GOVERNMENT DEGREE COLLEGE, NANDIKOTKUR

DEPARTMENT OF BOTANY

Plant Breeding

Unit 1: Basic Concepts of Plant Breeding

Short Answer Questions:

1. Define plant breeding and state its aims and objectives.
2. Explain the concepts of genetic variation, heritability, and selection in plant breeding.
3. Discuss the advantages and disadvantages of asexual reproduction in plants.
4. What is apomixis? Explain its types and significance.
5. Compare and contrast self-pollination and cross-pollination.

Long Answer Questions:

1. Discuss the scope of plant breeding and its significance in agriculture.
2. Write an essay on the classification of crop plants based on their mode of pollination and reproduction.
3. Explain the genetic consequences and significance of self- and cross-pollination.
4. Describe the role of genetic variation and selection in plant breeding programs.

Unit 2: Contrivances for Cross-Pollination

Short Answer Questions:

1. Define self-incompatibility and explain heteromorphic and homomorphic systems.
2. How is self-incompatibility exploited in hybrid production?
3. Write a note on genetic and cytoplasmic male sterility.
4. Discuss the significance of male sterility in plant breeding.
5. What is domestication of plants, and why are centers of origin important in crop breeding?

Long Answer Questions:

1. Explain the concept of self-incompatibility and its applications in plant breeding.
2. Discuss the types of male sterility and their utilization in hybrid seed production.
3. Write an essay on the domestication of plants and its impact on modern agriculture.
4. Describe the importance of centers of origin in understanding crop evolution and breeding.

Unit 3: Breeding Methods in Plants

Short Answer Questions:

1. What is plant introduction? List its objectives and types.
2. Define genetic erosion and explain the role of gene sanctuaries in germplasm conservation.
3. What are the basic principles of artificial selection?
4. Explain the procedure and advantages of pure line selection in self-pollinated crops.
5. What is clonal selection? Mention its merits and limitations.

Long Answer Questions:

1. Discuss the procedure and importance of germplasm collection and conservation.
2. Explain the plant introduction process and its role in crop improvement.
3. Write an essay on clonal selection in vegetatively propagated crops, highlighting achievements and limitations.
4. Compare natural and artificial selection, providing examples of their application in plant breeding.

Unit 4: Breeding Methods in Cross-Pollinated Plants

Short Answer Questions:

1. Define hybridization. What are its objectives and types?
2. Explain the dominance, over-dominance, and epistasis hypotheses of heterosis.

3. What are synthetics and composites? How are they produced?
4. Write a note on the back cross method and its applications.
5. What are the physiological bases of heterosis?

Long Answer Questions:

1. Describe the procedure of hybridization and discuss its advantages and disadvantages.
2. Write an essay on the genetic and physiological bases of heterosis and its commercial utilization.
3. Explain the back cross method of breeding, highlighting its merits and limitations.
4. Discuss the production procedures, merits, and applications of synthetic and composite varieties.

Unit 5: Modern Methods in Plant Breeding

Short Answer Questions:

1. What are spontaneous and induced mutations? Explain their characteristic features.
2. Define polyploidy breeding and discuss its applications in crop improvement.
3. What are RFLP, SSR, and SNP markers? How are they used in plant breeding?
4. Explain the concept of Marker-Assisted Selection (MAS).
5. What are the advantages and limitations of mutation breeding?

Long Answer Questions:

1. Write an essay on the procedure and applications of mutation breeding in crop improvement.
2. Discuss the role of auto-polyploids and allopolyploids in plant breeding, highlighting their limitations.
3. Explain the applications of DNA markers in modern plant breeding techniques.
4. Describe the steps and significance of Marker-Assisted Selection in developing tailored plant varieties.