

# CATALOGUING AND RECORD KEEPING FOR PLANT COLLECTIONS

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This is an adapted version of a booklet that we have produced for internal use at the National Botanic Gardens, Glasnevin. If you would like more information please contact: Matthew Jebb, National Botanic Gardens, Glasnevin, Dublin 9, Tel: 353 1 837 1636 / 1637 / 4388 Email: .

## 1 Turnover in Living Collections

The National Botanic Gardens receives about 2-2,500 new plants each year. The collection probably consists of about 20,000 specimens, and from year to year it remains more or less the same size. Thus we must presume that about the same number of specimens depart the collection each year; many seeds never germinate, some plants die of old age or disease, or are simply composted. The constant supply of new material is therefore necessary to maintain the collections at their present size.

The Royal Botanic Gardens Edinburgh has 40,000 living collections (at four sites) and they have calculated that without new accessions or propagations they would lose half that number in just 3½ years. The bigger the collection, especially of annuals, short-lived perennials and biennials, the greater is the throughput.

In 1999, for example, the National Botanic Gardens accessioned 3,724 specimens. Of these, 2,250 came via Index Seminums from 166 other Botanic Gardens; 314 came from commercial seed catalogues (8); 195 as plants from Nurseries (20); 515 came from donations by 39 individuals including our own staff; and 136 came from an expedition to Belize. Of the remainder, 131 numbers were issued to plants which had either lost numbers or never been accessioned, and 181 numbers were issued to new propagations in the Nursery.

## 2 A Living Collections Strategy

### *2.1 Why you need a written Strategy*

The purpose of a policy is to provide a reference for best-practise for everyone in the organisation. Having things clearly spelt out helps to maintain traditions or unwritten rules, as well as directing the collections towards a better state. You need to have policies as to what you wish to acquire each year (An Acquisition Policy), how and in what way you accession that material (An Accessioning Policy), how you decide what to keep or not keep in the collection (A De-Accessioning Policy), who is allowed to use the collection and in what manner (An Access Policy) and directing all these policies you need to have certain overriding rules of practice (An Ethical Policy).

## 2.2 Ethical Policy

### CBD and pre-CBD specimens

The National Botanic Gardens has a pro-active compliance to **AGENDA 21** (Acting locally to preserve the environment globally), **CBD** (Convention on Biological Diversity - recognising that the country of origin of a plant should benefit from any intellectual, scientific, medicinal, horticultural, or financial value) and **CITES** (Convention on International Trade in Endangered Species of wild Fauna and Flora). Therefore we now have a statement which those receiving plants from the Gardens are required to sign.

1. The Agreement states that:
  - ❖ NBG Glasnevin intends to honour the letter and spirit of the Convention on Biological Diversity in the use of its collections.
  - ❖ Recipient may use Material, progeny or derivatives for non-commercial purposes only.
  - ❖ Recipient will provide NBG Glasnevin with any benefits arising, including research results and publications.
  - ❖ NBG Glasnevin supplies material on the understanding that the Material or any progeny or derivatives are not commercialised, and that if commercialised, then the recipient will enter a separate and negotiated agreement with NBG, whereby the benefits obtained are shared fairly and equitably with the source country of the Material.
  - ❖ Recipient may not transfer Material without written, similar agreement
2. You should try not to purchase or accept imported plants without clear understanding of source and legality.
  - ❖ Plants bought from nurseries or dealers should be carefully considered, so that you are not supporting activities which might be endangering species in the wild, or supporting illegal collecting.)
  - ❖ All plants coming into and out of the collections should abide by **CITES** regulations.
3. Rare / Endangered species in the Collection. These need to be carefully assessed:
  - ❖ Are you maximising the species survival by keeping these plants?
  - ❖ What is their long term prospect ?

- ❖ Many Irish cultivars are already extinct, how many do you keep, and how actively are they propagated?

## 2.3 Acquisitions Policy

This would be directed by the Collections Policy. It is important to have a slightly different Acquisition Policy from an Accessioning Policy, since some plants are acquired for specific displays, such as bedding plants, half-hardy annuals and the vegetables, as well as pot plants in seasonal displays (None of which are given Accession Numbers).

Some basics for such a Policy are:

1. Compliance with your Ethical Policy, CBD, CITES etc.
2. A Priorities list, either of Families, Genera, Plant type or whatever.
3. Catalogues, seed lists etc. These should be treated in a systematic manner, so that incoming material can be checked against them when it arrives.
  - ❖ Wild collected seed is important in such areas as shrubs or order bed seeds, also Native beds should by necessity be wild-origin whenever possible. **Seed from Botanic Gardens and Arboreta has a very high likelihood of being a hybrid.**
  - ❖ Irish native species should never be ordered from overseas except for very specific scientific needs.
  - ❖ Garden Origin specimens would be permitted where horticultural needs must be satisfied, or where cultivars are obviously not 'wild' taxa.

## 2.4 Accessioning Policy

Before plants are Accessed you should have guidelines which ensure that you are only accepting legitimately collected or acquired specimens. Nothing should enter the Garden without first being accessed (there are a few exceptions - see **Section 3.5**).

1. Incoming seeds must be accessed prior to sowing.
2. Multiple plants sourced from the same site or seed/propagation accession only need 1 number (some exceptions might be for known genetic diversity in wild collected conservation plants; plants collected from the wild, or old Cultivars).
3. Propagations, cuttings etc. need new numbers when they are made (There are a few exceptions - see **Section 3.6**)

4. All separate plantings, pots or separate individuals need to have a **Qualifier** (A,B, etc.) - see **Section 3.7**.
5. In-transit plants going to other gardens or displays. Because that gives a record of such movements through the garden.

## 2.5 De-accessioning Policy

For the same reason you have guidelines for accessioning, you should also have guidelines for de-accessioning. No plant should be removed from the garden without obtaining certain pieces of information:

- ❖ Do you know exactly what it is ?
- ❖ Do you have other specimens ?
- ❖ Could you obtain it again easily ?
- ❖ Should you attempt to keep it in the form of cuttings or seed ?
- ❖ Is it covered by a CBD agreement ?
- ❖ Is it in accordance with your Ethical Policy ?
- ❖ Could you transfer it to another Garden ?
- ❖ To the compost heap ?
- ❖ Will it be beneficial to the collection as a whole ?

A dynamic procedure needs to be implemented to bring about mixed-age stands of tree collections, such as Oaks, Ash, Beech, Maples etc. Should you actively remove old / decrepit, low value collections, such as trees past their prime ?, or of little aesthetic value, poor provenance ? etc.

## 2.6 Access Policy

Access to the collections for propagation purposes by outsiders needs to be carefully regulated. Access must conform to CITES/CBD etc. You may otherwise fall foul of other Botanic Garden's policies if you have no firm commitments.

Simply keeping a record of what goes to whom, and getting recipients to sign the statement in your Ethical Policy (Section 2.2) is sufficient to demonstrate compliance with CBD. A standard formal letter should be put in place.

# 3 Accession Numbers

## 3.1 Why have Accession Numbers.

An Accession Number serves the purpose of attaching the documentation of a plant (*Its source, the date it arrived, whether you have propagated from it,*

*what it was previously called, has it been critically determined etc.*) to the actual specimen. If this link is broken it may be possible to re-establish it if, for example, you know you have only a single or limited number of specimens of the given species or cultivar, and can exclude other possibilities, or you have the specimen mapped accurately.

1. Each Accession Number identifies one or a group of plants that:
  - ❖ are of the same taxon
  - ❖ are of the same propagule type (or treatment)
  - ❖ were received from the same source
  - ❖ were received at the same time.
2. Accession Numbers can never be re-used, transferred or assumed (it is better to scrap an uncertain one and Re-accession - see **Section 3.6**)
3. Some plants already in the collection might need to be Re-accessioned for one of the following reasons
  - ❖ Where it is discovered the original batch of plants was mixed, or one plant shows extreme variation.
  - ❖ Where the original number is lost or unknown (this includes some for which numbers were never issued). If the original number is discovered later on, then the history (attached to that number) can be restored to the plant. The new number is thus acting as a **Trace number** (see 3.4), storing information in the meantime until it can be unambiguously associated with its original number.
4. Whenever a propagation, division, grafting or some other multiplication of a plant (i.e. a seed or cutting of a shrub, climber or tree) is undertaken, then a **new Accession Number** must be issued to the propagations, except for certain limited conditions, namely:
  - ❖ Where the propagation is equal and clonal (i.e. division of a hardy herbaceous Perennial).
  - ❖ Where tender perennials (*Penstemon* etc.) or potted plants (*Pelargonium*) are being bulked up for display.
  - ❖ Where annual seed is re-sown.

It is important that Accession Numbers are issued before a seed germinates, a cutting strikes or a grafting takes. This provides a record of propagation procedures. This will provide you with much useful information in the future. Eventually the database will tell you:

- whether a particular mother plant produces better cuttings,

- what conditions a particular species needs to root, germinate etc.,
- whether seed from Nantes Botanic Garden has lost viability,
- whether you have ever been able to get *Escallonia resinosa* to take as cuttings and if so how, etc.
- whether certain plants always die in a particular bed or lawn.

Accurate use of Accession Numbers is extremely important in the gardens. If for example a specimen of *Dryas octopetala* dies or is transplanted the identity of the plant might be critical - because within the gardens you might have a mixture of foreign and Irish specimens. Unless you are certain of an individual plant's history it is better that it be de-accessioned and removed from the collection. In some cases of horticultural interest you might await the propagation of known provenance material before de-accessioning. In other cases you might Re-accession the plant under a new number in the hope that you might discover its true identity later.

The Golden Rules are:

- **Every plant in the collection must have an Accession Number** (there are just two exceptions see Section 3.5)
- **Don't re-use a label on a different plant just because it has the same species or cultivar name.**
- **Don't assume a species or cultivar has the same number throughout the Gardens.**

### ***3.2 The three levels of Identity***

There are three different kinds of identity for every individual plant within the collection:

1. Is it the correct individual. (for example there are several specimens of *Acer davidii* on the Maple class lawn at Glasnevin – we have to be certain which is which, since they came to the gardens at different times, from different sources, and are very variable in appearance. With plants in pots there is even greater risk of confusion, since in the case of the trees we have maps that can help fix the identity of a particular plant.)
2. Do you have the correct provenance/history to go with that particular plant. (We have 5 *Acer davidii* at NBG for example: one came from Kew in 1940, one from Mount Usher in 1936, whereas the remaining three have not been traced through the accessions books).

3. What is the current, correct name for the taxon. (Some plants have outdated names, that are now synonyms, or have never been correctly identified).

The first two questions are in some ways the most important. The third question could be answered at any time, but is of limited use if you don't know the previous two facts about a plant.

### ***3.3 Accessioning a Garden for the first time***

Sequential Accession Numbers were only introduced at the National Botanic Gardens, Glasnevin in 1970, and backdated at that time to 1967. Prior to that date 2 parallel sets of accessions books were kept: one for *Donations* to the Gardens, the other for *Purchases*. However the remainder of the collections had no Accession Numbers. Some trees and shrubs recorded their source and date of planting on the labels alone (examples can still be seen on most of the Birch and Horse Chestnut Class lawn).

During the early 1980's, information on 14,500 specimens was added to a computerised database (**BGBASE**). This was achieved by a stocktake of the garden, during which plants without Accession Numbers were numbered with aluminium disks, starting from 1 and going through 13600.

When the accessioning backlog was undertaken there were more than 10,000 plants in the Gardens, therefore a 5-digit number was needed. In addition, it was planned, at that time, that all Gardens in State care in Ireland would also have a Garden code as the initial digit of the Accession Number and therefore all these XX numbers were treated as having six decimal places.

Our XX series numbers always have six decimal places (**XX.009464**). Accession Numbers that were issued sequentially via the accessions books always have four decimal places (**2000.0000**). When an XX number is identified as having arrived in the gardens in a specific year (via the accession registers) then it retains the full six digits, but gains the year instead of XX, i.e. **1963.009464**. This means that one can instantly see whether a plant's history has not been traced (still XX) whether it was in the garden when numbers were first introduced (6 decimal places) or arrived after sequential numbering had been undertaken (4 decimal places).

Of course you could use any type of code, and if your starting collection comprises less than 10,000 plants, then a 4 character system could be used (**XXXX.0000**). If you have more than 10,000 plants, then the appearance of

four and six-decimal place codes will not look odd if you use a 2-character code, since the numbers all end up as being 8 digits long, and if and when they do acquire a year of accession, this still carries the additional information that the number was originally an XXnumber, and it is not the case that at least 9,464 plants arrived in the gardens in 1963, for example.

Zeros are very important and must not be left out, nor must the year be shortened. Do not use a backslash (use a fullstop only) and do not run the numbers together (19990012). Carefully plan a system and write down a basic set of rules so that all the staff understand what is happening.

### 3.4 Dealing with plants which have no Accession Number

Plants lose their labels, sometimes through pruning, sometimes through being stolen or falling off, and sometimes because it has become illegible or wrongly copied. There are several ways of recovering numbers.

1. Another member of staff may know something about where, or when the plant was moved to its current position. With a year, or an internal location, it may be possible to find a number, or determine whether it was ever accessioned in the first place.
2. There is the possibility that the plant is listed or mapped.
3. The plant may be unique enough to make it worthwhile checking the accessions books - both ledger and electronic versions.

If all these methods fail then the best thing is to issue the plant with a **Trace Number**. This is simply a new number for the current year, which can be used in the meantime, in the hope that one day the correct (if it ever existed) Accession Number may be found, and can be 're-attached' to the specimen. In this way you will be able to continue recording the history of a plant.

Any bed or section of border that is being re-planted should be fully listed and any unnumbered plants can either be hunted down in the catalogues and, if unfound, then issued with a Trace Number. With herbaceous plants, a sequential number for the current year is issued. With woody shrubs, climbers or trees, it is not a good idea to go on issuing 2000 or 2001 numbers, so an **XXnumber** is used, since these plants have a real size relative to their age.

### 3.5 Plants that do not need Accession Numbers

There are a few exceptions to the rule that "All plants entering the garden require an Accession Number". For example the following plants are not accessioned at the National Botanic Gardens, Glasnevin:

- ❖ **Annuals such as the Half-Hardy display, Sweet Peas, and Vegetables**, but not those in the Family and Native beds etc.
- ❖ **Biennials and Perennials that are treated as bedding plants**, i.e. they are bought in and turned out at the end of the year (this includes Tulips, Daffodils etc.)

### 3.6 Dealing with Propagations

Historically when a propagation was undertaken in the National Botanic Gardens, the original Accession Number was used. To all intents and purposes this is still quite useful, however, the following plants were all propagated in 1998, they are all only 2 years old, but would have carried these numbers for the rest of their lives.

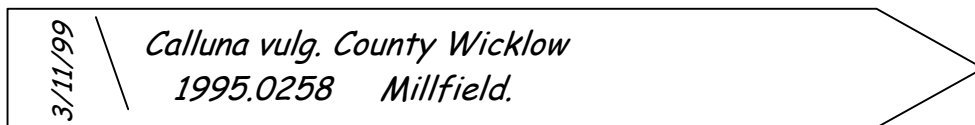
1886.009462	<i>Ilex aquifolium</i> 'Smithiana'
1926.004182	<i>Salix fargesii</i>
1962.009425	<i>Ilex</i> × <i>altaclerensis</i> 'Hodginsii'

By issuing new numbers we have a permanent record of when and how a propagation is made. In the case of a woody shrub or tree it also gives an accurate measure of the age of the plant. In issuing a new number, the old number is used as the source of the material, and becomes a **Lineage number**.

Different methods of propagation have different outcomes, especially with regard to the genetic make-up of a plant. For example it might be clonal (a cutting, layering, or division), a graft, or seed may have been sown. When using seed or ordering seed from other Botanic Gardens you must be aware of the potential consequences. The majority of *Sorbus* and *Malus* seeds for example are nearly always outcrossed (being self-sterile), so all seeds will be hybrids unless several individuals of the same species are standing together, and isolated from others. Alternatively some species such as *Sorbus hupehensis*, *S. forrestii* and *S. vilmorinii* are all **apomictic** (seeds are set automatically without pollination), and come absolutely true from seed, these are therefore perfect clones of the mother tree.

### Example 1:

When cuttings are first made a label is usually written out by hand. This is a cutting made on the 3<sup>rd</sup> November 1999, when the Millfield beds were replanted.:



These are then listed in a cuttings book, which periodically can be taken to the Records office, where new numbers can be assigned, and a printed label produced:



The original Accession Number that the plant arrived in the Garden under is **1995.0258**, this becomes a **Lineage number**. Checking the accessions book reveals that the plant arrived from Doran's Nurseries, Naas, on the 7<sup>th</sup> June 1995.

### Example 2:



A *Pittosporum bicolor* in front of the 1<sup>st</sup> year lecture hall was propagated on the 5<sup>th</sup> March 1998, however, two treatments were involved. The former (1998.1667) was put in the side frame of the old propagation house, while the latter (1998.1669) was put on the misting bench. The **1998.1669** label was returned to the herbarium as 'failed to strike', while the **1998.1667** plants number three. The value in issuing two numbers is that we have now learned that placing *P. bicolor* cuttings under mist is of no apparent benefit. Likewise having different numbers when propagations are done at different times of the year or with different treatments (hormone powder, bottom heat etc.) will eventually make the database a source of much useful information on

propagation techniques. Likewise certain individual shrubs or trees can be very stubborn at striking. If necessary grafting or tissue culture techniques could be applied to material you are anxious to propagate.

### PROPAGATIONS EXEMPTED FROM NEW NUMBERS

Annuals in the Native and Family beds will be sown year after year, likewise some perennials such as *Penstemons*, and Zonal *Pelargoniums* are produced from cuttings on an annual basis. Herbaceous perennials need to be divided every few years. If you gave all these plants new numbers, you would soon have a mass of unwieldy lineages, which would take a long time to trace to the original accession. Therefore as with Accession Numbers there are a number of exceptions. The following plants would retain their old numbers when propagated by the stated means:

- ❖ **Species Annuals** (i.e. those in the Family & Native sections) **by seed**
- ❖ **Herbaceous perennials by division**
- ❖ **Bedding Perennials renewed by cuttings within the Gardens, such as Pelargoniums and Penstemons** (Perennials & Biennials treated as Bedding plants bought in, such as Penstemons, Lupins etc. do not have Accession Numbers - see **Section 3.5**).

Always bear in mind that an Accession Number is used to 'record' some change. Annuals which exhibit some interesting change, in flower colour or appearance, should be re-accessioned (i.e. given a new number) in order to help you record for the future when and where something came from. Suppose for example a 'mixed' annual plant is carefully weeded, so as to leave only a single colour form, or that seed is selectively collected, then the resulting offspring will be rather different from the original sowing.

**Example:** *Platycodon grandiflorum* with mixed flower colours was received in 1985 from Marseilles Botanic Gardens (1985.1620). Since then a pure white form has been selected within the Gardens. In order to distinguish this it was re-accessioned as 1999.2538.

Likewise a shoot on a herbaceous perennial might have a dissected leaf margin, variegated leaves, a somewhat different flower colour or appearance. Therefore when propagating from this shoot, or dividing the clump to separate this anomaly, a new Accession Number would be necessary. Normally a division of a long-lived herbaceous perennial is of no significance - a 100 year clump of Asters looks much like a 5 year old clump.

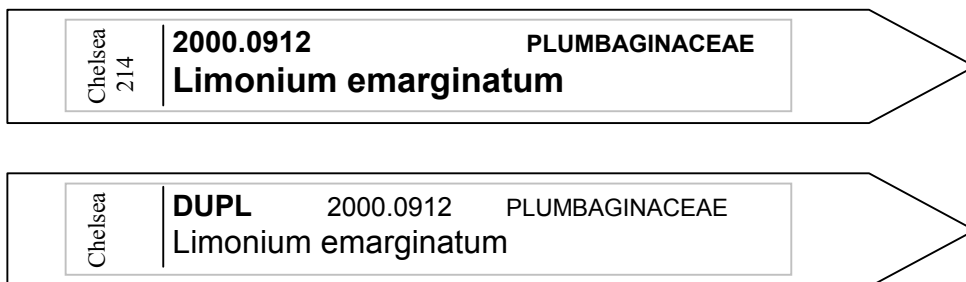
With zonal Pelargoniums and Penstemons you still need to know where something originally came from, so they are issued with Accession Numbers when they first arrive. Each year fresh cuttings are made, however, and the previous plants will usually be thrown out. In these cases you continue to transfer the Accession Numbers from plants of previous years to the fresh plants. A list of these 'exempted' propagations needs to be established.

### 3.7 Qualifiers for multiple specimens

When a seed batch or propagation fails to germinate or strike, then the single nursery label is returned to the records office, and the database can be updated to record its failure. If a plant has successfully established itself, however, it may be that there are anything from one to dozens of individual specimens.

If one or more plants are moved into the Gardens (into one or more locations), while some are retained in the Nursery then there may be problems in knowing whether an entire Accession Number is alive or dead in the collections. If the single, original label stays behind in the Nursery with living plants which then die, then there is a risk that the label will be sent to the records office under the misapprehension that the accession is dead, when in fact an individual is still alive on the grounds somewhere. Likewise a shrub dying, or being stolen, on the grounds could be recorded in the 'Dead' book, but is in fact still alive in the nursery, or in another location within the Garden.

For these reasons a propagation (whether incoming seed or an internally-sourced cutting etc.) only ever gets a single label. If two identical labels were issued, then an apparent 'complete' death might be erroneously recorded. If it is necessary to label several pots then a distinctive 'Duplicate Label' should be used:



Multiple specimens need to be given qualifiers. A qualifier is a letter after the accession number, which tells you where an individual, or group of individuals, is in the Gardens.

**Example 1:** Twenty four plants of *Primula farinosa* germinate from Accession Number 1999.2334. Ten plants are planted in the rockery and the remaining 14 are retained as display plants for the Alpine house. These would be numbered as follows:  
 1999.2334A 14 plants in NU  
 1999.2334B 10 plants in RG  
 Some months later, six plants in the nursery are planted into a trough in the Alpine yard. The records are updated as:  
 1999.2334A 8 plants in NU  
 1999.2334C 6 plants in AY  
 A year later the plants in the trough produce seed which is saved and placed in cold storage in case the plant should be lost in the future. The seed would be recorded as 1999.2334C indicating which plant(s) it came from. If it is then sown in 2004, it will be issued a 2004.\_\_\_\_ Accession Number, and 1999.2334C becomes the Lineage number for that accession..

**Example 2:** A quantity of *Ranunculus alpestris* seed is accessioned as 1999.2335. Some of the seed was sown and the remainder was sent to the cold store where it was stored as 1999.2335B. The seed that was sown eventually produced 6 plants. Two were planted in the Family beds, the remainder were kept in the Nursery for displaying in the alpine house. The records would be as follows:  
 1999.2335A seed in store  
 1999.2335B 2 plants in F1  
 1999.2335C 4 plants in NU  
 If seed had been collected from a number of specimens (i.e. B & C) and pooled then that would be stored using the next available qualifier:  
 1999.2335D seed in store  
 If the Family bed plants both died, they might be replaced with one other from the Nursery plants, and the records updated as:  
 1999.2335C 3 plants in NU  
 1999.2335E 1 plant in F1

**Example 3:** *Laburnum alpinum* was accessioned as 1999.2329. 4 plants germinated. One was planted in the Legume class area, and after a number of years the remaining plants in the nursery were sent to other Dúchas gardens. The records then would read:

1999.2329A de-accessioned  
1999.2329B 1 plant in LE

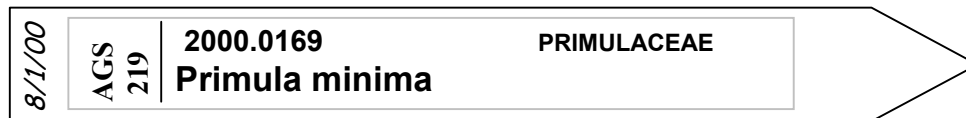
## 4 Labelling

Labels are the key to linking the information held in the records to the actual specimen. There are several levels of labelling. A **Primary label** (or Nursery label) is the label a cutting or sown seed is marked with, often a sowing date is added. When ready for public display a **Secondary label** is produced which may show information useful to the General public, such as a common name, the natural distribution of the plant, its source etc. A **Tertiary label** is a back-up label - it might be an aluminium XXnumber disc, or the original primary label pushed down inside the pot or buried below the plant.

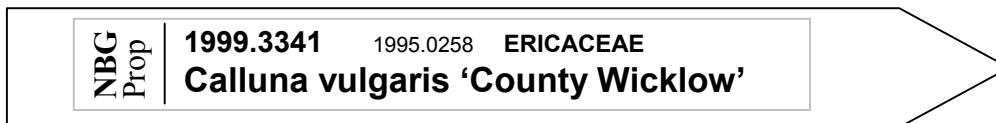
### 4.1 Primary Labels

When a seed is sown, a label is printed out in the herbarium and fixed to a spike label. Only **one** of these labels should ever be issued, so that if the plant fails, this label can be returned to the records office and treated as a 'dead' plant. A Primary label acts as a paper-trail for knowing what plants survive the vital first step (germination, rooting etc.). Because of this, they must never be peeled off, and must never exist in more than a single copy.

Some examples of Primary Labels:



This is a Primula seed packet from the Alpine Garden Society, number 219 in their 1999 catalogue. It arrived on the 17<sup>th</sup> January at Glasnevin, and was Accessed as 2000.0169.



This is a cutting made on the 3<sup>rd</sup> November 1999, when the Millfield beds were replanted. The original Accession Number that the plant arrived in the Garden under is 1995.0258, this is its **Lineage number**. Checking the

accessions book reveals that the plant arrived from Doran's nurseries, Naas, on the 7<sup>th</sup> June 1995.

### 4.2 Secondary Labels

Secondary Labels are the labels that are attached to plants for the general public to read. It is important that labels within the gardens are uniform in the information they carry and in the way it is laid out.

One particularly important change since 1995 is that cv. should no longer be used to indicate a cultivar. Instead the cultivar name should be enclosed in single inverted commas ('...') or straight quotes ('...').

The following rules apply to all new secondary labels at Glasnevin:

- **All new labels must have an Accession Number.**
- **XXnumbers (including those with years) must have 6 decimal places.**
- **Sequential numbers must have 4 decimal places only.**
- **Accession numbers for 2000.0000 specimens must have a qualifier (A,B, etc.) if there is more than one location for the accession.**
- **The species name must all be written in an identical font size (not smaller).**
- **The cultivar name (if there is one) must be placed in quotes and written in lower case, with the initial letter(s) in capitals. Never with the abbreviation cv.**

A standard label looks like this:



The Source, and whether or not the plant has been verified (V), are not obligatory and should be regarded as a matter of judgement. Such



information is on record somewhere else and is not necessarily of interest or consequence to most visitors. The Country of Origin on the other hand is information which can be useful to members of the public.

The Family should be written in small capitals (N.B. LILIACEAE see **Section 6.3**), the species (+subspecies, variety) name in large capitals, cultivar and common names in lower case with leading capitals. Different sized labels are permitted, but the same six rules must apply.

## 5 Record Keeping

As plants are moved and transferred to permanent locations, the records need to be updated. In doing so, lists are prepared for ordering of **Secondary Labels**.

### INITIAL PLANTING OUT

A standard form should be filled in for the initial move from the Nursery to planting out locations. At this point it is important to know whether the entire accession or only a part is moved. If the accession is divided into more than one location (i.e. one or more specimens stay in the nursery) then a qualifier is needed (see **Section 3.7**).

### MOVING / RE-MOVING PLANTS

Likewise moving some or all plants from one location to another requires that the same form be filled in, sometimes to merely change the location information, sometimes to increase the number of qualifiers. A Dead book needs to be maintained. Each section or gardener should have a Dead book, where records of plants that have died can be noted. These records can be updated to the computer at regular intervals.

## 6 Identification and Verification

### 6.1 The importance of provenance information

Without the source of a plant, it can sometimes prove difficult, if not impossible, to name the specimen correctly. Seed sourced from other Botanic Gardens or Arboreta has usually come from collections where many species, varieties and cultivars of the same genus are growing cheek-by-jowl. The result is a high risk, if not certainty in many cases, of hybridisation.

**Example:** White-barked Birches are notorious for hybridising. On the Birch class lawn at NBG there are seven Birch trees, each at least 30 years old, with the label 'Betula sp.' In all cases, where the provenance is known, these trees have come from Arboreta or other Botanic Gardens. These trees cannot be satisfactorily identified, and are probably all of hybrid origin.

As mentioned under Section 3.6, some plants, such as *Sorbus* and *Malus* are what are known as *obligate outcrossers*, i.e. they cannot self-pollinate themselves and can only set seed when pollen from another plant lands on the stigma. Thus for the majority of species in these genera, all seeds will be hybrids unless several individuals of the same species are standing together, and isolated from others. Alternatively some species, such as *Sorbus forrestii*, *S. hupehensis*. and *S.vilmorinii* are all **apomictic** (seeds are set automatically without pollination), and come absolutely true from seed, these are therefore perfect clones of the mother tree. Thus obtaining these plants from virtually any source would be fine, since it is the very same clone that was originally collected by Forrest (or whoever) in China.

Thus, where woody material of species, or naturally occurring varieties, is being sourced it is important to obtain the seed from either a wild source, or from propagations of known, certified wild origin material. There is no point in planting a tree with an estimated life span of 50-100 years if it might not be possible to attach a name to it later. It is therefore always better to throw away or remove suspect material in favour of the genuine article. Where horticultural needs, aesthetics or simply 'interesting' material is at hand, then you would take the pragmatic view that it is worth hanging on to such plants.

### 6.2 Names

Checking on the correct name of a species or cultivar is not always straightforward, and nor are all books correct! For example, ***Bean's Trees & Shrubs*** has useful information on origins, cultivation and biology, but the names are often out of date, and the usage of cv. followed by the cultivar name in inverted commas is quite wrong. The ***RHS Dictionary*** (4 volume orange set) has many errors, although the usage of names is usually correct. ***The Plant Finder*** is an excellent guide to the more usual cultivars and their correct spelling and designation. ***Kew Index*** is only a listing of published plant names, and does not tell you what the currently accepted name is. The ***European Garden Flora*** is a useful book for identifying Garden plant species or subspecies, but has no information on cultivars.

The features to check are **1.** whether the plant conforms to the description, **2.** Whether the present name is regarded as a synonym or invalid, and lastly **3.** Whether any sub-specific category, if there is one, is a subspecies, a variety or a cultivar name.

Since 1995 it has become mandatory to use inverted commas for designating cultivar names, and the use of cv. is discouraged. All new labels should conform to this usage.

### 6.3 Family designations

The National Botanic Gardens decided, some years ago, to drop the traditional names for eight families, and to adopt the standardised names. Thus the following names are used on our labels:

Traditional Name	NBG usage	
Compositae	<b>Asteraceae</b>	Daisy Family
Cruciferae	<b>Brassicaceae</b>	Cabbage Family
Gramineae	<b>Poaceae</b>	Grass Family
Guttiferae	<b>Clusiaceae</b>	St. John's wort Family
Labiatae	<b>Lamiaceae</b>	Mint Family
Leguminosae	<b>Fabaceae</b>	Pea Family
Palmae	<b>Arecaceae</b>	Palm Family
Umbelliferae	<b>Apiaceae</b>	Carrot Family

Other family divisions sometimes change. For example the family Escalloniaceae is sometimes regarded as part of Grossulariaceae, which in turn is seen by some authorities as part of Saxifragaceae. Other examples in gardens are: Nolanaceae which is now part of Solanaceae; Francoaceae which is part of Saxifragaceae. Some genera are shifted from one family to another. Thus the New Zealand shrub *Corokia* has long been placed in the Cornaceae, but the DNA evidence now gives added weight to the argument that it is in fact a member of the family Grossulariaceae.

Consistency is important, and at the National Botanic Gardens, Glasnevin we follow the arrangement in Brummitt (but note that the traditional family names are used there), which is more or less what the RHS *Plant Finder* now follows. A list of the more common problem genera are:

Corokia	GROSSULARIACEAE
Escallonia	ESCALLONIACEAEA

Griselinia	GRISELINACEAE
Hypericum	CLUSIACEAE
Itea	ESCALLONIACEAEA
Orobanche	SCROPHULARIACEAE

**LILIACEAE** was once a catch-all family, with 4,500 species in nearly 300 genera. Today the family is sometimes split into 22 separate families, such as Alliaceae, Hyacinthaceae, Convallariaceae, Hostaceae etc. You need to decide whether your garden will adopt the broader concept or the narrower concept. The authority for these that we follow at NBG is Brummitt's *Vascular plant families and genera* and the RHS *Plant Finder*, which recognise the 22 narrower concepts. Examples of genera and their families:

*Agapanthus* (Alliaceae), *Agave* (Agavaceae), *Albuca* (Hyacinthaceae), *Allium* (Alliaceae), *Aloe* (Aloaceae), *Alstoemeria* (Alstroemeriaceae), *Asparagus* (Asparagaceae), *Asphodeline* (Asphodelaceae), *Asphodelus* (Asphodelaceae), *Astelia* (Asteliaceae), *Bomarea* (Alstroemeriaceae), *Brodiaea* (Themidaceae), *Cardocrinum* (Liliaceae), *Chionodoxa* (Hyacinthaceae), *Colchicum* (Colchicaceae), *Convallaria* (Convallariaceae), *Cordylina* (Agavaceae), *Crinum* (Amaryllidaceae), *Dasyilirion* (Dracaenaceae), *Dracaena* (Dracaenaceae), *Eremurus* (Asphodelaceae), *Erythronium* (Liliaceae), *Eucomis* (Hyacinthaceae), *Fritillaria* (Liliaceae), *Gagea* (Liliaceae), *Galanthus* (Amaryllidaceae), *Gasteria* (Aloaceae), *Haworthia* (Aloaceae), *Hemerocallis* (Hemerocallidaceae), *Hippeastrum* (Amaryllidaceae), *Hosta* (Hostaceae), *Hyacinthoides* (Hyacinthaceae), *Hyacinthus* (Hyacinthaceae), *Kniphofia* (Asphodelaceae), *Lilium* (Liliaceae), *Liriope* (Convallariaceae), *Muscari* (Hyacinthaceae), *Narcissus* (Amaryllidaceae), *Nolina* (Dracaenaceae), *Ophiopogon* (Convallariaceae), *Paris* (Trilliaceae), *Polygonatum* (Convallariaceae), *Ruscus* (Ruscaceae), *Sansevieria* (Dracaenaceae), *Scilla* (Hyacinthaceae), *Trillium* (Trilliaceae), *Tritelia* (Themidaceae), *Tulbaghia* (Alliaceae), *Tulipa* (Liliaceae), *Veratrum* (Melanthiaceae), *Yucca* (Agavaceae).

### CLADISTICS

There are other changes afoot that you need to be aware of. For example, study of the evolutionary history of the family Sapindaceae reveals that close relatives of both the maples and horse-chesnuts lie within the large tropical family Sapindaceae (in the mid-19<sup>th</sup> Century these families were combined in this manner). A similar case is that for Taxodiaceae/Cupressaceae Araliaceae/Apiaceae Apocynaceae/Asclepiadaceae. Thus in certain modern evolutionary texts these families are united. In effect, Taxodiaceae is the ancient group which is gradually becoming extinct, whilst Cupressaceae is a modern derivative which is still evolving from within this ancient family. At Glasnevin we continue to use Hippocastanaceae and Aceraceae, as well as Taxodiaceae and Cupressaceae and the other families for the time being.

## 7. How to Catalogue a Plant Collection

The first decision is how to store your data. Obviously it is likely you will want some sort of electronic system. Some programs are expensive (BGBASE) while others are virtually standard on many new computers (Wordprocessors, Spreadsheets, ACCESS etc.). The first questions you should ask yourselves are:

1. Will all the staff be able to use it easily? This is VERY important if you want to make sure you have a functional system.
2. Plan how you are going to deal with the backlog of plants which have no accession number. Devise an infallible system to ensure numbers are not given out twice to this backlog. Pre-numbered stainless steel tags is a good method (ca. UK£130 / 1,000 from Stobart-Davies Ltd, Priory House, Priory Street, Hertford, SG14 1 RN; 01992 501 518, fax .. 519).
3. What sort of output do you want?
  - Plant lists for particular lawns or borders.
  - To know where plants came from.
  - What has been propagated / what have you yet to propagate.
  - To list all members of a particular plant family
  - A list of all climbers or trees

### Databases

**BG-Base** is the ultimate Botanic Gardens database system, but very expensive and not popular amongst staff of mixed computer abilities. **BG-RECORDER** is an Access-based program designed for being cheaper and easier to use. It is produced by Botanic Gardens Conservation International, Descanso House, 199 Kew Road, Richmond Surrey, TW9 3BW U.K. Email: bgci@rbgkew.org.uk www.bgci.org.uk. It costs ca. £50. It does require a familiarity with Access, and may not be logical to non-computer folk. Lastly you could write your own Access system, which some gardens have done, but this can be very time-consuming and make the system inaccessible or incomprehensible to others in your organisation. Spreadsheet programs on the other hand are very user-friendly, and for collections of a few thousand specimens, where you want to encourage all staff to participate in a catalogue (the only way to really make it work) I would strongly recommend them. Before describing the advantages please be aware of the disadvantages:

1. Information is **repeated**, thus every Rose cultivar and species has to record the fact that it is in the genus *Rosa* and the family Rosaceae. If

you make a spelling mistake i.e. Srobus, then a list of *Sorbus* might miss this rather important fact – in a database the genus name is, in theory, recorded just once.

2. Complicated **outputs or enquiries are not possible** without a lot of editing (i.e. a list of all Rosaceae you have received from North American Nurseries; a list of Shrubs that you have taken propagations from in the past 2 years etc.) This kind of data handling requires a database program.

### A Spreadsheet catalogue

There are three vital pieces of information you need to know for each plant in your collection:

1. What is its provenance (Where and who did it come from)
2. Where is it growing (Its current location in the collection)
3. What is its name

In addition it can be useful to know the following facts:

4. What is its history (did it lose a limb in a particular gale; when did it first bear fruit etc.)
5. Did it get re-identified after growing for a number of years? what was it called before?
6. Has it been propagated, and where did these offspring end up?

In order to equate this written information to the individual plant, it is best to use a code number, or Accession Number that will uniquely identify it. This number must not be reused if it dies or is removed. It is best to incorporate the year of acquisition (2000.0001, 2000.0002 etc.) because it then gives the age of the tree. Where a year of planting is unknown then I would suggest using an unknown year code such as XXXX.0001. Numbers should not be written without leading zeros, because 2000.1 can be misread as 2000.1000. If you get more than one individual seedling or sapling, but they have all come from the same source and are more or less the same, then one accession number is used, but with a qualifier (2000.0001A, 2000.0001B, C.etc.). The number records the origin (which is the same for all), but the individual plant has its own history and is a unique individual.

A spreadsheet program such as **Excel** will be adequate for storing information. Attached are some examples of our data laid out in spreadsheet

format. The 1998 sheet shows what our own propagation data looks like. The minimal data we keep is:

<b>DATE</b>	Date the plant arrived or the information was recorded.
<b>SOURCE</b>	Who we received the plant from, with the full address if it is not one of our regular sources.
<b>SOURCE Acc Numb</b>	If it is a propagation from within your own Garden, then the accession number (and qualifier) of the original plant is put here. If you re-use accession numbers for cuttings or seedlings, then a 3 year old cutting from a 40 year old shrub might have the number 1961.0123 which gives a false idea of its actual age. Whilst 1997.1085 will have the information about when the cutting was taken, how it was treated, and who the mother plant was (1961.0123).
<b>ACC NO</b>	This is a simple series of 4 digit year and 4 digit number. These numbers should never be re-issued.
<b>QUALIFIER</b>	This is a letter. If we have more than one individual plant that has come from the same source but is growing in a different location we can distinguish them with the qualifier. With a mass planting (say of herbaceous plants) there is no need for a qualifier if they are all in the same location. Qualifiers help to distinguish an individual of a group of otherwise identical individuals.
<b>NAME</b>	Botanical name of the plant.
<b>VERN</b>	Vernacular name for the species or cultivar.
<b>AUTHOR</b>	Author of the name.
<b>REF</b>	Any code number the nursery catalogue or collector used - useful for checking back in the future.
<b>SRC</b>	An abbreviation we use on the labels.
<b>FAMILY</b>	Botanical family, useful if you want to produce a list of all the Rosaceae in your collection.
<b>TYPE</b>	How it arrived: s=seed, c=cutting, p=plant etc.
<b>SECTION</b>	Where it is growing - we divide the Botanic gardens into 178 different lawns or shrubberies. You might want to have a secondary number for its position on a lawn or within a border or shrubbery.
<b>PROVENANCE</b>	Where the original seed or sapling came from.

**VERIFICATION** What it has been called in the past, and who currently named the plant or what book was used to check the name/identify the plant. Maybe a book illustration that helped you identify the plant.

**HISTORY** Any relevant information about the plant's history, damage, fertiliser use, pests, diseases, how it died, whether you passed on seed or cuttings to other growers.

**DEAD/LIVING** Is the plant alive (L) or Dead (D).

**DEAD** How and when the plant died - this is very useful in knowing what mistakes not to make in the future, or what precautions to take. This is why it is best to always number seed before you sow or cuttings before they strike. If it doesn't germinate/root it is useful to know so as to try a different procedure next time. Dead plants should never be deleted from a catalogue – it is very useful to know where it was once grown and when and why it died.

**WZG** This can be important when trying to identify the plant, or where the species is of conservation importance. W=Known wild origin; G= Garden origin; Z=seedling or cutting from a plant of known wild origin. Where a cultivar is being grown it is useful to know if it came from the original clone or not. For example Rosemary Brown grew the first Helleborus 'Graigueconna', and therefore this specimen is from the true mother plant and is marked C=Clonal.

**Plant Type** If you want to list trees, herbaceous plants, climbers, tender plants etc. or spring-flowerers or plants by flower-colour, then you must add a 'Plant type' category, or categories, and devise a coding system. That way you can output a list of all the living January/February flowering vines for example.