Principal paper BT303 Plant Biotechnology

Section: I

Unit 1

1.1. Conventional plant breeding, Introduction to cell and tissue culture
1.2. Tissue culture as a technique to produce novel plants and hybrids
1.3. Callus and suspension cultures
1.4. .Tissue culture media (Compo sition and preparation), Initiation and maintenance of callus and suspension cultures Single cells clones.

Unit 2

2.1. Organogenesis; Somatic embryogenesis Transfer and establishment of whole plants in soil
2.2. Rapid clonal propagation and production of virus -free plants; Embryo culture and embryo rescue Protoplast isolation, culture and fusion; Selection of hybrid cells and regeneration of hybrid plants;
2.3. Plants; Symmetric and asymmetric hybrids, cybrids Anther, pollen and ovary culture for production of haploid plants and homozygous lines.Cryopreservation; Slow growth and DNA banking for germplasm conservation.
2.4. Cryopreservation; Slow growth and DNA banking for germplasm conservation.

Section: II

Unit 3

3.1. .Somaclonal variation; In vitro mutation
3.2. Sexual incompatibility and male sterility
3.3. Plant Trans genesis Generation of transgenic plants and production of recombinant products using rDNA technology.
3.4. Crop improvement: insect resistance, herbicide resistance, stress resistance, improvement of quality of plant Golden rise,. protease inhibitors, alpha amylase inhibitor, virus resistance, coat protein mediated disease resistance .

Unit 4

4.1. Molecular marker aided breeding – RFLP maps, linkage analysis
4.1. RAPD markers, microsatellites, SCAR (Sequence Characterized Amplified Regions), SSCP (Single Stranded Conformational Polymorphism),
4.2. AFLP, QTL, map based cloning, and molecular marker assisted selection
4.3. Metabolic engineering and industrial products – Plant secondary metabolites, control mechanisms and manipulation of phenyl pro panoid pathway, shikimate pathway; alkaloids.

References:

1. Plant Biotechnology – J. Hammond, *et al.* Springer Verlag.
2. Plant cell and tissue culture for production of food ingredients – T.J. Fu, G. Singh *et al.*
3. Biotechnology in crop improvement – H.S. Chawla
4. Practical application of plant molecular biology – R.J. Henry, Chapman & Hall.
5. Elements of biotechnology – P.K .Gupta
6. An Introduction to plant tissue culture – M.K. Razdan