apid advances and new developments in the field of plant tissue culture which have occurred during the last decade resulted in an objective need to revise the first edition of a highly popular textbook entitled Plant Tissue Culture: Theory and Practice, originally published in 1983. All chapters from the first edition were completely revised and updated, however, the original character of the book remained the same. Two new contributions on the production of secondary metabolites and genetic transformations of plant cells were added.

The volume consists of 18 chapters devoted to particular topics, glossary of terms used in plant tissue culture and a massive list of references covering over 140 pages. After a short preface we are plunged into the introductory historical survey of plant tissue culturalists who had significantly contributed to the development of the field into a present shape. Many anecdotes from the research work of those pioneers and leaders shed light on how important discoveries were made and novel concepts postulated.

The following two chapters bring general comments on the laboratory design, required laboratory apparatus and preparing the culture media. Compositions of several widely used plant tissue culture media are also given. Those students and researchers who encounter with plant tissue culturing for the first time may find there much useful and valuable information about how to set the experiment design.

The chapter 4 is devoted to the cell culture: isolation of single cells, establishment of suspension and single cell cultures, mass culture in plant cell bioreactors, and utilization of cell culture in mutant selection or polyploidy induction, as well.

The chapter 5 aimed at cellular totipotency deals with the organogenesis as well as vascular tissue differentiation. The emphasis is given on the investigation of physical, chemical and biological factors that affect differentiation processes.

The successive chapter highlights accumulated information on the embryogenic potential of somatic plant cells that may give rise to somatic embryos. It provides several examples of plants on which successful studies of somatic embryogenesis have been undertaken, and describes factors controlling induction, development and maturation of somatic embryos, and synthetic seed technology, as well.

The chapters 7 and 8 bring fundamental insights into the production of haploid and triploid regenerants. Experimental techniques utilized and practical importance of those cultures are thoroughly discussed. Surveys of plant species for which androgenic and gynogenetic haploids, and endosperm triploids have been raised are also involved.

The next chapter directs the attention to the elucidation of variations observed in tissue cultures. In vitro mutant selection, causes of origin and mechanisms underlying somaclonal variation are assessed from the view of the current knowledge coming from molecular and somatic cell genetic studies.

A very attractive and promising topic aimed at in vitro pollination and fertilization is discussed in the tenth chapter. Readers will become acquainted with techniques used in such experiments and with suggested applications in crop improvement.

In the eleventh chapter, potential applications of zygotic embryo cultures in the plant production are presented. The authors give examples when embryo culture technique should be applied to obtain unique hybrids, haploids and rare plants, or to investigate nutritional, hormonal, physical and chemical effects during embryogenesis.

The chapters 12 and 13 deal with the technology of protoplast isolation and culture, and production of somatic hybrids and cybrids. Those pages describe optimal culture requirements of isolated protoplasts for a successful plant regeneration as well as methods of protoplast fusion and hybrid selection. A list of whole plants regenerated from isolated protoplasts along with examples of interspecific and intergeneric hybrids produced through somatic hybridization are provided.

The chapter 14 is concerned with various gene transfer methods currently used in genetic transformations of plant cells, and practical applications of plant genetic engineering in crop improvement. However, little space is devoted to possible environmental hazards resulting from the introduction of transgenic plants into the field.

The next chapter is aimed at the virus elimination through meristem-tip culture and production of pathogen-free plants. Factors that affect virus eradication by shoot-tip cultures are discussed. A survey of plant species for which virus-free plants have been obtained by tissue culturing is also given.

Clonal multiplication of genetically identical copies of higher plants is the subject of the sixteenth chapter. That important one describes general techniques of micropropagation to produce large amounts of plants on a commercial scale. Readers may benefit from advices how to avoid or overcome the problems associated with clonal propagation such as hyperhydration, contamination, oxidative browning, etc. A list of micropropagated orchids through in vitro is added.

The chapter 17 brings the appraisal of the production of secondary metabolites in plant cell cultures. Strategies used to improve product yield and economic aspects are outlined giving examples of successful commercialization of particular metabolite productions in bioreactors.

The last chapter deals with the assembled information on the germplasm storage. Methods of cryopreservation and short- or medium-term storage under growth limiting conditions are discussed. Surveys of species either successfully cryopreserved for a long time or maintained under cold temperature for several months are also included.

In addition, chapters 2, 3, 4, 6, 7, 12, 13, 15, 16 and 18 are followed by useful appendices that provide step-by-step laboratory protocols and procedures on particular chapter topics.

The book belongs to basic workpieces in the field of plant tissue culture. The main body of information on plant species
is devoted to herbaceous plants putting far less attention to woody plants. So readers engaged with tissue culturing of agricultural crops and ornamentals would benefit by this title much more than those working with forest tree species. However, Plant Tissue Culture: Theory and Practice, a Revised Edition, provides a valuable background for both newcomer and experienced plant tissue culturist, and of course, it's of lasting value in plant tissue culture library. This title should be recommended as the good teaching textbook and reference tool.

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SEED MANAGEMENT


Publication dealing with generative propagation of broadleaves has originated as a result of cooperation between the Institute of Forest Dendrology of the Polish Academy of Sciences and the INRA, Centre de Recherches Forestieres in Champenoux – Nancy, France.

Generative propagation has a long-term tradition in nursery practice. At present its significance is growing with regard to the increasing forest decline in Central Europe as well as for gardening purposes. Since the forest seed material of superior genetic quality is used it requires its optimum utilization. Increasing demand is for those species which were not cultivated in nurseries. Several species (e.g. beech and oak) which produce seed crop in several year intervals, are problems with seed availability also in the periods between seed crops.

The publication is divided into two parts and the authors deal with seed biology and seed management from harvest to sowing in 15 broadleaves. In general part comprising 11 chapters, the problem of ripening, collection, seed processing, seed storage and pre-sowing treatment is discussed.

In the first four chapters the criteria of morphological and physiological seed ripeness of individual tree species are defined, the conditions of fructification and crop intervals. Further, the problem of fruit and seed collection, transport and temporary storage as well as cleaning of obtained seed are discussed. The fifth chapter is aimed at further treatment, the drying of seed prior storage, which has to be carried out according to individual seed categories – recalcitrant and orthodox – at given humidity and temperature to maintain their viability.

In the sixth and the seventh chapter the conditions for seed storage and protection against fungi and insects are given.

The chapters 8 and 9 are aimed at classical seed storage of selected seed types and there are also generalized the research results of short-term and long-term storage of seed with and without the dormancy. It is also necessary to point out the new progressive methods of seed storage of dormant seed, which were tested in the abovementioned research institutes. In these tree species, different variants of pre-sowing treatment and the possibilities of long-term seed storage in controlled conditions after breakage of dormancy are recommended.

In the ninth chapter the pre-sowing treatment of dormant seed for sowing with cold and combined stratification is discussed in detail. The authors recommend new methods of pre-sowing treatment of these seed types without a stratification medium.

In the tenth and eleventh chapter the methods of quality testing (sampling, purity testing, 1000 g weight, water content, viability and germination capacity) according to the valid procedures are given. Furthermore some sowing technologies into mineral soil, artificial substrates and under the PE shelters are discussed.

The second part of the publication is species oriented. In the next 14 chapters the knowledge and experience with seed of individual tree species from collection, processing, storage, pre-sowing treatment up to sowing in nurseries are given. This information given for seed of the following genera: Acer, Alnus, Betula, Carpinus, Fagus, Fraxinus, Prunus, Quercus, and Tilia.

The monograph is suitable mainly for the foresters, nurserymen, and nursery owners, since it contains a large amount of information on seed biology and physiology. It is also valuable contribution for research workers in the field of genetics and tree breeding. It is elaborated in a complex way and on a high standard. It has been systematically compiled and contains a lot of factographic material from the own research of both research laboratories. The list of references concerning the seed biology of broadleaves is also a valuable contribution. Publication of this monograph in English (after former Polish and French editions) is a very valuable contribution and makes this publication available for readership in the northern hemisphere.

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