



UNIVERSITY OF MYSORE

Ph.D. IN SERICULTURE
(Course and Research Work)

DEPARTMENT OF STUDIES IN SERICULTURE SCIENCE
MANASAGANGOTRI
MYSURU – 570 006
2014-15

PROGRAMME OUTCOMES

On successful completion of the programme, researcher will be able to

1. Gain substantial knowledge on the research work carried out in the field of their research interest and select right topic of their choice for research.
2. Know how and when use of scientific equipments towards their proposed field of research.
3. Acquire good skill for preparation and presentation of research data.
4. Understand the research developments and concepts of frontier research to keep pace with the current trends in research.

Course-1: Advanced Research Methodology

Course Outcomes

On successful completion of this course, researcher will be able to

1. Acquire basic knowledge on the principles, procedures and use of various scientific instruments towards research.
2. Understand various techniques and methodologies involved in sericulture that are supposed to be in use towards research.
3. Gain knowledge on the advanced scientific equipments and their application in conduct of molecular experiments.
4. Know the basic and advanced methodologies for the conduct of research in the field of post cocoon technology and extension related aspects for transfer of technology to the field.

Pedagogy

1. Presentation through power point slides, photos, videos, etc.
2. Demonstration in handling of scientific equipments.
3. Visit to scientific instrumentation laboratories and research institutes..

Unit -1	Instrumentation and research methods in Mulberry.
1.	Principles, procedures and application of Microscopes, microtome, calorimeter, pH meter, leaf area meter, cytophotometer, centrifuge, laminar air flow, biophotometer, Electrophoretic units, thermal cycler, gel documentation unit, immunoblotting unit, HPLC, TLC and GLC.
2.	Technique for analysis of N, P, K and OC in soil samples, production of SeriAzo, Seriphos and VAM for mulberry. Procedure for assessment of growth, leaf quality and yield of mulberry. Experimentation on irrigation and fertilizer requirements for mulberry. Strategies and methods for collection and analysis of data from mulberry garden.
3.	Cytological techniques – chromosome preparation and analysis. Microtomy. Mulberry breeding strategies – clonal selection, hybridization, induction and analysis of polyploidy. Evaluation of genotypes – PYT, FYT, MLT and bioassay.
4.	Techniques for preparation and identification of disease causing pathogens in mulberry. Assessment of leaf yield loss due to disease and pests of mulberry. Integrated management of diseases and pests of mulberry.

Unit -2	Research methods in Silkworm
5.	Techniques involved in silkworm egg production and preservation, silkworm rearing – conventional and advanced. Techniques for formulation application and evaluation of disinfectants during silkworm rearing. Strategies for moulting and mounting assays.
6.	Breeding Techniques – parameters, methods - selection, evaluation and cumulative index; inbreeding depression, co-efficient and heritability. Estimation of heterosis and combining ability; line x tester diallel analysis. Procedure for analysis of QTL. Breeding plan and procedure for evolution of silkworm breeds for temperature tolerance and disease resistance.
7.	Methods followed for monitoring the incidence of diseases and pests of silkworms. Production, Isolation, purification and storage of pathogens of <i>Bombyx mori</i> . Histopathological techniques. Early diagnosis of diseases in silkworm using molecular techniques. Procedure for determination of LC50 and LD50 values of pathogens. Mass production of parasitoids and their evaluation. Assessment of cocoon yield loss and strategies for IPM and IDM.
8.	Methods for construction and analysis of linkage map of <i>B. mori</i> . Technique for construction of cDNA and Genomic libraries. Procedure for development of molecular markers and their application in construction of genetic and genome map of <i>B. mori</i> . Induction and analysis of radiation and chemical mutagenesis in <i>B. mori</i> .
Unit -3	Biostatistics and research methods in Post cocoon Technology, Extension and Economics.
9.	Principles, procedure and application of completely random block design and randomized complete block design methods- CRD, RCBD and LSD. Regression and correlation analysis, measurement of central tendency. DMRT and Probit analysis. Statistical analysis packages (SPSS, GENSTAT etc.) and applications.
10.	Assessment of physical and commercial traits of cocoons of mulberry and non mulberry. Conventional and advanced procedure for cocoon cooking, reeling and wet processing of mulberry silk. Techniques for Determination of water quality (pH and hardness) for reeling and wet processing. Physical and chemical tests of raw silk. Raw silk testing and grading. Molecular techniques for determination of structure and properties of silk fiber.
11.	Extension systems and strategies adapted in central silk board, state governments and voluntary organizations. Extension services, communication and training in sericulture. Extension methods, adoption and diffusion of innovations in sericulture.
12.	Computation of cost and returns in Kisan nursery, irrigated, rainfed, traditional and advance methods of mulberry cultivation. Calculation of economics for chawki rearing centers, traditional and improved methods of cocoon production. Economics of silk reeling – charaka, cottage basin and multi-end units.
Unit -4	Research methods in Seribiotechnology

13.	Mulberry and silkworm cell & tissue culture techniques: Selection and preparation of materials. Preparation of medium and composition for mulberry and silkworm. Procedure for micro-propagation, pollen and protoplast culture. Methods for establishment and maintenance of silkworm cell lines.
14.	Techniques for qualitative and quantitative estimation of Protein – Colorimetric and Spectrophotometric methods, Single and Two dimensional Electrophoresis, Mass spectrometry and western blotting; DNA – isolation and estimation by DNS method, phenol-chloroform and advanced methods, electrophoresis, sequencing, polymerase chain reaction, southern blotting and fluorescence in situ hybridization.
15.	Techniques for estimation of carbohydrates, analysis of proteases, esterases and amylases by calorimetric, spectrophotometric, electrophoresis and zymography. Elucidation of structure and isomerism (optical & stereo) in sugars. Energy budget of sugars. Estimation of lipid profile in silkworm. Enzymes – methods for determination of protease, esterase, amylase, dehydrogenase, transaminases and peroxidases by calorimetric, spectrophotometric, electrophoresis and Zymography.
16.	Techniques in gene cloning and analysis. Bioinformatics tools and techniques for identification and analysis of protein and DNA. Silkworm and other biological databases- contents, structure, annotation and uses. IPR, bio-safety protocol, bio-ethical issues and patent.

Course-2: Review of Literature (Area of Research)

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On successful completion of this course, researcher will be able to

Course Outcomes

1. Understand background and progress of the proposed research work.
2. Know how to survey and collect the related literature, and identify the field of research of their choice.
3. Gain experience to compile and present research work related and plan the proposed research work.

Pedagogy

1. Hands on training in collection of literature related to research.
2. Methods of classifying and reviewing of literature.
3. Guidance for preparation of report.

The research student should collect the literature related to the area of research chosen for forthcoming investigation and need to be presented before the faculty and examiners for evaluation.

Sd/-

(Prof. H.B. MANJUNATHA)
Chairman – BOS in Sericulture