AUSTRALIAN BIOLOGICAL RESOURCES STUDY, CANBERRA

SPECIES PLANTARUM

FLORA OF THE WORLD

Introduction to the Series

Environment Australia
Department of the Environment and Heritage

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INTRODUCTION

The Species Plantarum Project is an initiative by a world-wide consortium of taxonomists to write and publish a Flora of the vascular plants of the world. The Project operates under the auspices of the International Organization for Plant Information (IOPI), a Commission of IUBS.

Species Plantarum aims to provide in concise format, and with standardised data fields, basic taxonomic information on the vascular plants of the world, including accepted names and synonyms with bibliographic data, types of names, keys and descriptions from family to varietal levels, geographical distributions, ecological information and other related matters, and to publish it in both hard copy and electronic form.

The format of the *Species Plantarum* is based on that of *Flora of Australia*, with some departures made necessary by the different scale of the project. Initially at least, the series is being edited and published for the Species Plantarum Project and IOPI by the Australian Biological Resources Study (ABRS), producers of *Flora of Australia*.

Treatments are contributed on a voluntary basis. Each part of *Species Plantarum* is intended to provide a complete account of a family, subfamily, large genus or other related taxonomic group. While treatments of small families may be shorter, it is intended that contributions will, in general, cover at least 50 to 100 species. The taxonomy adopted is that of the author, although the family delimitations recommended are initially those of R.K.Brummitt, *Vascular Plant Families and Genera* (1992). The order of taxa within families, genera and species in the *Species Plantarum* is intended to reflect natural relationships, so far as this is possible in a linear sequence.

Maps are provided for each species, or in those cases where infraspecific taxa are recognised, for each of the terminal taxa. Distribution maps are based on those in S.Hollis & R.K.Brummitt, *World Geographical Scheme for Recording Plant Distributions* (1992), and the 'countries' adopted are those of Level 3 and 4 of that work. Description of distribution follows the same work, with a two-digit code for regions and a three-letter code for the 'country'. Upper case letters for the 'country' indicate native distribution; lower case letters indicate that the taxon is only present in that 'country' as an introduced and naturalised plant. If a taxon is extinct in a 'country', this is indicated by a dagger. Distribution of species as cultivated plants is not included.

Misapplied and invalid names are, in general, omitted. Journal titles are abbreviated according to G.H.M.Lawrence *et al*., *Botanico-Periodicum-Huntianum* (1968) and its *Supplementum* (1991). Book titles are abbreviated according to F.A.Stafleu & R.S.Cowan, *Taxonomic Literature* (2nd edn) Vols 1–7, and *Supplements* (1976–), except that all major words are capitalised. Authors of plant names are abbreviated according to R.K.Brummitt & C.E.Powell, *Authors of Plant Names* (1992).

In a long-term project such as this, various conventions will probably change with time. For this reason, information about the project and instructions for authors will also be available on the World Wide Web, initially through the ABRS site (currently http://www.anbg.gov.au/abrs/flora/spplant/spplant) with links from the IOPI site (currently http://life.csu.edu.au/iopi/iopihome) and others.

The need for the Project

Many attempts have been made to write a Flora of the World at species level. The most recent fully successful author was C.Linnaeus, *Species Plantarum* (1753), and the various workers who produced supplements and new editions of that work in the years to 1833.

In the 19th century and early 20th century other attempts to write a complete Flora of the World met with varying degrees of success. Those who went closest were A. P. de Candolle & A. de Candolle, *Prodromus Systematis Naturalis Regni Vegetabilis* (1824–1873), and H.G.A. Engler and coauthors, *Das Pflanzenreich* (1900–1953).

The chances of completing such a task are therefore slim, judged on historical precedent. Even with the strength of the French and German botanical world behind them, and with their undoubted mastery of the subject, the de Candolles and Engler were unable to take the task to its conclusion. Why then, with a much larger flora to describe than any of our predecessors, and with the world facing a chronic shortage of taxonomists, do we have the temerity to embark on this course?

The reasons are diverse. Firstly, with the world facing unprecedented stress on the natural environment, when species are becoming extinct at rates rivalling the major extinction events in geological history, there is an urgent need to record what we know of the plants of the planet in a uniform, comprehensive, yet concise way. Several hundred years of experimenting with ways of cataloguing and providing guides to plant taxa have led to the evolution of the Flora, and this genre offers the best solution to providing an easy-to-use account of the kind needed.

Secondly, at the present time there are probably more regional, national and continental scale Floras being written than at any other time in history. It is true that there are major gaps in knowledge and geographical coverage between them, and that all are written to different criteria. However, some reasonably up-to-date knowledge is currently available for a large part of the world's flora, and filling the gaps is not as daunting a task as it would have been even 20 years ago.

Thirdly, electronic means of communication have reduced the time needed to transport text and illustrations across the world from days or weeks to seconds. Electronic means of storing and manipulating text have greatly simplified editing and publishing. Therefore, bringing together and publishing a major serial work is much quicker and much less labour-intensive than ever before.

Finally, there is a demonstrated will from botanical taxonomists from around the world to make such a Flora a reality, and if this can be sustained and augmented, then the project certainly looks possible.

All of those involved intend that the *Species Plantarum — Flora of the World* will be carried through to completion, although this will clearly take many years. However, in a project such as this, benefits accrue almost from the beginning. Families or other large groups published will have uniform world-wide descriptions and keys available. Taxonomists will be encouraged to raise their sights from regional or national revisions to global ones, either alone or in cooperation with others. Finally, and perhaps most importantly, taxonomy will be seen to be relevant, indeed crucial, to other international efforts in biological diversity conservation, including those flowing from the Convention on Biological Diversity.

As our task begins, *Species Plantarum* is a largely voluntary project. It is hoped that with the appearance of the first few parts it will attract additional support from the world's taxonomists. Offers to provide manuscripts are particularly solicited. Assistance (financial or in kind) with the task of editing, refereeing and publishing the work will also be needed.

A brief history of the Species Plantarum Project

Initial informal discussions took place in 1990–1991 between a number of institutions with a view to producing a Flora of the World. At a meeting of interested parties in Kew in November 1991, the idea of a formal Flora-writing project was put to one side, while the idea of producing a Global Plant Checklist was pursued. This checklist/database project led to the formation of the International Organization for Plant Information (IOPI), which is preparing this Checklist as the taxonomic 'skeleton' to which other data can be attached. This may include systematic, biological, ecological, geographical and molecular data.

In August 1993 the concept of writing and publishing a World Flora was revived, and a letter to interested parties was circulated by Dr R.K. (Dick) Brummitt, with the support of Prof. Ghillean Prance (Kew). Dr Brummitt prepared trial treatments of five small families to show what might be achieved. A Steering Committee for the Species Plantarum Project (SPP) was established, and an informal public meeting was convened during the International Botanical Congress in Tokyo in September 1993. At that meeting strong international support was received from the botanical community, and the organisation of SPP was formalised.

Over the next two years considerable progress was made on developing the concept and content of the proposed Flora. This was carried out by correspondence between members of the Steering Committee, under the secretarial direction of Dr Brummitt. The first formal meeting of 21 members of the Steering Committee of SPP was in Madrid in September 1995, where fine details of the Flora project were hammered out, and a number of working groups were established to deal with key tasks:

Guide for Contributors,

Glossary,

Editorial Standards,

Priorities and Contributors

Information Systems

It was agreed that the default style of the World Flora would be that of *Flora of Australia*, but departures in some details were endorsed. Subsequently, SPP was included under the umbrella of IOPI, as a separate initiative to the Checklist, but closely linked to it.

Offers to publish the series were received from the Australian Biological Resources Study (ABRS: editors and publishers of *Flora of Australia*), and from the International Association for Plant Taxonomy (IAPT). A decision on a publisher was deferred by the meeting.

Following the Madrid meeting two drafts of a *Guide for Contributors* were produced by the Guide for Contributors working group (Convenor: Dr A.E. (Tony) Orchard). At least one consortium was convened to begin writing of major contributions to the Flora (Juncaceae).

A second meeting of the Species Plantarum Steering Committee was convened in San Francisco in June 1997. Twenty two members of the Steering Committee of Species Plantarum Project met in the California Academy of Sciences building in San Francisco on 6–8 June, 1997, under the chairmanship of Dr John McNeill and Dr Nancy Morin. Major items discussed included the following:

- It was agreed that the title of the work would be *Species Plantarum*, with the subtitle *Flora of the World*.
- Final details of the *Guide for Contributors* were discussed and agreed.
- It was agreed that the *Glossary of Terms* prepared for the *Flora of Australia* would be adopted for *Species Plantarum*.
- It was agreed that the book by S.Hollis & R.K.Brummitt, *World Geographical Scheme for Recording Plant Distributions*, (1992), would be adopted as the standard for describing and mapping distributional data.

- It was agreed that the project would develop both a traditional printed Flora and an electronic database simultaneously.

- At least one major family treatment (Juncaceae; c. 10 genera, 325 species) was noted as being in preparation for *Species Plantarum* by a consortium of international botanists, and the Steering Committee identified a number of others which could be developed quickly.

- Two draft family treatments, Irvingiaceae (David Harris) and Morinaceae (M.J & J.F.M.Cannon) were tabled. It was agreed that these provided excellent models for the printed Flora, should be published as soon as possible, and be widely distributed.

- The Australian Biological Resources Study (Environment Australia, Canberra) was invited to act as editing coordinator and publisher of the printed version of *Species Plantarum*. Format was to follow, in general, *Flora of Australia,* with minor modifications as agreed. Publication would be in self-contained fascicles, each covering a family, subfamily or other large contiguous group (e.g. a large genus or group of related genera).

- It was agreed that the vehicle for electronic publication should be the Global Plant Checklist of the International Organisation for Plant Information (IOPI). In the first instance information on names, bibliographic information, type information, and distributional information will be passed from the printed version of the Flora to the compilers of the IOPI Checklist project. Descriptive information and miscellaneous notes, which present major difficulties in development of a protocol and format, will not be databased initially, but may be added later.

- It was agreed that *Species Plantarum* had to be an international project not just in name, but in its writing and publication as well. It provides an ideal vehicle for capacity-building in taxonomy, and every effort should be made to involve young taxonomists, particularly from developing countries, in all aspects of the project.

The way forward

This introduction contains materials necessary to guide potential contributors in the preparation of *Species Plantarum* treatments, and to provide general information for users. It consists of a Guide for Contributors, Glossary, a list of Abbreviations and Contractions, explanation of the 'Country' abbreviations used to describe distribution, and maps showing the extent and location of those 'Countries'. As some of these instructions may change over time, they will also be available in regularly updated form on the World Wide Web, via the ABRS homepage (currently http://www.anbg.gov.au/abrs/), and the IOPI homepage (currently http://life.csu.edu.au/iopi/iopihome.html).

The *Guide for Contributors* will be translated into a number of other languages for ease of use, although the language of *Species Plantarum* will be English.

The Priorities and Contributors Subcommittee of *Species Plantarum* will be primarily responsible for recruitment and coordination of authors of particular groups, but volunteers are invited to contact any member of the Steering Committee with offers to contribute. It is intended that parts will be published in the order completed, and will each contain a family, subfamily or other group of related taxa. With the exception of small families, it is intended that individual parts will contain a minimum of 50 to 100 species.

Contributions will provide descriptions of taxa from family to infra-specific ranks, synonymy, classification, keys for identification at all intermediate levels, illustrations, maps, and brief discussions of biology, biogeography and variability. All validly published names will be accounted for either as accepted names, synonyms or names of uncertain application, and bibliographic details and typification for each name will be provided.

GUIDE FOR CONTRIBUTORS

CONTENTS

INTRODUCTION

This *Guide* is based on that of *Flora of Australia*, and the examples are mainly taken from that work, modified where necessary. They are intended to illustrate content, style and format only, and should not be taken to be completely accurate in a world sense (they were originally written for a continental *Flora* only). Other examples are completely fictitious. In cases where particular points are not fully covered by this *Guide*, then conventions used in recent volumes of the *Flora of Australia* will provide an acceptable default standard.

Species Plantarum — Flora of the World is intended to be a synthesis of present taxonomic knowledge of the world's flora. Although the treatment of some groups will be based on recent revisionary studies, it is not intended that the *Flora* be a monographic work: that would take much longer to prepare. Rather, the aim is to bring together what is known and in the process solve the more straightforward problems but not linger over difficult ones. For many years there will be new discoveries and new problems, and taxonomists will continue to refine understanding of plant classification.

The *Flora* will be published in parts of various length, as manuscripts become available. Ideally, each of these parts will cover a whole family. For large families, a part may comprise only a subfamily, or in some cases a large genus or group of related genera, but for ease of reference and cataloguing, excessively small contributions are not encouraged. Authors intending to submit only part of a family for this series should first discuss this with the Editorial Committee / Executive Editor, so that attempts can be made to find other authors prepared to provide complementary accounts to complete major groups.

The *Flora* is intended for use by professional botanists and any persons requiring information on the names, characteristics, distribution and habitat of the world's vascular plants. It should be understandable to anyone with a basic knowledge of plant structures. While technical terms must often be used they should be restricted as much as possible to those in common use. Complex and rare terms should be avoided.

The *Guide* takes the reader through the preparation of a *Flora* account using examples from published volumes of *Flora of Australia*, modified where necessary. It describes the sequence of the text and explains points of format and style.

Aspects that recur in dealing with family, genus and species are discussed when they first arise and are then cross-referenced when mentioned later. An index is provided for locating particular points.

Contributors to the *Flora* are asked to take particular care not to exceed the recommended maximum length of descriptions. Longer descriptions will have to be edited down, and it will save time for the contributor and editorial staff if these are avoided from the start. It must be kept in mind that the principal aims of a Flora are to enable the reader to identify specimens and to give a concise, accurate account of the plants of a region.

Contributors, especially those preparing large treatments, are strongly urged to submit a sample of several descriptions at an early stage. The editorial staff will check and return these promptly.

Presentation of manuscripts

It is preferred that manuscripts be submitted on disc in electronic form, accompanied by hard copy. Discs readable directly by an IBM-compatible computer, using most major word processing packages (Microsoft Word, Word for Windows, WordPerfect, Microsoft Works, WordStar, etc.) are acceptable. When submitted in this form it is helpful if the text has basic formatting applied (bold, italic, centring), although unformatted text files are also acceptable. While Macintosh files can be converted, we prefer DOS-based manuscripts.

If contributors do not have access to computers, or are unable to send electronic copies of their manuscripts, then typewritten or printed copies of manuscripts can be accepted. All manuscripts must be typed on one side of A4 (30 cm × 21 cm) bond paper (quarto and US

Letter are acceptable substitutes), leaving a 2.5 cm (1 inch) margin on all sides. The text should be double-spaced with no underlining and should be left-justified only.

Manuscripts submitted only as hard copy will be machine-read using an optical character reader and must be prepared using a letter-quality printer or typewriter using Courier 12 point type, although other clear fonts may be readable. Before using an alternative type face please contact the Executive Editor. Dot matrix printers do not produce machine-readable text and should not be used for *Flora* manuscripts. Late amendments by hand to a manuscript should be added in red.

Manuscripts should be sent to the Executive Editor, Flora of Australia, Australian Biological Resources Study, G.P.O. Box 636, Canberra, Australian Capital Territory 2601 (phone 02 62509442 in Australia, international +61 2 62509442; fax +61 2 62509448; Email tony.orchard@ea.gov.au).

This Guide and other information regarding the Species Plantarum Project will be maintained on the World Wide Web site of the Australian Biological Resources Study, currently http://www.anbg.gov.au/abrs/flora/spplant/spplant

Geographical coverage

The *Flora* covers the entire world. This is subdivided into 'botanical countries' using the scheme of S.Hollis & R.K.Brummitt, *World Geographical Scheme for Recording Plant Distributions* (Hunt Institute for Botanical Documentation, Pittsburgh, 1992). Only Levels 2 and 3 of this scheme are used.

FAMILY TREATMENT

The treatment of each family begins with the family name as a heading but without the author of the name. It should be the name used for the family in R.K.Brummitt (ed.), *Vascular Plant Families and Genera* (Royal Botanic Gardens, Kew, 1992). Authors who believe that they have good reason to depart from this system should first discuss this with the Executive Editor.

Authorship

The name of the contributor follows the family name and is given in the form in which the contributor wishes it published, e.g. with initials or given name(s). If there is more than one contributor, they are all cited under the family name unless the number is large. When several contributors prepare a manuscript jointly they must decide the sequence and form their names should take. When contributors are individually responsible for parts of the account such as particular genera then their names are cited under the relevant genera, as for example in Droseraceae, *Fl. Australia* 8: 9, 64 (1982).

Synonymy and typification

Immediately beneath the Family heading and author(s), the Family is repeated, with author(s) and place of publication. On the next line the Type genus, with author, is cited. Major synonyms at family level, with typification, may follow as separate paragraphs.

Description

The family description occupies a paragraph following the synonymy and typification. It should contain no more than 150 words. The description should cover all of the characters needed to understand the generic descriptions.

If a family or character has one or several attributes that are common and others that are rare it is often worthwhile to say so, for example, 'Leaves alternate or rarely almost opposite'.

There may be genera of flowering plants which, in the opinion of the contributor, are clearly misplaced in the Brummitt system. These may, with the approval of the Executive Editor, be treated in a more appropriate family in the *Flora*. They should also be mentioned in the family in which they were placed by Brummitt in the form of a generic heading followed by a note on the placement in the *Flora*.

The format for a family treatment may be seen in the following example.

THYMELAEACEAE

B.L.Rye
Kelleria by *M.J.Heads*

Thymelaeaceae Juss., *Gen. Pl*. 76 (1789)

Type: *Thymelaea* Mill.

Annual herbs to trees, usually shrubs, commonly with stringy bark, often with simple hairs. Leaves simple, entire, usually reticulate-veined; stipules absent or vestigial. Inflorescence commonly racemose or spicate to capitate. Flowers actinomorphic or rarely slightly zygomorphic, usually with a well-developed corolla-like hypanthium. Calyx of 4 or 5 or sometimes 3 or 6 sepals or lobes or rarely erose, arising at summit of hypanthium or sometimes basal. Corolla lobes (when present) as many as or more than sepals, often scale-like, inserted at throat of hypanthium or sometimes free from other floral whorls. Nectary disc or glands often present around base of ovary. Stamens 1–80, usually 2–10, inserted on hypanthium or sometimes free, often in 2 whorls; anther locules 2, parallel, longitudinally dehiscent. Ovary free, superior, 2–12-carpellate, 1–12-locular; ovules 1 per carpel, pendulous; style simple. Fruit indehiscent or sometimes a loculicidal capsule. Embryo oily, straight. [146 words]

An almost worldwide family of 55–60 genera and over 500 species, concentrated in tropical and southern Africa and from SE Asia to Australia. Many genera contain toxic species. In Australia 13 species in the genera *Pimelea* and *Wikstroemia* have been reported to cause stock poisoning (S.L.Everist, *Poison. Pl. Australia* 691–710, 1981). Some species, particularly of *Daphne* and *Pimelea*, are cultivated as ornamental shrubs. The bark of many genera has been used locally for varied purposes including paper manufacture and, in Australia, string.

The interpretation of floral structure adopted here follows L.Bunniger, *Beitr. Biol. Pflanzen* 48: 79–156 (1972), who concluded that the hypanthium in subfam. Thymelaeoideae consists of outer axial tissue and inner tissue derived from the corolla and androecium. According to this interpretation, the calyx originates from axial tissue at the summit of the hypanthium and appears to be a continuation of the tube. The proximal part of the hypanthium, which encloses the ovary and is commonly fusiform, is referred to here as the ovary-portion, and the usually narrower distal portion enclosing part or rarely all of the style as the style-portion.

G.Bentham, Thymeleae, *Fl. Austral*. 6: 1–39 (1873); E.Gilg, Thymelaeaceae, in A.Engler & K.Prantl, *Nat. Pflanzenfam*. 3(6a): 216–245 (1895); W.Domke, Untersuchungen über die systematische und geographische Gliederung der Thymelaeaceen nebst einer Neubeschreibung unter Gattungen, *Biblioth. Bot.* 111: 1–151 (1934); K.Heinig, Studies in the floral morphology of the Thymelaeaceae, *Amer. J. Bot*. 38: 113–132 (1951); Ding Hou, Thymelaeaceae, *Fl. Males*. ser. I, 6: 1–48 (1960); L.Bunniger, Untersuchungen über die morphologishe Natur des Hypanthiums bei Myrtales- und Thymelaeales-Familien II. Myrtaceae. III. Vergleich mit den Thymelaeaceae, *Beitr. Biol. Pflanzen* 48: 79–156 (1972).

Amended from Fl. Australia 18: 122 (1990)

Word count

When checking the length of descriptions for the *Flora*, the following count as single words: *(1)* a whole word of any length, e.g. a, actinomorphic; *(2)* each part of a hyphenated word that can also stand alone, e.g. blue-green, linear-lanceolate; *(3)* a hyphenated word with a qualifying prefix or number, e.g. non-glandular, sub-terete, 3-flowered; *(4)* a whole number standing alone, or two numbers separated by 'or', e.g. 10, 1 or 2; *(5)* a measurement including the unit, e.g. 10 m, 7–12 mm; *(6)* a fraction expressed in words, e.g. three-quarters; *(7)* an abbreviation standing alone, e.g. T.S., diam.

The abbreviations c. (*circa*, about) and ± (more or less) are considered part of the word they qualify and do not count as extra words. Note that chromosome numbers are excluded from the count.

In this *Guide*, the word count is added after each description for illustrative purposes only, and does not have to be added to contributions.

Sequence of organs in descriptions

Throughout the *Flora* the organs of families and all other taxa are arranged in a fixed sequence. This facilitates the comparison of descriptions.

The sequence for flowering plants is as follows. The sequence for other major groups will be provided on request, or can be deduced from *Flora of Australia* volume 48.

Habit; sexuality; include underground parts if relevant
Indumentum if it can be described easily for the whole plant
Stems; branches
Bark
Leaves, presence or absence of stipules; petiole; lamina
Inflorescence; form, position; bracts; bracteoles
Flowers; form, sex
Receptacle
Calyx
Corolla
Disc
Androecium
Gynoecium
Fruit
Seeds

Not all of these organs will be needed in every description. A diagnosis of a tribe, for example, may require the description of only one or two characters.

Indumentum should be included as indicated in this sequence only if it can be described easily for the whole plant, e.g. 'tomentose in all parts' or 'glabrous except hirsute calyx'. In other cases the description of indumentum should be organ by organ, where appropriate. Usage of terms for indumentum as defined in H.J.Hewson, *Plant Indumentum: A Handbook of Terminology*. Australian Flora & Fauna Series No. 9 (1988) is encouraged.

Details of attributes such as size, margins of leaves and petals, colour and texture, are usually omitted from descriptions of families.

In some cases it will be more appropriate to combine the sentences for the inflorescence and flowers, as for example when the flowers are solitary and axillary. When unisexual flowers are described separately the male is described before the female, and the organs are combined into one sentence for each sex, e.g. 'Male flowers: sepals 3–9, free or connate; petals 8 or absent; stamens 3–9, opposite sepals; ovary vestigial. Female flowers: .....'.

In general, if an organ has more than one of the parts being described use the plural, otherwise use the singular; for example, petals of a flower but lamina of a petal.

Each principal organ (e.g. leaves, stamens) begins a new sentence and its attributes are separated by commas. Secondary organs (e.g. lamina, anthers) are preceded by a semi-colon and the attributes again are separated by commas. For example in the description of the leaf in Thymelaeaceae: attributes of the whole leaf are given first, separated by commas and ending with a semi-colon; a part of the leaf, the stipule, is then described in a new phrase. For each organ the noun is given first in the phrase, followed by the qualifying or descriptive adjectives. Thus, 'Petals 5, linear...' rather than 'Five petals, linear...'. It is most important that ambiguity be avoided. Make sure that the adjectives refer to the correct noun. See also the description of the ovary in Thymelaeaceae.

Seedlings are not described unless they show important diagnostic features, but characters of the seed, such as endosperm, are often included.

Reference to particular genera may be made in the family description (an example would be an atypical genus only tentatively placed in the family), but usually there is not space for this.

Terminology

Bearing in mind the readership of the *Flora*, the use of technical terms should be kept to a minimum. If a term must be used which is not in the Glossary it should be defined in a supplementary glossary in the relevant volume. Consider whether the term will be used often enough to justify its inclusion in a glossary. If needed for only one or two taxa it may be preferable to explain it in the description.

Additional information

Following the description there is a paragraph of general information on the family. It should include the number of genera and species and distribution worldwide. If the family contains plants of major economic importance they may be mentioned here.

It may be necessary to discuss the concept of the family as treated by Brummitt and therefore as used in the *Flora*, and this should be done if the concept differs from other widely-used concepts. Alternative family names or spellings may be mentioned here.

A pantropical family of about 20 genera and 450 species. Opinions vary as to the included genera and suprageneric classification. Lecythidaceae *s. str.* is confined to tropical America. Australian material has usually been placed in the family Barringtoniaceae, characterised as follows: stipules absent; flowers mostly in racemes, axillary or terminal; stamens incurved or inflexed in bud, sometimes without anthers; filaments shortly united at base or sometimes free.

Amended from Fl. Australia 8: 1 (1982)

If considered necessary there may be a further paragraph in which aspects such as morphology, evolution and other information of general interest to flora-users are discussed. Those seeking more detailed information will usually go to specialised references. Thus information presented here should be concise, review-type discussion, with references to more detailed or source material.

The last item under the family treatment is a bibliography of selected important works on the family. It may also include non-taxonomic works: for example, in the Solanaceae, *Fl. Australia* 29: 2 (1982) those by Everist (1974) and Peterson (1979) on poisonous plants and Aboriginal use of the family, respectively. The references are arranged in chronological order. Authors' names are not abbreviated in this bibliography; titles of articles are included.

Bibliographic citation

A bibliographic citation is given for each botanical name, illustration and other reference mentioned in the *Flora*. The sequence to be followed is author, title, volume, page, date. Most titles are abbreviated according to standard formats.

Book titles follow F.A.Stafleu & R.S.Cowan, *Taxonomic Literature*, 2nd edn (Bohn, Scheltema & Holkema, Utrecht, 1976–1988), and Supplements by F.A.Stafleu & E.A.Mennega (1992–), except that upper case initial letters are used for proper names and significant words.

Journal titles follow G.H.M.Lawrence *et al.*, *Botanico – Periodicum – Huntianum* (Hunt Botanical Library, 1968), and its supplement, G.D.R.Bridson & E.R.Smith, *Botanico – Periodicum – Huntianum / Supplementum* (Hunt Institute for Botanical Documentation, Pittsburgh, 1991).

The title of any work not listed in these references should be given in full, and the Editor will abbreviate it if appropriate. Capitals, diacritical marks, etc. should be included exactly as in the published work.

The abbreviations *op. cit*. and *loc. cit*. are not used. All references are spelled out each time they are used. In bibliographic citations of major literature, e.g. at the end of a family or genus description, the titles of chapters or individual papers are given. In bibliographic citations associated with individual taxon names, or those for map or illustration references, only book titles or journal titles are cited (both abbreviated).

Citation of authors of botanical names

Whenever a botanical name is given with its author, the form of citation of the author follows R.K.Brummitt & C.E.Powell (eds), *Authors of Plant Names* (Royal Botanic Gardens, Kew, 1992). For citation of authors not included in this work the Executive Editor of the *Flora* should be consulted.

Infrafamilial classification

The inclusion of an infrafamilial classification is optional but is encouraged if it is relevant. Such a classification is usually adapted from a published source, and this should be acknowledged with the appropriate reference.

Any infrafamilial taxa included should be keyed out before the genera. Such a key is titled, as in the Solanaceae (shown below). It need not use easily-recognised characters (unless intended for use in identifying specimens) since the differences between taxa may be in characters such as pollen or seed structure. If the key is taken from another source it must be modified if necessary to agree with the format and terminology of the *Flora*; the source should be acknowledged.

Format of keys

All keys in the *Flora* are indented, dichotomous keys. The key couplets are numbered, the first number of a couplet having no punctuation and the second a colon. Keys consisting of only a single couplet have no numbering. The shorter of two associated groups of couplets is placed first. If possible, taxa should key out in an order approximating their order in the text, although in many cases this will not be practicable. Authors of plant names are not included in any key. The over-riding principle in key construction is that they must be user-friendly, utilising the most easily observed and useful characters, even if this means sacrificing their synoptic value. Geographic criteria alone should not be used in keys, but sometimes may be usefully cited as confirmatory (subsidiary) data.

KEY TO SUBFAMILIES AND TRIBES

Key adapted from A.T.Hunziker *in* J.G.Hawkes *et al., Linn. Soc. Symp. Ser.* 7: 49–51 (1979)

1	Seeds prismatic, reniform or subglobose, or of a different form but never discoidal-compressed	subfam. 1. **CESTROIDEAE**
2	Pedicels articulated; corolla actinomorphic; shrubs or trees (*Cestrum*)	trib. 2. **CESTREAE**
2:	Pedicels not articulated; corolla actinomorphic or zygomorphic; herbs or shrubs	
3	Aestivation volutive; corolla regular, 5-lobed, streaked; shrubs (*Anthocercis, Anthotroche, Crenidium, Cyphanthera, Duboisia, Grammosolen, Symonanthus*)	trib. 1. **ANTHOCERCIDEAE**
3:	Aestivation contorted-conduplicate, imbricate-conduplicate, imbricate or cochlear; corolla actinomorphic or sub-zygomorphic, herbs, rarely shrubs	
4	Stamens 5, 1 usually inserted at a different level (in Australian species); corolla actinomorphic or slightly zygomorphic; herbs, rarely shrubs (*Nicotiana, Nierembergia, Petunia*)	trib. 3. **NICOTIANEAE**
4:	Stamens 4, usually didynamous; corolla zygomorphic; herbs (*Browallia*)	trib. 4. **SALPIGLOSSIDEAE**
1:	Seeds discoidal or ±reniform, flat, compressed	subfam. 2. **SOLANOIDEAE**
5	Aestivation valvate, induplicate, plicate or conduplicate (i.e., corolla lobes never overlapping)	
6	Filaments inserted generally near centre of anthers on dorsal face; climber (*Salpichroa*)	trib. 6. **JABOROSEAE**
6:	Filaments inserted at or near base of anthers; herbs or shrubs	
7	Aestivation conduplicate-contorted (*Datura*)	trib. 9. **DATUREAE**
7:	Aestivation valvate, induplicate or plicate, never conduplicate-contorted (*Capsicum, Cyphomandra, Lycianthes, Lycopersicon, Physalis, Solanum, Withania*)	trib. 7. **SOLANEAE**

[continues]

Amended from Fl. Australia 29: 2 (1982)

Treatment of infrafamilial taxa

For each infrafamilial taxon there is a centred heading followed by a line repeating the name and giving the author and the reference to the place of original publication. The nomenclatural type is also given. The subfamily Cestroideae and tribe Anthocercideae provide examples.

Synonyms

Synonyms for infrafamilial names are included, within reason, with each beginning a new line. Where the numbers of synonyms are excessive, only the more important and better known are listed. A full list may be prepared for inclusion in the IOPI Checklist. If in doubt consult the Executive Editor.

Subfam. 1. CESTROIDEAE

Solanaceae subfam. *Cestroideae* Reiche, *Fl. Chile* 5: 310 (1910), as *Cestreas*.

Type: *Cestrum* L.

Seeds prismatic, reniform or subglobose or otherwise, but not discoidal and compressed; embryo straight, or bent (not strongly curved) and then with incumbent or oblique cotyledons; endosperm copious. [28 words]

Contains the tribes Anthocercideae, Cestreae, Nictotianeae and Salpiglossideae.

Trib. 1. ANTHOCERCIDEAE

Solanaceae trib. *Anthocercideae* G.Don, *Gen. Hist.* 4: 479 (1837), as Anthocerceae.

Type: *Anthocercis* Labill.

Duboiseae Miers. *Ann. Mag. Nat. Hist*. ser. 2, 3: 165 (1849). T: *Duboisia* R.Br.

Woody shrubs. Calyx scarcely enlarged in fruit. Corolla regular or nearly so, 5-lobed, the tube shortly funnel-shaped and striated; aestivation volutive; margins of each lobe inrolled, one overlapping the other. Stamens 5, or 4 with a staminode, inserted near base of corolla tube; anthers with extrorse dehiscence. Fruit a berry or capsule. Seeds sub-reniform with reticulate testa; embryo slightly curved. [62 words]

Seven genera, all species endemic in Australia except *Duboisia myoporoides* R.Br. which extends to New Caledonia.

Amended from Fl. Australia 29: 5 (1982)

Infrafamilial description

A brief description is included for each infrafamilial taxon that is formally treated. It should not repeat characters constant for the family but should cover those that distinguish the taxon from others of the same rank. The description of the Cestroideae (above) for example, covers only the seeds.

A short paragraph after the description lists the names or number of subordinate taxa included.

Monogeneric families

A variation from the standard format may be used for monogeneric families. An example is the treatment of Corynocarpaceae. The content of the family, including the number of species, is given in the paragraph after the family description. The generic treatment is reduced to a heading (see below), the original reference, synonyms if appropriate (none in this case) and the type. There is no generic description.

CORYNOCARPACEAE

G.P.Guymer

Trees or shrubs, bisexual. Leaves alternate, sometimes in pseudowhorls, simple, entire or occasionally spinose in juveniles, glabrous, coriaceous, petiolate, exstipulate; terminal shoots with caducous cataphylls leaving a crescent-shaped scar just above leaf scar. Inflorescence terminal, paniculate; ultimate branches simple cymes. Flowers actinomorphic,

hypogynous, pedicellate, bracteate. Sepals and petals 5, free, imbricate. Stamens 5, opposite petals and adnate to them at base; anthers dorsifixed, bilocular, introrse by longitudinal slits; staminodes 5, alternate with stamens, petaloid, each with a basal depressed-globular nectary. Ovary superior, 1-locular; ovule 1 on apical placenta, anatropous; styles 1 or 2; stigma capitate. Fruit a drupe. Seeds without endosperm; embryo straight. [103 words]

A single genus *Corynocarpus* with c. 6 species, native to eastern Australia, New Guinea, New Caledonia, New Zealand and Vanuatu.

W.B.Hemsley, On the genus *Corynocarpus* Forst., with descriptions of two new species, *Ann. Bot.* 17: 743–760, t. 36 (1903); C.G.G.J.van Steenis, Corynocarpaceae, *Fl. Males.* ser. I, 4: 262–264 (1951); J.Krause, Corynocarpaceae, *Nat. Pflanzenfam.* 2nd edn, 20b: 22–35 (1960); D.B.Foreman, Corynocarpaceae, *Handb. Fl. Papua New Guinea* 1: 111–113 (1978).

CORYNOCARPUS

Corynocarpus J.R.Forst. & G.Forst., *Char. Gen. Pl.* 31, t. 16 (1776).

Type: *C. laevigatus* J.R.Forst. & G.Forst.

Leaves not aristate, juveniles with entire margins; petals shortly spathulate, entire; staminodes irregularly lobed **1. C. cribbianus**

Leaves aristate, juveniles with spinose margins; petals oblong-spathulate, minutely fimbriate at apex; staminodes denticulate **2. C. rupestris**

(partial key only)

Amended from Fl. Australia 22: 214 (1984)

Key to genera

Next follows the key to genera which is titled as such. Where infrafamilial taxa are recognised and described, genera in each may be keyed separately. Where no infrafamilial ranks are used, or where it is more convenient to do so, the key to genera may follow directly after the family treatment. The key to genera is intended primarily as an aid in identification and therefore should be as simple as possible. In the Solanaceae (*Fl. Australia* 29: 3–5, 1982), note that many of the leads are of only one or two lines of text. It is quite acceptable for variable taxa to be keyed out in more than one place, as for example *Nicotiana* in this key.

In constructing the key the most important consideration is workability. It should be tested with as many species as possible, in particular to ensure that the user does not finish up at a dead end or have to choose for or against a character that has already been chosen against. As far as possible, especially in large keys, the early couplets should be used to divide the major parts of a key into more or less equal-sized groups of taxa. This prevents a key becoming indented too far to the right.

Sometimes it will be valuable to have more than one key to genera, as for example if the included species are dioecious. The Cucurbitaceae are such a case, with separate keys based on male and female plants.

KEY TO GENERA BASED ON MALE FLOWERS

1 Male flowers in panicles, rarely racemes; stamens 5, free, inserted on disc **1. NEOALSOMITRA**

1: Male flowers not in panicles (rarely in dichotomous racemes appearing paniculate); stamens 3, free, coherent or fused, not inserted on disc

2	Corolla fringed with hair-like outgrowths	**16. TRICHOSANTHES**
2:	Corolla not fringed	
3	Male flowers solitary, sometimes co-axillary with females	
4	Flower-scape bearing sessile bract; corolla with 1–3 scales at base inside	**2. MOMORDICA**
4:	Flower-scape lacking bract; corolla lacking basal scales	
5	Corolla yellow	
6	Anther locules straight or slightly curved; corolla less than 15 mm diam.	**12. MUKIA**

[continues]

Amended from Fl. Australia 8: 160 (1982)

KEY TO GENERA BASED ON FEMALE FLOWERS AND FRUIT

1	Female flowers in panicles, rarely in racemes or solitary (then associated with a male panicle); styles 3; fruit a truncate capsule; seeds winged	**1. NEOALSOMITRA**
1:	Female flowers not in panicles; style 1; fruit various (if capsular then operculate or fleshy); seeds not winged	
2	Female flowers solitary, sometimes co-axillary with males	
3	Corolla fringed with hair-like outgrowths	**16. TRICHOSANTHES**
3:	Corolla not fringed, ±entire	
4	Tendrils absent	**9. ECBALLIUM**
4:	Tendrils present	

[continues]

Amended from Fl. Australia 8: 161 (1982)

Numbering of genera

Genera should be numbered in the key in the sequence in which they will appear in the text. This sequence should be determined by the contributor, and should reflect relationships as far as is possible in a linear sequence. Where a family is treated in full in one publication, there is one numbering sequence for all genera throughout the family; do not begin a new sequence in each infrafamilial taxon.

GENERIC TREATMENT

Introduction

The generic treatment begins with the number and name as a heading, without the author for the name. The name is then repeated on a new line together with its author and original reference.

The name and author of the type species is then given on a new line.

Nomenclatural and taxonomic synonyms, if any, are then cited in chronological order. Details of the Type of taxonomic synonyms are given at the end of the relevant paragraph.

Misapplied generic names (if any) are included in square brackets, each in its own paragraph after the nomenclatural and taxonomic synonyms, and should include a fully cited example of the misapplication. Only important misapplications should be included, with trivial or obscure instances omitted.

1. ANTHOCERCIS

Anthocercis Labill., *Nov. Holl. Pl.* 2: 19 (1806)

Type: *A. littorea* Labill.

Shrubs, glabrous, or pubescent with glandular or non-glandular hairs. Leaves alternate or clustered, simple. Inflorescence cyme-, raceme- or panicle-like, terminal and axillary; flowers rarely solitary. Flowers bisexual, slightly zygomorphic, each subtended by a pair of opposite bracts. Calyx campanulate to cupular, 5-lobed. Corolla zygomorphic or almost so, narrowly tubular with spreading limb, white, cream or yellow, with dark striations in tube; limb 5-lobed; lobes volutive in bud. Stamens 4, didynamous or subequal, inserted at base of corolla tube; a staminode sometimes present; anthers bilocular, not cohering, dorsifixed, dehiscing by longitudinal slits. Ovary bilocular; stigma capitate, very shortly bilobed. Fruit a smooth capsule, opening from apex by 2 bifid valves, the lower part enclosed by persistent calyx. Seeds subreniform. $x = 36$; L.Haegi, *Telopea* 2: 176 (1981). [117 words]

A genus of 9 species endemic in southern temperate Australia, with its centre of distribution in the South West Botanical Province of Western Australia. All species contain tropane alkaloids; some have occasionally caused poisoning in children or have been suspected of poisoning stock.

G.Bentham, *Anthocercis* in Scrophulariaceae, *in* A.P.de Candolle, *Prodr.* 10: 191–192 (1846); J.Miers, On the genera of the tribe Duboisieae, *Ann. Mag. Nat. Hist.* ser. 2, 11: 370–375 (1853); G.Bentham, *Anthocercis p.p.* in Scrophularineae, *Fl. Austral.* 4: 474–481 (1868); L.Haegi, Australian genera of the Solanaceae in J.G.Hawkes *et al., Linn. Soc. Symp. ser.* 7: 121–124 (1979); L.Haegi, A conspectus of Solanaceae tribe Anthocercideae, *Telopea* 2: 173–180 (1981).

Amended from Fl. Australia 29: 6 (1982)

3. KORTHALSELLA

Korthalsella Tiegh., *Bull. Soc. Bot. France* 43: 83, 163 (1896).

Type: *K. remyana* Tiegh.

Bifaria Tiegh., *Bull. Soc. Bot. France* 43: 163, 164 (1896). T: *B. rubra* Tiegh.

Pseudixus Hayata, *Bot. Mag.* (*Tokyo*) 29: 31 (1915). T: *P. japonica* (Thunb.) Hayata

Amended from Fl. Australia 22: 140 (1984)

Generic description

The generic description follows next. It should be no more than 100 words long on average (see p. 11, Word count). Organs should be described in the same sequence as in the family description and should cover characters that distinguish the genus from related genera. It should neither repeat attributes that are consistently present in the family nor include data more appropriately placed in specific descriptions, such as dimensions of leaves. Where the family description includes various alternative character states, then the state that applies in each genus should be described. In the Solanaceae, *Fl. Australia* 29: 1–208 (1982), for

example, the family description begins 'Herbs, shrubs or small trees', and the first genus, *Anthocercis*, is characterised in habit by 'Shrubs'. For *Solanum*, all states are included.

For monotypic genera, the generic description should include only those characters by which it is distinguished from other genera in the same family or infrafamilial group. The single species should be described separately, with details of shape, size, colour etc more appropriate at species level.

Content of the genus

In the paragraph after the description the worldwide size and distribution of the genus are stated, as brief free text. Geographical rather than political terms should be used for the distribution, e.g. southern Africa, not South Africa, New Guinea not Papua New Guinea. Notes on the generic concept may be included if relevant, especially where a different concept has been used by other recent authors. Brief mention should be made of species of economic or other importance.

Generic bibliography

The bibliography covers major references to the genus arranged in chronological order. It should be stated if the genus has sometimes been placed in a different family, e.g. *Anthocercis* was placed in Scrophulariaceae (as Scrophularineae) by Bentham. Here, as in the family bibliography, authors' names are not abbreviated and titles of articles are given. Capitals, diacritical marks, etc. should appear as in the original work.

Infrageneric classification

Use of an infrageneric classification is encouraged where it is generally accepted and improves understanding of the genus. If such a classification is used it should follow a format similar to that for an infrafamilial one. There should be a key to the infrageneric taxa, titled as such, as in *Barringtonia, Fl. Australia* 8: 3 (1982). The decision whether to include such a classification is left to the contributor and will usually be determined by its importance, degree of general acceptance and usefulness in identifying and understanding of relationships of included species.

Key to species

The key to species has no heading unless preceded by a key to infrageneric taxa. Otherwise it has the same format as the key to genera. It is acceptable to key out a species more than once, and this is encouraged if it will make the key easier to use. In the *Anthocercis* key, for example, species 8 and 9 are both keyed out twice. Where a large number of species are involved it is sometimes useful to subdivide them first by a key to formal infrageneric taxa or informal 'Groups', and then to provide a key to each group. For examples see *Eucalyptus* (*Fl. Australia* 19: 7–67, 1988) and *Scaevola* (*Fl. Australia* 35: 85–92, 1992).

1	Branchlets spinescent	
2	Branches and leaves conspicuously pubescent	**8. A. anisantha**
2:	Branches and leaves glabrous or sparsely pubescent	
3	Inflorescence usually branched; pedicels pubescent; most leaves at least 3 mm wide	**6. A. intricata**
3:	Inflorescence not branched; pedicels glabrous or sparsely pubescent; most leaves 0.5–2.5 mm wide	
4	Corolla-lobes with tuft of hairs at apex	**7. A. genistoides**
4:	Corolla-lobes glabrous at apex	**8. A. anisantha**

1:	Branchlets not spinescent	
5	Plant glandular-pubescent, rarely almost glabrous	
6	Leaves 10–30 mm wide	**1. A. viscosa**
6:	Leaves 0.5–10 mm wide	
7	Corolla 9–16 mm long, the lobes 4–9 mm long	**2. A. fasciculata**
7:	Corolla 15–28 mm long, the lobes 10–20 mm long	
8	Leaves, pedicels and calyces pubescent with conspicuous glandular hairs; corolla-tube narrowly funnel-shaped	**3. A. angustifolia**
8:	Leaves, pedicels and calyces glabrous or sparsely pubescent with inconspicuous hairs; corolla-tube inflated, slightly constricted at apex	**9. A. gracilis**
5:	Plant glabrous, rarely pubescent, the branches sometimes with prickles	
9	Leaves 1–2 mm wide, few at flowering; flowers in small groups	**9. A. gracilis**
9:	Leaves 4–35 mm wide; branches leafy; inflorescence raceme- or panicle-like	
10	Plant much-branched from base; inflorescence a leafy raceme; corolla-tube not more than one-third of corolla length, the lobes narrow	**4. A. littorea**
10:	Plant with 1 or 2 main stems; inflorescence a pyramidal panicle leafless except at base; corolla-tube one-third to one-half of corolla length, the lobes broad	**5. A. ilicifolia**

Extract from Fl. Australia 29: 6–7 (1982)

The species are numbered in the same order as they appear in the text. As with genera, this order is determined by the writer and, if possible, should bring related species close together. Data used in the key should also be included if possible in the specific descriptions. In large genera it will not be possible to include information from every lead in the key in the descriptions, because of the word limit. In these cases it is useful to ensure that characters from the last few leads are included, as these frequently contain the more diagnostic characters.

Note that the key to species does not include infraspecific taxa. These are keyed out after the description of the species concerned.

TREATMENT OF SPECIES

The number, name and bibliographic reference form a heading for each species. There is no full stop at the end of this heading.

For guidelines on abbreviations of authors, books and journals in bibliographic references, the works cited earlier (p. 13) should be consulted.

Type information

Following the heading, information is given about the Type, starting on a new line. This begins with information on the Type specimen unless there is a basionym, in which case this precedes the specimen information. Synonyms are grouped homotypically, i.e. all names based on a single Type occur together as a discrete paragraph. These paragraphs are arranged

chronologically by basionym date, except that the paragraph containing the basionym of the accepted name (if applicable) always appears first.

For each Type the information should include the locality, country (Level 3, from Hollis & Brummitt, 1992), date, collector's name (including initials) and number. The locality should be given as originally cited; if this differs from the current geographic name then the latter should be given in square brackets after the original name. Where alternative spellings are in use, The Times Atlas of the World is the *Flora* standard for the spelling of place names. If the name of the collector is not known, use the expression 'coll. unknown'. If the locality is not known, use the expression 'locality unknown' or 'precise locality unknown'. The country is included even if not given in the protologue. The original citation should not be given in quotes unless it cannot be expressed in modern terms, as for example a place that no longer retains its original or other name. Distances should be cited as given on the herbarium label; where these are imperial (or other non-metric) measurements, the equivalent metric units should be shown in square brackets, e.g. 17 miles [c. 27 km]. The type locality data should not include information on habitat. The abbreviation *s.n.* (*sine numero*) is added after the collector's name if the collector normally numbered his/her collections but did not do so for a particular collection.

Herbaria where sheets of the type are known to be lodged are then given. The holotype (given as holo:), lectotype (lecto:) or neotype (neo:) is given first, followed by isotypes (iso:), isosyntypes (isosyn:) or syntypes (syn:). Where Types are found in several herbaria these are listed alphabetically. All herbaria are cited by the abbreviations listed in P.K.Holmgren, N.H.Holmgren & L.C.Barnett, *Index Herbariorum* Part 1, 8th edn (New York Botanical Garden, Bronx, 1990) and supplements in *Taxon*. Usually only those sheets seen by the contributor should be cited. When a photograph of a sheet has been seen, the words 'photo seen' are added after the herbarium acronym (see, for example, *Gyrostemon brownii*, *Fl. Australia* 8: 370, 1982). The herbarium where the photo is held may be cited thus 'K *n.v.*; photo MEL'. The herbarium sheet number may be included if necessary to define one of two otherwise similar sheets. If no holotype or isotype sheets have been seen then references to them in published works may be cited, with '*n.v., fide'* followed by a reference to those publications. If a lectotype or neotype has been chosen the authority and reference should be given, again using the term *fide* (according to). In this latter case the use of *fide* indicates the author who has actually chosen the lectotype.

In cases where no type was cited and none has subsequently been nominated this may be stated as 'not designated'. Authors are not expected to lectotypify or neotypify taxa purely for the sake of this *Flora*. These decisions should only be made in the context of a revision: the *Flora* treatment should reflect the *status quo*.

Where a Type specimen is definitely known to have been lost, this may be indicated by e.g. holo: B (destroyed).

Gomphandra australiana F.Muell., *Fragm.* 6: 3 (1867)

Stemonurus australianus (F.Muell.) Kuntze, *Revis. Gen. Pl.* 1: 112 (1891). T: Queensland: Gold Island, 1 Aug. 1865, *J.Dallachy s.n.*; syn: MEL; Queensland: Dalrymples Gap, 26 June 1866, *J.Dallachy s.n.*; syn: MEL; Queensland: Rockingham Bay, *J.Dallachy s.n.*; syn: MEL.

Amended from Fl. Australia 22: 209 (1984)

1. Momordica charantia L., *Sp. Pl.* 2: 1009 (1753)

T: Netherlands: from a plant cultivated at Hartekamp; lecto: BM, *n.v.*, *fide* C.Jeffrey, *Fl. Trop. E. Africa* 31 (1967).

Amended from Fl. Australia 8: 167 (1982)

4. *Lepidium sativum L., *Sp. Pl.* 2: 644 (1753)

T: not designated.

Extract from Fl. Australia 8: 261 (1982)

7. Scaevola enantophylla F.Muell., *Fragm.* 8: 58 (1873)

Based on *Scaevola oppositifolia sensu* F.Mueller, *Fragm.* 6: 225 (1868), *non* Roxb.; *Lobelia enantophylla* (F.Muell.) Kuntze, *Revis. Gen. Pl.* 2: 378 (1891). T: Queensland: Rockingham Bay, *J.Dallachy*; lecto: MEL, *fide* R.C.Carolin, *Fl. Australia* 35: 333 (1992); isolecto: K.

Scaevola scandens F.M.Bailey, *Rep. New Pl.* 2 (1889); *Rep. Exped. Bellenden-Ker* 47 (1889); *S. enantophylla* var. *scandens* (F.M.Bailey) Ewart, *Proc. Roy. Soc. Victoria* ser. 2, 19(2): 45 (1907). T: Queensland: Bellenden Ker at about 3000 ft [914 m], *F.M.Bailey*; holo: BRI.

Amended from Fl. Australia 35: 101 (1992)

3. *Allium triquetrum L., *Sp. Pl.* 1: 300 (1753)

T: illustration in J.Parkinson, *Paradisus* 142, t. 143, fig. 4 (1629); lecto, *fide* R.B.Nordenstam, *Taxon* 27: 371 (1978).

Extract from Fl. Australia 45: 363 (1987)

342. Eucalyptus angulosa Schauer *in* W.C.Walpers, *Repert. Bot. Syst.* 2: 925 (1843)

T: Australia, *coll. unknown*; *n.v.*

Amended from Fl. Australia 19: 305 (1988)

342. Eucalyptus angulosa Schauer *in* W.C.Walpers, *Repert. Bot. Syst.* 2: 925 (1843)

Eucalyptus incrassata var. *angulosa* (Schauer) Benth., *Fl. Austral.* 3: 231 (1867). T: Australia, *coll. unknown*; *n.v.*

Eucalyptus cuspidata Turcz., *Bull. Soc. Imp. Naturalistes Moscou* 22(2): 21 (1849). T: Western Australia: Swan R. Colony, *J.Drummond 4*: *75*; iso: BM, CGE, FI, K, PERTH, W.

Fl. Australia 19: 305 (1988)

341. Eucalyptus incrassata Labill., *Nov. Holl. Pl. Spec.* 2: 12, t. 150 (1806)

T: Australia: south coast, , *J.J.H.de Labillardière s.n.*; holo: FI; iso: BM, G, LINN, MEL.

Eucalyptus costata F.Muell. & Behr ex F.Muell., *Trans. Victorian Inst. Advancem. Sci.* 33 (1855); *E. incrassata* var. *costata* (F.Muell. & Behr ex F.Muell.) N.Burb., *Trans. Roy. Soc. S. Australia* 71: 150 (1947); *E. incrassata* subsp. *costata* (F.Muell. & Behr ex F.Muell.) P.Johnstone & Hallam, *Proc. Roy. Soc. Victoria* 91: 204 (1980). T: South Australia: Murray Desert, 1854, *F.Mueller*; syn: MEL; other syns: *n.v.*

Fl. Australia 19: 303 (1988)

Synonyms

Synonymy for the species is placed after the type citation for the accepted name. All synonyms should be included unless these are very numerous. In such cases only (check with Executive Editor), only a selection of the more important ones are published in the *Flora*, with a full list published in the IOPI Checklist. Where only a selection are published in the *Flora* this should be specifically noted at the end of the synonymy, and reference given to full published synonymys elsewhere if these exist.

Illegitimate names are designated as such with '*nom. illeg.*' after the reference, followed by '*non*' with the author and date if there is an earlier homonym. *Nomina nuda* and invalid names are excluded unless there is a special reason to cite them. A reason for inclusion would be if they have been accepted in prominent publications.

Taxonomic synonyms are arranged in chronological order of their publication. Each begins a new paragraph which includes its nomenclatural synonyms (if any), with the type citation at the end. Where infraspecific taxa are recognised the synonyms are placed under the appropriate subspecies or variety.

24. Amyema miquelii (Lehm. ex Miq.) Tiegh., *Bull. Soc. Bot. France* 41: 507 (1894)

Loranthus miquelii Lehm. ex Miq. in J.G.C.Lehmann, *Pl. Preiss.* 1: 280 (1845); *Dendrophthoe miquelii* (Lehm. ex Miq.) Ettingsh., *Denks. Akad. Wiss. Math.-Nat.* 32: 66 (1872); *Loranthus pendulus* var. *miquelii* (Lehm. ex Miq.) Domin, *Biblioth. Bot.* 89: 55 (1921). T: Western Australia: York, 13 Mar. 1839, *L.Preiss 1617*; *n.v.*

Loranthus aurantiacus A.Cunn. ex Hook. in T.Mitchell, *J. Exped. Trop. Australia* 101 (1848); *Amyema aurantiaca* (A.Cunn. ex Hook.) Tiegh., *Bull. Soc. Bot. France* 41: 507 (1894). T: New South Wales: Lachlan R., 1817, *A.Cunningham 134*; holo: K; iso: BM.

Loranthus miquelii var. *micranthus* F.Muell. ex Miq., *Ned. Kruidk. Arch.* 4: 105 (1856). T: Queensland, Halifax Bay, *F.Mueller*; *n.v.*

Loranthus miquelii var. *minor* Blakely, *Proc. Linn. Soc. New South Wales* 47: 406, t. 45 (1922). T: Western Australia, Coolgardie, 1898, *L.C.Webster*; holo: NSW.

Extract from Fl. Australia 22: 111 (1984)

1. Nesaea crinipes (F.Muell.) Koehne, *Bot. Jahrb. Syst.* 3: 337 (1882)

Ammannia crinipes F.Muell., *Trans. Proc. Phil. Inst. Victoria* 3: 49 (1859); *Koehnea crinipes* (F.Muell.) F.Muell., *Syst. Census Austral. Pl.* 1: 142 (1883), *nom. illeg.* T: Northern Territory: banks of rivers in Arnhem Land, (lower Victoria R.), ?*F.Mueller*; holo: MEL; iso: MEL.

Extract from Fl. Australia 18: 106 (1990)

Misapplied names, if any, are given after the synonymy, each in its own paragraph. They are set in square brackets and include a fully cited example of the misapplication. More than one example may be given if the misapplication occurred in several important works. Misapplications in works of minor importance are not included.

[*Datura metel auct. non* L.: J.M.Black, *Fl. S. Australia* 2nd edn, 4: 755 (1957)]

Extract from Fl. Australia 29: 193 (1982)

Bibliography of illustrations

Following the synonyms there may be a paragraph citing one to three published illustrations of the species. These should be good, representative illustrations in readily available works. Photographs may be cited provided they show detail of the flowers or fruit. Where there are infraspecific taxa the illustrations should be cited under the appropriate taxon. In the citations, authors' names are given in full but the titles of articles are omitted. Both page number and figure number (if present) should be given. If the taxon name in the caption to the illustration differs from the accepted name in the *Flora,* then it is added in the form 'as ....' after the reference.

Brief annotations to the references may be used sparingly where it is necessary, e.g. where illustrations are photographs of herbarium specimens not line drawings.

Illustrations: J.M.Black, *Fl. S. Austral.* 2nd edn 755, fig. 1081, as *D. metel* L.; W.T.Parsons, *Noxious Weeds Victoria*, 256, fig. 238A(3) (1973); B.J.Grieve & W.E.Blackall, *How to Know W. Austral. Wildfl.* 4: 603 (1975).

Extract from Fl. Australia 29: 193 (1982)

Bibliography of maps

Following the paragraph on illustrations, another paragraph in the same format may be added, listing 1 to 3 references to distribution maps of the species.

Species descriptions

Descriptions of species are limited to an average of 100 words, maximum 150 words (see p. 11, Word count). It is strongly recommended that they be kept well within this limit. They should be readily understandable in relation to the generic description. Species descriptions within any one genus or subdivision of a genus should be directly comparable as far as possible. If, for a particular species, an organ described for all other species has not been seen, this should be stated.

Characters common to all species should be covered in the generic description. This is especially useful when there is difficulty in keeping to the 100-word limit.

Species descriptions usually contain a number of measurements. These are always given in metric units, – µm, mm, cm or m. As a rough guide, use cm for sizes over 3 cm, but consideration should be given to the level of precision intended. For example 1–2 cm is less precise than 10–20 mm. It is important to be consistent within descriptions and in particular for individual organs. If nine of ten species in a genus have leaves less than 3 cm long but the other has leaves 9 cm long then use the same unit of measurement (mm in this case) for them all. For long, narrow organs it is acceptable to use different units for length and width, e.g. leaves 2–4 m long, 2–3 cm wide. The form 3–4 cm × 1–2 cm should be avoided in most circumstances, but may be acceptable where there is no ambiguity in deciding which measurement refers to length and which to breadth. An example might be 'Fruit usually 3–5 mm long, 1–2 mm wide (rarely up to 7 × 4 mm)'. If this form of expression is used, then the multiplication sign (×) rather than the letter (x) should be used.

Description of leaves can be particularly complex. The following general order and punctuation should be followed (although not all points will be needed in all taxa): Arrangement, deciduous/nondeciduous; overall shape (compound leaves), overall size (compound leaves), simple/compound type, petiolate/sessile; stipules; petiole shape, petiole size; lamina shape, lamina size, base, margins, tip, midrib, secondary venation, indumentum; leaflet characteristics in same order as lamina. In very simple leaf descriptions, to avoid ambiguity, the lengths of the lamina and petiole should be described separately.

The practice of expressing extreme measurements in brackets may be used in the *Flora* but should be employed sparingly. The convention used is of the form 'petals (5–) 7–9 (–12) mm long', indicating that the normal range is between 7 and 9 mm, with occasional extremes as small as 5 or as long as 12 mm. If the extremes are not significantly outside the normal range consideration should be given to amalgamating them with the normal measurements to eliminate the brackets. Other methods of expressing ranges, such as 'petals 7–9 mm long (rarely only 5 mm)' or 'petals 7–9 mm long, rarely longer' are also acceptable. In some cases a specimen of unusual size may be worth discussing in the notes following the citation of collections.

When one term is used to qualify another the two words may be separated by a hyphen, e.g. sinuate-dentate. If the intention is to express a range from one to the other then the word 'to' should be used, e.g. 'linear to lanceolate'. Expressions of the form '(ob-) lanceolate to (ob-) ovate', meaning 'ranging through lanceolate, ovate, oblanceolate and obovate' should be avoided.

When expressing the number of parts, consecutive numerals should be separated by 'or', not a hyphen, e.g. 'stigmas 2 or 3', not 'stigmas 2–3'.

The details given for each organ will vary between genera and families. The writer should concentrate on those that are characteristic for the group. For example in one genus the form of the anthers may be diagnostic and should be described for each species, while in another it may be the same for all species and may be excluded or covered in the generic description.

Species descriptions are complicated if the plants are monoecious or dioecious, necessitating the description of some characters for each sex separately. The characters common to both sexes should be covered first, followed by separate sentences for the male and female flowers or plants. In these cases the organs that are usually given a sentence each are separated by semi-colons. Examples may be seen in the Gyrostemonaceae and in Casuarinaceae (*Flora of Australia* vol. 8 and 3, respectively).

26. Allocasuarina littoralis (Salisb.) L.Johnson, *J. Adelaide Bot. Gard*. 6: 76 (1982)

Casuarina littoralis Salisb., *Prodr*. 2 (1796). T: [New South Wales], Botany Bay, 1770, *J.Banks & D.Solander*; holo: BM (with cones); iso: NSW, P.

Illustrations: J.H.Maiden, *Forest Fl. New South Wales* 2: 72 (1905); L.Fuller, *Wollongong's Native Trees* 2nd edn, 71 (1982).

Map: K.L.Wilson & L.A.S.Johnson, Casuarinaceae, *Fl. Australia* 3: 186, map 141 (1989).

Usually dioecious tree 5–15 m high or rarely a shrub. Bark fissured. Branchlets ascending or drooping, to 20 (rarely to 35) cm long; articles 4–10 mm long, 0.4–1 mm diam., smooth, pubescent in furrows; phyllichnia angular or rounded with median ridge; teeth 6–8, rarely 5 or 9, erect or rarely spreading, not overlapping, 0.3–0.9 mm long, usually not marcescent. Male spikes 0.5–5 cm long, 6–12.5 whorls per cm; bracteoles persistent; anther 0.4–0.8 mm long. Cones cylindrical, rarely broader than long, pubescent at least when young; peduncle 4–23 mm long; cone body 10–30 (rarely to 45) mm long, 8–21 mm diam.; bracteoles thin, broadly acute to obtuse, with thick pyramidal protuberance shorter than bracteole body, occasionally with 2 lateral bodies. Samara 4–10 mm long, dark brown to black. $2n$ = 22, 44, B.A.Barlow, *Austral. J. Bot*. 6: 38–46 (1958). Figs 20, 54C–D. [113 words]

Amended from Fl. Australia 3: 148 (1989)

It must be remembered that species descriptions consistently longer than 100 words (maximum 150 in individual cases) will not be accepted for publication in the *Flora*.

Chromosome numbers

Chromosome counts based on reliably identified material should be included, and run on from the last line of the description. They should be cited in the form given in the original source together with the reference, e.g. x = 12, B.A.Barlow & D.Wiens, *Taxon* 20: 291 (1971).

Common names

Common names are in general not cited. In the case of plants of major economic importance, the English name may be indicated in the Further Notes paragraph, e.g. under *Solanum tuberosum* the name 'potato' should be indicated in the comments.

Citation of *Species Plantarum* figures

Reference to a figure to be included in *Species Plantarum* goes at the end of the descriptive paragraph as Fig. ***, the number being added later by the Executive Editor. Line drawings and colour plates are all termed Figures, e.g. in *Anthocercis littorea*, Fig. 4 is a colour plate and Fig. 5A, B is a black-and-white illustration (*Fl. Australia* 29: 9, 1982).

Species distribution and habitat

The paragraph after the species description describes the distribution and habitat of the species in a world context. First the distribution is described in free text in terms of specific geographical localities or features, together with the country or countries. This is followed by a coded list of 'botanical countries', as listed in S.Hollis & R.K.Brummitt, *World Geographical Scheme for Recording Plant Distributions* (Hunt Institute for Botanical Documentation, Pittsburgh, 1992). Only the Level 2 and 3 units are used. These should be listed with the 2-digit code indicating continent and region, followed by a colon, and the 3-letter code for each 'country', separated by commas. Where a species occurs in each 'country' of a region, the designation 'All'. may be used. If a taxon is present in a 'country' only as an introduced or naturalised plant, then the 'country' is given in lower case letters. If a taxon was previously present in a 'country' but is now extinct there, the 'country' is given in upper case letters followed by a dagger. Distribution as a cultivated plant is not listed

New South Wales: Between Broken Hill and Orange. 50: NSW.

New South Wales to Queensland: From Bundaberg, Queensland, S to Newcastle, New South Wales, within 50 km of the coast. 50: NSW, QLD.

Native to central South America, but naturalised widely in tropical, subtropical and warm temperate countries worldwide. 10: grb. 11: aut. 12: fra. 26: zim. 27: bot, cpp, les, nat, ofs, swz, tvl. 29: mdg. 38 jap. 42: jaw, mly, phi. 50: nsw, qld, tas, vic. 51: nzn. 63: haw. 76: arl, cal, nev, uta. 77: tex. 78: ala, fla, geo, lou, msi. 83: BOL. 84: BZC. 85: AGE, AGW, CLN, PAR, URU.

Well-known regional names may be used in the free text description, e.g. Cape York Peninsula, Sahara Desert, Rocky Mountains, but not local names such as North Kennedy or South West Slopes. Distribution must be based on herbarium collections. The free text description of distribution should use geographical in preference to political terms, e.g. tropical Africa, SE Asia.

The habitat is then described. It may be given in the same sentence as the distribution, following a semi-colon; or it may be in a separate sentence in the same paragraph. The soil,

vegetation and landform should be described. Dominant species in the vegetation are cited without authors. Altitudinal range, where this can be given succinctly, should be mentioned. Flowering and fruiting times should be included if known, and if they can be given concisely. For those taxa where a wide distribution through different hemispheres or climatic zones precludes description of flowering or fruiting times by month, a description by season may be given.

Grows in red loam in Mulga (*Acacia aneura*) low open woodland on plains. Flowers July–Aug.; fruits Oct.–Nov.

Found at the base of rocky outcrops in alpine herbaceous meadows; occasional in lowland pastures. Flowers mid- to late-summer, fruits late-summer to autumn.

Specimen citation

A selection of specimens is cited in a paragraph after the distributional information. Their principal function is to provide vouchers for the author's taxonomic concept. Choice of specimens is left to the writer. Some criteria to be considered are the degree of variation, geographical distribution, representation of important morphological features, and presence of duplicates in several herbaria. At least one and not more than ten collections may be cited, and should be chosen where possible from a range of herbaria and different parts of the taxon's range. The data cited are locality (with distances in km), collector's name (with initials) and number, and herbaria where lodged (in alphabetical order). Only sheets seen by the contributor should be cited. The date of collection or a herbarium sheet number is cited only when there is no collector's number. When specimens from more than one botanical 'country' are cited, the order of citation should follow that of Hollis & Brummitt (1992), Levels 2 (numerical) and 3 (alphabetical).

50. WESTERN AUSTRALIA: Salmon Gums, *R.D.Royce 4036* (PERTH); Merredin, *M.Koch 2837* (K, NSW); c. 21 km E of Meekatharra, *N.T.Burbidge 4718* (CANB, PERTH); c. 19 km N of Lake Grace, *P.R.Jeffries 641030* (PERTH); Borrikin Rock, *B.H.Smith 122* (MEL, NSW).

Amended from Fl. Australia 35: 288 (1992)

50. NEW SOUTH WALES: Lord Howe Is., beach near War Memorial, *P.S.Smith 1918* (K); **51.** NEW ZEALAND NORTH ISLAND: 16 km west of Keri Keri, *J.M.Brown 123* (AK).

Precise locality data should be omitted when citing collections of rare or endangered taxa.

Further notes

Following the specimen citation it is optional, but strongly encouraged, to include concise notes on such aspects as variation within the species, relationships, distinctive characters, toxic properties, major economic uses, rarity, traditional uses, etc. Other species mentioned here should include the names of their authors unless they are treated elsewhere in the same volume. Special references may be mentioned here, such as a detailed paper on a species. Any economic uses should be briefly mentioned, using the highest level categories in the *Taxonomic Databases Working Group Standard on Economic Botany*. To encourage further collecting of poorly known taxa, it is useful to mention in the discussion if a taxon has been little collected. Rare or endangered species should if possible be flagged, using the categories

in the *IUCN Red List Categories* standard (1994) – Extinct, Extinct in the wild, Critically endangered, Endangered, Vulnerable, Lower risk, as defined in that work.

Infraspecific taxa

The treatment of infraspecific taxa may be seen in *Anthocercis viscosa*. Following the species description the overall distribution of the species is given and a statement of the number of infraspecific taxa. These are then keyed out. When there are only two taxa the couplet is not numbered. The taxa are referred to in the key by the sequential number of the species followed by a, b, etc., and the infraspecific rank and epithet. For each taxon there is a numbered heading with the name in full. Citation of references and synonyms follows the same format as for species treatments. There is a short description or diagnosis which should include at least the characters used in the preceding key. Distribution and specimen citation follow the usual format.

1. Anthocercis viscosa R.Br., *Prodr.* 448 (1810)

T: Western Australia: King George Sound, *R.Brown s.n.*; iso: BM.

Erect, sometimes spreading or straggling viscid shrub to 3 m, pubescent with glandular hairs. Leaves obovate to ovate, almost sessile, 20–60 mm long, usually 10–30 mm wide, minutely serrulate-crenulate. Inflorescence a cyme, 1–3-flowered, pedunculate; pedicels 5–15 mm long. Calyx 3–15 mm long. Corolla 20–48 mm long, white to creamy white, the striations green or purplish; lobes ovate-triangular to linear, 12–25 mm long, sometimes with pale purple streaks. Stamens 4.5–12.5 mm long. Capsule ovoid to ellipsoidal, acute or apiculate, 8–19 mm long. Seeds 1.8–3 mm long. *Sticky Tailflower.* [77 words]

Endemic in Western Australia along the southern coastline westwards from Cape Arid. Always associated with granite outcrops. Suspected of poisoning stock. There are two subspecies.

Corolla lobes 1.5–2.5 times longer than wide and less than 1.5 times as long as corolla tube — **1a.** subsp. **viscosa**

Corolla lobes 3–5 times longer than wide and usually twice as long as corolla tube — **1b.** subsp. **caudata**

1a. Anthocercis viscosa R.Br. subsp. viscosa

A. viscosa var. *baueriana* Benth. *in* A.P.de Candolle, *Prodr.* 10: 191 (1846). T: based on S.L.Endlicher, *Iconogr. Gen. Pl.* t. 68 (1839).

Calyx usually 8–13 mm long. Corolla usually 30–40 mm long; tube about half length of corolla; lobes 7–15 mm wide. Stamens 8–13 mm long. [20 words]

Western Australia: from Bremer Bay to Albany, and near Denmark. 50. WAU. Map 1.
50. WESTERN AUSTRALIA: Albany, *A.M.Ashby 1993* (AD); Two Peoples Bay, *N.T.Burbidge 8140* (AD, CANB); Frenchman Bay, *R.Garraty 43* (PERTH); Bremer Bay area, *L.Haegi 1858* (BRI, CORD, F, MEL, NSW, PERTH).

1b. Anthocercis viscosa subsp. caudata Haegi, *Telopea* 2: 175 (1981)

T: Western Australia: Condingup Peak, c. 62 km ENE of Esperance, 6 Oct. 1976, *L.Haegi 1225*; holo: PERTH; iso: AD, CANB, K, L, MO, NSW.

Calyx 3–6.5 mm long. Corolla 20–30 mm long; tube c. one quarter to one third length of corolla; lobes 3.5–6.5 mm wide. Stamens 4–8 mm long. Fig. 1. [24 words]

Amended from Fl. Australia 29: 7 (1982)

New taxa

Taxa must not be formally described in the *Flora*. They should be published separately beforehand. Unnamed taxa, and taxa referred to only by manuscript names, should not be included.

Hybrids

Hybrids at genus, species or infraspecific level which are well established should be treated in the appropriate place, as if the initial multiplication sign was not present (Example 1). Where hybrids are frequent, but have no formal name, they can be referred to by a hybrid formula. These, and other extensive lists of putative hybrids are best grouped at the end of the genus (Example 2) or (for infraspecific hybrids) at the end of the species. Where hybrids are only occasional, or their existence is suspected but not considered established, then they are best discussed in the 'Further Notes' section at the end of the relevant taxon (Example 3).

Example 1:

4. Sonneratia ×**gulngai** N.C.Duke, *Austrobaileya* 2: 103 (1984) = *S. alba* Sm. × *S. caseolaris* (L.) Engl.

Fl. Australia 18: 89 (1990)

Example 2:

Presumed Hybrids

The following names published in *Eucalyptus* are believed to be hybrids. In most cases the putative parent species are given, with relevant references.

Eucalyptus adjuncta Maiden, *J. Proc. Roy. Soc. New South Wales* 54: 167 (1920)

T: New South Wales: about 3/4of a mile [c. 1 km] from Wyee railway station, near Morrisset, *coll. unknown* [*J.H.Maiden*?]; *n.v.*

Reputed hybrid with *E. longifolia* as one parent, *fide* L.D.Pryor & L.A.S.Johnson, *Classif. Eucalypts* 57 (1971).

Eucalyptus affinis H.Deane & Maiden, *Proc. Linn. Soc. New South Wales* 25: 104, t. v (1900)

T: New South Wales: 'western N.S.W.', *coll. unknown*; *n.v.*

Reputed hybrid between *E. albens* and *E. sideroxylon*, *fide* J.H.Maiden, *Proc. Linn. Soc. New South Wales* 30: 498 (1906).

Amended from Fl. Australia 19: 428 (1988)

Example 3:

Gonocarpus mezianus frequently hybridises with *G. elatus*, the progeny being intermediate in all characters; e.g. SOUTH AUSTRALIA: Ferguson Recreation Park, Stonyfell, *K.Preiss 200, 296* (AD); c. 24 km from Lobethal towards Adelaide, *J.W.Wrigley 7764* (CBG). VICTORIA: Cave of Fertility, Victoria Ra., *H.Streimann 2932* (CBG).

Amended from Fl. Australia 18: 46 (1990)

Doubtful and unplaced names, excluded species etc.

Doubtful and unplaced names and excluded species are treated at the end of the generic or family account.

Excluded species

Barringtonia sphaerocarpa C.A.Gardner, *Forest Dept. Bull.* 32: 69 (1923).

T: Western Australia: near Lawley R., Oct. 1921, *C.A.Gardner 1491*; iso: PERTH.

This is a species of *Cassine* (Celastraceae), probably *C. melanocarpa* (F.Muell.) Kuntze, but not *C. glauca* (Rottb.) Kuntze as suggested by J.Payens, *Blumea* 15: 259 (1968), *fide* P.G.Wilson (PERTH).

Amended from Fl. Australia 8: 6 (1982)

Doubtful and excluded names

Choretrum chrysanthum F.Muell. ex Miq., *Ned. Kruidk. Arch.* 4: 103 (1856).

T: ?South Australia: Wheal-Warton, *F.Mueller*; *n.v.*

This is a later homonym of *C. chrysanthum* F.Muell. (1855) and is probably referable to this taxon. If so, then it is a synonym of *C. glomeratum* var. *chrysanthum* (F.Muell.) Benth.

Choretrum oxycladum F.Muell., *Fragm.* 1: 21 (1858).

T: South Australia: Port Lincoln, *C.Wilhelmi s.n.*; *n.v.*

This is *Acacia spinescens* Benth.

Amended from Fl. Australia 22: 48 (1984)

ILLUSTRATIONS

Both black-and-white and colour illustrations may be included in the *Flora*. Their purpose is principally to supplement the text in aiding identification. In some cases half-tone plates may be used, e.g. SEM photographs of seeds. Contributors are responsible for procuring suitable illustrations, which may be original for this work, or reused (with appropriate permission) from previous works. General comments concerning preparation of illustrations are given below. Contributors should discuss illustrations with the Executive Editor when commencing their *Flora* account.

Line drawings

Black-and-white figures are usually line drawings. Their preparation should be arranged in consultation with the Executive Editor, especially if the contributor needs assistance in selecting an artist. Ideally at least one species from each genus will be illustrated, but in families with a number of small genera this will not always be feasible. Usually illustrations should show something of the habit of the plant as well as diagnostic details of flowers and fruit.

Illustrations may be prepared either as complete plates or as separate items to be arranged in plates later. When drawn as separate items they should be on film, paper or thin cardboard suitable for attaching to a thicker board. For complete plates the artist should keep in mind the positioning of lettering when arranging drawings on the page, and the order of species within the text. No lettering should be included by the artist, however, since this is added by the editorial staff. The magnification of each drawing should be indicated with a simple scale bar.

The printable area for a figure, including its caption, is 12.5 cm wide and 20.5 cm deep. In determining the proportions of a complete plate the size of the caption must be considered. A plate with many items will need a large caption. Illustrations should preferably be prepared 1.5–2 times final size.

Captions to all figures should be submitted on a separate sheet with the manuscript. These should give the species name (and infraspecific name if appropriate) and the feature shown. A voucher specimen should be cited for each drawing. This may be done in abbreviated form, e.g. J.Matheson 3456, BRI. If there is no collector's number then the locality should be cited, e.g. Broken Hill, New South Wales, J.Smith, MEL. The final lettering will be added by the editorial staff when the reduction factor for printing the figure is determined.

The name and address of the artist must be provided for inclusion in the list of illustrators at the beginning of the volume.

Half-tone figures

Half-tone figures should be submitted as glossy, unmounted prints showing good contrast. They should be about 1.5 times the size at which they are to be reproduced. Lettering will be added by the editorial staff. As with line drawings, the size of the caption should be considered when determining the composition of a whole page of figures.

Colour figures

Colour illustrations will be included only in exceptional circumstances (e.g. when the colour is necessary to illustrate key differences between species).

Colour illustrations in the text, if they are to be included, are reproduced from colour slides. These may be submitted by contributors or obtained from other sources. The Executive Editor makes the final selection of slides to be used. Slides should show detail, in focus, of habit, flowers or leaves and have no distracting features such as a hand holding a branch.

As for line drawings, the name of the photographer or artist, and their address, should be supplied to the Executive Editor.

GENERAL ABBREVIATIONS AND CONTRACTIONS

aff.	*affinis*
alt.	altitude
app.	appendix
auct.	*auctoris/auctorum* (of an author or authors)
auct. mult.	*auctorum multorum* (of many authors)
auct. non	*auctorum non* (of authors [but] not....), used for misapplied names
c.	*circa* (about)
cf.	*confer* (compare)
Ck	Creek
cm	centimetre
col.	colour
coll.	collector
colln	collection
comb.	*combinatio* (combination)
comb. nov.	*combinatio nova* (new combination)
comm.	*communicavit* (he/she communicated)
cons.	*conservandus* (to be conserved)
cult.	cultivated
cv.	cultivar
Dept	Department
diam.	diameter
E	east
ed./eds	editor/editors
edn	edition
e.g.	*exempli gratia* (for example)
et al.	*et alii*/and others
fam.	*familia*/family
f.	*forma*/form
fig./figs	figure/figures (in other works)
Fig.	Figure (referring to a Figure in this Volume of the Flora)
gen.	*genus*/genus
gen. nov.	*genus novus* (new genus)
Gt	Great
holo	holotype
hort.	*hortus* (garden) or *hortorum* (of gardens)
Hwy	Highway
i.e.	*id est* (that is)
ined.	*ineditus* (unpublished)
in litt.	*in litteris* (in correspondence)
Is.	Island/Islands
iso	isotype
isolecto	isolectotype
km	kilometre
L.	Lake
lat.	latitude
lecto	lectotype
loc. id.	*loco idem* (in the same place as just cited)
long.	longitude
L.S.	longitudinal section
m	metre

mm	millimetre
Mt/Mts	Mount/Mounts
Mtn/Mtns	Mountain/Mountains
N	north
n	haploid chromosome number
2n	diploid chromosome number
Natl	National
NE	north-east(ern)
nom. cons.	*nomen conservandum* (conserved name)
nom. illeg.	*nomen illegitimum* (illegitimate name)
nom. inval.	*nomen invalidum* (name not validly published)
nom. nov.	*nomen novum* (new name)
nom. nud.	*nomen nudum* (name published without description or reference to a previous effectively published name)
nom. rej.	*nomen rejiciendum* (rejected name)
nom. superfl.	*nomen superfluum* (superfluous name)
nov.	*novus* (new)
n. ser.	new series
n.v.	*non visus* (not seen)
NW	north-west(ern)
orth.	orthography, orthographic
penin.	peninsula
pers. comm.	by personal communication
pl. / pls	plate/plates
P.O.	Post Office
p.p.	*pro parte* (in part)
p./pp.	page/pages
q.v.	*quod vide* (which see)
R.	River
Ra.	Range(s)
Rd	Road
rly	railway
S	south
sect.	*sectio*/section
SEM	scanning electron micrograph
ser.	*series*/series
SE	south-east(ern)
s. lat.	*sensu lato* (in a wide sense)
s.n.	*sine numero* (without number)
sp./spp.	species (singular/plural)
sp. aff.	*species affinis* (species related to)
sp. nov.	*species nova* (new species)
s. str.	*sensu stricto* (in a narrow sense)
St	Street
stat.	*status*/status
Stn	(pastoral) Station
subg.	subgenus
subsp./subspp.	subspecies (singular/plural)
subsp. nov.	*subspecies nova* (new subspecies)
suppl.	supplement
SW	south-west(ern)
syn	syntype
synon.	synonym
T	Type (collection)
t./tt.	*tabula/tabulae* (plate/plates)

trib.	*tribus*/tribe
trig.	trigonometric station
T.S.	transverse section
typ. cons.	*typus conservandus* (conserved type)
var.	*varietas*/variety
viz.	*videlicet* (namely)
W	west
x	basic chromosome number

Symbols

†	formerly present but now extinct
±	(in taxonomic descriptions) more or less
[ ]	in nomenclatural section, denotes misapplied name; in localities, denotes a place name later than that originally cited or on the herbarium sheet; other text inserted editorially
♀	female
♂	male

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GLOSSARY

This glossary contains terms used in all volumes of *Species Plantarum*. Where alternative terms are given, the unbracketted alternative is the preferred terminology for use in *Species Plantarum*.

It is based upon that used for *Flora of Australia*. Both Glossaries will be maintained in electronic form on the ABRS Website and will be updated from time to time.

abaxial: *of the side or surface of an organ*, facing away from the axis. *cf.* **adaxial**.

abscission: the normal shedding from a plant of an organ that is mature or aged, *e.g.* a ripe fruit, an old leaf. adj. **abscissile**.

acarodomatia: domatia adapted to provide shelter to beneficial mites.

accessory fruit: a fruit, or group of fruits derived from one flower, in which the conspicuous, fleshy portion develops from the receptacle and is shed with the true fruit(s) attached.

accrescent: continuing to increase in size after maturity, as the calyx of some plants after flowering.

accumbent: *of the orientation of an embryo*, with the radicle lying against the edges of the two cotyledons.

achene: a dry, indehiscent fruit formed from a superior ovary of one carpel and containing one seed which is free from the pericarp (often applied, less correctly, to the one-seeded fruits of Asteraceae). *cf.* **cypsela**.

acicle: a slender, stiff, needle-like prickle. adj. **acicular**.

aciculate: finely scored on the surface, as if scratched by a pin.

acrodromous: with two or more primary or strongly developed secondary veins running in convergent arches towards the leaf apex. Arches not recurved at base.

acropetal: arising or developing in a longitudinal sequence beginning at the base and proceeding towards the apex. *cf.* **basipetal**.

acrostichoid: *of sporangia*, densely covering the abaxial surface of the fertile frond, *i.e.* not in distinct groups; *of ferns*, having the sporangia arranged as above.

acrotonic: *of flowering seasonal growth units (seasonal shoots)*, producing leaves below the inflorescence, cf. **basitonic.**

actinomorphic: *of flowers*, radially symmetrical; symmetrical about more than one plane passing through the axis of the flower. *cf.* **peloric**, **zygomorphic**.

aculeate: prickly.

acumen: a long, tapering point.

acuminate: tapering gradually to a protracted point.

acute: terminating in a distinct but not protracted point, the converging edges separated by an angle less than 90°.

adaxial: facing towards the axis. *cf.* **abaxial**.

adnate: fused to an organ of a different kind, *e.g.* applied to a stamen fused to a petal.

adventitious: arising in abnormal positions, *e.g.* roots arising from the shoot system, buds arising elsewhere than in axils of leaves.

adventive: introduced to an area recently. *cf.* **introduced**, **naturalised**.

aerenchyma: tissue incorporating large, gas-filled spaces interspersed with the cells in a characteristic pattern.

aestivation: the arrangement of sepals and petals or their lobes in an unexpanded flower bud. *cf.* **vernation**.

aggregate fruit: a cluster of fruits formed from the free carpels of one flower. *cf.* **syncarp**.

albumen: = **endosperm**.

allantoid: sausage-shaped.

allopatric: *of two or more taxa,* having different ranges of distribution. *cf.* **sympatric**.

alternate: *of leaves or other lateral organs*, borne singly at different heights on the axis; *of floral parts*, on a different radius, *e.g.* describing the position of stamens with respect to petals. *cf.* **opposite**.

alternitepalous: *of floral parts*, inserted alternately with the tepals.

alveolate: pitted or honeycombed on the surface.

amplexicaul: *of a leaf base*, stem-clasping.

anastomosis: fusion to form a network, *e.g.* of veins in a leaf blade.

anatropous: *of an ovule*, inverted so that the micropyle faces the placenta.

anauxotelic: applied to inflorescences, parts of inflorescences or to axes that do not end in a flower, and in which growth does not continue beyond the flowering region, cf. **auxotelic.**

androdioecious: having bisexual flowers and male flowers, on separate plants.

androecium: the stamens of one flower collectively.

androgynophore: a stalk bearing both the androecium and gynoecium of a flower above the level of insertion of the perianth.

androgynous: having male and female flowers in the same inflorescence.

andromonoecious: having bisexual and male flowers, on the same plant.

androphore: a stalk bearing the androecium.

anemophilous: pollinated by wind.

angiosperm: a seed-bearing plant whose ovules, and hence seeds, develop within an enclosed ovary. *cf.* **gymnosperm**.

angustiseptate: with narrow partitions, *cf.* **latiseptate**.

annual: a plant whose life span ends within one year after germination.

annular: arranged in or forming a ring.

annular corona: raised fleshy tissue, usually in a ring, on the corolla around the base of the staminal column but not closely adnate to it.

annulus: a ring; *in ferns*, the elastic ring of cells, forming part of the sporangium wall, that initiates dehiscence.

anterior: *of floral organs*, on the side of the flower farthest from the axis. *cf.* **posterior**.

anther: the pollen-bearing part of a stamen. *cf.* **filament**.

antheridium: the fertile organ of a male gametophyte or the male organ of a bisexual gametophyte, in which male gametes are formed.

anthesis: the time of opening of a flower.

anthocarp: a false fruit consisting of the true fruit and the base of the perianth, as in Nyctaginaceae.

antipetalous: inserted in front of the petals; opposite the petals.

antisepalous: inserted in front of the sepals; opposite the sepals.

antrorse: bent, and pointing towards the apex. *cf.* **retrorse**.

apetalous: without petals.

apical: *of a placenta*, at the top of the ovary.

apiculum: a short, abrupt, flexible point, adj. **apiculate**.

apocarpous: *of a gynoecium*, consisting of two or more carpels which are free from one another or almost so.

apomict: a plant that produces viable seed without fertilisation.

appendage: a structure arising from the surface or extending beyond the tip of another structure.

appressed: pressed closely against a surface (or another organ) but not united with it.

aquatic: living in or on water for all or a substantial part of the life span (generally restricted to fresh/inland waters).

arborescent: resembling a tree (applied to non-woody plants attaining tree height and to shrubs tending to become tree-like in size). *cf.* **dendroid**.

arcuate: curved like a bow.

areole: a space between the threads of a net; *in Cactaceae*, a cluster of hairs/spines/bristles borne at the node of a leafless stem; *in Mimosaceae (for example)*, a distinct, oblong or elliptical area on the face of a seed, bounded by a fine line; *on leaf laminas:* the space bounded by the finest veins. adj. **areolate**.

aril: a structure partly or wholly covering the testa of a seed and formed by expansion of the funicle. adj. **arillate**.

aristate: having a stiff, bristle-like awn or tip.

aristulate: having a small awn.

article: a segment of a jointed stem, or of a fruit with constrictions between the seeds.

articulate: jointed; having joints where separation may occur naturally; *of a stem*, having nodes.

ascending: growing erect after an oblique or semi-horizontal beginning.

asexual: not forming part of a cycle which involves fertilisation and meiosis.

asperulate: slightly rough to the touch.

attenuate: tapering gradually.

auricle: an ear-shaped appendage at the base of a leaf, leaflet or corolla lobe. adj. **auriculate**.

autapomorphic: *of a character*, derived and unique to a given taxon or monophyletic group.

autochthonous: *of the inhabitants of a region*, original; earliest known; (applied to an element of the Australian flora rich in endemics and believed to have been evolving in Australia for a long period of time).

autotrophic: independent of other organisms in respect of organic nutrition; able to fix carbon dioxide, by photosynthesis, to form carbohydrates.

auxotelic: applied to inflorescences, parts of inflorescences or to axes that do not end in a flower, and in which growth continues beyond the flowering region, cf. **anauxotelic.**

awn: a bristle-like appendage, *e.g.* on the tip or back of the lemma of a grass floret.

axil: the angle between a leaf or bract and the axis bearing it. adj. **axillary**.

axile: on an axis; *of a placenta*, on the central axis of the ovary.

axis: a stem, (commonly used for the main stem of a whole plant or of an inflorescence).

baccate: berry-like; *of seeds*, having a succulent or pulpy testa; *of fruits*, having the seeds embedded in pulp.

barbellae: short, straight, stiff hairs or barbs.

barbulae: in *Scaevola* (Goodeniaceae), outgrowths on the margin of the wings or in the throat of the corolla, sometimes with apical hairs or papillae.

basal: at the base; *of a placenta*, at the base of the ovary.

basifixed: attached at or by the base, *e.g. of anthers*, by the base of the connective. *cf.* **medifixed**, **versatile**.

basipetal: developing, in sequence, from the apex towards the base. *cf.* **acropetal**.

basiscopic: *of the first lateral vein of a leaflet on the side nearer the leaf base*, pointing towards the base.

basitonic: *of flowering seasonal growth units (seasonal shoots)*, producing no leaves (but sometimes some bracts) below the inflorescence, cf. **acrotonic.**

beak: a prominent terminal projection, especially of a carpel or fruit.

berry: a fleshy or pulpy indehiscent fruit with the seed(s) embedded in the fleshy tissue of the pericarp. *cf.* **drupe**, **pyrene**.

biennial: a plant whose life span extends for more than one but less than two years after germination.

bifacial: *of leaves*, flat or channelled with distinct adaxial and abaxial surfaces.

bifid: divided, for about half the length, into two parts. *cf.* **bipartite**.

bifoliate: *of plants*, having two leaves.

bifoliolate: *of leaves*, having two leaflets.

bigeminate: in two pairs; *of pinnate leaves,* having only two pairs of pinnae.

bilabiate: two-lipped, *e.g.* of a corolla in which fusion of an anterior group and a posterior group of petals extends beyond the top of the corolla tube.

bilamellate: consisting of two plates or lamellae.

bilocular: having two cavities.

bipartite: divided, nearly to the base, into two parts. *cf.* **bifid**.

bipinnate: *of leaves*, twice pinnately divided. *cf.* **pinnate**, **tripinnate**.

biseriate: arranged in two rows or whorls.

bisexual: bearing both male and female organs together, *e.g.* on the same gametophyte or in the same flower.

biternate: twice ternate, the three pinnae each divided into three pinnules.

blade: the expanded part of a leaf or petal. *cf.* **lamina**, **limb**.

bole: the trunk of a tree, below the lowest branch. *cf.* **canopy**.

brachyblast: a short branch; a spur shoot.

bract: a leaf-like structure, different in form from the foliage leaves and without an axillary bud, associated with an inflorescence or flower.

bracteole: a small bract-like structure borne singly or in pairs on the pedicel or calyx of a flower.

bristle: a rigid trichome similar to a pig's bristle.

brochidodromus: pinnate venation in which the secondary veins do not terminate at the margins but are joined in a series of prominent arches.

bulb: a storage organ, usually underground, made up of a stem and leaf bases, the food reserves being stored in the inner, fleshy leaf bases.

bulbel (= **bulblet**): a bulb arising from another bulb.

bulbil: a small, deciduous bulb (or tuber) formed in the axil of a leaf or replacing flowers in an inflorescence, and functioning to propagate the plant vegetatively.

bullate: having a blistered or puckered surface; *of a leaf surface,* prominently raised (like a bubble) between veins.

burr: a rough or prickly propagule consisting of a seed or fruit and associated floral parts or bracts.

buttress: a flange of tissue protruding from the base of the main trunk of a tree.

caducous: falling off early.

caespitose: growing in tufts.

callus: a protruding mass of hardened tissue, often formed after an injury but sometimes a regular feature of the plant, *e.g.* on the labellum of some orchids and on the axis of the spikelet of some grasses. adj. **callose**; pl **calli**.

calycine: belonging to the calyx; with a well-developed calyx

calyptra: *in mosses*, a cap-like structure covering or partly covering the capsule and derived from the neck of the archegonium; *in a flower*, (= operculum), a cap formed by fusion or cohesion of perianth parts and covering the stamens and carpels in the bud.

calyx tube: a tube formed by fusion or cohesion of sepals. *cf.* **hypanthium**.

calyx: the sepals of one flower collectively.

campanulate: bell-shaped.

campylotropous: *of an ovule*, orientated transversely (*i.e.* with its axis at right angles to its stalk) and with a curved embryo sac.

canaliculate: with a longitudinal groove or channel.

canescent: more or less grey-pubescent, hoary.

canopy: the branches and foliage of a tree. *cf.* **bole**.

capillary: *of hairs etc*., very slender.

capitate: *of an inflorescence*, with the flowers unstalked and aggregated into a dense cluster; *of a stigma*, globose, like the head of a pin.

capitellate: shaped like, or aggregated into, a very small head.

capitulum: a dense cluster of sessile flowers. adj. **capitate**.

capsule: a dry fruit formed from two or more united carpels and dehiscing at maturity to release the seeds.

carinate: keeled.

carpel: an organ (generally believed to be a modified foliar unit) at the centre of a flower, bearing one or more ovules and having its margins fused together or with other carpels to enclose the ovule(s) in an ovary, and consisting also of a stigma and usually a style.

carpophore: *in ferns*, the stalk of a sporocarp; *in a fruit*, the stalk of a mericarp.

caruncle (= **strophiole**): an outgrowth of a seed coat, near the hilum.

caryopsis: a dry, indehiscent, one-seeded fruit in which the seed coat is closely fused to the fruit wall (characteristic of grasses).

cataphyll: a scale leaf associated with a vegetative propagating organ such as a rhizome or perennating bud; a simple, scale-like leaf.

catkin: a spike in which the flowers are unisexual and without conspicuous perianth.

caudate: having a narrow tail-like appendage.

caudex: a thick, erect trunk, especially of cycads.

caudicle: a thread to which a pollen mass is attached in Orchidaceae and Asclepiadaceae; the part of a pollinarium that connects the corpusculum with the pollinia.

cauliflorous: *of plants*, with flowers (and fruits) borne on a well-developed trunk or major branch. *cf.* **cauline**.

cauline: *of leaves*, borne on an aerial stem; *of flowers or fruits*, borne on old wood. *cf.* **cauliflorous**).

cell: the basic unit of plant structure consisting, at least when young, of a protoplast surrounded by a wall.

centrifugal: directed, or developing, from the centre or axis outwards.

centripetal: directed, or developing, from the outside towards the centre or axis.

chaff: thin, membranous scales or bracts; thin, dry unfertilised ovules among the fully developed seeds of a fruit.

chalaza: the part of an ovule to which the end of the stalk (funicle) is attached.

chartaceous: papery.

chasmogamous: pollinated when the flower is open. *cf.* **cleistogamous**.

chlorophyll: pigment(s) constituting the green colouring matter of plants and absorbing radiant energy in photosynthesis.

chromosome: a thread-like structure in the nucleus of a cell, containing a linear sequence of genes.

cilia: *in gametes, spores etc.*, minute hair-like protoplasmic protrusions whose movement confers motility on the cell; *in vascular plants*, hairs more or less confined to the margins of an organ. sing. cilium; adj. **ciliate**.

ciliolate: minutely ciliate.

cincinnus: a monochasial, cymose inflorescence with flowers arising alternately from one side of an axis then the other.

cinereous: ash-grey, as of wood ash.

circinnate (= **circinate**)**:** spirally coiled, with the tip innermost.

circumsciss: (to) break open along a transverse line around the circumference. adj. **circumscissile**.

cladode: the photosynthetic stem of a plant whose foliage leaves are absent or much reduced. *cf.* **phyllode**.

cladophyll: a flattened, leaf-like photosynthetic stem not bearing leaves or scales. *cf.* **phylloclade**.

class: a major taxonomic rank, between order and division.

clathrate: latticed or pierced with apertures like a trellis.

clavate: club-shaped.

claw: a narrow, stalk-like basal portion of a petal, sepal or bract.

cleistogamous: self-pollinated and setting fertile seed but the flowers never opening. *cf.* **chasmogamous**.

clone: a set of organisms produced from one parent by vegetative reproduction.

coccus: a one-carpel unit of a schizocarp or lobed fruit, becoming separate at maturity. pl. **cocci**.

cochlear: *of the arrangement of corolla lobes in a bud*, a variant of imbricate aestivation.

cochleate: coiled like a snail-shell.

cohesion: the sticking together of floral parts of the same whorl without organic fusion. adj. **coherent**.

collateral: situated side by side; adjacent and on the same radius of an axis.

colleter: a group or tuft of mucilaginous secretory hairs, often found near the base of the leaf lamina and on the calyx in Apocynaceae and Asclepiadaceae.

colliculate: covered with small, rounded or hillock-like elevations (n. **colliculae**).

colpate: *of a pollen grain*, having elongate apertures.colporate: *of a pollen grain*, having apertures with pores within colpi. *cf.* **porate**.

columella: a little column; the central, persistent axis of a schizocarpic fruit; the axis of a cone or cone-like fruit.

column: the lower part of an awn in grasses, when distinctly different in form from the upper part; (= **gynostemium**) a structure in Orchidaceae, Asclepiadaceae and Stylidiaceae, extending above the ovary of a flower and incorporating stigma, style and stamens.

coma: a tuft, especially of hairs on a seed. adj. **comose**.

commissure: a join or seam; the interfacing of two fused carpels in an ovary.

complicate: *of leaves*, the lamina (or part of the lamina) folded upon itself.

compound: *of a leaf*, having the blade divided into two or more distinct leaflets; *of an inflorescence*, made up of an aggregate of smaller inflorescences.

compressed: flattened in one plane, either dorsally (bringing the front and back closer together) or laterally (bringing the sides closer together).

concolorous: coloured uniformly; the same colour on both sides. *cf.* **discolorous**.

conduplicate: folded together, with the fold-line along the long axis (*e.g. of cotyledons in a seed*).

cone: *in gymnosperms and club-mosses*, a group of sporophylls arranged compactly on a central axis; (loosely) *in Casuarinaceae*, a woody multiple fruit incorporating the bracts and bracteoles associated with the flowers; (loosely) *in Petrophile and other Proteaceae* the semi-woody multiple fruit made up of nutlets in the axils of closely imbricate floral bracts which become woody.

conflorescence: a compound inflorescence consisting of two or more unit inflorescences, in which the main axis does not end in a flower but the axes of the branches do so.

connate: fused to another organ (or other organs) of the same kind.

connective: the part of an anther that connects the lobes.

connivent: coming into contact; converging.

contorted: see convolute.

convolute: *of the arrangement of corolla lobes in a bud*, a form of imbricate aestivation in which each segment has one edge overlapping the adjacent segment, like a furled umbrella.

cordate: *of a leaf blade*, broad and notched at the base; heart-shaped (in two dimensions).

cordiform: shaped like a heart (in three dimensions).

coriaceous: leathery.

corm: a fleshy, swollen stem base, usually underground, in which food reserves are stored between growing seasons.

corniculate: bearing, or terminating in, one or more small horns.

corolla: the petals of a flower collectively.

corolline corona: fleshy ridges or outgrowths of tissue attached to the corolla tube, usually in the lobe sinuses.

corona: a ring of tissue arising from the corolla, perianth or filaments of a flower and standing between the perianth lobes and the stamens.

corpusculum: the central part of a pollinarium.

cortex: the region of a stem or root surrounding the vascular cylinder but inside the epidermis.

corymb: a racemose inflorescence in which the pedicels of the lower flowers are longer than those of the flowers above, bringing all flowers to about the same level.

costa: a rib; a midrib or middle-nerve (when it is the only nerve).

costate: ribbed

costule: the midvein of a pinnule.

cotyledon: the primary leaf (or one of two or more primary leaves) of an embryo.

crenate: with small, rounded teeth; scalloped.

crenulate: minutely scalloped.

crisped: curled.

crown: the part of a tree or shrub above the level of the lowest branch.

crownshaft: *in palms*, a conspicuous cylinder formed by the tubular base of leaf sheaths at the top of a stem.

crustaceous: brittle.

cryptogam: (literally) a plant whose sexual reproductive parts are not conspicuous; a plant that produces spores, not seeds, in its sexual reproductive cycle; *among vascular plants*, ferns and fern allies. *cf.* **phanerogam**.

cucullate: hooded; hood-shaped.

culm: an aerial stem; *in grasses, sedges, rushes, etc*., the stem bearing the inflorescence.

cuneate: wedge-shaped.

cupule: a small cup.

cupuliform: nearly hemispherical, shaped like a cupola (dome).

curvinerved: with curved parallel veins.

cushion, floral: a swollen floral axis on which several small flowers are borne.

cuspidate: tapering into a sharp, rigid point.

cyathium: an inflorescence of unisexual flowers surrounded by a cup of involucral bracts, as in *Euphorbia*.

cyclic: *of floral organs*, several borne at the same level on the axis; whorled. *cf.* **spiral**.

cyme: an inflorescence in which each flower, in turn, is formed at the tip of a growing axis and further flowers are formed on branches arising below it. adj. **cymose**. *cf.* **raceme**.

cymule: a diminutive cyme, usually few-flowered.

cypsela: a dry, indehiscent, one-seeded fruit formed from an inferior ovary. *cf.* **achene**.

cystolith: a stalked structure growing from a cell wall into the cell cavity, encrusted with calcium carbonate.

deciduous: falling seasonally, *e.g.* of the leaves or bark of some trees. *cf.* **evergreen**.

declinate: angled downwards or forwards. *cf.* **decurved**.

decompound: more than once compound.

decumbent: spreading horizontally but then growing upwards.

decurrent: extending downwards beyond the point of insertion, *e.g.* of a lamina extending downwards to form a flange along the petiole.

decurved: angled downwards and curved or curled.

decussate: in opposite pairs, with successive pairs borne at right angles to each other.

definite: of a constant number; *of stamens*, twice as many as the petals or sepals, or less; *of an inflorescence*, ending in a flower or an aborted floral bud.

deflexed: bent abruptly downwards. *cf.* **inflexed**.

dehiscent: breaking open at maturity to release the contents.

deltoid (= **deltate**): triangular with the sides of about equal length.

dendritic: *of a trichome*, with branches arising along the main axis, i.e. tree-like.

dendroid: tree-like in form but not in size. *cf.* **arborescent**.

dentate: toothed.

denticle: a small tooth; in *Coprosma* (Rubiaceae), thick papillate tubercles on the margin of the interpetiolar stipules.

denticulate: finely toothed.

depressed: flattened as if pressed down from the top or end.

determinate: *of growth or branching*, with a bud or flower terminating the growth of the main axis; *of an inflorescence*, see definite.

dextrorse: turned towards the right. cf. **sinistrorse**

diadelphous: having the stamens united into two groups, or all but one united in a group and one free.

diaphanous: extremely thin and transparent.

dichasium: a cymose inflorescence with opposite branching below the flower which terminates each axis. *cf.* **monochasium**.

dichlamydeous: *of a flower*, having two whorls of perianth parts.

dichotomous: forking into two equal branches resulting from division of the growing point.

diclinous: having the stamens and the carpels in separate flowers.

dicotyledon: a flowering plant whose embryo has two (rarely more) cotyledons (seed leaves). *cf.* **monocotyledon**.

didymous: borne in pairs; *of anthers*, having two lobes, with scarcely any tissue connecting them.

didynamous: *of stamens*, four in number, two being distinctly longer than the other two.

digitate: branching from the axis or stalk like the fingers of a hand.

dimidiate: appearing to be halved, as when half an organ is so much smaller than the other that it seems absent.

dimorphic: of two different forms.

dioecious: having the male and female reproductive structures on separate plants. *cf.* **monoecious**.

diplecolobous: *of cotyledons in a seed*, twice folded transversely.

diploid: having two of the basic sets of chromosomes in the nucleus. *cf.* **haploid**, **polyploid**.

disc: a plate or rim of tissue, derived from the receptacle of a flower, occurring between whorls of floral parts.

discolorous: of different colours; *of leaves*, having the two surfaces different in colour; variegated. *cf.* **concolorous**.

dissepiment: a partition (septum) within an ovary or fruit, derived by fusion of adjacent carpels.

distal: remote from the point of origin or attachment. *cf.* **proximal**.

distichous: arranged in two rows on opposite sides of a stem and thus in the same plane.

diurnal: *of flowers*, opening only during daylight hours.

divaricate: widely spreading and often ±horizontal.

division: the major taxonomic rank within the Plant Kingdom. Alternative name for **phylum**.

domatia: small structures on the lower surface of a leaf in some woody dicotyledons, located in the axils of the primary veins and usually consisting of depressions partly enclosed by leaf tissue or hairs. sing. **domatium**.

dorsal: *of a lateral organ*, (relating to the side) facing away from the axis, *i.e.* the 'back'; *of a thallus*, facing away from the substratum. *cf.* **ventral**.

dorsifixed: attached at or by the back.

dorsiventral: having structurally different upper and lower surfaces.

drupe: a succulent fruit formed from one carpel, having the seed(s) enclosed in an inner stony layer of the fruit wall. adj. **drupaceous** (which is often used to mean drupe-like but not strictly a drupe). *cf.* **berry**, **pyrene**.

duplicate: folded twice.

echinate: bearing stiff, stout, prickly hairs.

edaphic: pertaining to the soil.

eglandular: without glands.

elaiosome: an appendage of a seed, usually rich in oil, attractive to fauna (especially ants) and hence an aid to dispersal by such fauna.

elater: in *Equisetum,* an appendage to the spore.

elliptic: oval in outline, widest at the centre.

emarginate: having a broad, shallow notch at the apex.

embryo: a young plant contained within an archegonium or seed.

emersed: *of leaves, flowers, etc.*, rising above the surface of water in which the plant is rooted.

enation: an epidermal outgrowth.

endemic: having a natural distribution confined to a particular geographical region.

endocarp: the innermost layer of the wall of a fruit; *in a drupe*, the stony layer surrounding the seed.

endosperm: nutritive tissue in a seed, in angiosperms triploid and formed in the embryo sac after fertilisation, in gymnosperms haploid and derived from the sterile portion of the female gametophyte. *cf.* **perisperm**.

ensiform: sword-shaped.

entire: having a smooth margin, not dissected or toothed.

entomophilous: pollinated by insects.

ephemeral: short-lived.

epicalyx: a whorl of bracts, just below a flower, looking like a second calyx.

epicarp: the outer layer of the wall of a fruit, *i.e.* the 'skin'. Also known as the exocarp.

epicormic: *of buds, shoots or flowers*, borne on the old wood of trees (applied especially to shoots arising from dormant buds after injury or fire).

epicortical: on top of the bark, *i.e.* outside the bark.

epidermis: the outermost layer of cells of an organ, usually only one cell thick.

epigeal: *of germination*, having the cotyledon(s) emerging from the seed coat and becoming photosynthetic. *cf.* **hypogeal**.

epigynous: *of floral parts (especially stamens)*, attached above the level of insertion of the ovary, and arising from tissue that is fused to the ovary wall. *cf.* **hypogynous**, **perigynous**.

epipetalous: borne on the petals.

epiphyllous: growing on leaves, *e.g.* the vegetatively derived plantlets of some Crassulaceae; *of bryophytes, lichens, fungi*, growing upon leaves but not parasitic on them.

epiphyte: a plant growing on, but not parasitic on, another plant (often loosely applied to plants, such as orchids, that grow on vertical rock faces). *cf.* **parasite**, **saprophyte**.

episepalous: *of stamens*, borne on the sepals.

equilateral: *of stamens*, with anthers regularly spaced around the style.

equitant: *of a leaf*, folded in half along the midline so that the adaxial surface disappears from view, and overlapping the edges of a similarly folded leaf on the opposite side of the stem (at least at the base).

eremean: belonging to regions of low, irregular rainfall.

erose: *of a margin*, finely and irregularly eroded or incised.

eucamptodromous: pinnate venation in which the secondary veins do not terminate at the margins but which gradually diminish inside the margin, connected to the superadjacent secondary veins by a series of cross-veins without forming prominent marginal loops.

eusporangiate: *of ferns*, having sporangia with walls more than one cell thick. *cf.* **leptosporangiate**.

evergreen: bearing green leaves throughout the year. *cf.* **deciduous**.

excentric: to one side; off centre.

exine: the outer layer of the wall of a pollen grain or spore.

exocarp (= **epicarp**)**:** the outer layer or "skin" of a pericarp.

exserted: protruding, *e.g.* of stamens with respect to a corolla tube.

exstipulate: without stipules.

extrafloral: *of nectaries*, not within the flower.

extrastaminal: outside the stamens.

extravaginal: *of a shoot*, arising from an axillary bud which breaks through the sheath of the subtending leaf.

extrorse: *of anthers*, opening away from the centre of the flower. *cf.* **introrse**.

facultative: *of parasites*, optional. *cf.* **obligate**.

falcate: sickle-shaped.

family: a group of one to many genera believed to be related phylogenetically, usually clearly separable from other such groups; the major taxonomic group between genus and order.

farinaceous: containing starch grains; mealy; resembling flour.

fascicle: a cluster, adj. **fasciculate**.

favulariate: *of a surface*, finely ribbed, the ribs separated by zig-zag furrows.

fenestrate: having openings or translucent areas ('windows').

fertilisation: the union of male and female gametes.

filament: the stalk of a stamen; a thread one or more cells thick.

filiform: thread-like.

fimbriate: *of a margin*, fringed with long slender hair-like processes (called fimbriae).

fimbrillate: minutely fimbriate.

fistular: hollow throughout its length.

flabellate (= flabelliform): fan-shaped.

flaccid: limp; tending to wilt. *cf.* **turgid**.

flagelliform: long and very slender, like a whip-lash.

flexuose (= **flexuous**)**:** bent from side to side in a zig-zag form.

floccose: bearing tufts of soft hairs or wool which tend to rub off and adhere in small masses.

floral: belonging to or associated with a flower.

floret: a grass flower, together with the lemma and palea that enclose it (often also applied to the individual small flowers in Cyperaceae and Asteraceae).

flower: the sexual reproductive structure of the angiosperms, typically consisting of gynoecium, androecium and perianth and the axis bearing these parts.

foliaceous: leaf-like.

follicle: a dry, dehiscent fruit formed from one carpel and dehiscing along the line of fusion of its edges.

forb: a non-woody plant other than a grass, sedge, rush, *etc*. *cf.* **herb**.

-form: superficially resembling; e.g. umbelliform (inflorescence resembling but not truly an umbel).

foveate: pitted.

free-central: *of placentation,* with the ovules borne on a free-standing central placenta within the ovary.

free: *of floral organs*, not fused or united with other similar organs.

frond: a leaf, especially of a fern, cycad or palm.

fruit: the seed-bearing structure in angiosperms, formed from the ovary after flowering.

frutescent: becoming shrub-like (woody).

fruticose: shrub-like.

fugacious: falling or withering away very early.

fulvous: dull yellowish brown or yellowish grey.

funicle (= **funiculus**)**:** the stalk of an ovule.

fusiform: spindle-shaped, *i.e.* narrower at both ends than at the centre.

gamete: a cell or nucleus that fuses with another, of opposite sex, in sexual reproduction.

gametophyte: a plant, or phase of a plant's life cycle, that bears gametes.

gamopetalous: see sympetalous.

gamophyllous: having the leaves or perianth segments united by their margins, at least at the base.

gamosepalous: having the sepals united by their margins, at least at the base.

gemma: a bud or bud-like organ capable of reproducing the plant. pl. **gemmae**.

geniculate: bent abruptly like a knee joint.

genotype: the total complement of hereditary factors (genes) acquired by an organism from its parents and available for transmission to its offspring. *cf.* **phenotype**.

genus: a group of species believed to be related phylogenetically and usually clearly separable from other such groups, or a single species without close relatives; the major taxonomic rank between species and family. pl. **genera**.

geophyte: a plant whose perennating buds are buried in the soil.

gibbous: *usually of a calyx or corolla*, with a large hump or pouch-like swelling.

glabrate: glabrous, **but obviously** having previously had an indumentum.

glabrescent: becoming glabrous.

glabrous: without hairs.

gland: a structure, within or on the surface of a plant, with a secretory function.

glandular: bearing glands; functioning as a gland.

glaucous: blue-green in colour, with a whitish bloom (as in the juvenile leaves of many *Eucalyptus* species).

globose: nearly spherical.

glochid: a barbed hair or bristle.

glomerule: a small compact cluster. adj. **glomerulate**.

glumaceous: glume-like, tending to be chaffy or membranous in texture.

glume: a bract in the inflorescence of a grass, sedge or similar plant.

grain: a fruit characteristic of grasses (= **caryopsis**); pollen grain, a microspore of a seed plant, or the partially developed gametophyte formed from it.

granulate: *of a surface*, granular.

guard cells: the two cells that open and close the stomata to allow gas exchange.

gymnosperm: a seed plant with the ovules borne on the surface of a sporophyll. *cf.* **angiosperm**.

gynobasic: *of a style*, arising near the base of the gynoecium, *e.g.* between the lobes of the ovary.

gynodioecious: having bisexual flowers and female flowers on separate plants. *cf.* **gynomonoecious**.

gynoecium: the carpels of a flower collectively.

gynomonoecious: having bisexual and female flowers on the same plant *cf.* **gynodioecious**.

gynophore: a stalk bearing the gynoecium above the level of insertion of the other floral parts.

gynostegial corona: collective term for the staminal and interstaminal coronas, both of which are associated with the gynostegium. cf. **interstaminal corona**, **staminal corona**.

gynostegium: a structure formed by the fusion of the stamens and the gynoecium in Asclepiadaceae. *cf.* **column**.

habit: the growth form of a plant, comprising its size, shape, texture and orientation.

habitat: the environment in which a plant lives.

half-inferior: *of an ovary*, partly below and partly above the level of attachment of the perianth and stamens.

halophyte: a plant adapted to living in highly saline habitats; a plant that accumulates high concentrations of salt in its tissues.

haploid: having a single set of chromosomes in the nucleus (*i.e.* having each gene locus represented only once).

hastate: spear-shaped; *of a leaf blade*, narrow and pointed but with two basal lobes spreading approximately at right angles.

haustorium: an absorbing organ through which a parasite obtains chemical substances from its host.

helicoid: coiled; *of a cymose inflorescence*, branching repeatedly on the same side. *cf.* **scorpioid**.

hemiparasite: an organism which lives on and derives part of its nourishment from a different organism, and is partially self-supporting.

herb: any vascular plant that never produces a woody stem. *cf.* **forb**.

herbaceous: not woody; soft in texture.

hermaphrodite: = **bisexual**.

hesperidium: a fleshy indehiscent fruit derived from a single pistil, with an outer leathery rind and septate interior (*e.g. Citrus*).

heteroblastic: having the adult parts of the plant (especially the leaves) distinctly different in form from the juvenile parts.

heterogamous: producing flowers of two or more kinds with respect to their fertile organs, *e.g.* male and female or bisexual and female. *cf.* **homogamous**.

heteromorphic (= **heteromorphous**): of two or more distinct forms.

heterosporous: producing two kinds of spores (male and female, or microspores and megaspores). *cf.* **homosporous**.

heterostylous: species in which flowers are similar except that the stigmas and anthers are held at different levels relative to each other, because style length differs between plants. *cf.* **homostylous**.

hilum: the scar on a seed coat at the place where it was attached to its stalk during development.

hirsute: bearing coarse, rough, relatively long hairs. *cf.* **villous**.

hispid: bearing stiff, bristly hairs.

hispidulous: minutely hispid.

hoary: covered with a greyish layer of very short, closely interwoven hairs.

holotype: a single specimen or illustration designated by the author of a plant (or animal) name, at the time of original publication, which fixes the application of the name; the 'voucher specimen' of a name.

homogamous: having flowers of only one kind. *cf.* **heterogamous**.

homosporous: producing only one kind of spore in the sexual reproductive cycle, and hence one gametophyte which produces both male and female gametes. *cf.* **heterosporous**.

homostylous: species in which the flowers have stigmas and anthers held at the same level relative to each other on all plants. *cf.* **heterostylous**.

host: an organism on which a parasite lives and by which it is nourished (also applied, loosely, to a plant supporting an epiphyte).

hyalescent: becoming translucent.

hyaline: translucent, almost like clear glass.

hybrid: an offspring of genetically different parents (in a Flora, usually applied where the parents are of different species).

hygroscopic: absorbing water (and undergoing movements or changes brought about by changes in water content).

hypanthium: a cup or tube bearing floral parts above the base, and often above the top, of the ovary of a flower, *e.g.* in many Myrtales. *cf.* **calyx tube**.

hypocotyl: the part of the stem of an embryo or young seedling below the cotyledonary node.

hypodermis: a clearly differentiated layer of cells below the epidermis.

hypogeal: *of germination*, having the cotyledon(s) remaining within the seed coat. *cf.* **epigeal**.

hypogynous: arising below the level of insertion of the ovary (often applied, loosely, to a *flower* in which the sepals, petals and stamens are inserted below the ovary). *cf.* **perigynous**, **epigynous**.

imbricate: *of perianth parts*, having the edges overlapping in the bud. *cf.* **valvate**.

imparipinnate: having an uneven number of pinnae, by virtue of having one terminal pinna. *cf.* **paripinnate**.

incised: cut deeply, sharply and often irregularly (an intermediate condition between toothed and lobed).

included: enclosed, not protruding.

incrassate: thickened; *of a pollen grain*, with thickened margins around the apertures.

incumbent: *of the orientation of an embryo*, with the cotyledons lying face to face and folded downwards beside the radicle; *of anthers*, lying against the inner face of the filament.

incurved: bent or curved inwards or upwards; *of leaf margins*, curved towards the adaxial surface.

indefinite: variable in number; numerous; *of stamens*, more than twice as many as the petals or sepals; *of an inflorescence*, not terminating in a flower (*i.e.* having a continuing, terminal growing point).

indehiscent: not opening at maturity.

indeterminate (= **monopodial**)**:** *of growth*, the condition in which the terminal bud persists and produces successive lateral branches; *of an inflorescence*, when the floral axis is not terminated by a flower, *i.e.* a racemose inflorescence. *cf.* **cymose**.

indumentum: the epidermal appendages, *e.g.* hairs or scales, collectively.

induplicate: folded inwards so that the outer faces of the margins are in contact.

indurated: hardened.

indusium: tissue covering the sorus of a fern; a hollow pollen-cup surrounding the stigma in Goodeniaceae.

inferior: *of an ovary*, at least partly below the level of attachment of the other floral parts. *cf.* **superior**.

inflexed: bent sharply upwards or forwards. *cf.* **deflexed**.

inflorescence: the group or arrangement in which flowers are borne on a plant.

infraspecific: of lower taxonomic rank than species.

infructescence: the grouping or arrangement in which fruits are borne on a plant.

insectivorous: catching, and ostensibly feeding on, insects.

inserted (*on*): attached to; arising from.

integument: a covering; one of the outer layers of tissue of an ovule.

internode: the portion of a stem between the level of insertion of two successive leaves or leaf pairs (or branches of an inflorescence).

interpetiolar: *of stipules*, between the petioles of two opposite leaves. *cf.* **intrapetiolar**.

interrupted: *of an inflorescence*, having the flowers unevenly distributed along the axis, with conspicuous gaps.

interstaminal corona: fleshy lobes, often connate into a tube, attached to the base of the staminal column in the interstaminal areas. cf. **gynostegial corona**.

intramarginal: situated inside but close to the margin, *e.g.* of a vein in a leaf.

intrapetiolar: between a petiole and the subtending stem. *cf.* **interpetiolar**.

introduced: not indigenous; not native to the area in which it now occurs. *cf.* **adventive**, naturalised.

introrse: *of anthers*, dehiscing towards the centre of the flower. *cf.* **extrorse**.

involucre: a group of bracts enveloping a condensed inflorescence; a layer of tissue enveloping particular structures, *e.g.* an archegonium in Bryophyta, sporangia in Hymenophyllaceae.

involucel: involucre of bractlets surrounding a secondary inflorescence such as the base of an umbellule.

involute: rolled inwards; *of a leaf*, with the margins rolled towards the adaxial surface. *cf.* **revolute**.

irregular: see zygomorphic.

isobilateral (= **isolateral**)**:** having structurally similar upper and lower surfaces.

isotype: a specimen which is a duplicate of the holotype, *i.e.* part of the same collection.

juvenile: *of leaves*, formed on a young plant and different in form from the adult leaves.

karyoevolution: evolutionary change in the chromosome set, expressed as changes in number and gross structure of the chromosomes; (more broadly), evolutionary relationships between taxa as indicated by karyotype differences.

karyotype: the gross morphology of the chromosome set, described in terms of number, length, centromere position, *etc*.

keel: a ridge like the keel of a boat; *in Fabaceae*, a boat-shaped structure formed by fusion of the two anterior petals of a flower.

keeled: *of leaves, petals or bracts*, folded and ridged along the midrib.

kwongan: low sand heath or sand plain sclerophyllous vegetation common in south-western W.A.

labellum: a lip; *in Orchidaceae*, the distinctive median petal that serves as an alighting platform for pollinating insects; *in Zingiberaceae and Costaceae*, a (usually showy) structure derived from petaloid staminodes.

laciniate: slashed into narrow, pointed lobes.

lacrymiform: tear-shaped, *i.e.* more or less ovoid or obovoid.

lacuna: a gap or cavity.

lamella: a thin, plate-like layer; middle lamella, the layer between the walls of two adjacent cells.

lamellose: composed of or arranged in layers or thin plates.

lamina: the blade of a leaf.

lanceolate: *of a leaf*, about four times as long as it is broad, broadest in the lower half and tapering towards the tip.

latex: a viscous fluid exuded from the cut surfaces of the leaves and stems of certain plants.

latiseptate: with broad partitions. *cf.* **angustiseptate**.

latrorse: turned sideways, *i.e.* not towards or away from axis; *of anthers*, opening laterally, i.e. towards adjacent anthers.

leaflet: one of the ultimate segments of a compound leaf.

lectotype: a specimen or illustration selected from among those cited with the original description to serve in place of a holotype where the holotype is missing or destroyed, or where no holotype was designated.

legume: a fruit characteristic of the families Mimosaceae, Caesalpiniaceae and Fabaceae, formed from one carpel and either dehiscent along both sides, or indehiscent; *in particular*, such a fruit that is grown as an edible crop; a crop species in the family Fabaceae.

lemma: the lower of two bracts enclosing a grass flower.

lenticel: a loosely-packed mass of cells in the bark of a woody plant, visible on the surface of a stem as a raised powdery spot, through which gaseous exchange occurs.

lenticular: shaped like a biconvex lens.

lepidote: covered with small, membranous scales.

leptosporangiate: *of ferns*, having sporangia with walls only one cell thick. *cf.* **eusporangiate**.

liane: a climbing or twining plant (usually applied to woody climbers).

lignified: woody, due to the deposition of lignin in cell walls.

lignotuber: a woody swelling at the base of the shoot system below or just above the ground, containing adventitious buds from which new shoots develop if the top of the plant is cut off or burnt (common in the shrubby eucalypts ('mallee') and in many other fire-tolerant Australian shrubs).

ligulate: bearing a ligule; strap-shaped.

ligule: a strap-shaped structure; a membranous or hairy appendage on the adaxial surface of a leaf, especially in grasses, at the junction between sheath and blade; a small adaxial appendage near the leaf base in some pteridophytes; the corolla limb in ray flowers of Asteraceae.

limb: the upper, free, spreading portion of a corolla or perianth that is connate at the base.

linear: very narrow in relation to the length, and with the sides parallel. *cf.* **lorate**.

linguiform: tongue-shaped.

lithophyte: a plant that grows on the surface of unweathered rock.

lobulate: having small or indistinct lobes.

loculicidal: *of the dehiscence of a fruit*, along lines coinciding with the centres of loculi. *cf.* **septicidal**.

loculus: an enclosed compartment within an organ *e.g.* an ovary, an anther. pl. **loculi**.

lodicule: one of a pair of tiny scales in a grass floret, between the lemma and the fertile parts of the flower, which may be reduced perianth segments.

lomentum: a legume having distinct constrictions or lines of abscission between the seeds and breaking into one-seeded segments when mature.

lorate: *of leaves*, strap-shaped (moderately long with the two margins parallel). *cf.* **linear**.

lumen: the cavity of a plant cell.

lyrate: deeply lobed, with a large terminal lobe and smaller lateral ones.

macrospore: = **megaspore**.

mallee: a growth habit in which several woody stems arise separately from a lignotuber (usually applied to shrubby eucalypts); a plant having the above growth habit; vegetation dominated by such plants.

mammillate: having small nipple-shaped projections.

marcescent: withering without falling off.

marginal: occurring at or very close to the margin.

medifixed: attached by or at the middle, *e.g. of anthers*,with filament attached at the middle of the connective. *cf.* **basifixed**, **versatile**.

megagametophyte: a plant body or cell lineage, formed by vegetative growth of the megaspore, that produces the female gametes of a heterosporous plant.

megasporangium: the larger of the two kinds of sporangia produced in the sexual life cycle of a heterosporous plant.

megaspore: the larger of the two kinds of spores produced in the sexual life cycle of a heterosporous plant, giving rise to the female gametophyte.

megasporophyll: a specialised leaf upon which (or in the axil of which) one or more megasporangia are borne.

meiosis: the two-stage division of a diploid nucleus, occurring once in every sexual life cycle, in which gene recombination occurs and the number of chromosomes characteristic of the sporophyte plant is halved prior to the production of gametes.

mellitophily: an insect-flower pollination syndrome involving bees.

mentum: *in Orchidaceae*, a spur formed by extension of the base of the column.

mericarp: one segment of a fruit that breaks at maturity into units derived from the individual carpels. *cf.* **schizocarp**.

meristem: growing regions of a plant in which cells that have retained their embryonic characteristics, or have reverted to them secondarily, divide to produce new cells.

-mery: the number of parts per whorl that characterises a particular flower (generally constant for the perianth whorls and less often for the whorl(s) of stamens also). adj. **-merous**.

mesocarp: the fleshy portion of the wall of a succulent fruit inside the skin and outside the stony layer, if any, surrounding the seed(s).

mesophyll: photosynthetic tissue of a green plant; *of vegetation*, characteristic of moist habitats and with soft, fairly large leaves predominating; a leaf with an area within the approximate range 20–180 cm^2.

microgametophyte: a plant body or cell lineage, formed by vegetative growth of the microspore, that produces the male gametes of a heterosporous plant.

microphyll: small leaf.

micropyle: a small canal through the integument(s) of an ovule, persisting as a pore in the seed coat.

microsporangium: the smaller of the two kinds of sporangia produced in the sexual life cycle of a heterosporous plant.

microspore: the smaller of the two kinds of spores produced in the sexual life cycle of a heterosporous plant, giving rise to the male gametophyte.

microsporophyll: a specialised leaf upon (or in the axil of) which one or more microsporangia are borne.

midrib: the central, and usually the most prominent, vein of a leaf or leaf-like organ.

monadelphous: *of stamens*, united by their filaments into one bundle.

moniliform: cylindrical but constricted at regular intervals like a string of beads.

monocarpic: flowering and fruiting only once during its life span.

monochasium: a cymose inflorescence with the branches arising singly. *cf.* **dichasium**.

monochlamydeous: *of a flower*, having only one whorl of perianth parts.

monoclinous: having male and female reproductive organs in the same flower.

monocotyledon: a flowering plant whose embryo has only one cotyledon (seed leaf). *cf.* **dicotyledon**.

monoecious: having the male and female reproductive structures in separate flowers but on the same plant. *cf.* **dioecious**.

monophyletic: derived from a single ancestral line. *cf.* **polyphyletic**.

monopodial: *of growth*, with a persistent terminal growing point producing many lateral organs successively; *of a stem*, growing in the above manner. *cf.* **sympodial**.

monotypic: containing only one taxon of the next lower rank (*e.g.* applied to a family containing only one genus). *cf.* **polytypic**.

morphocline: a graded series of character states of an homologous character.

morphology: the form and structure of an organism or part of an organism; the study of form and structure.

motile: actively moving; self-propelled.

mucilage: slimy material exuded by certain plants or plant organs. adj. **mucilaginous**.

mucous: slimy.

mucro: a sharp, abrupt terminal point. adj. **mucronate**.

mucronulate: with a very small mucro; diminutive of mucronate.

multiplanar: *of divided leaves*, with the lobes held in several to many planes.

muricate: rough on the surface; covered with short, hard tubercles or hard outgrowths of the epidermis.

muriculate: rough with minute, short, hard points.

muticous: pointless, blunt, awnless.

mycorrhiza: a symbiotic union between a fungus and a plant root.

naked: *of sporangia*, not covered by an indusium; *of seeds*, exposed on the surface of a sporophyll (not enclosed within an ovary); *of flowers*, without perianth; *of protoplasts or gametes*, not bounded by a cell wall.

naturalised: introduced and reproducing itself without human assistance. *cf.* **adventive**, **introduced**.

navicular: boat-shaped.

nectary: a gland that secretes nectar. adj. **nectariferous**.

neotype: a specimen or illustration selected to serve in place of a holotype, where all of the material on which the name was originally based is missing or destroyed. *cf.* **lectotype**.

nerve: a vein.

nest-fronds: specialised, shield-like, basal fronds in some ferns (e.g. *Platycerium)*which accumulate leaf-litter.

neuter: sterile (*e.g.* of flowers in which neither the androecium nor the gynoecium is functional in reproduction).

nocturnal: *of flowers*, opening only at night.

node: the level (transverse plane) of a stem at which one or more leaves arise.

nomen conservandum: a name of a family, genus or species that has been formally accepted under the *International Code for Botanical Nomenclature* as the correct name contrary to the usual principles of botanical nomenclature; abbrev. *nom. cons*.

nomen illegitimum: a name which, at the time of its publication, was superfluous (because it included the type of an earlier name which should have been adopted) or had already been applied to another plant; abbrev. *nom. illeg*.

nomen nudum: a name published without a diagnosis or description of the entity to which it was applied, and without reference to either; abbrev. *nom. nud*.

nomen rejiciendum: a name rejected in favour of a 'nomen conservandum'; abbrev. *nom. rej*.

nucellus: the central tissue of an ovule, within which the megaspore mother cell is formed.

nut: a hard, dry, indehiscent fruit formed from two or more carpels but containing only one seed.

obconical: cone-shaped but attached at the narrower end.

obcordate: *of a leaf blade*, broad and notched at the tip; heart-shaped but attached at the pointed end.

oblanceolate: similar in shape to lanceolate but attached at the narrower end.

obligate: *of parasites*, unable to survive without the host. *cf.* **facultative**.

oblique: *of a leaf or leaflet*, larger on one side of the midrib than on the other, *i.e.* asymmetrical.

obloid: (a three-dimensional shape) with short, parallel sides and rounded ends, as if composed of two hemispheres linked together by a short cylinder.

oblong: having the length greater than the width but not many times greater, and the sides parallel.

obovate: similar in shape to ovate but attached at the narrower end.

obsolescent: non-functional but not reduced to a rudiment.

obsolete: reduced to a rudiment, or completely lacking. *cf.* **rudimentary**, **vestigial**.

obtuse: blunt or rounded at the apex, the converging edges separated by an angle greater than 90°.

ochrea: a sheath, formed from two stipules, encircling the node in Polygonaceae.

ontogeny: the development of a single organism, *i.e.* the sequence of stages through which it passes during its lifetime.

operculum: a lid or cover becoming detached at maturity by abscission; *in Eucalyptus*, a cap covering the bud and formed by fusion or cohesion of perianth parts.

opposite: *of leaves*, borne at the same level but on opposite sides of the stem; *of floral parts*, on the same radius. *cf.* **alternate**.

orbicular: circular or nearly so.

order: a taxonomic grouping of families believed to be closely related (sometimes a single family with no apparent close relatives); the major taxonomic rank between family and class.

orthotropous: *of an ovule*, erect so that the micropyle points away from the placenta.

ostiole: an opening or pore, *e.g.* at the apex of a fig.

ovary: the basal portion of a carpel or group of fused carpels, enclosing the ovule(s).

ovate: a two dimensional shape, like a section through the long axis of an egg, and attached by the wider end. *cf.* **ovoid**.

ovoid: egg-shaped (in three dimensions). *cf.* **ovate**.

ovulate: with ovules.

ovule: a structure in a seed plant within which one or more megaspores are formed and which develops into a seed after fertilisation.

ovuliferous: bearing ovules (*e.g.* applied to scales in a megasporangiate cone in gymnosperms).

ovulode: sterile structures on the placenta.

palea: *in a grass floret*, the upper one of the two bracts enclosing a flower.

palmate: *of a leaf*, divided into several leaflets which arise at the same point.

palmatifid: *of a leaf*, deeply (but not completely) divided into several lobes which arise (almost) at the same level. *cf.* **pinnatifid**, **palmate**, **palmatisect**.

palmatinerved: *of leaves*, palmately nerved, *i.e.* with the (main) nerves radiating from one basal point.

palmatisect: a condition intermediate between palmate and palmatifid, with the green tissue of the lamina completely divided into several segments, but the segments not fully separated at the base.

palynology: the scientific study of pollen.

pandurate: fiddle-shaped.

panicle: a compound raceme; an indeterminate inflorescence in which the flowers are borne on branches of the main axis or on further branches of these.

paniculate: indeterminate and much branched.

pantoporate: *of a pollen grain*, with rounded apertures all over the surface.

papilla: a small, elongated protuberance on the surface of an organ, usually an extension of one epidermal cell. adj. **papillose**.

pappus: a tuft (or ring) of hairs or scales borne above the ovary and outside the corolla in Asteraceae and possibly representing the calyx; a tuft of hairs on a fruit.

parapatric: *of distributions of two taxa or populations*, having non-overlapping but contiguous ranges.

paraphyletic: a group of taxa derived from a single ancestral taxon, but which does not contain all the descendants of the most recent common ancestor.

paraphyses: sterile filaments in the fruiting bodies of non-vascular plants.

parasite: an organism living on or in a different organism and deriving nourishment from it. *cf.* **saprophyte**, **epiphyte**.

paratype: a specimen or illustration, other than the holotype, isotype or one of the syntypes, that was cited with the original publication of a name.

parenchyma: plant tissue consisting of mature, living cells that are relatively unspecialised in function.

parietal: attached to the margins of a structure; *of placentation*, having the ovules attached to placentas on the wall of the ovary.

paripinnate: having an even number of pinnae by virtue of having a pair in the terminal position. *cf.* **imparipinnate**.

-partite: divided, almost to the base, into segments (commonly applied to a style).

pectinate: comb-like.

pedate: *of a palmate or palmately-lobed leaf*, having the lateral segments divided again.

pedicel: the stalk of a flower. adj. **pedicellate**.

peduncle: the stalk of an inflorescence; *in ferns*, the stalk of a sporocarp. adj. **pedunculate**.

pellucid: transparent.

peloric: actinomorphic, *of a flower which, from its taxonomic context, would be expected to be zygomorphic,* e.g. in Orchidaceae.

peltate: *of a leaf*, having the stalk attached to the lower surface of the blade, not to the margin (also applied, in the same sense, to other stalked structures).

pendulous: drooping; *of ovules*, attached at the top of the ovary and hanging downwards from an apical placenta.

penicillate: pencil-shaped; tufted like an artist's brush.

penninerved (= **penniveined**): having conspicuous lateral veins divergent from the midrib and lying approximately parallel to each other.

pentamerous: *of a flower*, having five parts in each floral whorl (not necessarily including the gynoecium).

pepo: *literally*, a pumpkin (Latin); a fruit with firm skin, pulpy interior, many seeds and a single locule.

perennate: maintain a dormant, vegetative state throughout non-growing seasons.

perennial: a plant whose life span extends over more than two growing seasons.

perfoliate: *of a sessile leaf or bract*, having its base completely wrapped around the stem.

perianth: the calyx and corolla of a flower, especially where the two are similar.

pericarp: the wall of a fruit, developed from the ovary wall.

perigynous: *of perianth segments and stamens*, arising from a cup or tube (hypanthium) that is free from the ovary but extending above its base. *cf.* **hypogynous**, **epigynous**.

perisperm: nutritive tissue in an angiospermous seed, formed from the nucellus. *cf.* **endosperm**.

persistent: remaining attached to the plant beyond the expected time of falling (*e.g.* of sepals not falling after flowering).

petal: a member of the inner whorl of non-fertile parts surrounding the fertile organs of a flower, usually soft and coloured conspicuously.

petaloid: like a petal; soft in texture and coloured conspicuously.

petiole: the stalk of a leaf.

petiolule: the stalk of a leaflet.

phalange: a bundle comprising several structures fused together; a group of connate carpels, *e.g.* in Pandanaceae.

phanerogam: (literally) a plant with conspicuous reproductive parts; a plant reproducing by seeds. *cf.* **cryptogam**.

phenotype: the physical characteristics of an organism; the outward expression of characteristics conferred on an organism by its genotype. *cf.* **genotype**.

phloem: the tissue in the conducting system of a plant through which metabolites (products of chemical reactions in the plant) are transported.

phyllichnium: *in Casuarinaceae*, the ridge of a branchlet segment; pl. **phyllichnia**.

phylloclade: a very leaf-like, photosynthetic stem of a plant whose true leaves are much reduced. *cf.* **cladophyll**.

phyllode: a leaf whose blade is much reduced or absent, and whose petiole and rachis have assumed the functions of the whole leaf. *cf.* **cladode**.

phyllotaxy: the arrangement of leaves on a stem (when spiral, often expressed quantitatively as the fraction of the circumference of the stem that separates two successive leaves).

phylogeny: the evolutionary development of a plant group, *i.e.* its derivation from its ancestors and the relationship among its members. adj. **phylogenetic**.

phylum: an alternate name for division, the major taxonomic rank below kingdom.

pilose: hairy, the hairs soft and clearly separated but not sparse.

pinna: a primary segment of the blade of a compound leaf. pl. **pinnae**.

pinnate: divided into pinnae; once-compound. *cf.* **bipinnate**, **tripinnate**.

pinnatifid: cut deeply (but not to midrib) into lobes that are spaced out along the axis (of the leaf). *cf.* **palmatifid**.

pinnatipartite: *of leaves*, pinnatifid, where the lobes pass beyond the middle (or are within the middle third) and the parenchyma is not interrupted.

pinnatisect: dissected down to the midrib but having the segments confluent with it.

pinnule: a leaflet of a bipinnate leaf.

pistil: a free carpel or a group of fused carpels.

pistillode: a sterile pistil, often rudimentary.

pith: the central region of a stem, inside the vascular cylinder.

placenta: a region, within an ovary, to which ovules are attached.

placentation: the arrangement of placentas, and hence of ovules, within an ovary.

plesiomorphic: *of a character,* ancestral or primitive.

plicate: folded back and forth longitudinally like a fan.

plietesial: monocarpic but living for several years before flowering.

plumose: like a feather; with fine hairs branching from a central axis.

plumule: the portion of an embryo that gives rise to the shoot system (as distinct from the root system) of a plant. *cf.* **radicle**.

pneumatophore: an air-vessel; an organ containing aerenchyma; *in particular*, a root of a mangrove plant, growing above the substratum.

pod: a leguminous fruit.

pollen: the microspores of seed plants; the powdery mass of microspores shed from anthers.

pollen-grain: see grain.

pollen presenter: *of many Proteaceae*, a structural modification, usually a swelling, of the style around or below the stigma which enables pollen, shed in the bud, to be retained.

pollen-sac: see sac.

pollination: the transfer of pollen from the male organ, where it is formed, to the receptive region of a female organ, *e.g.* from anther to stigma.

pollinarium: the complex structure found in flowers of Asclepiadaceae where the pollen masses of the two adjacent anther-lobes (thecae) are united for dispersal as a unit. The pollinarium consists of two pollinia, two caudicles and a corpusculum. pl. **pollinaria**.

pollinium: a cohering mass of pollen grains from one anther-lobe (theca), transferred as a unit in pollination. pl. **pollinia**.

polygamodioecious: with bisexual and male flowers on some plants, and bisexual and female flowers on others.

polygamomonoecious: with bisexual flowers and unisexual flowers of both sexes on the same plant.

polygamous: having bisexual and unisexual flowers on the same or different plants.

polymorphic: having more than two distinct morphological variants.

polypetalous: with free petals. *cf.* **gamopetalous**.

polyphyletic: composed of members that originated, independently, from more than one evolutionary line. *cf.* **monophyletic**.

polyploid: having more than two of the basic sets of chromosomes in the nucleus.

polytypic: containing more than one taxon of the next lower rank. *cf.* **monotypic**.

pome: a fleshy (false) fruit, formed from an inferior ovary, in which the receptacle or hypanthium has enlarged to enclose the true fruit.

porate: *of a pollen grain*, with rounded apertures only. *cf.* **colporate**, **colpate**.

poricidal: *of anthers or capsules*, opening by pores.

porrect: *of a trichome,* having branches spreading more or less horizontally from the top of an erect stalk.

posterior: *of floral parts*, on the side of the flower nearest to the axis. *cf.* **anterior**.

praemorse: appearing bitten off at the end.

prickle: a hard, pointed outgrowth from the surface of a plant, involving several layers of cells but not containing a vein.

process: *as part of a plant*, a projecting outgrowth or appendage.

procumbent: trailing or spreading along the ground but not rooting at the nodes.

proliferous: able to reproduce vegetatively from the shoot system, e.g. by stems rooting at the nodes (as in *Conostylis)*; producing plantlets on leaves or fronds (*Pteris*) or in the inflorescence (*Isolepis).*

propagule: a structure with the capacity to give rise to a new plant, *e.g.* a seed, a spore, part of the vegetative body capable of independent growth if detached from the parent.

prophyll: a leaf formed at the base of a shoot, usually smaller than those formed subsequently.

prostrate: lying flat on the ground.

protandrous: having the male sex organs maturing before the female; *of a flower*, shedding the pollen before the stigma is receptive. *cf.* **protogynous**.

prothallus: a gametophyte body, especially in bryophytes, ferns and related plants.

protogynous: having the female sex organs maturing before the male; *of a flower*, shedding the pollen after the stigma has ceased to be receptive. *cf.* **protandrous**.

proximal: near to the point of origin or attachment. *cf.* **distal**.

pruinose: having a whitish, waxy, powdery bloom on the surface.

pseudanthium: a compact inflorescence of several to many small flowers which simulates a single flower.

pseudo-: false; apparent but not genuine.

puberulous: covered with minute, soft, erect hairs.

pubescent: covered with short, soft, erect hairs.

pulverulent: as though dusted over with powder.

pulvinate: cushion- or pad-shaped, resembling a pulvinus.

pulvinus: a swelling at the base of the stalk of a leaf or leaflet, often glandular or responsive to touch.

punctate: marked with dots.

puncticulate: minutely dotted.

pungent: ending in a stiff, sharp point; having an acrid taste or smell.

pustulate: covered with small pustule- or blister-like elevations.

pyrene: the 'stone' (endocarp plus seed) of a succulent fruit. *cf.* **berry**, **drupe**.

quincuncial: *of the arrangement of corolla lobes in a bud*, a variant of imbricate aestivation.

raceme: an indeterminate inflorescence in which a main axis produces a series of flowers on lateral stalks, the oldest at the base and the youngest at the top. adj. **racemose**.

racemule: secondary raceme in a compound raceme or umbellate inflorescence.

rachilla: (= **rhachilla**) *of palms and woody monocotyledons*, the lateral or secondary branches of the inflorescence; *of a grass spikelet*, the axis above the glumes.

rachis: (= **rhachis**) the axis of an inflorescence or a pinnate leaf; pl. **rachises**. **secondary rachis:** the axis of a pinna in a bipinnate leaf.

radical: *of leaves*, clustered at the base of the stem.

radicle: the portion of an embryo that gives rise to the root system of a plant. *cf.* **plumule**.

ramiflorous: *of flowers and fruits*, borne below the current leaves on recently formed woody branches. *cf.* **cauliflorous**.

raphe: the part of the stalk of an anatropous ovule that is fused along the side of the ovule.

raphides: needle-like crystals that occur in bundles in the vacuoles of some plant cells.

ray: *in woody stems*, a radial band of cells traversing the conducting elements; *of a compound umbel*, one of the first (lower) series of branches of the inflorescence axis.

ray floret: a zygomorphic flower in Asteraceae.

receptacle: the axis of a flower (= **torus**); *in ferns*, an axis on which sporangia arise.

recurved: curved or curled downwards or backwards.

reflexed: bent sharply downwards or backwards.

regular: see actinomorphic.

reniform: kidney-shaped.

replum: a longitudinal partition in an ovary, formed between parietal placentas.

resupinate: twisted through 180°, *e.g.* as with the ovary of most Orchidaceae.

reticulate: forming a network.

retinaculum: a hook-like structure to which another structure is tethered; *in Orchidaceae and Asclepiadaceae*, the structure to which pollen masses are attached; *in Acanthaceae*, the persistent stalk of an ovule.

retrorse: bent, and pointing away from the apex. *cf.* **antrorse**.

retuse: with a very blunt and slightly notched apex.

revolute: rolled downwards or backwards; *of a leaf lamina*, with the margins rolled towards the abaxial surface. *cf.* **involute**.

rhachilla: see rachilla.

rhachis: see rachis.

rhipidium: a compound cyme with the lateral branches developed alternately on one side and then the other.

rhizoid: a thread-like, unicellular absorbing structure occurring, in the vascular plants, in gametophytes of ferns and some related plants.

rhizome: an underground stem, usually growing horizontally.

rhizophore: *in Selaginella*, a leafless stem that produces roots.

rhomboid: quadrangular, with the lateral angles obtuse.

root: unit of the axial system of a plant which is usually underground, does not bear leaves, tends to grow downwards and is typically derived from the radicle of the embryo. c.f. **adventitious.**

rootstock: a short, erect, swollen structure at the junction of the root and shoot systems of a plant (loosely: the root system).

rostellum: *in Orchidaceae*, a beak-like upward extension of the stigma.

rostrate: beaked.

rosulate: clustered into a rosette, e.g. of basal leaves of some annual and biennial forbs.

rotate: circular and flattened, *e.g.* of a corolla with a very short tube and spreading lobes.

rudimentary: poorly developed and not functional. *cf.* **vestigial**, **obsolete**.

rugose: deeply wrinkled.

rugulose: covered with minute wrinkles.

ruminate: mottled in appearance, *e.g.* of bark, or of the food reserves in a seed.

runcinate: deeply lobed and with the lobes slanted away from the apex.

runner: a slender, prostrate or trailing stem which produces roots and sometimes erect shoots at its nodes. *cf.* **stolon**.

sac: a pouch or cavity; pollen-sac: a cavity, in an anther, in which pollen is formed; **embryo-sac:** a large, multi-nucleate cell in which an egg nucleus is formed and fertilised, and in which an embryo begins to develop.

saccate: pouched.

sagittate: shaped like an arrow-head.

salverform: *of a sympetalous corolla*, salver-shaped, i.e. with a slender tube and abruptly expanded flat, rotate limb (like the corolla of *Primula*).

samara: a dry, indehiscent fruit with its wall expanded into a wing.

saprophyte: an organism deriving its nourishment from dead organic matter and usually lacking chlorophyll. *cf.* **epiphyte**, **parasite**.

scaberulous: slightly or minutely rough to the touch, minutely scabrous.

scabridulous: slightly rough; diminutive of scabrous.

scabrous (= **scabrid**)**:** rough to the touch.

scalariform: having a ladder-like pattern.

scale: a reduced or rudimentary leaf, *e.g.* surrounding a dormant bud; a thin flap of tissue of epidermal origin, *e.g.* at the base of a stamen in Simaroubaceae; a thin scarious trichome which is flattened and variously shaped.

scandent: climbing.

scape: the stem-like, flowering stalk of a plant with radical or rosulate leaves.

scarious: dry and membranous.

schizocarp: a dry fruit formed from more than one carpel but breaking apart into 1-carpel units when ripe. *cf.* **mericarp**.

sclerenchyma: mechanical tissue with heavily thickened cell walls.

sclereid: a cell (usually elongated) with a strongly lignified wall.

scleromorph: a plant whose leaves (or stems, if leafless) are hard in texture, usually having thick cuticle and containing many fibres. *cf.* **xeromorph**.

sclerophyllous: with leaves stiffened by sclerenchyma.

scorpioid: *of a cymose inflorescence*, branching alternately on one side and then the other, with the main axis coiled like the tail of a scorpion. *cf.* **helicoid**.

scribble: irregular lines on the bark of some eucalypts, being the old tunnels burrowed by moth larvae between bark layers and exposed when the outer layer falls.

secund: with all the parts grouped on one side or turned to one side (applied especially to the grouping of flowers in an inflorescence or stamens in a flower).

seed: a propagating organ formed in the sexual reproductive cycle of gymnosperms and angiosperms, consisting of a protective coat enclosing an embryo and food reserves.

segment: a part or sub-division of a divided organ; one of a group of similar organs named collectively, *e.g.* one petal = a segment of a corolla.

semicraspedodromus: pinnate venation in which the secondary veins branch just inside the margin, one of the branches terminating at the margin, the other joining the superadjacent secondary vein.

sepal: a member of the (usually green) outer whorl of non-fertile parts surrounding the fertile organs of a flower.

sepaloid: looking like sepals, *e.g. of bracts*, usually green and arranged in a ring beneath a flower.

septate: divided internally by partitions.

septicidal: *of the dehiscence of a fruit*, along lines coinciding with the partitions between loculi. *cf.* **loculicidal**.

septifragal: *of the dehiscence of a fruit*, the valves or backs of the carpels breaking away leaving the septa intact.

septum: a partition. pl. **septa**.

seriate: in rows or whorls.

sericeous: silky; covered with silky hairs.

serrate: toothed, with asymmetrical teeth pointing forward.

serrulate: finely serrate.

sessile: without a stalk (when applied to a stigma, indicates that the style is absent, the stigma being 'sessile' on the ovary).

seta: a bristle or stiff hair; terminal seta: an appendage to the tip of an organ, *e.g.* to the primary rachis of a bipinnate leaf in *Acacia*. adj. **setaceous**.

setiferous: bearing setae.

setose: covered with bristles.

setulose: covered with fine bristles; resembling a fine bristle.

shrub: a woody plant less than 5 metres high, either without a distinct main axis, or with branches persisting on the main axis almost to its base.

sigmoid: doubly curved in opposite directions like the letter S.

siliceous: containing silica.

silicula: a short siliqua, not more than twice as long as its width.

siliqua: a dry, dehiscent fruit formed from a superior ovary of two carpels, with two parietal placentas and divided into two loculi by a false septum between the placentas.

simple: undivided; *of a leaf*, not divided into leaflets; *of a hair or an inflorescence*, not branched.

sinistrorse: turned towards the left. cf. **dextrorse**

sinuate: with deep, wave-like depressions along the margin. *cf.* **undulate**.

sinus: a notch or depression in the margin of an organ.

solitary: *of flowers*, borne singly, not grouped in an inflorescence.

sorus: *in ferns*, a discrete group of sporangia. pl. **sori**.

spadix: a spicate inflorescence with a stout, often succulent axis.

spathaceous: like a spathe; with a spathe.

spathe: a large bract ensheathing an inflorescence.

spathella: a closed membranous sac which envelopes the immature flower in some Podostemaceae, rupturing irregularly as the pedicel elongates at anthesis.

spathulate (= **spatulate**)**:** spoon-shaped; broad at the tip and narrowed towards the base.

species: a taxon comprising one or more populations of individuals capable of interbreeding to produce fertile offspring.

spike: an unbranched, indeterminate inflorescence in which the flowers are without stalks. adj. **spicate**.

spikelet: a unit of the inflorescence in grasses, sedges and some other monocotyledons, consisting of one to many flowers and associated glumes.

spine: a stiff, sharp-pointed structure, formed by modification of a plant organ, *e.g.* a lateral branch or a stipule.

spinescent: ending in a spine; modified to form a spine.

spinose: bearing spines.

spiral: *of leaves or floral organs*, borne at different levels on the axis, in an ascending spiral. *cf.* **cyclic**.

sporangiate: bearing spores (or pollen).

sporangiophore: the stalk of a sporangium; *in Botrychium*, the branched axis bearing sporangia.

sporangium: a structure within which spores are formed. pl. **sporangia**.

spore: a simple propagule, produced either sexually or asexually, and consisting of one or a few cells.

sporocarp: a fruiting body containing sporangia.

sporogenous: *of cells or tissues*, spore-generating.

sporophyll: a specialised leaf-like organ on which one or more sporangia are borne.

sporophyte: a plant, or phase of a life cycle, that bears the spores formed during the sexual reproductive cycle.

spur: a tubular pouch at the base of a perianth part, often containing nectar.

stamen: one of the male organs of a flower, consisting typically of a stalk (filament) and a pollen-bearing portion (anther). adj. **staminate**.

staminal corona: fleshy outgrowths of tissue, attached dorsally to the staminal column at the base of the filaments or on the backs of the anthers. cf. **gynostegial corona**.

staminode: a sterile stamen, often rudimentary, sometimes modified (e.g. petaloid).

staminophore: a band of tissue around the apex of the hypanthium in a eucalypt flower, on which the stamens are inserted.

standard: (= **vexillum**)**:** the posterior petal in the flower in Fabaceae and Caesalpiniaceae.

stellate: star-shaped; consisting of star-shaped cells.

stem: the main axis or a branch of the main axial system of a plant, developed from the plumule of the embryo and typically bearing leaves.

stigma: the pollen-receptive surface of a carpel or group of fused carpels, usually sticky.

stipe: a small stalk; *in ferns*, the petiole of a frond.

stipel: stipule-like appendage at the base of a leaflet (in unifoliolate leaves, inserted on the petiole, not on the stem). pl. **stipellae**. adj. **stipellate**.

stipitate: stalked; borne on a stipe; *of an ovary*, borne on a gynophore.

stipule: one of a pair of appendages at the bases of leaves in many dicotyledons.

stolon: a prostrate or trailing stem that produces roots at the nodes. *cf.* **runner**.

stoloniferous: having stolons; trailing over the soil surface and rooting at the nodes.

stoma: a pore; a pore in the epidermis of a leaf or other aerial organ, providing for gaseous exchange between the tissues and the atmosphere. pl. **stomata**.

stomium: a region of dehiscence, *e.g.* of an anther in flowering plants. pl. **stomia**.

stone cell: a ±isodiametric sclereid.

stramineous: straw coloured.

striate: striped with parallel longitudinal lines or ridges.

strigose: with sharp, stiff hairs which are appressed to the surface.

strigulose: minutely strigose.

strobilus: a 'cone' consisting of sporophylls borne close together on an axis.

strophiole: see caruncle.

struma: a cushion-like swelling, *e.g.* at the apex of staminal filaments in *Dianella*.

style: an elongated part of a carpel, or group of fused carpels, between the ovary and the stigma.

stylopodium: a disc-like enlargement of the base of the style.

subulate: narrow and tapering gradually to a fine point.

sulcate: grooved; furrowed.

superior: *of an ovary*, borne above the level of attachment of the other floral parts, or above the base of a cup (hypanthium) that is free from the ovary and bears the perianth segments and stamens. *cf.* **inferior**.

suture: a line of junction between two fused organs; a line of dehiscence.

syconium: a multiple fruit with a hollow centre, *e.g.* in *Ficus* (fig).

sympatric: *of two or more species*, having coincident or overlapping ranges of distribution. *cf.* **allopatric**.

sympetalous: (= **gamopetalous**)**:** with the petals united by their margins, at least at the base. *cf.* **polypetalous**.

sympodial: *of growth*, without a single, persistent growing point; changing direction by frequent replacement of the growing apex by a lateral growing point below it; *of a stem*, growing in the above manner. *cf.* **monopodial**.

synandrium: an androecium with the anthers of the stamens cohering. *cf.* **syngenesious**.

synangium: a group of fruits fused into a single structure; *in ferns*, a group of fused sporangia.

synapomorphic: the common possession by two taxa of a derived, homologous character.

syncarp: a structure consisting of several united fruits, usually fleshy. *cf.* **aggregate fruit**.

syncarpous: *of a flower*, having two or more carpels, all fused together.

syngenesious: *of the stamens of one flower*, fused together by the anthers *e.g.* in Asteraceae. *cf.* **monadelphous**.

syntepalum: *in some Musaceae*, a unilaterally split tube formed by the coherence of 3 sepals and 2 petals.

syntype: one of two or more specimens cited by the author at the time of publication of a name if no holotype was designated; any one of two or more specimens simultaneously designated as types.

tannin: a complex, aromatic compound occurring in the bark of many shrubs and trees.

tanniniferous: producing tannins.

taproot: the main, descending root of a plant that has a single, dominant root axis.

taxon: a group or category, at any level, in a system for classifying plants or animals. pl. **taxa**.

tendril: a slender climbing organ formed by modification of a part of a plant, *e.g.* a stem, a leaf or leaflet, a stipule.

tenuiexinous: *of a pollen grain*, with a thin exine.

tepal: a perianth segment in a flower in which all the perianth segments are similar in appearance.

terete: cylindrical or nearly so; circular in cross-section.

terminal: at the apex or distal end.

ternate: in groups of three; *of leaves*, arranged in whorls of three; *of a single leaf*, having the leaflets arranged in groups of three.

ternatifid: *of leaves*, deeply cut into three lobes.

terrestrial: of or on the ground; *of the habitat of a plant*, on land as opposed to in water, or on the ground as opposed to on another plant.

testa: a seed coat.

tetrad: a group of four; four pollen grains remaining fused together at maturity, *e.g.* in Ericaceae, Epacridaceae.

tetradynamous: *of an androecium*, consisting of four stamens of the same length and two of a different length.

tetramerous: *of a flower*, having four segments in each perianth whorl, and usually four in each whorl of stamens also.

thallus: the vegetative body of a plant that is not differentiated into organs such as stems and leaves, *e.g.* the gametophytes of ferns, and Lemnaceae.

thigmotaxis: a response, by movement or growth, to a mechanical stimulus, e.g. the leaves of 'Sensitive Plant' (*Mimosa*), the leaf hairs of *Drosera*, or the tendrils of many climbing plants. adj. **thigmotactic**.

thorn: a modified plant organ, especially a stem, that is stiffened and terminates in a pungent point.

throat: *of a corolla tube*, the top, where the tube joins the lobes.

thyrse: a branched inflorescence in which the main axis is indeterminate and the lateral branches determinate in their growth.

tomentellous: minutely tomentose.

tomentum: a covering of dense, matted, woolly hairs. adj. **tomentose**.

torus: see receptacle.

trabecula: a transverse partition dividing or partly dividing a cavity.

translator: applied to parts of a pollinarium, comprising the central part or corpusculum, and the arm-like structures or caudicles uniting the corpusculum with the pollinia.

trapeziform: having four straight unequal sides.

tree: a woody plant at least 5 metres high, with a main axis the lower part of which is usually unbranched.

trichome: an epidermal outgrowth, *e.g.* a hair (branched or unbranched), a papilla.

trichotomous: branching almost equally into three parts.

trifid: deeply divided into three parts.

trifoliate: having three leaves.

trifoliolate: *of a leaf*, having three leaflets.

trigonous: triangular in cross-section and obtusely-angled. *cf.* **triquetrous**.

trimerous: *of a flower*, having three segments in each perianth whorl and usually three in each whorl of stamens also.

tripartite: divided into three parts.

tripinnate: *of leaves*, thrice pinnately divided.

triplicate: folded three times.

triquetrous: triangular in cross-section and acutely-angled; with three distinct longitudinal ridges. *cf.* **trigonous**.

tristichous: arranged in three rows on a stem, each row in the same plane.

tristylous: heterostylous species having three style lengths (short, mid, long), the flowers of any one plant having styles of the same length.

trulliform: shaped like a bricklayer's trowel, i.e. angular-ovate, broadest below the middle, rhomboid with the two lower equal sides shorter than the upper.

truncate: with an abruptly transverse end, as if cut off.

tuber: a storage organ formed by swelling of an underground stem or the distal end of a root.

tubercle: a small wart-like outgrowth.

tuberculate: covered with tubercles.

tuberous: swollen; *of roots*, tuber-like.

tumid: swollen; inflated.

tunic: *of a bulb or corm,* the thin membranous or fibrous outer layers.

turbinate: top-shaped, obconical.

turgid: swollen due to high water content. *cf.* **flaccid**.

type: a designated representative (standard) for a plant name. *cf.* **isotype**, **holotype**, **neotype**, **syntype**.

umbel: a racemose inflorescence in which all the individual flower stalks arise in a cluster at the top of the peduncle and are of about equal length.

umbellule: secondary umbel in a compound umbellate inflorescence.

uncinate: terminating in a hooked point.

undulate: wavy, *i.e.* not flat. *cf.* **sinuate**.

unifoliate: having one leaf.

unifoliolate: *of a leaf*, basically compound, but reduced to only one leaflet.

unilateral: *of stamens*, with anthers grouped on one side of the style.

unilocular: *of an ovary, anther or fruit*, having only one internal cavity.

unisexual: bearing only male or only female reproductive organs.

united: fused together.

urceolate: urn-shaped.

utricle: a small bladder; a membranous bladder-like sac enclosing an ovary or fruit.

valvate: *of sepals or petals in a bud*, meeting edge to edge, not overlapping. *cf.* **imbricate**.

valve: a portion of an organ that has fragmented; *of a capsule*, the teeth-like portions into which the dehiscing part of the pericarp splits at maturity.

vascular: specialised for conduction of fluids; vascular plants: plants containing specialised conducting tissues.

vein: a strand of vascular tissue.

velamen: a water-retaining outer layer of the aerial roots of some epiphytes, especially orchids.

velum: a membranous covering; a veil.

venation: the arrangement of veins in a leaf.

ventral: *of a lateral organ*, facing towards the subtending axis; *of a thallus*, facing towards the substratum. *cf.* **dorsal**.

vernation: the arrangement of unexpanded leaves in a bud. *cf.* **aestivation**.

vernicose: varnished.

verrucose: covered with wart-like outgrowths, warted.

verruculose: covered with closely spaced, minute wart-like outgrowths.

versatile: *of anthers*, swinging freely about the point of attachment to the filament, which is approximately central. *cf.* **basifixed**, **medifixed**.

verticil: a whorl or circular arrangement of similar parts around an axis.

verticillaster: a false whorl of opposed cymes.

verticillate: arranged in one or more whorls; a false whorl of flowers in a pair of opposite dense cymes, especially in Lamiaceae.

vesicle: a bladder-like sac or cavity filled with gas or liquid.

vessel: a capillary tube formed from a series of open-ended cells in the water-conducting tissue of a plant.

vestigial: reduced from the ancestral condition and no longer functional. *cf.* **obsolete**, **rudimentary**.

vexillum: (= **standard**).

villous: shaggy with long, weak hairs. *cf.* **hirsute**.

viscid: *of a surface*, sticky; coated with a thick, syrupy secretion.

viscidium: *of orchids*, a viscid part of the rostellum which is clearly defined and removed with the pollinia as a unit, serving to attach the pollinia to an insect or other pollination vector.

viscous: *of a liquid*, not pouring freely; having the consistency of syrup or honey.

viviparous: *of seeds or fruits*, germinating before being shed from the parent plant.

wallum: coastal vegetation on sandy acidic soils, in south-eastern Qld.

whorl: a ring of leaves, bracts or floral parts borne at the same level on an axis.

wing: a membranous expansion of a fruit or seed, which aids dispersal; a thin flange of tissue extended beyond the normal outline of a stem or petiole; a lateral petal of a flower in Fabaceae.

xeromorph: a plant having structural features usually associated with plants of arid habitats (such as hard or succulent leaves) but not necessarily drought-tolerant. *cf.* **scleromorph**, **xerophyte**.

xerophyte: a drought-tolerant plant. *cf.* **xeromorph**.

xylem: the tissue, in a vascular plant, that conducts water and mineral salts from the roots to the leaves.

zygomorphic: *of a flower or calyx or corolla*, bilaterally symmetrical, symmetrical about one plane only, usually the plane that bisects the flower vertically along the longitudinal axis. *cf.* **actinomorphic**, **peloric**.

THE GEOGRAPHICAL SYSTEM

The geographical system to be used in *Species Plantarum* is that of S.Hollis & R.K. Brummitt (1992), *World Geographical Scheme for Recording Plant Distributions*, Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh. Only Level 2 (Regions) and Level 3 (Botanical 'countries') will be used in *Species Plantarum*. See the *Guide for Contributors* section (this volume) for details of conventions used in citing distribution using these codes.

To facilitate use and reference to these geographical units, on the following pages we reproduce (with permission) some of the maps used in the above publication, with a key to the Regional and Country codes.

MAP 1 Europe

10 Northern Europe

- DEN Denmark
- FIN Finland
- FOR Føroyar
- GRB Great Britain
- ICE Iceland
- IRE Ireland
- NOR Norway
- SVA Svalbard
- SWE Sweden

11 Middle Europe

- AUT Austria
- BGM Belgium
- CZE Czechoslovakia
- GER Germany
- HUN Hungary
- NET Netherlands
- POL Poland
- SWI Switzerland

12 Southwestern Europe

- BAL Baleares
- COR Corse
- FRA France
- POR Portugal
- SAR Sardegna
- SPA Spain

13 Southeastern Europe

- ALB Albania
- BUL Bulgaria
- GRC Greece
- ITA Italy
- KRI Kriti
- ROM Romania
- SIC Sicilia
- TUE Turkey-in-Europe
- YUC Yugoslavia

14 East Europe

- BLR Belorussiya
- BLT Baltic States
- KRY Krym
- RUC Russia Central
- RUE Russia East
- RUN Russia North
- RUS Russia South
- RUW Russia Northwest
- UKR Ukraina


SVA
ICE
NORTHERN EUROPE
FOR
NOR
SWE
FIN
RUN
RUE
EAST EUROPE
BLT-ES
RUW
IRE-NI
IRE-IR
DEN
BLT-LA
BLT-LI
RUC
GRB
BLT-KA
BLR
NET
GER
POL
FRA-CI
BGM-BE
BGM-LU
MIDDLE EUROPE
AUT-LI
RUS
FRA-FR
CZE
UKR-UK
SWI
AUT-AU
HUN
UKR-MO
SOUTHWESTERN EUROPE
FRA-MO
ITA-IT
ITA-SM
CRY
POR
SPA-SP
SPA-AN
ROM
YUG
SOUTHEASTERN EUROPE
SAR
BUL
SPA-GI
ITA-VC
TUE
COR
BAL
ALB
GRC
SIC-SI
SIC-MA
KRI

MAP 2 Africa

20 Northern Africa
- ALG Algeria
- EGY Egypt
- LBY Libya
- MOR Morocco
- TUN Tunisia
- WSA Western Sahara

21 Macaronesia
- AZO Azores
- CNY Canary Is.
- CVI Cape Verde
- MDR Madeira
- SEL Selvagens

22 West Tropical Africa
- BEN Benin
- BKN Burkina
- GAM The Gambia
- GHA Ghana
- GNB Guinea-Bissau
- GUI Guinea
- IVO Ivory Coast
- LBR Liberia
- MLI Mali
- MTN Mauritania
- NGA Nigeria
- NGR Niger
- SEN Senegal
- SIE Sierra Leone
- TOG Togo

23 West-Central Tropical Africa
- BUR Burundi
- CAB Cabinda
- CAR Central African Republic
- CMN Cameroon
- CON Congo
- EQG Equatorial Guinea
- GAB Gabon
- GGI Gulf of Guinea Is.
- RWA Rwanda
- ZAI Zaire

24 Northeast Tropical Africa
- CHA Chad
- DJI Djibouti
- ETH Ethiopia
- SOC Socotra
- SOM Somalia
- SUD Sudan

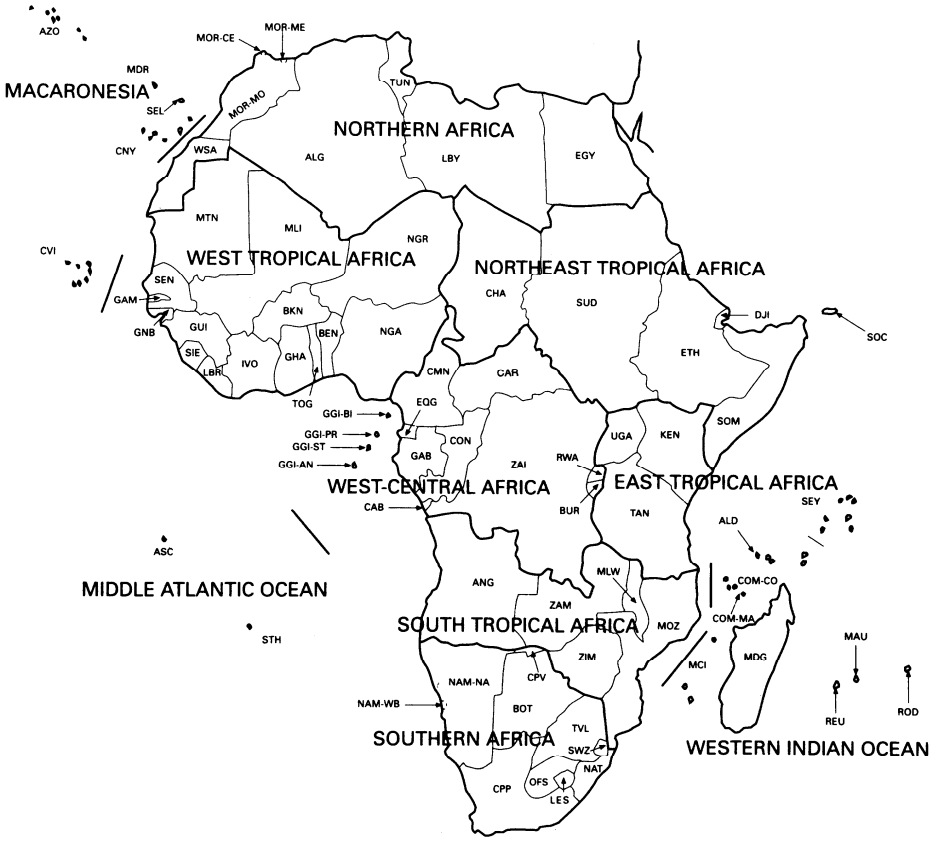
25 East Tropical Africa
- KEN Kenya
- TAN Tanzania
- UGA Uganda

26 South Tropical Africa
- ANG Angola
- MLW Malawi
- MOZ Mozambique
- ZAM Zambia
- ZIM Zimbabwe

27 Southern Africa
- BOT Botswana
- CPP Cape Province
- CPV Caprivi Strip
- LES Lesotho
- NAM Namibia
- NAT Natal
- OFS Orange Free State
- SWZ Swaziland
- TVL Transvaal

28 Middle Atlantic Ocean
- ASC Ascension
- STH St Helena

29 Western Indian Ocean
- ALD Aldabra
- COM Comoros
- MAU Mauritius
- MCI Mozambique Channel Is.
- MDG Madagascar
- REU Réunion
- ROD Rodrigues
- SEY Seychelles


AZO
MOR-CE
MOR-ME
MDR
MACARONESIA
SEL
MOR-MO
TUN
NORTHERN AFRICA
CNY
WSA
ALG
LBY
EGY
MTN
MLI
NGR
CVI
WEST TROPICAL AFRICA
NORTHEAST TROPICAL AFRICA
SEN
CHA
SUD
GAM
BKN
DJI
SOC
GUI
BEN
NGA
GNB
SIE
IVO
GHA
ETH
LBR
CMN
CAR
TOG
GGI-BI
EQG
SOM
GGI-PR
UGA
KEN
GGI-ST
CON
GAB
ZAI
RWA
GGI-AN
WEST-CENTRAL AFRICA
EAST TROPICAL AFRICA
SEY
CAB
BUR
TAN
ALD
ASC
MLW
COM-CO
ANG
MIDDLE ATLANTIC OCEAN
ZAM
COM-MA
SOUTH TROPICAL AFRICA
MOZ
MAU
STH
ZIM
MDG
MCI
NAM-NA
CPV
REU
ROD
NAM-WB
BOT
TVL
SOUTHERN AFRICA
SWZ
WESTERN INDIAN OCEAN
NAT
OFS
CPP
LES

MAP 3 Eastern Europe and the Far East

14 East Europe
- BLR Belorussiya
- BLT Baltic States
- KRY Krym
- RUC Russia Central
- RUE Russia East
- RUN Russia North
- RUS Russia South
- RUW Russia Northwest
- UKR Ukraina

31 Soviet Far East
- AMU Amur
- KAM Kamchatka
- KHA Khabarovsk
- KUR Kuril Is.
- MAG Magadan
- PRM Primorye
- SAK Sakhalin

32 Soviet Middle Asia
- KAZ Khazakhstan
- KGZ Kirgizistan
- TKM Turkmenistan
- TZK Tadzhikistan
- UZB Uzbekistan

33 Caucasus
- NCS North Caucasus
- TCS South Caucasus

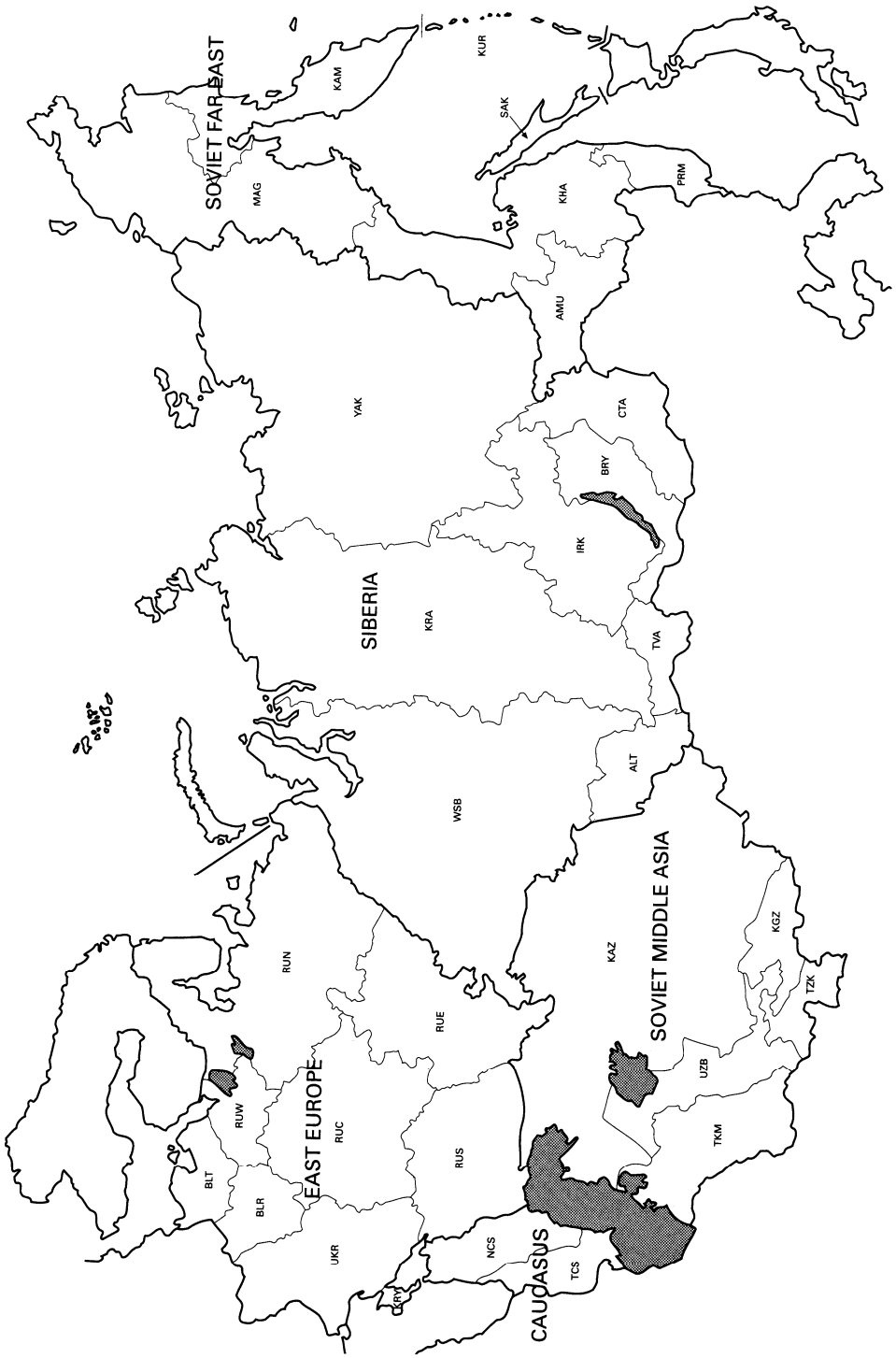
34 Western Asia
- AFG Afghanistan
- CYP Cyprus
- EAI East Aegean Is.
- IRN Iran
- IRQ Iraq
- LBS Lebanon-Syria
- PAL Palestine
- SIN Sinai
- TUR Turkey

35 Arabian Peninsula
- GST Gulf States
- KUW Kuwait
- OMA Oman
- SAU Saudi Arabia
- YEM Yemen

36 China
- CHC China South-Central
- CHH Hainan
- CHI Inner Mongolia
- CHM Manchuria
- CHN China North-Central
- CHS China Southeast
- CHT Tibet-Qinghai
- CHX Xinjiang

37 Mongolia
- MON Mongolia

38 Eastern Asia
- JAP Japan
- KOR Korea
- NNS Nansei-Shoto
- TAI Taiwan


SOVIET FAR EAST
KAM
KUR
SAK
MAG
KHA
PRM
AMU
YAK
CTA
BRY
IRK
SIBERIA
KRA
TVA
ALT
WSB
SOVIET MIDDLE ASIA
KAZ
KGZ
TZK
UZB
TKM
RUN
RUE
RUW
RUC
RUS
EAST EUROPE
BLT
BLR
UKR
NCS
TCS
CRY
CAUCASUS

MAP 4 Middle East and Asia

34 Western Asia
- AFG Afghanistan
- CYP Cyprus
- EAI East Aegean Is.
- IRN Iran
- IRQ Iraq
- LBS Lebanon-Syria
- PAL Palestine
- SIN Sinai
- TUR Turkey

35 Arabian Peninsula
- GST Gulf States
- KUW Kuwait
- OMA Oman
- SAU Saudi Arabia
- YEM Yemen

36 China
- CHC China South-Central
- CHH Hainan
- CHI Inner Mongolia
- CHM Manchuria
- CHN China North-Central
- CHS China Southeast
- CHT Tibet-Qinghai
- CHX Xinjiang

37 Mongolia
- MON Mongolia

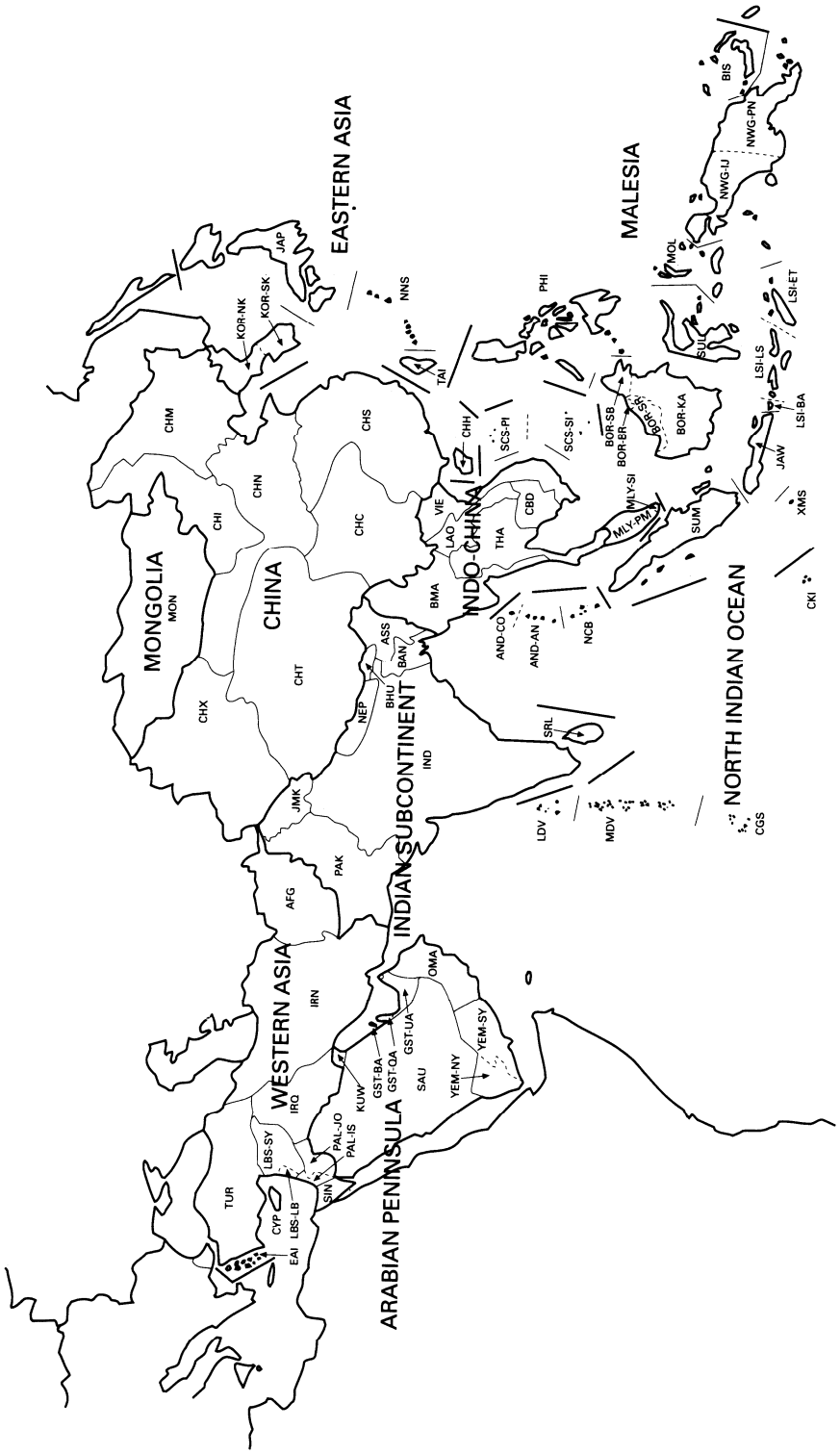
38 Eastern Asia
- JAP Japan
- KOR Korea
- NNS Nansei-Shoto
- TAI Taiwan

40 Indian Subcontinent
- ASS Assam
- BAN Bangladesh
- BHU Bhutan-Sikkim
- IND India
- JMK Jammu-Kashmir
- NEP Nepal
- PAK Pakistan
- SRL Sri Lanka

41 Indo-China
- BMA Burma
- CBD Cambodia
- LAO Laos
- SCS South China Sea
- THA Thailand
- VIE Vietnam

42 Malesia
- BIS Bismarck Archipelago
- BOR Borneo
- JAW Jawa
- LSI Lesser Sunda Is.
- MLY Malaya
- MOL Moluccas
- NWG New Guinea
- PHI Philippines
- SUL Sulawesi
- SUM Sumatera
- XMS Christmas Is.

43 North Indian Ocean
- AND Andaman Is.
- CGS Chagos Archipelago
- CKI Cocos (Keeling) Is.
- LDV Laccadive Is.
- MDV Maldives
- NCB Nicobar Is.


EASTERN ASIA
MALESIA
MONGOLIA
CHINA
INDO-CHINA
INDIAN SUBCONTINENT
WESTERN ASIA
ARABIAN PENINSULA
NORTH INDIAN OCEAN
JAP
KOR-NK
KOR-SK
NNS
PHI
BIS
NWG-PN
NWG-IJ
MOL
SUL
LSI-ET
LSI-LS
LSI-BA
JAW
XMS
CKI
CHM
CHS
CHH
SCS-PI
SCS-SI
BOR-SB
BOR-BR
BOR-SR
BOR-KA
MLY-SI
MLY-PM
SUM
CHI
CHN
CHC
VIE
LAO
CBD
THA
MON
CHX
CHT
BMA
AND-CO
AND-AN
NCB
ASS
BAN
BHU
NEP
IND
SRL
LDV
MDV
CGS
JMK
PAK
AFG
IRN
IRQ
KUW
GST-BA
GST-QA
GST-UA
SAU
OMA
YEM-SY
YEM-NY
PAL-JO
PAL-IS
LBS-SY
LBS-LB
SIN
TUR
CYP
EAI

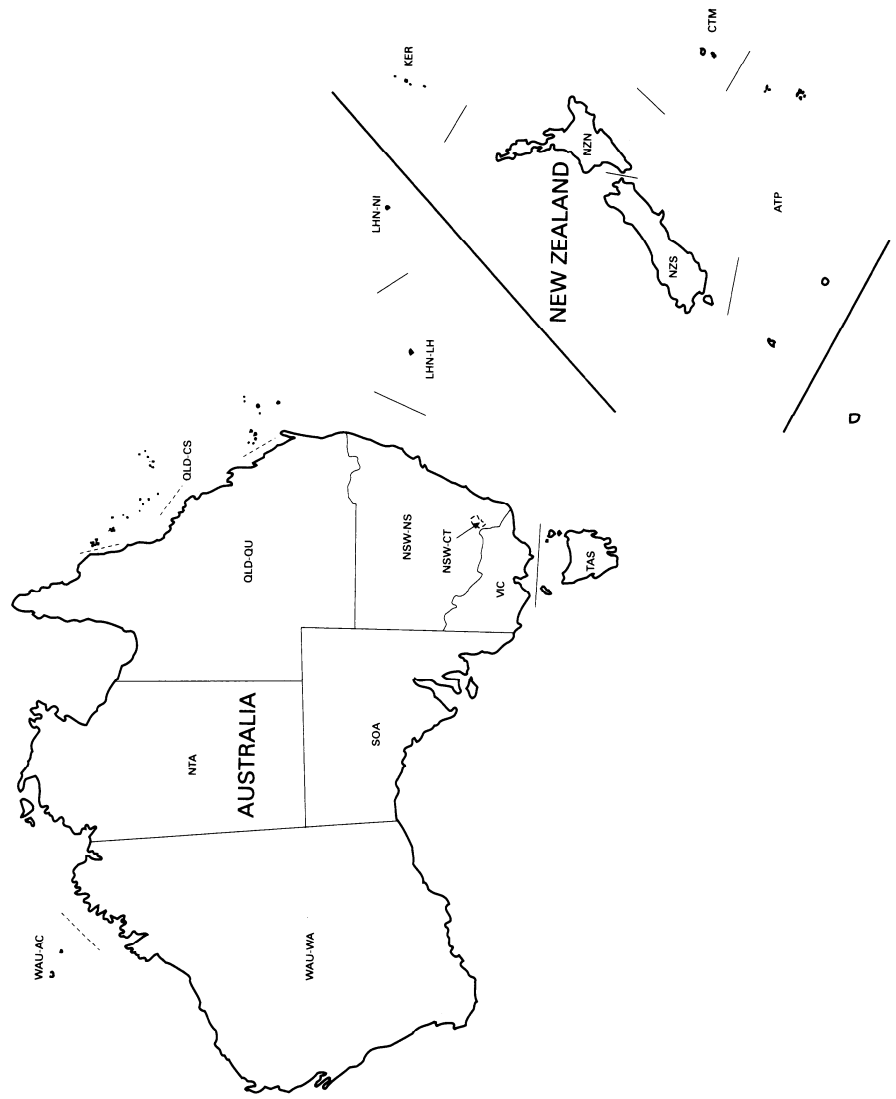
MAP 5 Australasia

50 Australia

- LHN Lord Howe-Norfolk Is.
- NSW New South Wales
- NTA Northern Territory
- QLD Queensland
- SOA South Australia
- TAS Tasmania
- VIC Victoria
- WAU Western Australia

51 New Zealand

- ATP Antipodean Is.
- CTM Chatham Is.
- KER Kermadec Is.
- NZN New Zealand North Is.
- NZS New Zealand South Is.


KER
CTM
LHN-NI
NZN
NEW ZEALAND
ATP
NZS
LHN-LH
QLD-CS
QLD-QU
NSW-NS
NSW-CT
VIC
TAS
AUSTRALIA
NTA
SOA
WAU-AC
WAU-WA

MAP 6 Pacific

60 Southwestern Pacific

- FIJ Fiji
- GIL Gilbert Is.
- HBI Howland-Baker Is.
- NRU Nauru
- NUE Niue
- NWC New Caledonia
- PHX Phoenix Archipelago
- SAM Samoa
- SCZ Santa Cruz Is.
- SOL Solomon Is.
- TOK Tokelau-Manihiki
- TON Tonga
- TUV Tuvalu
- VAN Vanuatu
- WAL Wallis-Futuna Is.

61 South-Central Pacific

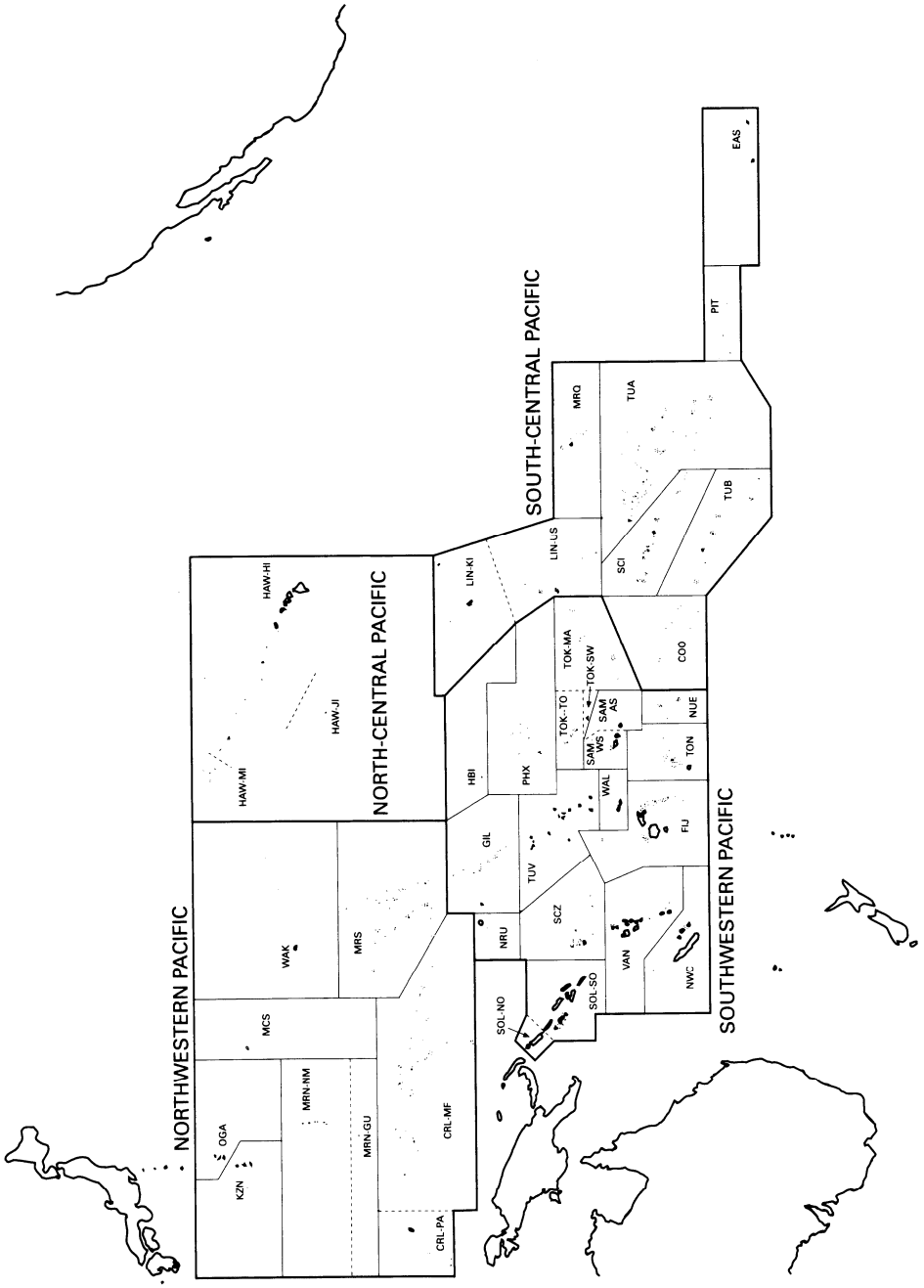
- COO Cook Is.
- EAS Easter Is.
- LIN Line Is.
- MRQ Marquesas
- PIT Pitcairn Is.
- SCI Society Is.
- TUA Tuamotu Is.
- TUB Tubuai Is.

62 Northwestern Pacific

- CRL Caroline Is.
- KZN Kazan-retto
- MCS Marcus Is.
- MRN Marianas
- MRS Marshall Is.
- OGA Ogasawara-shoto
- WAK Wake Is.

63 North-Central Pacific

- HAW Hawaii


NORTHWESTERN PACIFIC
NORTH-CENTRAL PACIFIC
SOUTH-CENTRAL PACIFIC
SOUTHWESTERN PACIFIC
OGA
KZN
MRN-NM
MRN-GU
CRL-MF
CRL-PA
MCS
WAK
MRS
NRU
SOL-NO
SOL-SO
SCZ
VAN
NWC
TUV
GIL
HBI
PHX
HAW-MI
HAW-JI
HAW-HI
LIN-KI
LIN-US
WAL
FIJ
TOK-TO
TOK-MA
TOK-SW
SAM-WS
SAM-AS
TON
NUE
COO
SCI
MRQ
TUA
TUB
PIT
EAS

MAP 7 North America, Central America, Caribbean

70 Subarctic America
- ALU Aleutian Is.
- ASK Alaska
- GNL Greenland
- NWT NW Territories
- YUK Yukon

71 Western Canada
- ABT Alberta
- BRC British Columbia
- MAN Manitoba
- SAS Saskatchewan

72 Eastern Canada
- LAB Labrador
- NBR New Brunswick
- NFL Newfoundland
- NSC Nova Scotia
- ONT Ontario
- PEI Prince Edward Is.
- QUE Quebec

73 Northwestern USA
- COL Colorado
- IDA Idaho
- MNT Montana
- ORE Oregon
- WAS Washington
- WYO Wyoming

74 North-Central USA
- ILL Illinois
- IOW Iowa
- KAN Kansas
- MIN Minnesota
- MSO Missouri
- NDA North Dakota
- NEB Nebraska
- OKL Oklahoma
- SDA South Dakota
- WIS Wisconsin

75 Northeastern USA
- CNT Connecticut
- INI Indiana
- MAI Maine
- MAS Massachusetts
- MIC Michigan
- NWH New Hampshire
- NWJ New Jersey
- NWY New York
- OHI Ohio
- PEN Pennsylvania
- RHO Rhode Is.
- VER Vermont
- WVA West Virginia

76 Southwestern USA
- ARI Arizona
- CAL California
- NEV Nevada
- UTA Utah

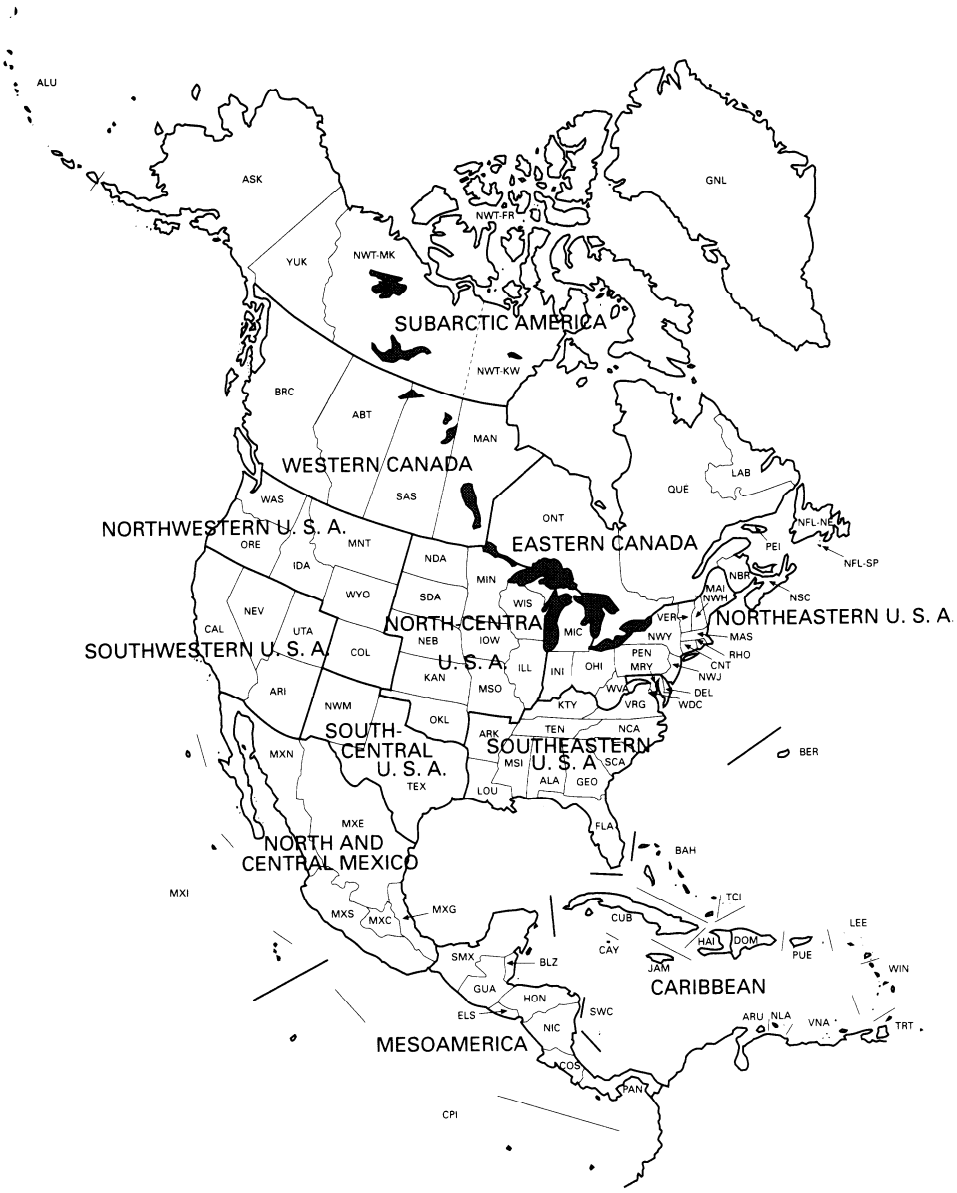
77 South-Central USA
- NWM New Mexico
- TEX Texas

78 Southeastern USA
- ALA Alabama
- ARK Arkansas
- DEL Delaware
- FLA Florida
- GEO Georgia
- KTY Kentucky
- LOU Louisiana
- MRY Maryland
- MSI Mississippi
- NCA North Carolina
- SCA South Carolina
- TEN Tennessee
- VRG Virginia
- WDC District of Columbia

79 North & Central Mexico
- MXC Mexico Central
- MXE Mexico NE
- MXG Mexico Gulf
- MXI Mexico Pacific Is.
- MXN Mexico NW
- MXS Mexico SW

80 Mesoamerica
- BLZ Belize
- COS Costa Rica
- CPI Cent. American Pacific Is.
- ELS El Salvador
- GUA Guatemala
- HON Honduras
- NIC Nicaragua
- PAN Panama
- SMX Mexico SE

81 Caribbean
- ARU Aruba
- BAH Bahamas
- BER Bermuda
- CAY Cayman Is.
- CUB Cuba
- DOM Dominican Republic
- HAI Haiti
- JAM Jamaica
- LEE Leeward Is.
- NLA Netherlands Antilles
- PUE Puerto Rico
- SWC SW Caribbean
- TCI Turks-Caicos Is.
- TRT Trinidad-Tobago
- VNA Venezuelan Antilles
- WIN Windward Is.


ALU
ASK
GNL
NWT-FR
YUK
NWT-MK
SUBARCTIC AMERICA
NWT-KW
BRC
ABT
MAN
WESTERN CANADA
LAB
QUE
WAS
SAS
ONT
NORTHWESTERN U. S. A.
ORE
MNT
EASTERN CANADA
NFL-NE
PEI
NFL-SP
IDA
NDA
MIN
NBR
MAI
NWH
NSC
WYO
SDA
WIS
NEV
VER
NORTHEASTERN U. S. A.
CAL
UTA
NORTH-CENTRAL
U. S. A.
MIC
NWY
MAS
SOUTHWESTERN U. S. A.
COL
NEB
IOW
PEN
RHO
MRY
CNT
ILL
INI
OHI
NWJ
ARI
KAN
MSO
WVA
DEL
NWM
KTY
VRG
WDC
OKL
TEN
NCA
SOUTH-
CENTRAL
U. S. A.
ARK
SOUTHEASTERN
U. S. A.
BER
MXN
MSI
SCA
ALA
GEO
TEX
LOU
FLA
MXE
BAH
NORTH AND
CENTRAL MEXICO
MXI
TCI
MXS
MXC
MXG
CUB
LEE
HAI
DOM
CAY
PUE
SMX
BLZ
JAM
WIN
CARIBBEAN
GUA
HON
ELS
SWC
ARU
NLA
VNA
TRT
NIC
MESOAMERICA
COS
PAN
CPI

MAP 8 South America

82 Northern South America

- FRG French Guiana
- GUY Guyana
- SUR Suriname
- VEN Venezuela

83 Western South America

- BOL Bolivia
- CLM Colombia
- ECU Ecuador
- GAL Galápagos
- PER Peru

84 Brazil

- BZC Brazil West-Central
- BZE Brazil Northeast
- BZL Brazil Southeast
- BZN Brazil North
- BZS Brazil South

85 Southern South America

- AGE Argentina Northeast
- AGS Argentina South
- AGW Argentina Northwest
- CLN Chile North
- CLS Chile South
- DSV Desventurados Is.
- JNF Juan Fernández Is.
- PAR Paraguay
- URU Uruguay


NORTHERN SOUTH AMERICA
VEN
CLM
GUY
SUR
FRG
ECU
GAL
BZN
WESTERN SOUTH AMERICA
BRAZIL
PER
BZE
BOL
BZC
BZL
CLN
PAR
DSV
AGW
BZS
AGE
URU
JNF
CLS
SOUTHERN SOUTH AMERICA
AGS

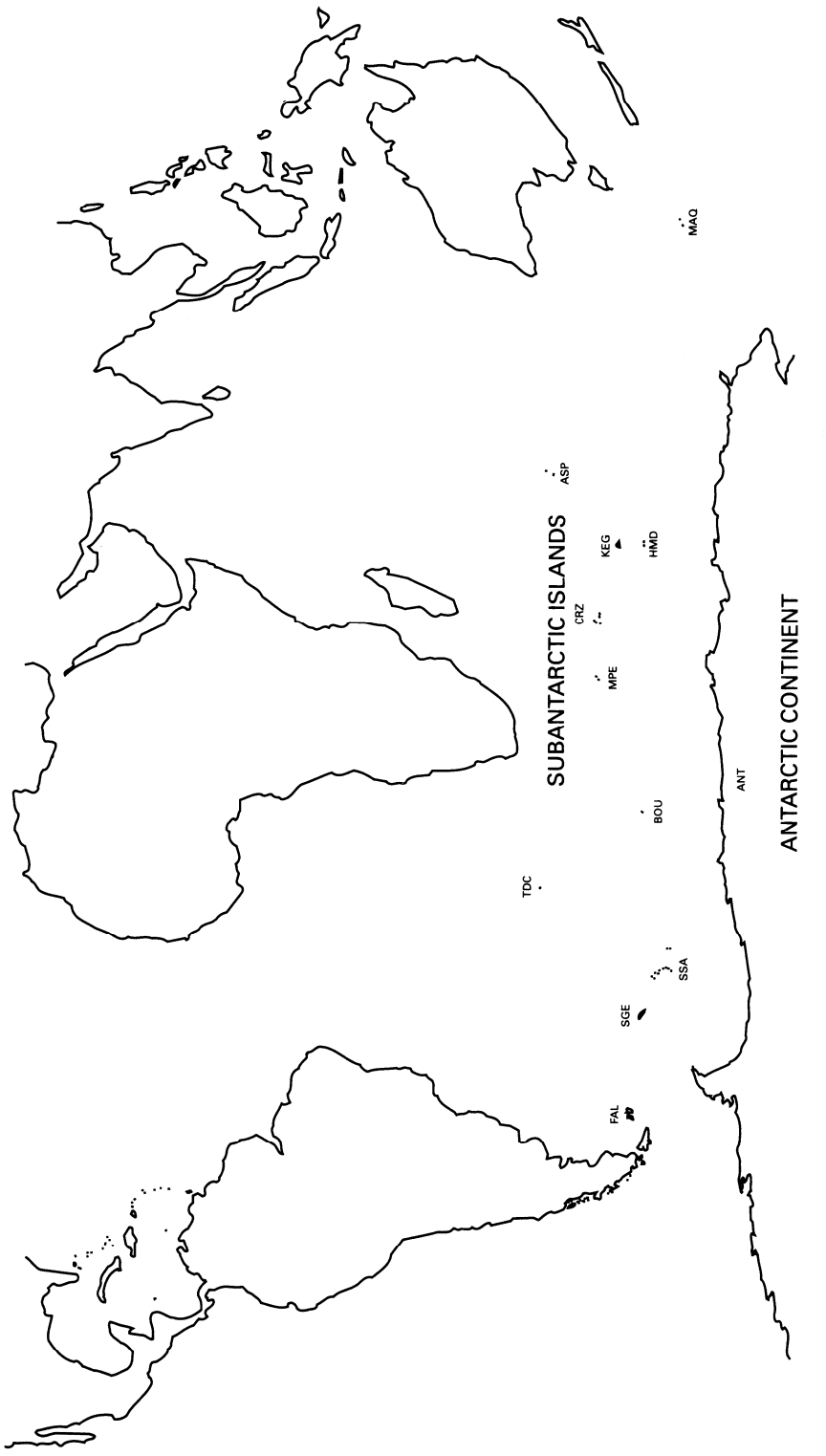
MAP 9 Antarctic

90 Subantarctic Islands

- ASP Amsterdam-St Paul
- BOU Bouvet I
- CRZ Crozet Is.
- FAL Falkland Is.
- HMD Heard-McDonald Is.
- KEG Kerguelen
- MAQ Macquarie Is.
- MPE Marion-Prince Edward Is.
- SGE South Georgia
- SSA South Sandwich Is.
- TDC Tristan de Cunha

91 Antarctic Continent

- ANT Antarctica


SUBANTARCTIC ISLANDS
ANTARCTIC CONTINENT
ASP
MAQ
KEG
HMD
CRZ
MPE
BOU
ANT
TDC
SSA
SGE
FAL