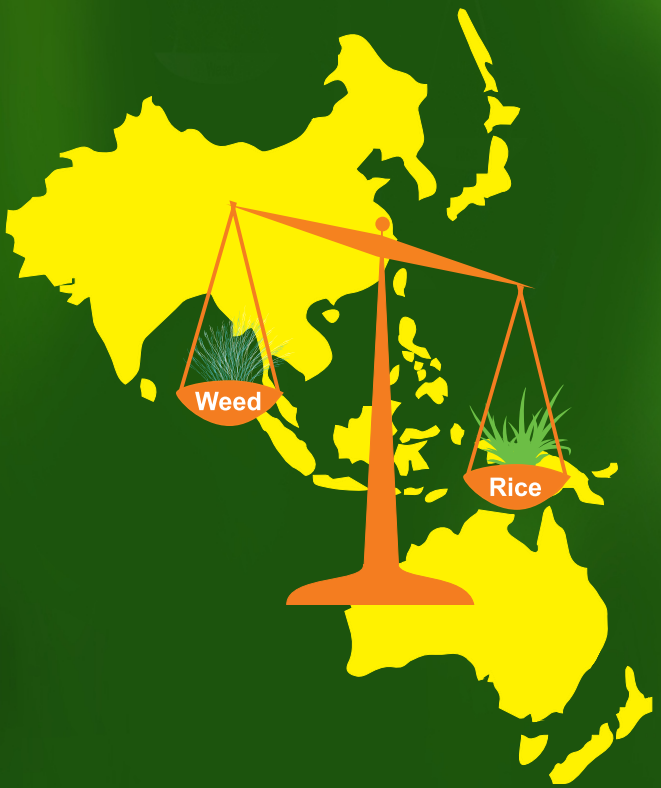
WEED MANAGEMENT IN RICE
IN THE ASIAN-PACIFIC REGION



Editors
A. N. Rao
H. Matsumoto

APWSS

Celebrating 50 years! 1967-2017

Asian-Pacific Weed Science Society
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Preface

Rice is the staple food of the Asian-Pacific Region, where over 90% of the world's rice is produced and consumed. Rice production is a major livelihood for millions of rice-farming households (around 140 million). However, around 529 million hungry people or 63% of the world's hungry, live in the Asian-Pacific region. Compared to other crops, rice has a stronger impact on poverty and hunger of the Asian-Pacific region countries. Increasing rice production is essential for achieving sustainable food security and even political stability in the region. Thus, there is a strong need to increase rice production on sustainable basis, by reducing the gap between productivity of rice achieved and what is achievable. The vision for the rice sector was set by FAO as "food-secure, better- nourished and prosperous rice farmers and consumers in the Asia-Pacific region who benefit equitably from a vibrant, innovative, and transformed rice sector that is more productive, efficient and environmentally sustainable by 2030". As most of that demand is from the Asian-Pacific Region, rice productivity and production are to be increased by alleviating various constraints, including weeds. For more than 50 years, scientists in the region have acknowledged that weeds are a major constraint to on-farm yield increases, in both tropical and temperate countries of the Asian-Pacific region. Thus, weed management plays a key role in enhancing rice productivity on sustainable basis in the region.

Despite the considerable progress that has been made in the development and adoption of various rice weed management technologies, weed problems continue to increase in most of the rice growing countries of the Asian-Pacific region. The development of herbicide resistance in some major rice weeds; the growing menace of 'weedy rice' and other alien, invasive weeds that have been introduced into the region by human activities are among the emerging weed problems that need to be tackled in the current era of a changing regional and global climate. Weeds are colonizing plants with strong adaptations for survival and perpetuation. They are dynamic in nature, and continue to evolve and resist attempts to control them. Successful weed management requires continuous monitoring of weed floras to detect changes, and refinement of management strategies to alleviate their adverse effects on rice productivity, as well as reduce other negative impacts on the environment and human and animal health.

The Asian-Pacific Weed Science Society (APWSS) is celebrating its Golden Jubilee 50th year of service to Weed Science in the Asian-Pacific region in 2017. The 26th APWSS Conference is being held at Kyoto, Japan during September 19-22, 2017 under the theme "Weed Science for People, Agriculture, and Nature". The Conference is intended to discuss current weed problems, progress made in Weed Science in the Asian-Pacific region, available management options, and future weed management strategies that may enhance agriculture productivity in the region, with positive impacts on people and nature.

Given the importance of sustainable weed management across the region's countries, a book on "Weed management in Rice in the Asian-Pacific Region" is considered appropriate, as a part of commemoration of 50 Years (1967 – 2017) in this APWSS Golden Jubilee Celebratory Year 2017. This volume contains contributions by the eminent weed scientists from around the world on various aspects of rice weeds management in Asian-Pacific region, such as: impacts of climate change (N. E. Korres et al.); role of industry in managing rice weeds (H. Kraehmer et al.); herbicide resistant weeds (S. Iwakami and A. Uchino); herbicide tolerant rice (S. Sudakir et al.); biocontrol (A.K. Watson); allelopathy (H. Kato-Noguchi) and weedy rice (M. Rathore et al.).

The synthesis of region-wide or country-specific aspects of rice weeds and weed management in rice has also been made in the contributory chapters on South Asia (A.N. Rao et al.); Southeast Asia (V. Kumar et al.); Australia (N. Chandrasena et al.); China (J. Zhu et al.); USA (N. Roma-Burgos et al.); Japan (H. Watanabe and H. Morita) and Korea (I.Y. Lee et al.).

Sixty one weed scientists from seventeen countries have made these contributions, representing USA (10 scientists); China (9); Japan (8); Philippines (7); Germany (6); Australia (5); India and Vietnam (3 each); Korea (2); Bangladesh, Canada, Greece, Indonesia, Malaysia, Pakistan, Singapore and Sri Lanka (1 each). We thank all of these authors for sparing their time and contributing articles for this book. In addition to our own editorial and technical reviews, some individual chapters were reviewed by other reviewers for technical contents. In this regard, we are grateful to: Dr. A. Nagamani (India); Dr. Beng-Kah Song (Malaysia); Dr. Francesco Vidotto (Italy); Dr. Guijun Yan (Australia); Dr. H. Kobayashi (Japan); Dr. Khawar Jabran (Turkey); Dr. Mithila Jugulam (USA); Dr. N.T. Yaduraju (India); Dr. Raghavan Charudattan (USA); Dr. Tsutomu Shimizu (Japan); Dr. V.S. Rao (USA) and Dr. Z. A. Cheema (Pakistan). Thanks are also due to the Indian Society of Weed Science (ISWS), in particular, Dr. N.T. Yaduraju; Dr. V.P. Singh and Dr. SushilKumar, for the help extended. We thank Mr. Y.S.N. Murthy and Dr. Rahel Ratna Kumari, for their help. Grateful thanks are extended to Dr. J.K. Ladha; Dr. S.P. Wani; Dr. Arvind Kumar and Dr. V.K. Singh, for their support. Our special thanks are due to Dr. Nimal Chandrasena for his valuable suggestions. The help rendered by Dr. (Mrs.) A. Nagamani is gratefully acknowledged, as without her help we would not have completed this book in time. A.N. Rao also extends personal thanks to the International Rice Research Institute (IRRI), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) and Governments of Karnataka and Andhra Pradesh for the support extended for this scientific endeavor. Many people helped in many ways, we extend our thanks to all of them.

It is hoped that this volume will serve as a guide and reference book for researchers, teachers, students, farmers and all those involved in Rice Crop-Weed Management and Weed Science in general, across the globe.

A.N. Rao
H. Matsumoto
Editors

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Dr. A. N. Rao is a Consultant Scientist at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Hyderabad, India. Dr. Rao has led various research projects on weed management in various crops and is an expert in disseminating integrated crop-weed management methods for obtaining optimal and sustainable crop productivity. A. N. Rao worked as an Agronomist (Weed Science) at the International Rice Research Institute (IRRI), in the Philippines and Egypt. His Ph.D. thesis was: "Eco-physiological responses of crops and weeds against herbicides and their residues". He did postdoctoral studies at ICRISAT (1978 to 1980) and IRRI (1985 to 1988). He has authored more than 150 research publications, including book chapters. He is a Fellow of the Indian Society of Weed Science (ISWS) and is also a recipient of the ISWS Gold Medal in recognition of contributions to Weed Science. Dr. Rao began his association with APWSS in 1981, when APWSS conference was held in India. APWSS Logo designed by him has won him the Ciba-Geigy Best Logo award in 1985. He functions as an Associate Editor of the Indian Journal of Weed Science and others. He became APWSS General Secretary at the 25th APWSS Conference at Hyderabad, India and is the current incumbent in that role.

Dr. Hiroshi Matsumoto is a Professor and the Provost of Faculty of Life and Environmental Sciences, University of Tsukuba, Japan and Executive Officer of the University. He received Ph. D. from University of Tsukuba in 1982 and became Professor in 2000. Dr. Matsumoto was the past president of the Weed Science Society of Japan and Pesticide Science Society of Japan. His research interests are mode of action of herbicides and natural products. He has over 130 publications, including research papers, book chapters and reviews, and currently serving as one of Associate Editors of Pest Management Science. Dr. Matsumoto is a member of the Science Council of Japan and Honorary Member of the Weed Science Society of America.

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