ORCHID BIOTECHNOLOGY II

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Foreword

Taiwan is one of the world-renowned exporting countries of orchid, not only because the climate congenial to the growth of orchid, but also its rich resource of native varieties and the advances in breeding techniques to breed more beautiful and elegant new varieties. While Taiwan's orchid industry faces competition from all over the world, modern biotechnologies are certainly the key to the success in maintaining a leading role in the global orchid market. Along with the sound development of agricultural business in general, numerous scientists in Taiwan have devoted themselves to orchid research for years. How to consolidate the academic strength in orchid basic and applied research is one of the main concerns of national agricultural biotechnology.

National Science and Technology Program for Agricultural Biotechnology (NSTP.AB), a joint program for the National Science Council (NSC), Council of Agriculture (COA) and Academia Sinica (AS), has supported seven items of agricultural researches for ten years from 1998 to 2008. These included floral and ornamental plants, plant protection, vaccines for animals and fishes, plant useful genes, post-harvest, marine aquaculture, medicinal plants and health food. To promote the output and application of the research, the Development Program of Industrialization for Agricultural Biotechnology (DPIAB) was launched in 2009, and I am honored to have served as the Director for DPIAB since then. The main focus of DPIAB includes aquaculture germplasm, floral germplasm, live stock germplasm, safe agriculture, animal vaccine, medicinal herbs and health food, microbial products, molecular farming and molecular animal farming. The financial support for DPIAB extend from the original sponsors of NSC, COA, AS, to the Departments of Education, Economy, and Health. All these efforts

will bring better joint cooperative programs between academia and industrial sectors and to build a solid biotechnology-based agriculture in Taiwan. Since the third stage of NSTP.AB from 2004, orchid has been selected as one of the main target crops to develop floral and ornamental plants. Orchid research has remained high priority in the DPIAB to produce better quality orchid germplasm as well as to have systemic integration of key technology for orchid cultivation and exportation. It is now the right time to review past achievements of the orchid researchers and to build the foundation for future development of Taiwan's orchid industry.

In 2007, Drs. Wen-Huei Chen and Hong-Hwa Chen published the first volume of "Orchid Biotechnology", which comprised fundamental knowledge about breeding new varieties, *in vitro* morphogenesis, somaclonal variation, and analysis of orchid genomes. In response to rapid development of agricultural biotechnology, especially transgenic strategies in these years, they further compiled papers from seventeen orchid research frontiers in Taiwan to publish Orchid Biotechnology II.

Hopefully for Taiwan, as well as the global orchid industry and researchers, all can benefit enormously from this book and be brought to a bright new era for the floral advancement internationally.

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Preface

The orchid production in the world has increased 12%–18% every year since 2000. The demand of the orchid pot-flower is enormous in Japan, Europe and the United States of America. It is the top seller among all pot-flowers in the Netherlands and Japan. The *Phalaenopsis* is the main orchid in the world market. It had 66% share of the orchid market in FlorHolland in 2006. Taiwan's orchid industry has been recognized by the international community as a prosperous one in terms of sales volume, average of orchid plantation, orchid growing technologies, and financial resources. *Phalaenopsis* seedling in Taiwan has maintained to be the main product for domestic and export markets since 1995. It has been selected as one of the four flagship export products for Taiwan by the Agriculture Product Competition Module in Council of Agriculture since 2004.

From the technology side, orchid research has long been supported by the National Science and Technology Program for Agriculture Biotechnology for ten years. Recently, the National Development Program of Industrialization for Agricultural Biotechnology has been initiated in 2009 to bring Taiwan orchid industry to a new level of more profitability. The authors of this book have collaborated and dynamically interacted with local orchid growers to develop orchid biotechnology for the application of orchid industry in Taiwan.

To compile the results from Taiwan's orchid research teams, the first Orchid Biotechnology was published by World Scientific Publishing Co. in 2007. This effort not only benefits researchers but also is useful for education of young students as well as orchid growers. In addition, it enhances the visibility and the soft strength of Taiwan's

orchid research capability. The current book is the second volume dedicated enormously to orchid biotechnology, mainly for *Phalaenopsis* and *Oncidium*. It includes eighteen chapters from seventeen orchid research groups. The contents cover molecular phylogeny and biogeography, endopolyploidy and its application in breeding, growth responses to orchid mycorrhizae, a practical method for *Phalaenopsis* cultivation, inflorescence development, flower color, floral scent, flower development, ovule developmental, chloroplast genome and chloroplast RNA editing, early response of *Erwinia* infection, and orchid viruses infection. Its publication would be tremendously helpful for readers such as scientists, graduate students, orchid growers interested in orchid biology, and orchid biotechnology.

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