SRI KRISHNADEVARAYA UNIVERSITY: ANANTAPUR
DEPARTMENT OF SERICULTURE

CURRICULUM FOR B.Sc Z.S.C (Zoology, Sericulture& Chemistry) COURSE (SEMESTER PATTERN)

(Effective from the Academic Year 2015-2016)

B.Sc. ZSC. V Semester 60 Hours

Paper – 5 SILKWORM DEVELOMENTAL BIOLOGY, CYTOLOGY AND GENETIC ENGINEERING

Unit 1: DEVELOPMENTAL BIOLOGY: 14 hrs

1. Structure of a typical insect egg,
2. Membrane organization of egg,
3. Development of polarity, cleavage, blastoderm and blastokinesis,
4. Appendage formation and organogenesis.

Unit 2: CYTOLOGY: 12 hrs

1. Mitosis,
2. Meiosis,
3. Chromosome number in Mulberry and Non-Mulberry Silkworms.

Unit 3: GAMETOGENESIS: 10 hrs

1. Detailed account of Gametogenesis:
    a. Spermatogenesis
    b. Oogenesis

Unit 4: SEX DETERMINATION: 12 hrs

1. Sex determination in silkworms,
2. Role of Z and W Chromosomes

Unit 5: INTRODUCTION TO GENETIC ENGINEERING: 12 hrs

1. Molecular vectors – Cloning, shuttle, expression, binary vectors, plasmids, and virus.

2. Enzymes – Restriction endonucleases, types and utility in gene cloning and mapping.

Practicals **45 Hours**

SILKWORM DEVELOMENTAL BIOLOGY,

CYTOLOGY AND GENETIC ENGINEERING

1. Staining and mounting the different embryonic stages (Blue Egg Stage, Pin Head stage).
2. Mitotic and Meiotic, preparation, procedure and identification (Prophase, Metaphase, Anaphase, Telophase).
3. Identification of different cocoons of silkworm races- NB4D2, NB18, NB7, KA, PM, C.B., Nistari, Tasar, Muga, Eri.
4. Cocoon Assessment- Single Cocoon Weight, Single Shell Weight, Shell Ratio.
5. Class Record.

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(Effective from the Academic Year 2015-2016)

B.Sc. ZSC V Semester 60 Hours

Paper – 6 SILK FIBRE TECHNOLOGY

Unit I: TEXTILE FIBRES 10 hrs

1. Brief introduction to natural and man-made fibres – Cotton – Wool – Silk and Nylons – Polyester – Acrylic.
2. Physical and chemical properties of silk.
3. dentification of fibres – Burning, microscopic and solubility tests

Unit 2: GRADING AND MARKETING 12 hrs

1. Different cocoon breeds (MV, B.V, U.V& Non Mulberry Cocoons)- Physical and Commercial Cocoon Characteristics.
2. Cocoon testing – methods followed in Japan and its practicability to Indian conditions
3. Cocoon sorting Objectives and Methods. Defective cocoons – Types -defective cocoon percentage
4. Grading of cocoons, Visual inspection, Selection- Assessment of Cocoon by Filament length – Filament denier – Non breakable filament length-Estimated Renditta and Raw Silk percentage – shell ratio.
5. purchase of cocoons in the open auction, preservation of cocoons, transportation, determination Marketing-and price fixation

Unit3: **POST COCOON PROCESSES** 14 hrs

1. Cocoon Stifling-Sun drying-Barrel-Hot air Oven methods
2. Cocoon cooking &Brushing -Mono pan, three pan and pressurized cocoon cooking
3. Reeling and Re-reeling
4. Packing different skeins, book making and bundling.

Unit 4: RAWSILK TESTING & GRADING 12 hrs

1. Raw silk Properties and uses,
2. Silk Examination and quality control International and ISI standards, marketing of silk yarn, Silk Exchange.

3. Silk Throwing and Twisting.

4. Silk Degumming, Processing and bleaching methods.
5. Silk Weaving in Handlooms and Power looms.

Unit 5: REELING INDUSTRY, REELING WASTE AND RESOURCE MANAGEMENT 12 hrs

1. Evolution of silk reeling industry in India and other silk producing countries.
2. Spun Silk Industry, Process of technology, utilization of bye products and uses.
3. Employment potential and income generation in Sericulture
4. Impact of advanced technology in the development of Sericulture Industry.

PRACTICALS 45 hours

1. Identification and sorting of different types.
2. Estimation of Shell ratio of M.V, B.V & C.B. Cocoons.
3. Reeling of cocoons, estimation of filament length, Non breakable filament length, calculation of Denier , Denier variation and Renditta of M.V, B.V & C.B Cocoon breeds(Comparative analysis)
4. Estimation of alkalinity in reeling water.
5. Textile fibers – Collection and Identification of Natural Fibres
6. Physical & Chemical Tests A) Microscope Test B) Burning Test.
7. Identification of silk wastes.

Class Record.

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S.T.S.N.GOVT DEGREE COLLEGE:: KADIRI

DEPARTMENT OF SERICULTURE

CURRICULUM FOR B.Sc Z.S.C (Zoology, Sericulture& Chemistry) COURSE

(SEMESTER PATTERN)

B.Sc. ZSC VI Semester **60 Hours**

Paper – 7 SILKWORM GENETICS AND BREEDING

Unit:I **12 hrs**

1. An overview of Mendelian principles of inheritance
2. Introduction: Gene and Environment Phenocopy : Interaction of genotype with environment and Special reference to silkworms.
3. Linkage and Crossing Over, Linkage Maps, factors influencing crossing over, Linkage groups.
4. Parthenogenesis with reference to silkworm-types and methods, induction of parthenogenesis.

   Merits and limitations.
5. Polyploidy-induclion and nature of polyploids-practical importance of polyploids in breeding.

Unit: 2 **12 hrs**

1. Allelism, Multiple alleles.
2. Pleiotropism- mechanism of pleiotropic action of 'E' group alleles.
3. Pseudo alleles ,Mosaic dominants.
4. Hereditary traits in silkworms- mutants of egg, larva, pupa and adult: hereditary lethal.

Unit:3 **12 hrs**

1. Genetic control of Voltinism and Moultinism, relation between genes and hormones,
2. Maternal inheritance and its biochemical aspects.
3. Genetics of cocoon colours.
4. Mutation - radiation and chemical mutagenesis measurement of mutation frequency – radiation sensitivity - mutation response - dose rate dependence - types of chemical mutagens, importance of mutagens in induction of mutations.

Unit:4 **14 hrs**

1. Aim of Breeding, inbreeding, out breeding, consequence of homozygocity,
2. Inbreeding depression, Pure line selection, Mass Selection,
3. Hybridization
4. Evolution of new breeds, Sex Limited races

Unit:5 **10 hrs**

1. Hetcrosis-theories-manifestation of hybrid vigour for economic characters- estimation of heterosis
2. Exploitation of heterosis in silkworm Bombyx mori-Hybrid vigour and Environment- Hybrid vigour in different crossing systems- utilization of hybrid vigour in the evolution of new races.
3. General and specific combining ability
4. Single and polyhybrids.

PRACTICALS **45 Hours**

SILKWORM GENETICS AND BREEDING

I. SILKWORM BREEDING

1. Characteristics of silkworm breeds/ races
2. Evaluation of heterosis of different combinations
3. Individual selection and family selection
4. Identification of mutants: eggs larva and moth.
5. Maintenance of germplasm, Characterization and documentation

II. Observation and description of racial characters of egg, larva, pupa, cocoon and adult stages in different voltine groups of B. Mori.

Mutants of silkworm B.mori.

(a) Larval mutants – Usra, Zebra and Knobbed.
(b) Egg colour mutants – Red and White
(c) Egg colour mutants – White eye
(d) Cocoon colour mutants – Orange and White.