

## Preface

Plant cell, tissue and organ culture is the basis of plant micropropagation. In recent years, liquid culture systems based on shoot cultures or somatic embryos have become of increasing interest to commercial micropropagators for some stages of the plant propagation cycle. Various vessels have been investigated for liquid cultures, from simple devices supplying an arbitrary amount of oxygen, to complex computer-controlled bioreactors that have been especially designed for plant cell multiplication and regeneration. The reasoning behind the choice of liquid systems for micropropagation is to simplify handling and reduce labour costs, but often it gives rise to the need for costly and complicated equipment instead. In addition, liquid systems often result in bottlenecks or limiting factors greater than those encountered using gelled media. All users of plant cell, tissue or organ cultures in liquid media face similar problems, irrespective of species with which they work; namely, problems related to the initiation and development of cultures and their liquid environment; how to supply sufficient oxygen; how to maintain asepsis; and how to maintain genetic quality in spite of somaclonal, epigenetic and physiological variations. Some of these issues are more prominent in liquid culture systems, compared with those on gelled media; some may be less prominent.

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and sponsored by the EU. The focus is on the opportunities, advantages and bottlenecks associated with liquid systems. We have built upon the expertise from previous COST actions in Europe, such as COST 87 and COST 822 that have created networks within Europe for scientists and commercial enterprises interested in developing more advanced systems for plant regeneration. Working Group 2 (WG2), "Advanced Regeneration Techniques" of COST843, realised during the first of its network meetings in Finland in 2000, that there was a need for a book dedicated to *in vitro* regeneration from liquid cultures. One thought led to another, and at the end of a creative evening, we had outlined the book you are holding in your hand! We decided to invite world-leading scientists within their fields to contribute to such a book, but firstly to be contributors to the 1<sup>st</sup> International Symposium on 'Liquid Systems for *in vitro* Mass Propagation of Plants', at Ås, near Oslo, Norway in May/June 2001.

In this book, eminent scientists from all over the world have given their perspectives from their various specialised fields. In addition, experts from industry present a commercial perspective. The various systems used for growth and developments of cultures in liquid media are presented: simple and complex bioreactors and temporary immersion systems, as well as combinations of these. The contributions comprise an essential reference for large-scale plant propagation in liquid cultures. The Scientific Committee chose the invited contributors for their valuable expertise in this specialised field, and collected these into chapters of this book; together with chapters offered by scientists from around the world.

We express our sincere appreciation to all the authors who have contributed to this book, and to our colleagues and families for their valuable support throughout this work.

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