published between the late 1960s and mid-1990s, provide the reader with access to a comprehensive range of detailed, primary studies of the topic. This is a book that I expect to refer to frequently for basic nutrient data and in that sense it meets its stated objectives.

**John Scullion**
© 2001 Annals of Botany Company

doi:10.1006/anbo.2001.1374


These volumes result from two symposia which took place together in Sydney, Australia, in September 1998—the Second International Symposium on the Comparative Biology of the Monocotyledons and the Third International Symposium on Grass Systematics and Evolution. The previous meetings in these symposium series took place in 1993 and 1986 respectively, so these new books come after intervals of five and 12 years.

The Monocotyledons volume contains 72 contributions in three main sections: General comparative biology; Systematics of the Lilioids; and Systematics of the Commelinoids. General comparative biology is further broken down into Phylogeny (three papers), Biogeography and fossils (three papers), Development and organisation (four papers), Chemotaxonomy and cytology (five papers), Micromorphology, anatomy and embryology (eight papers) and Reproductive biology (11 papers). These subsections occupy just under half of the book. The papers in the two systematics sections are mostly grouped by order, as follows: Asparagales and Liliales (seven papers); Asparagales–Orchidaceae (seven papers); Dioscoreales and Pandanales (four papers); Arecales (three papers); Commelinales (one paper); Poales–Bromeliaceae and Eriocaulaceae (two papers); Poales–Restionaceae (five papers) and Zingiberales (two papers).

While the Gramineae are not wholly absent from the Monocotyledons volume, they are treated much more closely in their own volume. Here the General section (three papers) is not divided. There follow sections on Bamboos (three papers), Pooids (six papers), Panicoids (six papers), Chloridoinds (six papers), Arundinoids (two papers), Physiology/ecology (four papers), Breeding systems (five papers), and Biogeography (six papers). In total, there are 41 contributions.

These two volumes constitute a very complete overview of the systematics and evolution of the families of monocotyledons, although it is surprising that there are no papers specifically on the basal orders Acorales and Alismatales. This must simply reflect the contributions offered to the original symposia and shows the difference between a book by one or more authors and the proceedings of a symposium. By contrast, the five papers on the Restionaceae (approx. 300 spp., according to Harborne *et al.*) show a certain understandable geographical bias towards the country where the symposium took place!

Both volumes begin with a combined phylogenetic analysis. Three genes were sequenced from an ingroup of 126 species and outgroup of 22 species by Chase *et al.* in the Monocotyledons volume; one morphological dataset and seven gene datasets were analysed for 57 ingroup and four outgroup species by Barker *et al.* in the Grasses volume. Huge quantities of data have been gathered since the previous symposia in these series and the degree of congruence among analyses is now reassuringly high. The sampling percentage is still uneven but the coverage of families is wide.

Everyone working on monocotyledons will find something of interest in these volumes. While the higher level classification seems to be approaching stability, there are still plenty of ambiguously placed groups in the many phylograms in these volumes which need further testing. At times, traditional classifications are supported but not always. For instance, Indsto and Weston (Monocotyledons volume) find that the distribution of a bulls-eye pattern seen in the flowers of *Dendrobium* under near-UV illumination supports the new molecular and anatomical data of Yukawa *et al.* (ibid.) rather than Schlechter’s morphological classification (Schlechter, 1912).

The search for characters goes on apace, molecular characters being favoured at the moment. However, it is fascinating to learn of new techniques in fields that have tended to fall out of favour in recent years, such as chemotaxonomy. Kite *et al.* (Monocotyledons volume) demonstrate clearly that there is much to be gained by returning to chemical characters with the new analytical tools now available.

The impression gained in reading these books is that they concentrate on higher level taxa and it is this that causes me concern. After all, it is not orders that go extinct, nor families or genera, but species and populations. If taxonomists are to be useful in the world we must provide the tools to identify and monitor wild plants and most of this comes down to delimiting species, writing descriptions and keys, and plotting specimen data on maps, especially in poorly known, tropical groups. In the two systematics sections of the Monocotyledons volume nearly 30 papers examine higher level relationships while nine look at genera or species. The picture is somewhat different in the Grasses volume where, for instance, there are keys to species of bamboos in Madagascar (Dransfield) and *Bromus* in South America (Planchuelo and Peterson). A related concern is that the many contributors who were Ph.D. students at the time of these papers may not have had enough contact with plants in the field or the herbarium to enable them to go on to write floras or monographs. Perhaps what will happen is that the results of molecular and other techniques used so well in these volumes will lead rapidly to a fairly stable classification within which we can begin to look at field-based problems. Several authors point out the need for more field work in areas such as pollination biology. If these symposia generate a new wave of enthusiasm for
alpha taxonomy analogous to the return to morphological study predicted by Professor Bennett in his Nancy T. Burbidge Memorial Lecture (Monocotyledons volume), then they will be even more successful than the results published here already demonstrate.

The books are well produced, following the format of Soderstrom et al. (1987) fairly closely. The proceedings of the First International Symposium on the Comparative Biology of the Monocotyledons (Rudall et al., 1995) had a smaller page size and came out in two softback volumes. The larger page size of these volumes makes the figures easier to see, although the books are quite large and heavy to handle.

I regret the decision to abbreviate the word monocotyledons even on the front cover of a book; these plants never have one ‘cot’ but often have one cotyledon. Matt paper would have made reading the text easier on the eyes: the shiny paper used reflects artificial light. Overall the presentation of maps, graphs, illustrations etc. is of high quality but there is a great deal of variation in thicknesses of lines, type faces, and depth of shading. These problems are more common in the Grasses volume where, for instance, the line drawings on pp. 371–379 should not have been accepted for publication. Many contributors have prepared their figures on computer and, at times, this is all too visible in the form of pixellation, see, for examples, the photomicrographs on pp. 151–152 and 264 of the Grasses volume and Plate 5 in the Monocotyledons volume. Several of the maps, including those on pp. 52, 164 and 336–343 of the Grasses volume and 408 and 638–640 of the Monocotyledons volume have been plotted on digitized outlines at the wrong level of resolution, producing an unpleasant stepped appearance in print. Most of the figures are phylograms and here there is huge variation in quality, sometimes within one paper. Compare figures 1 and 2 of Wilkin & Caddick with figure 3 (Monocotyledons volume, pp. 497–504); the lettering in the first two figures is badly broken up whereas figure 3 is crystal clear. I think both contributors and editors could have been a bit more demanding in this respect without causing undue delay or extra expense in production.

There are very few spelling mistakes, as one has come to expect in the days of spell-checkers. The few I noticed tended to be inconsistent uses of accented characters in names of people. The only mistake I found in the references is the name Gris appearing before Grant in an alphabetical list (Monocotyledons volume, p. 342).

Individuals may be dissuaded from buying these volumes by the very wide subject area they cover and the price. Botanical libraries in research institutes and universities will need to have them as they synthesize the state of taxonomic research in the monocotyledons at the end of the 1990s.

**LITERATURE CITED**


Mark Newman
© 2001 Annals of Botany Company

doi:10.1006/anbo.2001.1373


Student textbooks on plant systematics are rather thin on the ground, so I was pleased to see this, but humbled as I was unaware of the two previous editions. Woodward identifies his audience as undergraduate students (with bias towards North American university courses) and the serious amateur gardener/botanist with a basic knowledge of biology. Initial chapters give solid grounding in the many elements comprising systematics research. Starting with a refreshing discussion on the purpose and significance of systematics, Woodward leads the reader through the form and function of plant names, identification techniques and plant collection methods. These often dry subjects are enlivened with frequent well-chosen examples, good illustrations and a compelling writing style. Important facts are highlighted, terms emboldened when first used and then explained.

Having established a base level of systematics knowledge, students are shown the biology and great diversity of vascular plant life. Plants are treated under their traditional major groupings (Pteridophytes and allies, Gymnosperms, Dicots and Monocots), each with its own introduction to special terminology, discussion of reproductive biology (life cycles, etc.), and tabulated classification of group members. Family is used as the basic unit of classification, and a full page is given over to each. Twenty-two families of Pteridophytes and allies, 14 of Gymnosperms, 200 of Dicots, and 40 of Monocots are included. Flowering plant families are arranged systematically within subclasses and orders (following a Cronquist system). Illustrations (of rather variable quality) are provided for each family, along with ‘nutshell’ information under the headings: general description; leaves; flowers; fruit; seed distribution; economic value; classification; and fossil record. Comparable information is given for non-flowering vascular plants. Flowering plants are given special consideration with extensive discussion of morphological characters. This is supplemented with a well-illustrated glossary of morphological terminology broken down within related characters (e.g. stems, leaf apex, leaf margins, fruits, etc.). This format works well when parsing for terms to describe a feature, and a text-only A–Z glossary is provided at the end of the book for those looking up unfamiliar words. The full glossary repeats the definitions, but unfortunately does not include cross-references to the excellent illustrations in the main text.

The last 100 pages of the main text push the student further, exploring more deeply the processes and results of