
When meeting in Rome, at the 1996 World Food Summit, the world’s political leaders made a public commitment to halve the number of under-nourished people by 2015. This ambitious goal can be achieved only by the greater use of plant genetic diversity which will be required in order to produce varieties adapted to the extreme and highly variable environments of low-productivity or marginal areas. The importance of improving conservation and use of genetic diversity of useful plants has been recognized in many ways over the past two decades. The increasing demand for higher crop productivity and environmentally stable cultivars comes exactly at the time when green biotechnology is emerging by using molecular tools in its development. Earlier the green revolution had an impetus on the development of agriculture. Currently it is out of steam. We now need a new green revolution which relies on the latest molecular biological tools. Plant pathology has changed completely since the discipline started using a physiological and technical arsenal of molecular biological methods. This led to the establishment of a new scientific discipline—molecular plant pathology.

Plant breeding, an ancient plant science, is today expounding the same ideas, by integrating plant physiology and biotechnology in its methodology. This is the background of this book which offers a form of dialog between the two disciplines—crop physiology on the one hand and plant biotechnology on the other, indicating the latest findings in this important field. This provides a better understanding towards the goals of agriculture.

The book also offers updated information and views on crop physiology and a short summary on the state of the art in genome mapping. The book consists of the following sections. In the first there are several excellent contributions under the subtitle: Physiological basis of yield and environmental adaptation. In the second there are contributions dealing with the application of biotechnology in crop improvement, yield and adaptation.

The book provides new views for those who commenced working on functional genomics, which will definitively be the major route in the future to eliminate the genotype–phenotype gap and it will become the major method for improving crop productivity for non-adequate environmental conditions, so that agriculture can provide us with high quality foods for the increasing population on our planet. In addition the book is also a good example of the strong commitment of the Rockefeller Foundation and the US–Israel Bi-national Agricultural Research and Development Fund (BARD) to develop future agricultural needs.

Ervin Balázs
Department of Applied Genomics, Agricultural Research Institute, H-2462 Martonvásár Brunszvik u 2, Hungary
E-mail address: balazs@mail.mgki.hu.

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Stapeliads of southern Africa and Madagascar, Peter V. Bruyns, Umdaus Press, Hatfield, 600 pp in 2 Hard Cover Volumes, ISBN 1-919766-37-5 and-38-3, R1400-00, Email: umdaus@succulents.net

It is a characteristic of humankind to seek the ultimate state of knowledge in which all secrets are revealed, all problems solved. To us, aficionados of the Stapelieae, this point was attained by the 1937 edition of A. White and B.L. Sloane’s, The Stapelieae. But this was before the time of cladistics and DNA analysis. In the new botany, it was inevitable that even White and Sloane would need to be revised. In the past 70 years new knowledge has accumulated and new insights developed by many authors, notably L.C. Leach. Now all this has been gathered together and revised or corrected by Peter Bruyns in two magnificent volumes of 600 pages devoted specifically to the stapeliads of southern Africa and Madagascar. We await a similar revision covering the stapeliads of the rest of the world.

Bruyns recognises 326 species and 31 genera of stapeliads worldwide, compared with the 20 genera recognised by White and Sloane. Of these 31 genera, 19 are found in southern Africa, comprising 182 species (plus a further 6 spp in the Madagascar endemic Stapelianthus), viz. more than half the world total. The reason for this is explained in his philosophy. In every good monograph the author’s philosophy should cover three aspects: evolution, radiation and speciation. Bruyns places the origin of the stapeliads in north-eastern Africa, from where they have
radiated principally southward but also northward to east and west. He adopts the speciation principle that two species must be distinguished by at least two characteristics sufficiently obvious to the naked eye or under simple magnification, and that the differences must derive from genetic change. He admits that stapeliads show a genius for variability in which a species sometimes adopts characteristics normal to another genus. White and Sloane also warned against the variability of the species in the group.

Bruyn’s evolutionary scenario is set out in a cladogram on page 7, using the genus Ceropegia as outgroup. The cladogram is annotated with indications of radiation and diversification and should be read in parallel with the simplified version on page 5. A full 24 pages are devoted to morphology. The main body of the work contains clear and very detailed figures of the morphological characters of every genus and most species. These are a particularly important element of the monograph, more so perhaps than the colour photographs of the flowers of each species. Bruyns pays particular attention to the biogeographic and environmental factors that determined evolution, radiation and speciation. After the chapter on morphology are separate sections on pollination biology, biogeography and cultivation. Two main corridors of dispersal (east and west) are identified. Movement along both corridors is postulated to have resulted in the concentration of species in the Western Cape.

The main body of the work comprises a genus by genus catalogue in alphabetical order. The genus Carraluma (which contained 112 species in White and Sloane) is missing: some species have been incorporated in other genera but the genus is primarily reserved for northern species.

To those of us brought up on White and Sloane, and who collected in Kenya, our greatest loss is the Stapelia variegata which we knew. This became an Orbea and is featured as many species that we won’t recognise merely as colour forms. Another loss for us is Huernia. There are now some 21 huernias in southern Africa and our old garden stand-bye, H. keniensis, will presumably emerge from a later monograph on the tropical and northern species.

The Bruyns monograph is a magnificent and authoritative work. Bruyns personally checked all the species in habitat, which has ensured that a single philosophy was applied, unlike White and Sloane who depended on reports from a very large number of different collectors who may have had different perceptions of the same species.

There remains one warning: stapeliads have a notorious tendency to adapt to even minor geographical conditions. In another 70 years there may well be more species and more combinations!

A.T. De Villiers
4 Hayfield Crescent, Edgemead,
Cape Town 8001, South Africa


This revised and expanded volume includes data that will be relevant and beneficial to lecturers, researchers and students interested in the rapidly and constantly expanding fields of crop and/or plant physiology. The editor did not attempt to cover all fields but carefully selected those fields in which plant physiology plays an ever increasing role in attempts to continue feeding the burgeoning world population. Two-thirds of the material in this new edition is entirely new and are included under new titles. The remaining third has been modified and substantially updated.

The book now consists of 12 Parts and was written by 76 well-known scientists and specialists in the field of agriculture, representing 17 countries. Of necessity, the 12 Parts of the book vary in length. They all, nevertheless, cover significant and relevant information for our future existence on this planet.

The different Parts cover the following topics: Part I: Plants/Crops Growth Responses to Environmental Factors and Climatic Changes; Part II: Physiology of Plant/Crop Growth and Developmental Stages; Part III: Cellular and Molecular Aspects of Plant/Crop Physiology; Part IV: Plant/Crop Physiology and Physiological Aspects of Plant/Crop Production Processes; Part V: Plant Growth Regulators: The Natural Hormones (Growth Promoters and Inhibitors); Part VI: Physiological Responses of Plant/Crops under Stressful Conditions (Salt, Drought and Other Environmental Stresses); Part VII: Physiological Responses of Plant/Crops to Heavy Metal Concentration and Agrichemicals; Part VIII: Physiological Relationships between Lower and Higher Plants; Part IX: Physiology of Lower-Plant Genetics and Development; Part X: Physiology of Higher-Plant Crop Genetics and Development; Part XI: Using Computer Modelling in Plant Physiology; Part XII: Plant/Crop Physiology under Controlled Conditions, in Space, and Other Planets.

A wealth of information is covered in this book. It is easy to read and covers most of the relevant fields of importance to Modern Agriculture. This book should be on the library shelves of all Research and Teaching Institutions.

Johannes Van Staden
Research Centre for Plant Growth and Development,
School of Biological and Conservation Sciences,
University of KwaZulu-Natal Pietermaritzburg,
Private Bag X01, Scottsville 3209, South Africa
E-mail address: rcpgd@ukzn.ac.za.