BOOK REVIEWS

Bromeliaceae: Profile of an Adaptive Radiation. D. H. Benzing. Cambridge University Press. 2000. 690pp. ISBN 0 521 43031 3. £80.00 (hardback).
DOI: 10.10M/S0960428602240159

Bromeliaceae are a predominantly tropical family of approximately 2400 species. Many are epiphytes, their flower heads made conspicuous by brightly coloured bracts that have made them popular as cultivated ornamentals. Whilst *Ananas comosus*, the pineapple, is probably the most familiar member of this family, many other species are widely used for their edible parts, fibres and medicinal properties.

This is a fat volume containing information on all aspects of the family. Following a brief introductory section the book is broadly divided into two main sections. The first, 'Basic structure, function, ecology and evolution', shows the depth of knowledge that the author has of this family. It contains chapters such as 'Carbon and water balance', 'Reproduction and life history' and 'History and evolution'. The second section, entitled 'Special topics', includes contributions from a number of guest authors on subjects like 'Endangered Bromeliaceae' as well as four monographic chapters on selected groups within the family.

The introductory section gives an overview of the content of the volume and provides a thorough insight into this family, whose members exhibit an enormous diversity of growth forms including hemiepiphytic vines, alpine cushion or giant rosette plants, myrmecophytes and carnivores. Some of those that form water-retaining 'tanks' among their leaves are even home to poison-dart frogs. The *Bromeliaceae* is almost entirely restricted to tropical America with the exception of the West African *Pitcairnia feliciana* whose origin is proposed as a single and probably recent dispersal event. Summary tables provide data on the distributions of species and on numbers of species by region. The biology of the group is discussed, particularly the Crassulacean acid metabolism (CAM) method of photosynthesis which has been recorded in more members of the *Bromeliaceae* than any other family. CAM promotes water economy, which may account for the success of this family in areas such as the high Andes where they are exposed to severe drought and high UV radiation on nutrient-poor substrates.

The first major section of the book deals with all aspects of the biology, ecology and history of the bromeliads. Each chapter is divided into subsections; for example, the chapter entitled 'History and evolution' includes sections such as 'Fossils', 'Taxonomy', 'Chromosomes, hybridization and polyploidy', 'Chemical systematics' and 'Phytogeography'. The last of these discusses the origin and expansion of the subfamilies *Pitcairnioideae*, *Tillandsioideae* and *Bromelioideae*. The discussion focuses on areas of particularly high species diversity and endemism such as the northern Andes, the Guayanan highlands and the low montane forests of Colombia and Ecuador. The *Tillandsioideae* is considered to have branched off from the rest

of the family early in its history. It is acknowledged that the features such as CAM and the presence of phytotelma (cavities for storing water) which enable the *Bromeliaceae* to withstand environmental stresses are highly homoplasious, making attempts at systematic inference based on these features difficult. Conclusions are based on a synthesis of molecular data, where these are available, and morphology.

Within the 'Special topics' section of the book, detailed treatment is given to genera such as *Cryptanthus*, *Tillandsia* and *Racinaea*. In addition, there are chapters focusing on the ethnobotany and the conservation of the family. The chapter entitled 'Ethnobotany of the Bromeliaceae' lists the ways in which the family has been, and still is, used for a variety of purposes other than horticulture. At least 90 species have non-horticultural uses. For instance, the fibres of several species are used by indigenous South American tribes for making hammocks and bags. *Puya chilensis* is used for making fishing nets because its fibres are rot-resistant. *Tillandsia usneoides* (Spanish moss) once served as a horsehair substitute in upholstery and mattresses, and was commercially processed in the USA on a large scale. In terms of the family as a source of food, the pineapple is the most widely cultivated of the bromeliads. However, a number of other species of *Ananas* are eaten in South America, the flowers of some *Tillandsia* species are eaten for their high sugar content, and sweet drinks are made in Ecuador from *Puya hamata*. The medicinal uses of the *Bromeliaceae* are numerous and include treatment of intestinal ailments, the prevention of sea sickness and the promotion of wound healing. Bromelain, extracted from the pineapple, is marketed in the USA to treat inflammation and related pain.

In summary, the book gives a thorough account of this fascinating and useful family and would be equally appealing to an inquisitive newcomer as to an expert.

J. Herbert

Guide to Standard Floras of the World. 2nd edition. David G. Frodin. Cambridge University Press. 2001. 1100pp. ISBN 0 521 79077 8. £150.00 (hardback).
DOI: 10.10M/S0960428602250155

This book sets out to present a geographically arranged bibliography of the most useful complete Floras, checklists and related works dealing with the vascular plants of the world. This new publication updates the first edition, published in 1984, which has become an essential reference for botanical inventory around the world. The existence of a single volume which summarizes the most important accounts of the plants of specific regions has proved to be invaluable, particularly since it allows non-specialists to access otherwise obscure regional literature. This new edition has been revised, updated and expanded to incorporate the substantial literature of the late twentieth century.

Like the first edition, this volume starts with a lengthy introduction. The first

chapter begins with an outline of the rationale and structure of the book, followed by an illuminating synopsis of the history of Floras including a discussion of the motivation for their development and the reasons for production. The introduction concludes with an investigation of the state of Flora writing in the twentieth century and a discussion of the future of Floras in the light of the new technology now available.

The bibliographic section of the book is divided into nine divisions which are further subdivided into regions which correspond to countries or collections of countries. Each division and region starts with an introduction to the botanical literature of the area and this is followed by a review of the literature of subunits within the regions, usually either small countries or states of large countries. Most of the works covered are aimed at the specialist, with only a few popular books included. If there is a problem with non-specialists using this book it is that it points them to other books which are frequently difficult for non-specialists to use, although in most parts of the world this is a reflection of the state of floristics rather than a criticism of this *Guide*.

One of the most valuable properties of *Guide to Standard Floras* is that it enables a critical assessment of floristics today. Unfortunately it is not the most inspiring scenario. Despite the increased literature over the last two decades of the twentieth century there has been remarkably little change in the style of Flora writing. Much recent activity seems to be concentrated in the New World, especially South America which was previously very poorly covered. In this region the trend seems to be towards production of often excellent Floras of smaller areas, such as the *Flora of Pico das Almas* (Stannard, 1995), a mountain in Bahia, NE Brazil, and the copiously illustrated *Flora da Reserva Ducke* (Ribeiro *et al*., 1999), a 100 km^2 reserve near Manaus. There are some exceptions to this concentration on small areas, such as the *Flora of the Venezuelan Guayana*. Elsewhere, parts of larger projects such as *Flora Malesiana*, *Flora Neotropica* and *Flora of tropical East Africa* are still being written but their lamentably slow progress indicates the difficulties associated with these ambitious Floras coordinated by large institutions situated outwith the area being monographed. Frodin discusses the nineteenth-century debate on the merits of concise Floras, of which Hooker's *Flora scotica* (1821, still the only Flora of Scotland) is an excellent example. Unfortunately, as this *Guide* demonstrates, the emphasis on accessibility of information has often been overshadowed in twentieth-century Floras by cumbersome detail.

The major historical development in the approach to writing Floras, discussed in the introduction and exemplified in the geographical bibliographic section, has been one of divergence between the need to identify plants in a given area and the need to incorporate maximal amounts of information about them. In many cases it is the non-specialist who has been neglected. They may have a pressing need to identify plants but often have no interest in the technical descriptions or lists of synonymy which occupy large parts of many Floras. These technicalities are now increasingly being put into computer databases, usually in exhaustive detail. One hopes that this

could open the way for corresponding energy to be directed into designing Floras, computerized or otherwise, to maximize their utility as identification guides. Shifting the emphasis from verbal to visual information, something which is increasingly necessary in our visually sophisticated society, should be an integral part of this process. Frodin discusses these arguments with great scholarship, and this new edition should serve as an important landmark in floristics, helping to define the area's current status and setting the scene for the new century.

References

HOOKER, W. J. (1821). *Flora scotica, or a description of Scottish plants arranged both according to the artificial and natural methods*. 2 vols. London: Hurst-Robinson.

RIBEIRO, J. E. L. DA S. *et al*. (1999). *Flora da Reserva Ducke: guia de indentificação das plantas vasculares de uma floresta de terra firme na Amazônia Central*. Manaus, Brazil: INPA (in association with DfID, UK).

STANNARD, B. (ed.) (1995). *Flora of Pico das Almas – Chapada Diamantina, Bahia, Brazil*. Royal Botanic Gardens, Kew.

R. ATKINSON

Wild Orchids of Sussex. David C. Lang. Lewes, Sussex: Pomegranate Press. 2001. 144pp, including 102 colour photographs, 10 monochrome photographs, three line drawings and 33 distribution maps. ISBN 0 9533493 3 0. £14.95 (softback).
DOI: 10.10M/S0960428602260151

Once upon a time, orchid Floras covered only continents (Delforge, 2001, currently holds sway as the European bible) or countries (in the UK, half a century of books have not yet bettered Summerhayes, 1951, for content, while Allen *et al.*, 1993, is the clear leader for presentation). At the county level, when I completed a detailed survey of the orchids in my native Hertfordshire in 1981, the result was a modest 24-page paper in the *Transactions of the Hertfordshire Natural History Society* covering distributions, habitats and local variants. It has since become de rigeur to produce a glossy, polychrome, softback orchid book for each English county. Sanford's (1991) overview of Suffolk orchids was soon followed by Jenkinson's accounts of the orchids of Dorset (1991) and Hampshire (1995), and more recently by an exposé of a single famously orchid-rich locality, Box Hill in Surrey (Sankey, 2000). These books are now in turn joined by Lang's even more sumptuous treatment of the orchids of Sussex.

The book clearly reflects the author's considerable experience of the natural history of terrestrial orchids. The style of the text is pleasantly chatty and anecdotal; topics covered range from suspicious deaths surrounding an orchid photographer, the mechanical drawbacks of the Skoda as a field vehicle, a nomenclatural war waged at Kew over a single sheet of ambiguous helleborines, and whether the spiral twist

of the inflorescence of Autumn Ladies-tresses is sinistral or dextral (the satisfying answer is c.50:50).

Sussex may not instill quite the same level of adrenaline in the British orchid enthusiast as do the Chiltern Hills or Kentish Downs, but Lang does successfully convince the reader that Sussex has much to offer. Of Britain's c.50 orchid species, 33 are claimed as being Sussex natives for at least part of the twentieth century. Detailed treatments of these 33 species, supported by a detailed glossary and index, constitute 60% of the book. Each account includes a tetrad-based distribution map and at least two high-quality colour photographs taken in available light. These support 1–2 pages of text that summarizes the early history of collecting and distributional changes in Sussex (giving sites for all but the rarest species), and the morphology, ecology, phenology and pollination biology of the species, together with accounts of local infraspecific variation. Colour variants are discussed, as are the more interesting mutant floral morphs (the range presented for the ever-popular Bee Orchid is especially impressive). Surprisingly, no attempt is made to map the more common hybrids or infraspecific taxa, such as the widely recognized subspecies of the Early Marsh-orchid, the varieties of the Green-flowered Helleborine, and the even more contentious early- and late-flowering subspecies of Burnt Orchid. Even the three 'subspecies' of Fragrant Orchid that Lang (and I) controversially believe to be full species are lumped together as a single map, despite their almost mutually exclusive habitat preferences.

Indeed, the greatest weakness of the book is its low-key treatment (and, in some cases, explicit rejection) of recent scientific discoveries; the bibliography is almost devoid of hard science, and the knowledge reflected in the text is very much that of the period when the author produced his most recent orchid Flora of the British Isles as a whole (Lang, 1989). Since that time, we have for example learned from genetic studies that there is no close evolutionary relationship between *Orchis mascula*, '*Orchis*' (*Anacamptis*) *morio* and '*Orchis*' (*Neotinea*) *ustulata*, that the three 'subspecies' of Fragrant Orchid are reliably genetically distinct, that *Dactylorhiza praetermissa* 'subsp. *pardalina*' (correctly var. or subsp. *junialis*) has no especially close relationship with the continental *D. majalis*, that Young's Helleborine and Lapland Marsh-orchid are synonymous with Broad-leaved Helleborine and Narrow-leaved Marsh-orchid respectively, and that most presumed cases of hybridization between genera miraculously disappear when the genera are revised to take proper account of closeness of relationship of their constituent species (see Bateman, 2001).

Sadly, the author ignores recent genetic work on the grounds that it is 'not universally acceptable' (p. 35: a classic 'Catch-22' scenario, as its acceptance or rejection lies firmly in the hands of reputable authors such as Lang). Thus, Lang maintains the traditional broad circumscription of the genus '*Orchis*', despite the fact that this has three independent origins, thereby conflicting with the stipulation in Lang's glossary that a genus is by definition 'a group of related species'. He also features an archaic higher classification, dating back to Summerhayes and beyond, that includes the subtribe *Gymnadeniinae*, a highly artificial ensemble of five genera that

represent at least four independent evolutionary origins. His subsequent statement that 'hybrids between vastly different taxa can be fully fertile' (p. 37) is true only in the context of misleading classifications that make spurious assertions of relationship (Bateman, 2001). And to state that 'the classification and identification of the orchids of Great Britain provides many problems for the amateur botanist' (p. 35) is true only if the proffered solutions are rejected. Fortunately for the discipline, the solutions are often provided by amateur orchidologists themselves, who are no slouches at hands-on science.

Lang appears more comfortable summarizing recent ecological insights. For example, he notes that terrestrial orchids reach maturity more rapidly than was once believed; to this one could add recent revelations that juvenile and mature orchids appear to be maintained by distinct and separate suites of mycorrhizal fungi. Information given on pollinators also reflects recent observations, though the underlying data remain inadequate for most species; also, the quality of the associated line drawings of orchid flowers does not fully reflect the elegance of their adaptations for pollination. The account of orchid habitats in Sussex is thorough and supported by several evocative photographs. Interested field botanists can discern suitable sites for study after relatively brief scrutiny of the book, and they are encouraged to use Global Positioning System devices to precisely locate relevant orchid populations. It is especially refreshing to see a sensible approach to making voucher specimens (mounts of single dissected flowers are recommended) replacing the usual, scientifically counter-productive blanket ban on plant collecting.

Viewing the book from a conservation perspective, we learn that several orchid species formerly occurring in Sussex have become extirpated (*not* 'extinct' as the author states, a term that is best restricted to the demise of the last known individual of a species). Most of these disappeared relatively recently: they include Small-white Orchid, Lady Orchid and Bog Orchid, and probably Red Helleborine, Narrow-lipped Helleborine and Lesser Twayblade. Orchids that have declined substantially reflect similar patterns in other English counties: they include Narrow-leaved Helleborine, Marsh Helleborine, Lesser Butterfly-orchid, Early Marsh-orchid and Man Orchid. 'Improvement' of meadows and drainage of wetlands are the most common culprits, reinforced by coniferization of woodlands and urban expansion. However, it is more difficult to judge from this text whether any Sussex orchids have increased their distributions, as has been documented elsewhere. Like declining ranges, expansions tend to reflect changes in our management of the countryside. These may be very obvious, such as the colonization of abandoned chalk and gravel pits by downland and marshland orchids such as the Bee Orchid and various dactylorhizas, or more subtle, such as the expansion of the Violet Helleborine across parts of southern England in response to the cessation of coppicing.

Global warming too appears to be having a profound effect. Expansion of the range of the Lizard Orchid was long ago hypothesized by R. Good to occur in response to unusually warm summers; thus, Lang's predictions of the expansion into Sussex from Kent of the Late Spider-orchid, and of several species from across the

Channel, seem credible. Lang reports with remarkable objectivity the deliberate introduction of non-native orchids to southern England, most notoriously at Wakehurst Place where Cretan Loose-flowered Orchids, deliberately 'planted for scientific purposes', were recently inexplicably joined by the Tongue Orchid, *Serapias lingua*, appearing at its first ever UK locality. Sadly, any new orchid species legitimately crossing the Channel as wind-blown seed will now inevitably be viewed with considerable suspicion, one final conundrum prompted by reading this interesting and individualistic book.

References

ALLEN, B., WOODS, P. & CLARKE, S. (1993). *Wild Orchids of Scotland.* Edinburgh: Royal Botanic Garden Edinburgh/HMSO.
BATEMAN, R. M. (2001). Evolution and classification of European orchids: insights from molecular and morphological characters. *Journal Europäischer Orchideen* 33: 33–119.
DELFORGE, P. (2001). *Guide des Orchidées d'Europe*. 2nd edition. Lausanne, Switzerland: Delachaux & Niestlé.
JENKINSON, M. N. (1991). *Wild Orchids of Dorset.* Gillingham, Dorset: Orchid Sundries.
JENKINSON, M. N. (1995). *Wild Orchids of Hampshire and the Isle of Wight.* Gillingham, Dorset: Orchid Sundries.
LANG, D. C. (1989). *A Guide to the Wild Orchids of Great Britain and Ireland.* Oxford: Oxford University Press.
SANFORD, M. N. (1991). *The Orchids of Suffolk*. Suffolk Naturalist's Society.
SANKEY, A. (2000). *The Box Hill Book of Orchids.* Dorking, Surrey: Friends of Box Hill.
SUMMERHAYES, V. S. (1951). *Wild Orchids of Britain*. 1st edition. London: Collins.

R. M. BATEMAN

Flora of Iran, Fascicles 1–36. Edited by M. Assadi, M. Khatamsaz, A. A. Maassoumi & V. Mozaffarian. Tehran (Iran): Ministry of Jahad-e-Sazandegi, Research Institute of Forests and Rangelands. Information about the availability of the Flora can be obtained from the Librarian, Research Institute of Forests and Rangelands, PO Box 13-185-116, Tehran, Iran.
DOI: 10.10M/S0960428602270158

Of two earlier Floras of Iran, one was written in French (Parsa's *Flore de l'Iran*, dating from the 1950s), the other (mostly) in Latin (Rechinger's monumental *Flora Iranica* – also covering N Iraq, Afghanistan and highland Pakistan). The new *Flora of Iran* is in Farsi and now well underway. It is financially supported by the Iranian government, Research Institute of Forests and Rangelands, Tehran; to date, all the contributing authors have been local botanists. Although the initial timetable was to complete the Flora in 20 years, it is clearly going to take much longer. Arranged in family fascicles, the first appeared in 1989; now in 2001, 36 families have been published ranging in size from slender (*Resedaceae*, *Grossulariaceae*, *Zygophyllaceae*)

to chunky (*Papilionaceae*, *Rosaceae*, *Solanaceae*). In contrast to the extremely expensive *Flora Iranica*, the new *Flora of Iran* is much more modest in price and in the quality of presentation; it is aimed, primarily, at Iranian botanists and biologists. Except for its title, the names of taxa, synonyms and places of publication, everything is in Farsi. Because of its wider scope and greater accuracy, it is sure to gradually replace the two earlier home-based Iranian Floras: Parsa's non-user-friendly *Flore de l'Iran*, and Ghahreman's French/Farsi profusely illustrated but uncritical *Flore de l'Iran en coleurs naturelles* (1978–1993–).

The contents of the new Flora are what one expects from a good present-day scientific Flora. There are full descriptions, keys to taxa, an indication of where type material is held, details of internal geographic distribution (recent fascicles, from no. 20 onwards, have dot distribution maps), vernacular names and economic uses, and, always so helpful in a Flora, informative comments about relationships or characteristic features of the taxa. Included in the series is a basic guide (1988) to the fascicles which gives additional information. The Flora is reasonably well illustrated but the often simplistic drawings would have benefited from better detail of diagnostic flower and fruit parts.

A comparison of the new Flora with previous ones clearly shows that the fascicles have involved new research in the herbarium and in the field. They are not derivative from earlier Floras. Because of much field-work and new collections, it is not surprising that some of the earlier accounts in *Flora Iranica* are now outdated. For example, in Wendelbo's 1965 (no. 9) account of *Dionysia*, 21 species were recognized in Iran. In the 1999 *Flora of Iran* account, the total has risen to 31, with one of the previously recognized species, *D. bolivari*, reduced to synonymy. This total reflects new knowledge, not excessive taxonomic zeal to describe new taxa. Likewise, a comparison of the 1979 *Vicia* (no. 140) account by Chrtková-Zertová in *Flora Iranica* with that of *Flora of Iran* (2000) shows substantial differences, but in this case a significant reduction in the total of Iranian taxa: many (10) are reduced to synonymy, while two new taxa are recognized. The contributing authors of all the accounts published to date, and the four-man editorial committee, deserve congratulations in what they have achieved; local library and herbarium resources can scarcely have been ideal in recent years.

In a historical context, it is worth drawing attention to the ever-increasing role that local SW Asiatic botanists are now playing in better understanding their native flora. In the early days of the *Flora of Turkey* and *Flora Iranica* projects, both started in the 1960s, the input from Turkish and Iranian botanists was small. But time has passed and now the number of experienced local botanists has substantially increased – as has an awareness of the need for conservation strategies based on a real understanding of the taxa involved. Turkish botanists have greatly benefited from maintaining close links with the rich Turkish resources of, and staff at, the Royal Botanic Garden Edinburgh (E); the recently published Turkish-edited vol. 11 of the *Flora of Turkey* (2001) is a fine example. In Vienna, at the Natural History Museum (W), are housed the wonderfully rich, mainly K.H. Rechinger, collections that were the

basis of the now almost completed *Flora Iranica*. In years to come, one hopes that Iranian botanists will be able to make fuller use of these resources and those of other European institutes. As the *Flora of Iran* becomes better known to the taxonomic community at large, specialists from abroad will hopefully now play a role in contributing accounts to it and accelerate its progress – there are c.140 fascicles to go!

I. C. Hedge & S. Rezai

	Plan of Flora of Iran*	1988	Assadi, M.	300 Rials
No. 1	Tamaricaceae	1988	Assadi, M.	350 Rials
No. 2	Araceae	1988	Assadi, M.	200 Rials
No. 3	Anacardiaceae	1988	Khatamsaz, M.	150 Rials
No. 4	Ulmaceae	1991	Khatamsaz, M.	200 Rials
No. 5	Violaceae	1991	Khatamsaz, M.	300 Rials
No. 6	Rosaceae	1992	Khatamsaz, M.	3200 Rials
No. 7	Zygophyllaceae	1993	Akhiani, Kh.	3000 Rials
No. 8	Dipsacaceae	1993	Jamzad, Z.	1100 Rials
No. 9	Resedaceae	1993	Nowroozi, M.	650 Rials
No. 10	Juncaceae	1993	Taheri, Zh.	1000 Rials
No. 11	Frankeniaceae	1995	Amirabadizadeh, H.	500 Rials
No. 12	Saxifragaceae	1995	Jamzad, Z.	700 Rials
No. 13	Caprifoliaceae	1995	Khatamsaz, M.	800 Rials
No. 14	Plantaginaceae	1995	Janighorban, M.	1000 Rials
No. 15	Thymelaeaceae	1995	Akhiani, Kh.	800 Rials
Nos. 16 and 17	Gentianaceae and Menyanthaceae	1995	Khatamsaz, M.	1000 Rials
No. 18	Mimosaceae	1995	Zaeifi, M.	1200 Rials
Nos. 19–22	Pinaceae, Taxaceae, Cupressaceae and Ephedraceae	1998	Assadi, M.	2000 Rials
No. 23	Grossulariaceae	1998	Assadi, M.	1200 Rials
No. 24	Solanaceae	1998	Khatamsaz, M.	3500 Rials
No. 25	Primulaceae	1999	Jamzad, Z.	3500 Rials
No. 26	Nyctaginaceae	1999	Fadaie, F.	1200 Rials
No. 27	Guttiferae	1999	Azadi, R.	3500 Rials
No. 28	Asclepiadaceae	2000	Zaeifi, M.	3000 Rials ISBN 9644 730615
No. 29	Aristolochiaceae	2000	Majid, M.	1000 Rials ISBN 9644 730623
No. 30	Capparaceae	2000	Saghafi Khadem, F.	3000 Rials ISBN 9644 730631
No. 31	Iridaceae	2000	Mazhari, N.	4000 Rials ISBN 9644 73064X
No. 32	Crassulaceae	2000	Akhiani, Kh.	4000 Rials ISBN 9644 730232
No. 33	Papilionaceae	2000	Pakravan, M., Jalilian, N., Neamati, M.	6000 Rials ISBN 9644 730704

No. 34	Linaceae	2001	Sharifnia, F., Assadi, M.	3800 Rials ISBN 9644 730909
No. 35	Moraceae	2001	Azizian, D.	2500 Rials ISBN 9644 730917
No. 36	Urticaceae	2001	Janighorban, M.	2500 Rials ISBN 9644 730925
No. 37	Valerianceae	2001 (in press)	Moussavi-Allashlou, E.	4500 Rials ISBN 9644 73100X
No. 38	Chenopodiaceae	2001 (in press)	Assadi, M.	20000 Rials ISBN 9644 731131

*Un-numbered introductory volume.