

**National Botanic Gardens  
Canberra, Australia**

**Catalogue of  
the Living Plants  
Supported by  
Herbarium Vouchers**

Compiled and edited  
under the supervision  
of A.B.Court

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## CONTENTS

Foreword . . . . .	iii
Preface . . . . .	vii
Introduction . . . . .	ix
Foundation and early development . . . . .	ix
Scope of <i>Catalogue</i> . . . . .	xi
Details of entries . . . . .	xi
Identification of each record . . . . .	xi
Voucher records . . . . .	xi
Living specimens records . . . . .	xii
Nomenclature . . . . .	xiii
Availability of material for study . . . . .	xiii
Acknowledgements . . . . .	xiii
Pteridophyta . . . . .	1
Gymnospermae . . . . .	9
Dicotyledonae . . . . .	11
Monocotyledonae . . . . .	83
Index . . . . .	99

## PREFACE

The production of this *Catalogue* represents a major achievement in the scientific role of the National Botanic Gardens. It presents, for the first time, information on the origin of plants in cultivation which are matched by voucher Herbarium specimens.

The *Catalogue* contains 2180 entries covering 1450 species. Many Australian plants have never been grown in cultivation and a large element of experimentation is involved in establishing species in the Gardens. For this reason the *Catalogue* includes only plants registered by the end of 1976 and still growing in the Gardens towards the end of 1978. Specimens registered after 1976 will be included in future editions of the *Catalogue*.

As this is the first edition of the *Catalogue* it was decided to provide a precis of the history of the Gardens and the thinking which led to its establishment. Although the Gardens was officially opened only ten years ago it has its origins in the prize-winning plan for Canberra prepared by Walter Burley Griffin in 1911, which included provision for a large botanical garden. No activity on the project took place until 1935 when a detailed report was prepared and subsequently acted on in 1949 with an official tree-planting ceremony to commemorate the formal commencement of the Gardens. Steady progress has occurred over the last thirty years and the Gardens now contains the largest collection of Australian native flora in cultivation. Whilst this history appears to have been unduly protracted, it must be appreciated that two world wars and a major economic depression created other compelling priorities in the early days.

One of the aims of the Gardens is to provide a centre for the study of the Australian flora and it is hoped that this *Catalogue* will assist in encouraging botanists to make greater use of the preserved and living collections and assist in their further development.



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## INTRODUCTION

The publication of this *Catalogue* is a milestone in the history of the National Botanic Gardens because it formally notifies the scientific world that a large, living collection of indigenous Australian flora supported by herbarium vouchers has been under development in the nation's capital for many years. It also explains the philosophy of and scientific background to the development of the collection and, in particular, emphasises the important relationship between the preserved voucher collection in the Herbarium and the corresponding living specimens in the Gardens. This precise relationship arises from the development of a carefully controlled record system binding the two collections tightly together into an integrated taxonomic data bank. This bank therefore constitutes an important scientific resource of special value to botanists engaged in  $\gamma$ -taxonomy and it has given the Herbarium a new dimension.

### Foundation and early development

The Federal Government of Australia, which came into existence on 1 January 1901, established and maintained its seat of government in Melbourne, Victoria, until a permanent location could be found for it. After considerable controversy, an area of about 2350 Km<sup>2</sup> was set aside in the Yass-Cooma district of New South Wales and gazetted as federal territory on 1 January 1911. An international competition for the design of the proposed new national capital was launched in 1911 and won by Walter Burley Griffin of Chicago, U.S.A. Griffin's design, adopted (subject to amendment) in 1913, included a large botanical garden. However, other priorities in the building of a new city as the capital of a federation took precedence and nothing was done to initiate the development of the proposed gardens for many years. In 1933, the Advisory Council for the Federal Capital Territory recommended to the Minister for the Interior that a start be made on the development of the botanical gardens. Before this could be done a detailed report on the proposal was required and Dr B. T. Dickson, Chief of the Division of Plant Industry in the Council for Scientific and Industrial Research<sup>1</sup>, was asked to prepare a report in conjunction with Mr A. E. Bruce, Superintendent of Parks and Gardens in the Department of the Interior at the time. This report<sup>2</sup>, signed by Dickson on 4 September 1935 and known locally as the Dickson Report, became the basis upon which the present Botanic Gardens was established.

The principal points from a botanical point of view which Dickson emphasised in his Report are best indicated by quoting them:

In the first place botanical gardens cannot be created in a short time. They take years to establish and once established they cannot be materially changed in general lay out. Consequently the most

careful attention must be given to the choice of site and its suitability for the development of the main features of the gardens.

The modern tendency is for botanical gardens to become a combination of scientific and educational institution and public park, . . .

In view of the anticipated development of Canberra as the capital of the Commonwealth with a University and scientific institutions, the Botanical Gardens should be planned to serve as an additional scientific institution . . .

The authorities would be well advised to plan the proposed gardens at Canberra so that they are developed with a balance between the scientific and the aesthetic, and certainly not to the neglect of the scientific phase.

All plants and trees of the Australian flora which are found to be hardy should be grown and in addition exotic plants and trees from homoclimes should gradually be collected for trial, or if already known, for use in these gardens.

For scientific studies it is also necessary to have as full a representation as possible of the Australian flora and of specimens from homoclimes.

The Dickson Report was duly considered, but not acted on immediately. Instead, the Advisory Council was told that a survey of the site would have to be made and estimates of costs prepared before its proposals could be considered. However, before these tasks were done, World War II intervened and the entire project was shelved for the time being.

In 1944, Mr L. D. Pryor<sup>3</sup> succeeded Mr J. P. Hobday (who in turn had succeeded Bruce as Superintendent of Parks and Gardens) and inherited the development of the proposed botanical gardens. He studied the Dickson Report carefully and considered that the site recommended in it should be adopted. Early in 1945, Pryor laid the foundations for the development of a herbarium, which was implicit in the Dickson Report, by initiating collection of herbarium specimens. Some of this material is housed in the present Herbarium (CBG) but most of it is in the Herbarium, Botany Department, Australian National University (GAUBA).

In September 1945, Pryor recommended that an immediate start be made on the proposed botanical gardens, but little could be done on the project until some matters concerning the definition of the site and its acquisition from lessees were resolved. These matters took several years to finalise satisfactorily.

In 1947, Pryor visited many overseas botanical gardens and was particularly impressed by three of them. Each influenced his thinking on the course the future botanical gardens in Canberra should take. In particular, he saw much to commend the setting aside of a substantial part of the future gardens solely for a collection of native flora similar to that in the

<sup>1</sup> Now known as the Commonwealth Scientific and Industrial Research Organization.

<sup>2</sup> Dickson, B. T. (1935). "Botanical Gardens in Canberra": A report dealing with scope, site, buildings, costs and maintenance, etc., published in *Canberra Botanic Gardens*, Department of the Interior, Canberra (1970).

<sup>3</sup> Now Emeritus Professor at the Australian National University, Canberra.

Santa Barbara Botanic Garden in California. In the Botanic Garden of Göteborg, Sweden, the great diversity of ecological collections impressed Pryor and he resolved that such collections should be included in the Canberra project also. He noted the heather garden in the Royal Botanic Garden, Edinburgh, as a fine example of an ecological collection.

Gradually the Botanic Gardens neared reality and on 12 September 1949 an official tree-planting ceremony to commemorate the formal commencement of the Gardens was held near the site of the present entrance. The Hon. J. B. Chifley, then Prime Minister of Australia, and Sir Edward Salisbury, Director of the Royal Botanic Gardens, Kew, England, officiated.

Soon after this, Dr E. Gauba<sup>4</sup> who had been Professor of Botany at the University of Tehran Agricultural Faculty at Karaj during the early part of the World War II and for some years before that, was appointed Temporary Botanist. Gauba's main task, initially at least, was to accelerate the development of the herbarium collections and he started collecting extensively in the Canberra district and adjacent parts of New South Wales and nearby Victoria. Soon after his appointment, Gauba was given the additional task of collecting living plants and seeds for the new Gardens.

Pryor's concepts of the Canberra Botanic Gardens were becoming realities, but progress was slow so far as the development of the living collections was concerned because of difficulties in tending the young plants in Canberra's harsh climate.

In 1951, an annexe to the Canberra Botanic Gardens was established 150 km away in Commonwealth Territory at Jervis Bay on the east coast of Australia. Its purpose was the cultivation of frost-tender plants which could not be grown in Canberra.

It is quite clear from the foregoing that Pryor's concepts of the Botanic Gardens were based on the Dickson Report and on his own observations locally and overseas. Above all, he wanted to develop as large a botanical collection as possible for scientific and cultural study in the nation's capital. The development of a first-class herbarium was essential to ensure that sound taxonomic studies could be achieved. He saw them both becoming an integrated centre for studies on the Australian flora. Pryor proposed including several biogeographic collections to the south of the present site at a later stage. These collections were to consist of exotic plants from climates similar to that in Canberra, but because manpower and resources were limited the development of the native collections had to be given first priority.

Pryor resigned from Parks and Gardens in 1958 to become foundation Professor of Botany at the Canberra University College, which subsequently became part of the Australian National University. He was succeeded by D. W. Shoobridge<sup>5</sup> who had been

closely associated with the Botanic Gardens project as Assistant Superintendent from 1952.

On the retirement of Gauba, Shoobridge secured the appointment of Dr M. E. Phillips<sup>6</sup> to succeed him as Botanist on 20 June 1960 and directed that a substantial part of her time be spent collecting living material in the field for the Botanic Gardens and preserved specimens for the Herbarium. Special attention was to be given to ensuring that the identities of the living specimens could be established from the vouchers in the Herbarium collections. Phillips and her staff collected extensively throughout western, southern and eastern Australia and many thousands of specimens were added to the Herbarium and Gardens. The identification of these specimens was a major task and could not have been achieved without the excellent assistance given by the several herbaria in Australia, especially during the early period of development.

Phillips, whose fields of interest centered around ecological morphology, made an outstanding contribution to the development of the Botanic Gardens and Herbarium as a scientific resource of special note. She devised a record system which gave a precise relationship between the living specimens and the vouchers representing them in the Herbarium. This was accomplished by writing a number (known as a propagation number—see below) on the herbarium label to indicate exactly the associated living material introduced from the wild into the Gardens. This record system was introduced in 1963 and has been rigidly followed ever since. Particular care has always been given to the choice of living specimens in the field to ensure correspondence between them and their vouchers. Phillips extended the record system to include details of specimens propagated from the original living plants introduced into cultivation, establishing a mechanism by which any specimen could be referred to the Herbarium voucher collected in the field in association with the original living material. This greatly increased the value of the living collections as a taxonomic tool and further extended the Herbarium's facilities.

Shoobridge adhered to Pryor's concepts and sought to strengthen them throughout his term of office. He directed the Herbarium botanists to continue the development of both the living and preserved collections with the view of enhancing their value as a taxonomic and ecological resource for research by future generations of Australians. He considered this function to be of paramount importance and he also stressed the urgency in developing these collections because the natural environment was disappearing at an alarming rate.

Shoobridge was acutely aware of the need to develop both the Botanic Gardens and Herbarium as a national project befitting the national government's responsibilities, and not simply as a parochial one. To his mind this philosophy flowed naturally from the Dickson Report and subsequent development of the Gardens and was confirmed on 21 December 1978, when, as mentioned in the foreword, the name of the Gardens was changed to the National Botanic Gardens.

<sup>4</sup> Erwin Gauba (1891-1964).

<sup>5</sup> Now in retirement near Braidwood, New South Wales.

<sup>6</sup> Marie Elizabeth Phillips (1917-77).

## Scope of Catalogue

The entries in this *Catalogue* are confined to Australian indigenous vascular plants established in the National Botanic Gardens, accessioned by the end of 1976 and still growing in the Gardens toward the end of 1978. These limitations were introduced to ensure that all plants listed in the *Catalogue* had successfully survived in the Botanic Gardens for at least one full year. Specimens accessioned after 1976 will be included in subsequent editions. All this material has been introduced directly from the field as plants, cuttings, seeds or spores or has been propagated from such material from the wild already in the Gardens.

Specimens under cultivation in the Jervis Bay Annexe and species indigenous to the Botanic Gardens in Canberra and the Annexe have not been included at this stage.

Entries have been grouped into *Pteridophyta*, *Gymnospermae*, *Dicotyledonae* and *Monocotyledonae* in that order. Within each group entries have been arranged alphabetically by families, genera, species and infraspecific categories. Where there is more than one entry for a species or an infraspecific category, these have been arranged in a numerical sequence governed by the herbarium number. Table 1 gives the number of taxa and entries represented by the vouchers.

### Disposition of taxa and entries in the four major groups

Group	Family	Genus	Species	Entries
Pteridophyta	28	48	93	138
Gymnospermae	5	10	25	40
Dicotyledonae	93	326	1123*	1693
Monocotyledonae	28	106	213	309
Total	154	490	1454*	2180

\* These figures include four putative hybrids.

Entries in the *Catalogue* cover about 9.7% of the total number of species already described in the Australian vascular flora.<sup>7</sup> Since the beginning of 1977, about 1000 additional species supported by vouchers have been established in the living collections taking the coverage to approximately 16%. This coverage is continually rising and ultimately will exceed 75–80%. The scientific value of such a collection is obvious.

## Details of entries

Each record relating to a voucher preserved in the Herbarium consists of two distinct sets of data, one of which refers to the voucher itself and the other to the corresponding living specimens in the Gardens.

## Identification of each record

Each record is identified by the standard international symbol for the Herbarium (CBG) followed by a unique number.

<sup>7</sup> The number of species described in the Australian vascular flora now stands at approximately 15 000—editor's estimate, 1980.

Two sets of identifiers have been used during the life of the Herbarium.

The *first set of identifiers* was in operation until May 1977 when a substantial change was made to the numbering system to streamline registration procedures. Each identifier consisted of CBG followed by a six-digit number running from 000001 to approximately 068500. Very few additions have been made to this sequence since May 1977.

The *second set of identifiers* was derived in a different way. Each identifier consists of CBG followed by a seven-digit number, the first two digits of which are the last two of the year in which the voucher was registered. These two digits are then followed by another five digits which are derived as a simple numerical sequence. The set of identifiers for 1977 ran from 7702001 through to 7708882, that for 1978 ran from 7800001 through to 7811606 and that for 1979 ran from 7900001 through to 7911735. Numbers 7700001–7702000 were not used because of possible confusion with a different set of identifiers which were also prefixed by the digits 77.

Records prefixed by an identifier belonging to the second set will appear in future editions of this *Catalogue*.

## Voucher records

The first set of data relates to the vouchers filed in the Herbarium.

## Geographical data

Each record contains a reference to the locality of origin which consists of an abbreviation for the State (or Territory) in which the specimens were gathered and more specific data on locality. Geographical data gathered with the earlier collections was often brief but nowadays comprehensive information is recorded. Some pertinent remarks on certain elements in this data follow.

**State or Territory of origin.** The State or Territory of origin is given immediately after the CBG numbers and each is defined as follows for the purposes of this *Catalogue*:

Western Australia (W.A.), corresponds to the sovereign State of Western Australia, but excludes Scott Reef and Browse Island;

Northern Territory (N.T.), excludes West Islet, East Islet and Middle Island;

South Australia (S.A.), corresponds to the sovereign State of South Australia;

Queensland (Q.), corresponds to the sovereign State of Queensland and includes all islands in Torres Strait and the Great North East Channel under Australian administration the principal ones being Kawa, Mata Kawa, Saibai, Darnley, Turnagain, Gabba, Zagai, Mabuia, Sassi, Badu, Moe, Hammond, Wednesday, Friday, Thursday, Horn and Prince of Wales, but excluding those which lie to the east of the Great Barrier Reef and

are part of the Coral Sea Islands [See International Map of the World 1:1,000,000 No. SC54 (Torres Strait, 1974) and Australia Topographic Survey map 1:100,000, No. 7773 (Murray Islands, 1976).];

New South Wales (N.S.W.), corresponds to the sovereign State of New South Wales and includes Lord Howe Island and the Commonwealth Territory at Jervis Bay;

Australian Capital Territory (A.C.T.), excludes the Commonwealth Territory of Jervis Bay here included in New South Wales;

Victoria (V.), corresponds to the sovereign State of Victoria and includes all islands between Victoria and Tasmania north of latitude 39° 12'S;

Tasmania (T.), corresponds to the sovereign State of Tasmania and includes all islands between Victoria and Tasmania south of latitude 39° 12'S, the principal ones being Rodondo, East Moncoeur, West Moncoeur and King, and also those of the Hogan, Curtis, Kent and Furneaux groups (the latter including Flinders Island), but excludes Macquarie Island.

No entries for living material collected outside these regions have been included in this *Catalogue* but such entries may be included in future editions.

**State subdivisions.** Major State subdivisions which agree with those used by the various State herbaria have been used for some of the more recent collections. Nowadays, such subdivisions are usually included as part of the field data.

**Locality details.** The locality details have been taken from the herbarium label without any substantial changes to detail. No special effort has been made to correct errors in the spelling of place-names, firstly because of the time that this exercise would have taken and secondly because of the lack of standardisation in the spelling of certain names. Some order was introduced to the sequence of elements relating to locality details. Place-names, and data relating to place-names, are given first followed by altitude, latitude and longitude where these appear on the original label.

All data relating to distances or altitude have been given in metric measurements, but imperial measurements have been included in brackets where these were written onto the herbarium label. In the latter case, the imperial measurements were converted to metric expressed with the same degree of accuracy and in the same manner as the original measurements.

There may be a few instances where some overlap with ecological data has occurred. This has been unavoidable.

**Altitude.** Very little attention was given to recording altitude during the early years, but since 1975 altitude has been recorded wherever practical. Generally it has been recorded with an accuracy ranging from 10-100 m.

**Geographical coordinates.** No attention was given to recording latitude nor longitude until 1975 when these were recorded wherever possible in degrees and minutes. Careful attention is now given to recording such coordinates which are usually entered directly into the field notebook from maps in the field. While there may be arguments against recording latitude and longitude to the nearest minute in the remoter parts of Australia, it must be pointed out that there is, as yet, no system for recording Australia's flora on a uniform grid. The present system will be retained to ensure that the data can be accommodated in any system which might be adopted in the future.

**Ecological data.** In the past, the standard of ecological data collected in the field has been poor and sometimes non-existent. This matter received considerable attention during 1976 and a system of gathering and recording adequate field data in a standard way was introduced. The purpose of this was two-fold: firstly it maximised the scientific value of the herbarium specimens and secondly it provided information to assist directly with the culture of the corresponding living material brought in from the wild. Such data generally concerns habitat and the substrate as well as any special adaptive features such as life forms. As mentioned before, there is not always a clear distinction between geographical and ecological data.

In preparing the *Catalogue* entries the ecological data has been taken directly from the herbarium labels with the minimum of editing and with as little change to the sequence of the various elements as possible. A few entries are lengthy, but in future editions such entries will be abbreviated if necessary.

**Collectors and dates.** The collector(s) name(s) and initials follow immediately after the ecological data, or, if this is absent, immediately after the geographical data. An effort has been made to ensure that collectors' names have been given correctly. Collectors' numbers have been given in every case where they exist. If there is no collector's number for any particular specimen, then the abbreviation *s.n.* is given.

In the past, numerous series of collectors' numbers have been used in the field and sometimes one collector used several distinct sets of numbers instead of a single series. These numbers have been cited in the same way as they appear on the herbarium sheet. The practice of maintaining several different systems of collectors' numbers has been abandoned.

The collectors' names and numbers are followed by the date of collection for which the day of the month and the year are given in Arabic numerals and the month in small Roman numerals in the sequence day, month and year.

### Living specimens records

The second set of data relates to the living specimens in the Botanic Gardens. Until May 1977 this data consisted of a number (called a propagation number)

followed by a five-, six- or seven-digit number. In every case, the first two numbers were derived from the year in which the number was entered into a register known internally as a Propagation Register which consists of a number of bound volumes. The last three (or four) digits of each identifier were derived sequentially and ran on from 001 (or 0001) for each year. A seven-digit number was rarely used. This identifier was written near the bottom of the herbarium label and it was always preceded by the words 'plants', 'cuttings', 'seeds' or 'spores' to indicate the nature of the living material collected in the wild. Each individual in each batch (indicated by a unique propagation number) thus introduced into cultivation carried the same number throughout its life. *This link between the voucher permanently preserved in the Herbarium and the corresponding living material in the Botanic Gardens is the all-important feature of this living collection because it maximises its value as a resource for scientific research.*

One of the principal functions of the National Botanic Gardens is to maintain a collection of the indigenous Australian flora for continuous scientific study for generations to come. This is being achieved in many instances by propagating new individuals true to type in the Gardens from the original specimens introduced from the wild thus minimising the need for repeated field work to replenish stock. Specimens in this category have been given propagation numbers also and their presence in this *Catalogue* has been indicated by the words '*Ex orig.*' which precede the numbers. The symbol † is used to indicate that the original material from the wild has died out and its absence indicates that the original stock plants are still alive.

## Nomenclature

Continual attention is given to the accuracy of the names and every effort is made to keep them up to date at all times. The Herbarium staff operates a mechanism which enables name-changes or new identifications to be transmitted quickly to the specimens in the Gardens without re-identifying the living specimens. Thus, the identifications of these speci-

mens always agree with those of the corresponding Herbarium vouchers. In a sense, the updating of the names of the living specimens is automatic and the capacity to operate such a system stems from the basic record system established in the early 1960s.

## Availability of material for study

It is the policy of the Gardens to encourage the use of the living and herbarium collections for scientific research in all fields of botany including taxonomy, morphology, anatomy, physiology, genetics and evolutionary biology and scientists are encouraged to visit the institution to study the material *in situ*. Requests for living material from the Gardens for scientific use will be met subject to the availability of the material and the staff to collect it. All requests should be sent to the Director, National Botanic Gardens, PO Box 158, Canberra City, A.C.T. 2601, Australia, and include precise details of the material sought and, if necessary, advice on its preparation. Overseas correspondents should ensure that they comply with all laws and regulations governing the import of plant material to their country and in particular provisions of the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

## Acknowledgements

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