

Research Methodology in Plant Science



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RESEARCH METHODOLOGY IN PLANT SCIENCE

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PREFACE

For many years of observation during the last decade, it is our common observation that our students who approached us for the necessary suggestions about their future after post-graduation, and those who wish to carry out research in plant science, expressed that they find it very difficult to procure relevant material to take up their M. Phil, or pre-Ph. D, examination as the different chapters of research methodology cannot be located all at one place, and it was very difficult to procure the same. And some of them have also requested us to prepare a source book on research methodology in plant science which can be of use to the researchers and teachers where all the topics are at one place. Thus, the impetus for the publication of this book on '*Research Methodology in Plant Science*' began with an effort to provide a source book on research methodology wherein all the topics lie at one place for the benefit of the students.

This publication is a practical, down-to-earth text book for those people who wish to carry out research and also who want to appear for their examinations for M. Phil, and Pre Ph.D., as no book exclusively dealing with *Research Methodology in Plant Science* is available in the market. This book is designed to provide M.Phil. and Ph.D, students, with a concise introduction to conducting research not only in organizations but also in Universities. The main aim of the book is to impart knowledge for making the appropriate methodological choice and to provide readers a practical guide to design and execute a research problem. The book is aimed at those who are new to research and have no prior knowledge of the issues covered herein. It will also provide more about the research methods that are available to those people who have already conducted some research and interested in finding out more. This book is more than a text on research methods in plant science, and it is an introduction to the theoretical concepts as well as the descriptive and analytical research methods that are used by different disciplines associated with research in plant science.

These days' people, students and teachers frequently talk of research, both in the academic institutions as well as outside. Many research studies are undertaken and accomplished year after year, but in most cases, very little attention has been paid to an important dimension related to research, that of research methodology. Thus, a great deal tends to be futile as the significance lies in its quality and not in its quantity. Therefore, an urgent need is to pay due attention to designing and adhering to appropriate methodology for improving the quality of research. The methodology may always differ from problem to problem, yet the basic approach towards research remains the same.

Keeping all these points in view, the present book has been written with three clear objectives, namely, to enable the students as well as the researchers in plant science, to prepare well and to be successful in the M.Phil. and Pre Ph.D. examination, irrespective of their branch/field; when once they get into research, in

the development of an appropriate methodology for their research studies; and also to make them familiar with an art of using different methods and techniques. It is our ambition that this humble effort in taking out this book will definitely assist the students and the researchers in the accomplishment of result-oriented studies.

Regarding the organization of the content, the structuring of chapter scheme of the book is designed to be more practical in nature. The content of this revised edition is organized into nineteen chapters, well arranged in coherent manner. More details have been added and some new chapters are also incorporated keeping in mind the need of advanced techniques in plant science research. The book provides the basic as well as advanced level discussion on research methodology so that the students and/or the researchers may become familiar with the art of different advanced methods and techniques. This is also a useful source for those writing a thesis or dissertation or a monograph and/or a research paper. The key concepts have been explained so that they can be easily understood by those with little or no research experience. Though the book focuses specifically on issues of research methodology, we have included one chapter that focuses on statistics (biostatistics) wherein we have provided only a simple overview of some of the basic concepts in the field, and for those who intend to conduct detailed analysis, expert consultation is recommended. For some of the chapters where necessary, early history has been added to enable the readers to follow the time line of development.

Writing this book has been an enjoyable journey that we have been encouraged by a number of our students and colleagues teaching botany in and around Anantapur (State of Andhra Pradesh) along the way which served as an impetus for this work. This has been a much bigger project than we originally anticipated, and we hope that we have managed to provide what is required for research in plant science. We have done our best to incorporate all the details as far as possible and the book has run longer than we have expected. We wish to state that every care has been taken to bring out an error-free volume and some errors and omissions, if any, might have been crept in without our knowledge, and if any present, they will be rectified in future editions. Any suggestions for further improvement of the quality of this volume are warmly invited.

Our sincere thanks are due to the authors of Wikipedia, and various other sources of web, books, periodicals, monographs, bulletins, research reports/papers etc. Finally, we express our deep sense of gratitude to the members of our families for their continued cooperation, encouragement and best support in times of stress during the preparation of this volume. Last but not the least, we express our sincere thanks to our Publisher, Scientific Publishers, New Delhi, for their continued cooperation in bringing out this publication in a highly presentable form within a short time.

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