

Contents

<i>Preface</i>	<i>ix</i>
UNIT- 1	1
1.1 Genetic variability in mulberry sources of variability	2
1.2 Popular varieties of India with introduction to Japanese, China and Russian varieties	4
1.3 Germ plasm conservation, significance and methods	19
1.4 Functions of plant genetic resource centres	26
UNIT-2	29
2.1 General introduction to plant breeding	30
2.1.1 Determination of mode of reproduction in mulberry	35
2.1.2 Methods of plant breeding	37
2.1.3 Choice of methods of breeding	43
2.2 Objectives of mulberry breeding	44
2.2.1 Parameters associated with growth, yield and quality of mulberry	44
2.2.2 Breeding for disease and pest resistance, breeding for stress conditions like salinity and alkalinity	46
2.3 Pure line selection	54
2.3.1 Characteristics of importance of purelines	54
2.3.2 Applications of pure lines in mulberry	56
2.4 Clonal selection, characters of clone	57
2.4.1 Sources of clonal variation within clones in mulberry	57
2.4.2 Procedure of clonal selection, characters and achievements	58

UNIT-3 **61**

3.1 Polyploidy breeding	62
3.1.1 Occurrence and classification of polyploids	62
3.1.2 Effects of polyploidy	63
3.1.3 Production of haploid, triploid and tetraploids in mulberry	65
3.2 Hybridisation- application and objectives	68
3.2.1: Procedure of hybridisation	68
3.2.2 Heterosis	69
3.2.3 Selection of F1 progeny	70
3.2.4: Advantages, limitations, scope and achievements of hybridization	71
3.3 Role of tissue culture in the improvement of mulberry	74
3.4 Mutation	77
3.4.1 Induction of mutation through radiation and chemical mutagens	81

UNIT-4 **87**

4.1 Silkworm as a laboratory tool	88
4.2. Hereditary and environment	96
4.2.1 Genotype vs phenotype	98
4.2.2 Heredity and variation	101
4.2.3 Distinguishing hereditary and environmental relations	103
4.2.4 Pure lines and inbred lines	105
4.2.5 Hereditary traits of egg, larva, pupa and adult of the silkworm, bombyx mori	106
4.3 Inheritance of cocoon colour, larval marking, multiple alleles	113
4.4 Genetics of voltinism and moultinism	127

4.5 Sex determination, sex limited breed, breeding and utilisation	133
4.6 Mutation.....	153
4.6.1 Radiation and chemical mutagenesis in silkworm.....	168
4.6.2 Radiation sensitivity in different developmental stages.....	173
4.6.3 Economic utility of induced mutants	176

UNIT-5

179

5.1 Classification of silkworm races	180
5.2 Present status of silkworm breeding in india	186
5.3 Breeding of silkworm: pre-requisitives, aims and objectives	194
5.4 Selection methods: individual and family selection	200
5.5 Inbreeding and outbreeding: principles, advantages and disadvantages.....	209
5.6 Development of auto sexing silkworm breeds for egg colour, larval marking and cocoon colour; sex ratio in normal and sex limited breeds; and economic advantages of the hybrid preparation and need of the farmers	219
5.7 Heterosis and combining ability in silkworm.....	231
5.7.1 Heterosis and hybrid vigour.....	231
5.7.2 Theoretical basis of heterosis.....	239
5.7.3 Utilization of heterosis in sericulture.....	242
<i>References</i>	247