

THEORY

Introduction of the Course

This course is designed to provide essential knowledge about Plant Breeding. Different strategies used in breeding for plant selection with desired characteristics are also discussed. It also includes detailed study about application of horticulture techniques used in green house and in landscaping.

Course Objectives

1. To enable the students to understand the concept of Plant Breeding and different strategies used in breeding for plant selection with desired characteristics.
2. To make the students learn the application of horticulture techniques used in green house and in landscaping.

Contents

1. **Plant Breeding:** Introduction and History of Plant breeding, Basic Principles and Aims of Plant Breeding, Mendelian Genetics: Checker's Board and factors leading to deviation from Mendelian genetics, Breeding Methods for Both self-crop: Selection in (Single Plant Selection, Mass Selection, Pedigree Selection, Bulk Population Selection, and Backcross Breeding), Selection in cross pollinated (Single Plant Selection, Mass Selection, Recurrent Selection, Backcross Breeding). Hybrid Vigour, Hybrid Breeding.
2. **Horticulture:** An Introduction, Plant Science, Plant Propagation, Greenhouse Management and Crops, Integrated Pest Management (IPM), Container-Grown Plants, Using Plants in the Landscape, Lawn and Turf Grass Establishment and Maintenance, The Vegetable Garden, The Small Fruit Garden. Complete Production technology of one fruit, one vegetable and one ornamental plant.

Practicals:

1. Techniques of Plant Breeding (Emasculation in Wheat, Rice, Maize, Cotton and Tomato)
2. Pollination and fertilization in self and out Breeding Plants, their Implications and Consequences
3. Grafting, and Budding techniques
4. Nursery Development (Growing fruits/vegetables seeds and reporting germination percentage)
5. Gene Action, Hybrid Vigor Numerical Problems
6. Extraction of proteins from plant tissue and their quantitative (Bradford's) and qualitative (SDS, PAGE gel) analysis.

Teaching-learning Strategies

1. Lectures
2. Group Discussion
3. Laboratory work
4. Seminar/ Workshop

Learning Outcome:

1. Students are expected to get themselves familiarized with the molecular/macromolecular organization of plant cells and DNA in general.

2. They should be able to understand the concept of Plant Breeding and different strategies used in breeding for plant selection with desired characteristics.

Recommended Readings:

1. Acquaach, G. (2012). *Principles of Plant Genetics and Breeding*. Blackwell and Synergy Publishers.
2. Acquaach, G. (2002). *Horticulture Principles and Practices*. (2nd Ed.), Prentice Hall of India Private Limited, New Delhi.
3. Brown, J. and Caligare, P. (2008). *An Introduction to Plant Breeding*. Blackwell Synergy Publishers.
4. Carpenter, P.L. and Walker, I. (2004). *Plants in Landscape*. (2nd Ed.), New York Freeman.
5. Clevelard, D.A. (2002). *Farmers, Scientists and Plant Breeding Integrating Knowledge and Practice*.
6. Crockett, J.V. (1999). *Landscape Gardening*. New York Time – Life.
7. Gupta, S.K. (2000). *Plant Breeding Theory and Techniques*. Narosa Publishers.
8. Kang, M.S. (2002). *Quantitative Genetics. Genomics and Plant Breeding*.
9. Kumar, N. (2006). *Breeding of Horticulture Crops: Principles and Practices*. New Indian Publishers.
10. Peter, K.V. (2009). *Basics of Horticulture*. New India Publishers.
