Thesis Title	Outcome
1.	Rashmi M. Hegde	Studies On Induction Of Genetic Variability Through In Vitro Mutagenesis And Characterization In Banana.	Standardization In Vitro Micropropagation Protocol For Local Cultivars Of Banana And Induction Of Variability For Breeding
2.	Parvati Pujer	Generation Mean Analysis For Growth, Yield And Quality Traits In Brinjal (<i>Solanum Melongena</i> L.)	Identification Of Potential Parental Lines For Hybrid Production In Brinjal

2. **P.G. student's research topics linked with staff research projects:**

- Micropropagation of banana, pomegranate, dragon fruit, fig.
- Genetic diversity analysis in vegetable crops
- Association mapping in pomegranate for identification of QTLs/candidate genes for bacterial blight and wilt resistance
- 'Phage' therapy for management of bacterial diseases of horticultural crops
- *In vitro* production of insulin like peptides in *Momordica cymbalaria*
- DNA barcoding and DNA fingerprinting of local banana germplasm and their ecotypes
- DNA fingerprinting and genetic purity analysis of vegetable crops
- Marker assisted breeding of okra for heat and drought tolerance

External funded projects

- Establishment of Centre for Biotechnology research (CBR), funded by KBITS, GoK for instituting molecular biology and plant genetic engineering lab facility
- Establishment of a field germplasm bank and characterization of accessions for bacterial blight, wilt and genetic diversity in pomegranate (KBITS, GoK funded CBR project)
- Conservation, creation of genetic variability and in vitro mass multiplication of regionally important banana varieties (KBITS, GoK funded CBR project)
- Identification of bacterial blight resistance genes in pomegranate based on dual-mixed transcriptomics of *Xanthomonas axonopodis* sp. *punicae* and pomegranate, funded by DST-SERB, Govt. India
- VGST funded project funded by GoK

3. P.G research publications:

	Research papers published in > 4 NAAS ratings	Research papers published in < 4 NAAS ratings
PG students paper publications	06	04

4. No. of Ph.D. in Biotechnology & Crop Improvement students qualified in NET:

Sl. No	Year	No of NET qualified students
1	2015	02
2	2016	06
3	2017	04
TOTAL		12

6.4.2. FACULTY STRENGTH

Sl. No.	Sanctioned Faculty	Faculty in place	Vacant position	Faculty recommended by the ICAR	Deviations from ICAR recommendations
1.	Professor	1			
2.	Associate Professor	0			
3.	Assistant Professor	4			
Faculty from UHS Directorate of Research and other Department					
4.	Assistant Professor of Seed Science and Technology	2			
5.	Assistant Professor of Crop Physiology	3			
6.	Assistant Professor of GPB, HRES, Tidagundi (80 Km from Main station)	1			
7.	Assistant Professor of GPB, Plant Biotechnology and Molecular Biology COH, Arabhavi, (120 Km from Main station)	4			

6.4.3. TECHNICAL AND SUPPORTING STAFF:

The Department has 2 technical (non-teaching) staff.

Supporting staff position of the department

Sl. No.	Sanctioned Faculty	Faculty in place	Vacant position	Faculty recommended by the ICAR/UGC/VCI/ other regulatory bodies	Deviations from ICAR recommendations
1.	Laboratory Assistant	2	-	-	-
2.	Field Assistant	2	-	-	-

6.4.4. CLASS ROOMS AND LABORATORIES

Class rooms

Sl. No.	Class room No.	Area (Sq Ft)	Seating capacity	Other facilities (LED, projector, Computer, etc.)
1	Lecture hall for M.Sc. and PhD students	19X27	30 students	Computer and Projector, White board, black board, Air conditioner
2	Seminar Hall	36X17	50 students	Computer and Projector, White board, black board, Air conditioner
3	Conference room	23X14	15 students	Computer and Projector, White board, black board, Air conditioner

Laboratories and facilities

Sl. No.	Name of the laboratory	Area (Sq Ft)	Working capacity
A	Centre for Biotechnology Research		30
1	Molecular Biology labs-04	45X 27	
2	Nucleic acid isolation and gel electrophoresis lab	36X16 16X13	
3	Plant tissue culture lab	45X20	
4	Washing and sterilization room	17X36	
5	Radioactive lab	19X20	
6	Microscopy room	16X09	
7	Freezer room	17X24	
8	Cold room (4 ⁰ C)	16X09	
9	Common instrumentation facility-1 Common instrumentation facility-2	16X17 36X17	
10	Bioinformatics facility equipped with 14 bioinformatics workstations and a server	25X16	
B	Common laboratory for conducting UG and PG practical		60

Major equipment

Sl. No	Name of the Equipment	Year of purchase	Amount (Rs.)
1.	Online UPS Heavy Duty 3KV UPS 230 Volts	2015-16	52,620=00
2.	Okay 135 AH 12 Volt Tubular Battery	2015-16	37,800=00
3.	Glass Bead Sterilizer with Digital Display	2015-16	88,738=00
4.	Desktop Computers with Accessories	2015-16	77000=00
5.	Refrigerator 30 lit Single Door	2015-16	59,980=00
6.	HP LaserJet Printer (All in One) Model-1136	2015-16	14,600=00
7.	Tissue Culture Rack Make Scientek Services	2015-16	98,470=00
8.	Officers Cane Revolving Chair	2015-16	67,626=00
9.	3 Seater Executive Cushion Sofa	2015-16	15699=00
10.	Digital Camera (Canon)	2015-16	12,990=00
11.	Heavy guage plain steel Almirah (6.5'x 3'x18'')	2015-16	43,470=00
12.	Wooden Stand (8 L Staff Locker)	2015-16	37,980=00
13.	Spinnet Digital Magnetic Stirrer hot plate 18x18	2015-16	24,570=00
14.	Heavy Chemical Storage Glass door Almirah (Storewell)	2015-16	79,245=00
15.	Executive high back cane chair	2015-16	8000=00
16.	Autoclave 250x450mm with Accessories Rotex Brand	2015-16	57,937=00
17.	Metal board with Iron legs 4x3 size	2015-16	14,243=00
18.	Aspee-2007 Sprayer	2015-16	2500=00
19.	Double Glass Distillation Unit 4 lit & DAPS for Distillation Unit 4 lit	2015-16	899,34=00
20.	White Writing Board 4ft x 3ft (Ceramic &Magnetic)	2015-16	6870=00
21.	Bottle Washing Machine	2015-16	99,375=00
22.	LCD Projector	2015-16	58,767=00
23.	Projector Screen (5ft x 7ft)	2015-16	7000=00
24.	Plant Tissue Culture Trolleys (2 x 1.5 x 3 ft) 3 selves	2015-16	98,470=00
25.	Exhibition- cum- Display System	2015-16	33,995=00
26.	L. P. Gas Cylinders	2015-16	3050=00
27.	Padmashree Gas Stove	2015-16	1975=00
28.	Vertical Laminar Air Flow Unit	2015-16	6,24,000=00
29.	Aqua fresh RO System plant	2015-16	48,600=00
30.	Incubation Shaker Precision Rotex Series	2015-16	5,04,606=00
31.	Tissue Culture Racks with Florescent lights	2015-16	4,83,745=00
32.	Refrigerated Centrifuge	2015-16	4,37,500=00
33.	Table Top Gyrotory Shaker (Magnetic Driven)	2015-16	1,99,300=00
34.	Precision Dry Bath	2015-16	1,98,000=00
35.	Micro Controller Based P ^H Meter – CL180	2015-16	41,220=00
36.	Incubation Shaker (IND- 323)	2015-16	2,85,151=00
37.	Freezer (-80 degree) (IMD- 310)	2015-16	4,62,000=00
38.	Precision and Analytical Balance 2+2	2015-16	51,450=00
39.	Nucleic Acids Concentrator	2015-16	4,56,750=00
40.	Rotary Microtome	2015-16	2,34,725=00
41.	Master Cycler nexus Gradient 230V/ 50-60 H ₂	2015-16	3,99,000=00
42.	Crossing block with storage	2015-16	9,49,900=00
43.	Tarsonspinix- vortex shaker	2015-16	11,492=00
44.	Trason spin with MC-01 micro centrifuge with spare roter	2015-16	31,320=00

45.	Liquid Nitrogen container cryoseal IR container cap 10.5lit	2015-16	27,900=00
46.	Electro Magnetic water softener	2015-16	28,500=00
47.	Spinwin MC-00 6X1.5ML	2015-16	8,988=00
48.	Vortex shaker	2015-16	10,056=00
49.	Spinot digital magnetic stirrer hot plate	2015-16	31,458=00
50.	Water Bath Shaker 15 lit, 9x100ml	2015-16	32,000=00
51.	Aqua candy (RO+UV) water purifier system	2015-16	15,499=00
52.	Samsung laser all in one printer cartridge print/scan/copy/fax	2015-16	28,599=00
53.	Trolleys 3x1.5x3 feet,3sheleves	2015-16	91,600=00
54.	MS Trolley &Carriage for Autoclave -Horizontal	2015-16	82,612=00
55.	Laboratory oven lab model with LED display	2015-16	80,150=00
56.	Blue star Hi wall split Air conditioner 2I 3 star with V Guard stabilizer	2015-16	91,486=00
57.	Godrej Refrigerator	2015-16	99,000=00
58.	Vertical electrophoresis system for proteins	2015-16	3,04,389=00
59.	Semi Automatic Autoclave model SA75	2015-16	2,06,100=00
60.	PCR Work Station	2015-16	2,98,800=00
61.	Bio safety cabinet	2015-16	2,61,000=00
62.	Binocular Microscope with Image Analysis	2015-16	1,33,965=00
63.	Water Baths	2015-16	59,253=00
64.	Precision Electronic Weighing balance	2015-16	1,68,000=00
65.	Electroporator	2015-16	2,78,250=00
66.	Static Pass Box	2015-16	2,19,840=00
67.	Positive Pressure Module	2015-16	2,74,800=00
68.	Bolt welcome PK with IBLOT 2 EA (Western Blot)	2015-16	1,72,866=00
69.	Molecular Biology Lab-1, Research Island Module	2015-16	4,41,734=00
70.	Molecular Biology Lab-2, Research Island Module	2015-16	4,41,734=00
71.	Molecular Biology Lab-3, Research Island Module	2015-16	4,41,734=00
72.	Molecular Biology Lab-4, Research Island Module	2015-16	4,41,734=00
73.	Nucleic acid Isolation Lab, Research Island Module	2015-16	8,94,268=00
74.	Fractionation and Staining Room Research side work modules for Instrument Laboratories	2015-16	1,08,038=00
75.	Radio activity Laboratory, Research side work modules for Instrument Laboratories	2015-16	1,08,038=00
76.	Support Laboratory, Research side work modules for Instrument Laboratories	2015-16	1,08,038=00
77.	Tissue culture Facility, Research side work modules for Instrument Laboratories	2015-16	1,08,038=00
78.	Cold room, Research side work modules for Instrument Laboratories	2015-16	1,08,038=00
79.	Instrumentation room Research side work modules	2015-16	54,019=00
80.	Insectary facilities	2015-16	829900.00
81.	Viral and Fungi System	2015-16	849900.00
82.	Water purifier	2015-16	328920.00
83.	Pre Filtration	2015-16	16500.00
84.	Quantitative real time PCR	2015-16	1266554.00
85.	Cold Room	2015-16	980110.00
86.	Furniture	2015-16	974470.00
87.	Board	2015-16	17228.00
88.	Flourescent Microscope	2015-16	1299999.00

89.	Bioinformatics workstation (Desk top Computers)	2015-16	7,92,000.00
90.	Horizontal mini, medium and large electrophoresis units with one power pack	2015-16	994635.00
91.	Simple Sequence Repeat (SSR) separation vertical electrophoresis unit with high voltage power pack	2015-16	6,50,000.00
92.	High speed refrigerated centrifuge	2015-16	447232.00
93.	Non- refrigerated Microcentrifuge	2015-16	283200.00
94.	Spectrophotometer UV VIS double beam	2015-16	4,37,000.00
95.	Air conditioners (2 tonnes)	2015-16	999780.00
96.	Air Shower – Man Movement	2015-16	266680.00
97.	Diesel Generator	2015-16	6,22,303.00
98.	Electronic balance	2015-16	96000.00
99.	Lab modules	2015-16	32,00,000.00

(Miscellaneous: Filing cabinet steel, Lab stools, Office table, Office executive chairs, Almeria steel , Glass door Almeria, Wooden stools teak wood, Computer, HCL, Printer 2 h p 1020 LESER, Notice board, class room bench, Lab table modern fixed with reagent racks , Glass block board(6X4)(8x4, Wooden key board with 12 locks, Air conditioner LG Dell, Lenovo desktops, Fire extinguisher, First aid box, Acid storage unit, Barcode generator, essential equipments for field operation, Steel trolley).

Farm facilities

Sl. No.	Name of the Department		Farm Area	Irrigated / Non-irrigated	Crops grown
1	Civil facility	Transgenic containment and bio safety facility (1)	4 Gunta	Irrigated	Pomegranate
2		Breeding cage (1)	6 Gunta	Irrigated	Banana and pomegranate
3		Polyhouse and net house	8Gunta	Irrigated	Banana, pomegranate, Tomato, Beetle vine
		Insectary facility	2 Gunta	Irrigated	--
		Viral containment	2Gunta	Irrigated	Okra
4	Open land		3.0 acre	Irrigated	Pomegranate, Banana, Cucuber, Momordicacharantia, Carrot, Tuberose, Onion, Tomato

P.G research facility availability: Research facilities like inputs (Seeds, fertilizers, irrigation and pesticides) and workforce required for conducting PG research are facilitated from the Main Horticultural Research and Extension Centre (MHREC) and College of Horticulture, Bagalkot

Workshops if any: Nil

6.4.5. CONDUCT OF PRACTICAL AND HANDS ON TRAINING FOR STUDENTS

Sl. No.	Course	Courses with practical component	Skills / Method of Hands on training
1	Advances in plant molecular biology	PBT601 (1+2)	Isolation and Expression analysis of Promoter and regulatory elements, Virus Induced Gene Silencing as a post transcriptional gene silencing mechanism in plants, Total RNA isolation and cDNA synthesis, gene expression analysis; RT-PCR and qRT-PCR, Tissue specific gene expression profiling, Characterization of <i>in vivo</i> DNA-Binding events of plant transcription factors, Identification of direct targets of plant transcription factors, <i>in vitro</i> protein-protein interaction analysis for detection of hormone signalling, plant-pathogen interactions and abiotic stress, Constructing Simple Biological Networks for Understanding Complex High-Throughput Data in Plants
2	Advances in genetic engineering	PBT 602 (2+1)	Plant gene expression vector engineering and codon optimization, Genetic transformation of important Horticultural crops using Agrobacterium mediated and biolistic gun transformation, Conformation and validation of putative transformants by selectable marker genes and reporter genes, PCR, blotting techniques and bioassays, transgene copy number detection, Selection of Transgenic Plants Using a Herbicides, Characterization of transgenes using a heterologous full-length cDNA expression system, Techniques for detection of GMOs, Regulations for growing of transgenic crops under green house and field, Targeted plant genome editing via the CRISPR/Cas9 technology.

6.4.6. SUPERVISION OF STUDENTS IN PG/PH.D. PROGRAMMES

Every student shall have Advisory Committee with a Major Advisor and at least four members among whom two members shall be from outside the major field of specialization. Advisory Committee for Ph.D. student shall consist of at least five members of whom three are from outside the major field of specialization. Programme of Research proposed by the Advisory Committee and approved by the Dean (Post Graduate Studies) will be carried out by the student under the supervision of Advisory Committee. Totally 15 M.Sc. and 02 students have passed out from the Department of Biotechnology and Crop Improvement, College of Horticulture, Bagalkot from 2013 to 2018 and 06 M.Sc. and 05 PhD students currently perceive their degree program. Research work was carried out by students on the major crops which are grown in this area *viz.*, drumstick, Carrot, Onion, cucumber, Okra, Banana, pomegranate,

related to genetic variability studies, pests and disease resistance, fruit quality traits and abiotic stress tolerance. At genomic level candidate genes and markers have been identified for pests and disease resistance and fruit quality traits.

With respect to the allotment of the students to the PG teacher the major advisor shall not take more than 6 PG students (not more than 04 Ph.D. students) and also the PG teacher shall not be a member of the advisory committee for more than 15 PG students.

Student to teacher ratio

(Ph.d. Degree program- Biotechnology and Crop Improvement from 2014-15 to 2016-17 Plant Biotechnology 2017-18 onwards)

Sl. No.	Year	No. of PG recognized teachers	Intake of students	Student to teacher ratio
	2014-15	12	2	1:6
	2015-16	12	2	1:6
	2016-17	12	2	1:6
	2017-18	12	2	1:6
	2018-19	12	2	1:6

Teachers from neighboring campuses are taking up of classes of PG and UG as well. Teachers from neighboring campuses of KRCCH Arabhavi and HRES Vijaypur are guiding the students of M.Sc. and Ph.D. degree.

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

Feedback by the students

Sl.No.	Name	Degree	Important remarks/feed back
1	Radhika Hegde	PhD. (Hort.) in Plant Biotechnology	Well-equipped labs, greenhouse and filed facility for conducting plant molecular biology research. Faculty are well qualified and experienced in molecular biology and plant tissue culture

6.4.8. STUDENT INTAKE AND ATTRITION

Year	Sanctioned seats	Actual intake	Attrition	% Attrition
Doctoral degree programme				
Degree program- Biotechnology and Crop Improvement				
2014-15	2	2	0	0
2015-16	2	2	0	0
2016-17	1	1	0	0

Degree Programme -Plant Biotechnology				
2017-18	2	2	1	50
2018-19	2	2	0	0

Reasons for the Attrition:

Students who got job in government sector left the studies

6.4.9. ICT APPLICATION AND CURRICULA

In the college the students were paid the fees and registered 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. All approvals by the Head of the Department, Chairman and members of the Advisory Committee, Dean (PGS) and Registrar approval through on line by using AMS in order to make paperless transactions. Teaching will be done by using PPT and smart boards.

CeRA and other online e-resources: CeRA is the ICAR Consortium of e-resources in Agriculture. This covers more than 3000 scholarly journals pertaining to the Agriculture and allied sciences which are available in full text.

E-books: Library is having access to Springer e-books for the copy right 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 is member for Krishikosh and all the theses submitted to the UHS are being uploaded regularly.

Internet: The computer lab is provided with separate internet link with better speed. lab which is equipped with 25 computers with facility of internet connected to all computers. Web OPAC of the main campus library is available in the net. EZ-proxy remote access server is installed in the library through which one can access e-resources, CeRA, and Agristat in distant places also.

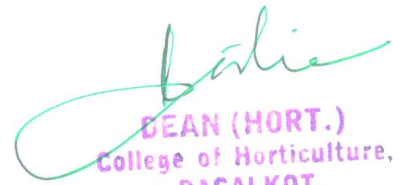
Bioinformatics and Internet facility: All the labs in the centre for Biotechnology Research are connected to the LAN based Internet through IP based network. Through which students and faculty members can browse CeRA and e-resources of the library in hostels and Departments, respectively. The CBR is also equipped with 14 bioinformatics workstations and one tower server for bioinformatics analysis including next generation sequencing data analysis.

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.