

NATIONAL

Herbaria with identification services

Australian National Herbarium (Canberra) (part of the Centre for Australian National Biodiversity Research, Canberra)

www.anbg.gov.au/cpbr/plant-enquiry-service/index.html

Scope: Plant, lichen and and macrofungal identifications and advice on most botanical subjects. No service for algae.

Charges: Free for members of the public and for not-for-profit organisations (limit of 10 specimens per batch). Undergraduate students needing identifications as part of assignments must have tried using the Public Reference Herbarium first (see below); postgraduate students should discuss needs well ahead of time via the Herbarium Curator. Fees apply for commercial inquiries or batches of more than 10 specimens (reductions may apply for good collections useful for the herbarium and for collaborative projects)..

Submission of specimens: See website for guidance on collecting and preparing specimens and on data requirements. Specimens should be submitted at the Visitor Centre at the Australian National Botanic Gardens, Black Mountain (9.30-4.30 every day except Christmas Day). For mail submission please ensure specimens are prepared and air-dried (see website guidelines). *Postal address:* Plant Enquiry Service, Australian National Botanic Gardens, GPO Box 1777, CANBERRA, ACT, 2601.

Self-help: A Public Reference Herbarium is located in the Botanical Resource Centre at the Australian National Botanic Gardens, Clunies Ross St, Acton. This is a reference set of pressed specimens covering native and naturalised plants of the A.C.T., and the NSW Southern Tablelands, Australian Alps and South Coast. It is open for use by the public 9:30am - 4:30pm daily (but please book via the Visitor Centre on 02 6250 9450). First-time users must have an introductory session from one of the Facilitators. The Resource Centre has a microscope, botanical books, and a computer with interactive identification tools and links to the Internet.

The main State and Territory Herbaria (listed under jurisdiction headings below) can often also tackle enquiries on a national scale, with cross-referral where necessary.

National - Plant Census and Plant Name Index

Council of Heads of Australasian Herbaria (ongoing) Australian Plant Census

<https://www.anbg.gov.au/chah/apc/>

The Australian Plant Census (APC) is not an identification guide, but provides essential background information on the taxonomy and authorship for the Australian flowering plants, ferns, gymnosperms, hornworts and liverworts, both native and introduced. It also includes a coded summary statement of national distribution of each taxon. This may help narrow the field for difficult identifications within a group.

APC provides a list of **currently accepted** names, but does not provide full details of their usage in the taxonomic literature. For comprehensive bibliographic information, see the Australian Plant Name Index database (APNI, below). Be aware that a few species names may vary from one Australian jurisdiction to another, depending on what is recognised by the local authority (e.g. State

Herbarium) – the APC designation of ‘currently accepted’ represents a more-or-less consensual national view but differences of scientific opinion do occur. Also note that plant names on legislative lists may sometimes be scientifically obsolete, but this does not affect the validity of their listing. APC is a work in progress – the nomenclatural inventory of some families is not yet completely up to date.

Australian National Herbarium (ongoing) Australian Plant Name Index (APNI).

<http://www.cpbr.gov.au/apni/index.html>

APNI is another background resource for the plant identification process. APNI is a comprehensive index of plant scientific names applied to the Australian flora and their authorship, publication history and usage, irrespective of whether the name is currently recognised or is regarded as a synonym. APNI does not recommend any particular taxonomy or nomenclature - for a listing of currently accepted scientific names for the Australian vascular flora, see the *Australian Plant Census* (APC, above), which is linked from the APNI site.

Flora of Australia series (and Fungi~ and Algae of Australia series)

Note that depending on dates of publication, some State and Territory Floras and flora information system websites may be more up to date for some regions or taxonomic groups – see separate sections of this bibliography.

***Flora of Australia* (various authors and editors, many volumes, publication proceeding).**

Published initially by Australian Government Publishing Service, Canberra, and later by CSIRO Publishing, 1981-to present.

This series is an ongoing national project (target 60 volumes) to document all the native and naturalised plant and lichen species occurring in Australia. Each plant family is critically reviewed for the series. An index listing the families in each published or projected volume can be found inside the covers of each volume, or at the ABRIS Website:

<http://www.environment.gov.au/biodiversity/abrs/publications/flora-of-australia/list.html>

Each volume is comprehensive up to date of publication (a few volumes are now very out of date). All species and subspecies are described, many are illustrated, and technical identification keys are provided. Depending on date of publication and allowing for some new research results since, many volumes remain authoritative texts for their groups and are here RECOMMENDED – see Plant Groups section below for some of these. **Vol. 1 (2nd edn)** has a useful glossary, an evolutionary history of Australian vegetation and of Australian botanical science, and a **key to families** occurring in Australia.

ELECTRONIC RESOURCE: Flora of Australia Online: Content of the printed *Flora of Australia* volumes is progressively being placed on-line, available from <http://www.environment.gov.au/biodiversity/abrs/online-resources/flora/main/> .

This site allows search by taxon name and access to full text files including keys, but omits introductory chapters.

For a quick check of what families have or have not yet been digitised, see <http://www.environment.gov.au/science/abrs/publications/flora-of-australia> (includes in/out-of-print

status of hardcopy volumes, and links to the on-line database for those with digitised content.).

Algae of Australia (<http://www.environment.gov.au/science/abrs/publications/algae>) and *Fungi of Australia* (<http://www.environment.gov.au/science/abrs/publications/fungi-of-australia>) are companion series covering those groups. Several hardcopy volumes have been published in each (see relevant sections of this bibliography) but as at 2015 there are no near-term plans for digitisation.

Australian Plant Image Index

Australian National Botanic Gardens (ongoing) Australian Plant Image Index (APII). Australian National Botanic Gardens and Australian National Herbarium (Centre for Australian National Biodiversity Research), Canberra. **ELECTRONIC ON-LINE:** <http://www.anbg.gov.au/photo/>

APII comprises a very large set of authenticated plant images, actively curated (but allow for some time lags in adjustment to new nomenclature, hence some obsolete identifications). There are a number of search options. The Index includes both digitised images (presented in low-res), and entries for as-yet undigitized images held in the ANBG collection. Access to high-resolution versions require contact with the Index staff. Contact and copyright/usage details are on the website.

Other resources for national-scope identification to family level

Thiele KR & Adams LG (2014) Families of flowering plants of Australia – an interactive identification guide. Second revised edition. ABRs Identification Series, CSIRO Publishing, Collingwood, Vic./Australian Biological Resources Study, Canberra. FLASH DRIVE, ISBNs: 9781486301997.

ELECTRONIC RESOURCE – INTERACTIVE: flash drive

The tool of choice for determining to what family a wild plant sample taken within Australia belongs, covering all native and naturalised families occurring in Australia and its Island Territories. Easy-to-use interactive key, running on the LucID system, with links to an illustrated glossary of terms. Both full and short-diagnostic family descriptions are given, with lists of genera, notes, and over 1500 colour photos and line drawings of representative species. The first (2002) edition on CD-ROM (ISBN 0643067213) remains useful.

HIGHLY RECOMMENDED

Orchard AE (1999) Key to families of flowering plants. In: (pp 521-584) *Flora of Australia vol. 1: Introduction. 2nd edition.* (AE Orchard & HS Thompson, eds). ABRs/CSIRO Australia. ISBN 0643059652 hbk.

A standard dichotomous key to the families of flowering plants that are recorded as having species (native or naturalised exotic) in Australia. This volume also includes a series of background chapters on the Australian flora, not directly related to identification.

The *Flora of Australia* series is being progressively digitised and placed on line (<http://www.environment.gov.au/biodiversity/abrs/online-resources/flora/main/>), but as at June 2015 this volume is not digitally available.

KeyBase: teaching old keys new tricks. (Multiple authors; ongoing).

ELECTRONIC RESOURCE, ON-LINE: limited interactivity: <http://keybase.rbg.vic.gov.au/>

KeyBase is a large scale project that is synchronising separately published dichotomous keys within various plant groups, after parsing the key elements into a relational database. The aim is to allow (among other things):

- The generation of ‘seamless’ composite keys (e.g. stitching together a good and up-to-date key to genera within a family at national level, with previously separate keys to species and subspecies within one or more of those genera).
- Allowing the generation by the user of ‘filtered’ or tailored keys (e.g. abridging a national key to a State, region, or locality of interest).
- Rapidly ascertaining what character-states the authors of the contributing keys have regarded as most diagnostic between any two related taxa.

KeyBase is a work in progress, but is already of significant potential use. However some familiarity with the structure and use (and preferably generation) of dichotomous keys is an advantage in using it, and keep a weather eye out for the vagaries that may arise from different original authors using the same terminology in somewhat different ways.

As at April 2019, partial or comprehensive keys are available for: Flowering plants of Australia, Queensland, Tasmania and Western Australia; Floras of NSW, Victoria, South Australia, Northern Territory, and ACT; Mosses and Ferns/Fern Allies of Australia; and the Horticultural Flora of South-eastern Australia. For further background see Knapp et al. (2016) in *Australasian Plant Conservation* 25(1): 5-6.

Morley BD & Toelken HR (eds.) (1983) Flowering plants in Australia, Rigby, Adelaide. 416 pp. ISBN 0727014773

In its day a useful single-volume overview at family level, including keys to all families and genera, but it is now well out of date – family and genus recognition, genus nomenclature, and flora statistics have all evolved greatly since its publication. Nevertheless a second-hand copy can be occasionally useful for placement to family, used in conjunction with more up to date resources. Keys to all families and genera of plants, native or naturalized, in Australia, with diagnostic and distributional information. Good glossary; useful illustrations of selected genera for each family. Still good for general interest but be aware of the obsolescence.

Watson L & Dallwitz MJ (1992 onwards) The families of flowering plants: descriptions, illustrations, identification, and information retrieval. (Version 11 May 2015). No ISBN.

Website: <http://delta-intkey.com/angio/index.htm>

ELECTRONIC RESOURCE – ON-LINE INTERACTIVE with downloadable app; DVD version also available.

Web-based information and identification system for plant families of the world, running on the DELTA system. Descriptive data is directly available on the above website, or as a DVD; the interactive identification component requires downloading (free) of the linked Intkey app. The characters scored for each family, in addition to fairly obvious morphological features, include geographical distributions, details of leaf and stem anatomy, embryology, germination syndrome, physiology, biochemistry and cytology. These data elements are all available for identification purposes or as part of a consolidated text diagnosis. Illustrations are provided for a few selected genera from each family. The latest edition of this package (April 2015) incorporates the family-level reclassification of flowering plant families by the Angiosperm Phylogeny Group (APG III, 2009).

Miscellaneous national-scope general interest guides

A number of handbooks attempt a snapshot approach to identification across the Australian flora or parts thereof. These are inevitably not comprehensive, and are more for general interest – they should not be relied upon for diagnostic identification, although the information they contain on particular species may be perfectly valid.

Boland DJ et al. (2006) Forest trees of Australia. 5th edn. CSIRO Publishing, Collingwood, Vic. 736 pp. ISBN 0643069690 (9780643069695).

Not comprehensive and showing the signs of repeated updates, but enduringly popular. Over 300 species are covered and species treatments and nomenclature have been revised throughout. Lacks keys, but has descriptions and notes, including forestry information, with b/w photos and some line drawings.

Cronin L (2000) Key guide: Australian wildflowers. Revised edition. Envirobook, Annandale NSW. 224 pp. ISBN 0858811707.

A casual-interest guide only, to about 600 species, with a pictorial and colour key to groups, plain-language descriptions and fair to good colour paintings.

Cronin L (2007) Cronin's Key Guide: Australian trees. Jacana Books, Crows Nest, NSW, 190 pp. ISBN 9781741751093.

A casual-interest guide only, to about 325 species, with plain-language descriptions and good colour illustrations. Contains a simple pictorial key based on leaf form.

Elliot G (1990) Australian plants identified : a home gardener's guide to the identification of over 1000 commonly grown Australian native plants. Hyland House, South Yarra, Vic. 232 pp. ISBN 0947062637.

The subtitle is accurate; useful for visual identification, usually only to genus, across a range of families. An introductory chapter on plant classification and parts is followed by a colour-photo guide to over 200 genera; then sections on the major families and genera, with easy-to-use keys to the commoner genera, and some detail to species level only for the very commonly grown species.

Elliot WR & Jones DL (1980-2002) Encyclopedia of Australian plants suitable for cultivation. Lothian. South Melbourne. (8 vols. to date)

Introduction (1980): 336 pp., ISBN 0850910706. **Vol. 1 (rev. edn.)** (1983): 336 pp., ISBN 0850911427. **Vol. 2** (1982): 517 pp. ISBN 0850911435. **Vol. 3** (1984) 516 pp., ISBN 0850911672. **Vol. 4** (1986): 447 pp., ISBN 085091213X. **Vol. 5** (1990): 512 pp., ISBN 0805913292. **Vol. 6** (1993): 509 pp., ISBN 0850915899. **Vol. 7** (1997): 479 pp., ISBN 0850916348. **Vol. 8** (2002): 46pp., ISBN 073440378X. **Vol. 9** (2010) 571pp., ISBN-13 9780734409744. Ring-bound **Supplements** issued: No 1 (1994) ISBN 0850916593; No 2 (1995) ISBN 0850916968; No 3 (1996) ISBN 0850917824.

Popular general-interest treatment. Many coloured photos and line illustrations; alphabetical by genus and species; useful short descriptions and (intro volume) cultivation notes; no identification keys. Earlier volumes are now becoming very dated.

Greig D (1999) Field guide to Australian wildflowers: over 1000 common Australian wildflowers, New Holland, Frenchs Forest, NSW. 442 pp. ISBN 1864363347.

Entries are organised alphabetically by family, genus, and species, with fair to excellent colour photos, and very brief descriptions. The taxonomy is now dated. Despite the number of species and the national scope, this can only account for about 5% of our plant species; it is of use to those wanting only a very general guide, for identification to genus level and perhaps to species in some groups.

Greig D (1998) A Photographic guide to trees of Australia. New Holland. 144 pp. ISBN-10 1864363266, ISBN-13 9781864363265.

Colour photos and descriptive notes, covering about 170 species.

Hodgson M & Paine R (1971, 1977) Australian wildflowers. Rigby, Adelaide.

vol. 1 (1971, reprints to 1984), 251 pp., ISBN 0851792553. **vol. 2** (1977), 254 pp., ISBN 0727002031.

Now so dated and non-comprehensive as to be of only historical interest, but an interesting attempt in its day. Short descriptions and notes, with stylised colour paintings of each species.

Holliday, I (2002) A field guide to Australian trees. 3rd edition. Reprinted 2010. Reed New Holland. 328 pp. ISBN-10: 1876334797, ISBN-13: 9781876334796

Covers more than 400 species, with a fair representation of eucalypts and acacias and many rainforest trees, with plain-English descriptions and about 150 photographs plus line drawings. No keys. A mid-level interest guide.

Spencer, R (ed.) (1995-2002) Horticultural flora of south-eastern Australia: the identification of garden and cultivated plants. University of NSW Press, Sydney. (4 vols to date) ISBN 0868401676 (set).

Vol. 1 (1995): Ferns, conifers and their allies. 464 pp., ISBN 0868402060.

vol. 2 (1997) Flowering plants. Dicotyledons part 1. 606 pp., ISBN 0868403032.

Vol. 3 (2002) Flowering plants. Dicotyledons part 2. 619 pp., ISBN-10: 0868406600; ISBN-13: 978-0868406602.

Vol. 4 (2002) Flowering plants. Dicotyledons part 3. 534 pp., ISBN 0868406848.

Vol. 5 (2005) Flowering plants. Monocotyledons. 638 pp. ISBN-10: 0868408328; ISBN-13: 978-0868408323.

Guide to the native and exotic plants likely to be found in horticultural situations, with general and cultivation notes. RECOMMENDED as a reference for southern Australia including when trying to identify marginally naturalised plants that may be garden escapes.

Wrigley JW & Fagg M (2013) Australian native plants: propagation, cultivation and use in landscaping and. 6th edn. New Holland Publications, Sydney. 720 pp. ISBN 0730104931.

Not intended as an identification resource, but useful as one for cultivated forms of native species (especially cultivars and hybrids) where no other literature is available. Short one-paragraph descriptions for several thousand species, varieties and hybrids (but not comprehensive), with occasional line drawings and colour photos. A concise version of the earlier 5th edition is also

available, covering about 1,500 taxa: *Wrigley JW & Fagg M (2007) Australian Native Plants - Concise Edition*. New Holland. 400 pp. ISBN 9781877069406.