

B. Sc. 6th SEMESTER
DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)

OPTION-I

STH616D1A: SEED TECHNOLOGY - PRINCIPLES OF PLANT BREEDING

Credits: Theory-4, Practical-2

THEORY: LECTURES: 60

UNIT- I

History of Plant Breeding. Objectives of plant breeding concept of biodiversity and its significance; plant introduction and its role in plant genetic resources in plant breeding. Centres of Origin of different crops.

UNIT-II

Genetic basis of breeding self and cross pollinated crops including mating systems and response to selection; nature of variability, components of variation; heritability and genetic advance, General and specific combining ability.

UNIT-III

Pure line theory, pure line selection and mass selection methods; line breeding, pedigree, bulk, backcross, single seed descent and multiline method; population breeding in self pollinated crops (diallel selective mating approach).

UNIT-IV

Breeding methods in cross pollinated crops; Population breeding-mass selection and ear-to-row methods; recurrent selection. Development of synthetics and composites. Cultivar development; testing, release and notification, maintenance breeding.

Practical

- Floral biology in self and cross pollinated species.
- Selfing and crossing techniques.
- Analysis of variance (ANOVA); Estimation of heritability and genetic advance.
- Maintenance of experimental records.
- Learning techniques in hybrids, Single, double and three way crossing in Maize crop.

Suggested Readings

- Allard RW. 1981. Principles of Plant Breeding. John Wiley & Sons.
- Chopra VL. 2001. Breeding Field Crops. Oxford & IBH.
- Chopra VL. 2004. Plant Breeding. Oxford & IBH.
- Gupta SK. 2005. Practical Plant Breeding. Agribios.
- Pohlman JM & Bothakur DN. 1972. Breeding Asian Field Crops. Oxford & IBH.
- Roy D. 2003. Plant Breeding, Analysis and Exploitation of Variation. Narosa Publ. House.
- Sharma JR. 2001. Principles and Practice of Plant Breeding. Tata McGraw-Hill.
- Simmonds NW. 1990. Principles of Crop Improvement. English Language Book Society.
- Singh BD. 2006. Plant Breeding. Kalyani.
- Singh P. 2002. Objective Genetics and Plant Breeding. Kalyani.

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OPTION-II

STH616D1B: SEED TECHNOLOGY - HYBRID SEED PRODUCTION

Credits: Theory-4, Practical-2

THEORY: LECTURES: 60

UNIT-1

Pre requisites for hybrid seed production; mechanisms and management of pollination in autogamous and allogamous crops; genetic constitution of varieties, hybrids and basic principles in seed production.

UNIT- 11

Heterosis: definition, expression and estimation of hybrid vigour; utilization of heterosis in agricultural, horticultural and other crop plants for crop improvement. Genetic load and inbreeding depression.

UNIT-111

Techniques of hybrid seed production; emasculation and crossing; use of self-incompatibility, modification of sex; types of male sterility and exploitation in hybrid development and its use in hybrid seed production; development and maintenance of A, B and R line in rice.

UNIT-IV

Fertility restoration; use of chemical hybridizing agents, problems of non-synchronization in flowering of parental lines and methods to overcome; planting ratios and population density in relation to hybrid seed yield; salient features of hybrid seed production of various crops viz., rice, maize, tomato and cucumber.

Practical

- Methods of hybrid seed production in major agricultural and horticultural crops eg. Maize, Rice, Tomato, Brinjal.
- Planting of rows/blocks of parental lines and manipulations for achieving flowering synchronization for production of hybrid seeds.
- Maintenance of A, B and R lines and production of breeder seed
- Genetic purity tests.
- Determination of cost of hybrid seed production of various crops.
- Visit to seed production plots.

Suggested Readings

- Basra AS. 2000. Heterosis and Hybrid Seed Production in Agricultural Crops. Food Product Press.
- McDonald MB & Copeland LO. 1997. Seed Production: Principles and Practices. Chapman & Hall.
- Singhal NC. 2003. Hybrid Seed Production. Kalyani Publishers.