Plant Recording Scheme

Instruction Booklet

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International Dendrology Society

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IDS Plant Recording Scheme

1 INTRODUCTION

The IDS Plant Recording Scheme and the record card for individual specimens were originally developed in 1983 by the IDS Conservation Committee and based on the Kew index card devised by David Hunt for the Royal Botanic Gardens, Kew in 1968. The last edition produced, version 3, was published in 1989.[1] While retaining the paper record card, it introduced an alternative: the personal computer and early database management systems.

The objective of the IDS scheme is to encourage members and others to keep good records of their plants and to offer a versatile recording methodology suited for individual gardens and arboreta, aligning as much as possible with standards adopted by institutional botanic gardens internationally.

Botanic Gardens Conservation International (BGCI) defines botanic gardens as follows: "Botanic gardens are institutions holding documented collections of living plants for the purpose of scientific research, conservation, display, and education."

The same applies to private collections, even if they are not open to the public at all: without documentation, a collection does not exist.

This revision of the IDS scheme endeavours to uphold the essence of the original. Considering that the first version was published forty years ago, however, it will be no surprise that the paper record card does not appear in the revised document anymore.[2]

2 USE CASES

This document addresses the plant-recording needs of private dendrological collections with limited resources (staff, financial, time). Two different use cases are considered.

Use Case 1: the collection holder acquires mainly individual plants in the nursery trade that go directly to the garden. Therefore, she or he wants to know which plants are in the garden and be able to locate them. This user must also have the option to migrate collection data to use case 2.

Use Case 2: the collection holder acquires a variety of plant material, including seed, cuttings, etc., sometimes from wild-collected sources, and needs to record more information about the plants than in Use Case 1. Such information needs to be recorded at different times in the life of the acquisition, not only when it is planted in the garden.

Larger gardens with greater means, including dedicated and trained staff, should refer to Gratzfeld (2016) and Rakow (2011), which exhaustively cover botanic garden and public garden management.

[1] An update was prepared around the mid-nineties but remained unpublished.

[2] A garden registration process was also foreseen in the original document but apparently never implemented and therefore dropped in this revision.

3 CATALOGUING

3.1 RECORDING ESSENTIALS

Simplicity is key! Plant records take a long time to compile and maintain. Each record is not a static thing, since plants grow and die, new plants are acquired, names may change, and so on. Further, we assume that most private collections do not have staff dedicated to plant record management. For this reason, we define in this section which information we believe is required for a private collection.

Of primary interest are the identity of the plants and their location in the garden (Use Case 1). We also make a clear distinction between taxon, accession, and individual plant (the original index card did not establish a clear distinction between accession and individual specimen). For reference purposes, and since there may be more than one accession of a given taxon and more than one specimen for a given accession, it is essential that each accession should have an individual and unique identifier, and each specimen plant as well.

Gratzfeld (2016) defines an accession as follows: "Plant material (individual or group) of a single taxon and propagule type with identical or closely similar parentage acquired from one source at the same time. For tracking purposes, an accession is catalogued and assigned a unique identifier (number or code) associated with additional information" (the accession identifier is often the year the accession is recorded followed by a serial number of a combination of letter and numbers). An accession can therefore represent several plants that will be planted in the garden. Those plants must be identifiable as well. Usually, this is done by extending the "accession identifier" with a "qualifier." The combination of the two fields is then the unique identifier for the individual plant (or group of plants in the case of mass planting if they are in the same location).

A second system, mentioned by Toomer (2010), is to use a garden number to uniquely identify specimen plants. Toomer suggests using the location code followed by a serial number. It is far simpler to use a serial number without the location code.[3] This is what the original booklet suggested.

Here follows the list of fields which are essential (and of course, this is something of an arbitrary choice with which not everybody will agree). See later section for details on recording the data.

1. Scientific name
2. Accession date.
3. Provenance type flag (wild origin or not)
4. Accession identifier.
5. Individual specimen qualifier
6. Garden number (also called tag number)
7. Individual plant location
8. Individual plant status

[3] One can have one stock of numbered labels and there is no need to change the garden number in case the plant is moved to another location.

3.2 Recording Software Platform

Recent years have seen substantial progress in the digitisation of botanical garden collection data. Today's database systems may be integrated with mapping functions and can be accessed online or are fully cloud based. The best-known specialised software packages are BG-BASE, BRAHMS and IrisBG.

However, these software packages require substantial resources: they are expensive (one-time charges, maintenance fees, installation cost, and training) and need trained staff to operate them. Further, they have many modules that will not be used for a private collection. For these reasons, they are out of the scope of this document.

Instead, for smaller collections with just a few hundred records, a basic spreadsheet program such as Microsoft Excel, preferably the free web version included in the Microsoft 365 online suite or Google Sheets, also a free web-based option. However, as the collection grows, maintaining the data can quickly become unwieldy.[4]

The current standard is to employ a relational database, which minimizes data redundancy (and the risk of error) by requiring each item of information to be entered and updated only once. Affordable or even free database options include Microsoft Access or Base, the latter being available in both Apache Open Office and Libre Office suites (Libre Office Base is also compatible with MacOS). These systems will require at least a small amount of custom development. Further, a quick survey has shown that members tend to use such a database with just one table, depriving them of the benefits of a relational database.[5] Regardless of the option chosen, for any local file (local meaning a file stored on a laptop or desktop computer), regular data backups are crucial.

Hence, the optimal approach would be to use an external cloud-based plant record management system. This avoids the need for custom development and eliminates the need for users to concern themselves with regular backups. Additionally, the data becomes readily accessible across various devices and is easily shareable. While there are market alternatives that are more budget friendly compared to programs like BG-Base, they may still be somewhat costly for those maintaining smaller collections.

3.2.1 Persephone 2.0

A cloud-based plant records system, called Persephone, was developed by Plant Heritage to record comprehensive information about the plants held in the National Plant Collections in the UK. This application is free for national collections records. For others interested in using the application, there are monthly subscription rates available based on the number of plants to record (it costs £40 per month for 3000 records, for instance, in April 2024). It was featured in The Plantsman in March 2018. The Sir Harold Hillier Gardens migrated their plant record management from BG-Base to Persephone two years ago, a solid reference.

3.2.2 HORTIS

HORTIS is also a cloud-based plant record management application, developed by Species 360. It is also subscription based but subscriptions are per user. Currently, only organisations (and not individuals) can subscribe. The organisation Botanical Gardens Australia and New Zealand (BGANZ) has endorsed HORTIS as the preferred plant record management system for its membership.

[4] Please do not use a word processor such as Microsoft Word.
[5] In this case, choosing the spreadsheet option is a better choice.

4 GARDEN MAPPING

For all but the smallest gardens, a scaled area map is indispensable for effective plant recording. A plant map pinpointing each plant's location is a plus, but not indispensable. Mapping is indeed a very time-consuming task, even with the help of GIS software: a good area map with areas of reasonably small size should be more than enough to locate plants in the garden.

4.1 CHOICE OF SCALE

First, you will need a base map, for which the scale should not be smaller than 1:2500. A base map provides geographical context that serves as background, a canvas to be drawn on. If you do not have such a map, estate plans, orthophotographs or aerial photographs, etc., buy the best or largest scale map of your area, and scan and enlarge on a computer. It may be desirable to paint out some of the printed details before enlargement, and it will certainly be necessary to add details of garden paths, etc. If you plan to publish the map in a garden guide, check copyright restrictions on the original map. If your final base map is on paper, make sure to digitise it.

At 1:2500, the base map will only be adequate for outlining coded areas and positioning noteworthy specimens.

For the plant map or maps, on which all the specimens will be plotted, the scale should be 1:1000 or 1:500. At these scales, 1 millimetre on the map will represent 1 metre (1:1000) or 0.5 metre (1:500) on the ground. Again, we do not think that it is a must to establish these plant maps for private collections, except for locations where there are several plants of the same taxon but for several accessions. In this case, however, a simple hand-drawn map may do the trick.

4.2 MAKING THE AREA MAP

To make the area map, divide the garden into areas, draw their boundaries on the base map, and assign reference codes to each of them.

Permanent natural and/or man-made features such as paths, streams, walls, and hedges are used as boundaries. Arbitrary lines should be avoided if possible or kept to a minimum. The areas should be broadly comparable in size, and in the number of plants they contain, and small enough to enable individual plants to be found quickly. Outline the divisions clearly on the map and assign a reference code to each. This code will be the location code for each specimen plant in the area. Usually a two-digit code is sufficient.

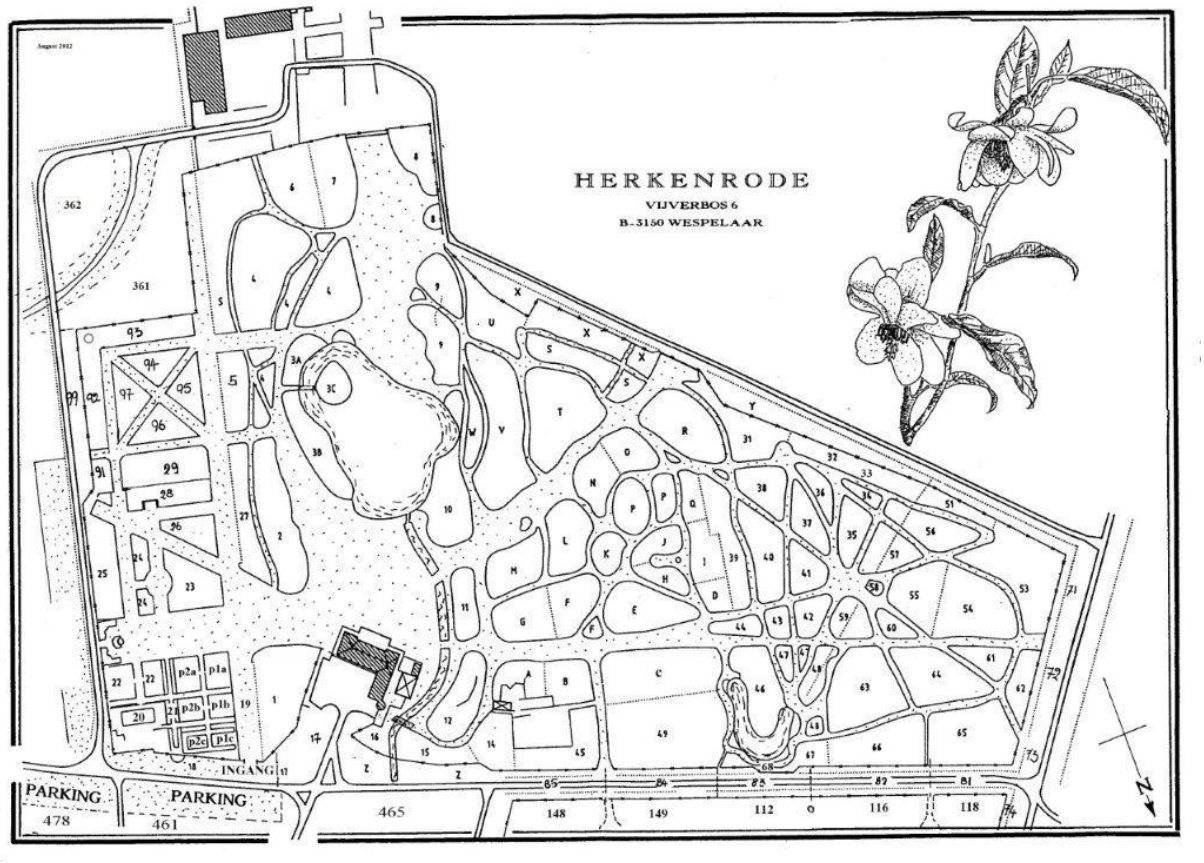

Figure 1. Hand-drawn area map of the garden of Herkenrode, Belgium.

4.3 Computer-based Mapping

Institutional gardens are increasingly adopting geographic information systems (GIS) for mapping plants in their gardens. However, for private collections, we would not advise using GIS, unless for exceptionally large and well-resourced arboreta. Implementing GIS requires significant investment and meticulous planning. There is an initial learning phase where staff will need to acquaint themselves with the various GIS features and tools, as well as the planning process itself. The success of such an endeavour depends on having an adequate team of skilled staff, not just to map the entire garden initially, but also to consistently update the map(s).

Refer to the website of the Alliance for Public Gardens GIS for more information on this topic.

5 Making the Inventory

Once the area map is ready, numbering (tagging) and listing the individual plants can begin. Whatever the circumstances, always deal with one area at a time, to ensure complete coverage. It is easier to tag all the plants in the chosen area consecutively, unless the survey is to be limited to a particular group, such as conifers, or you decide to omit, say, rhododendrons and camellias, for the time being.

5.1 Numbering

Since there may be several specimens of one species or variety in a collection, each individual plant must have a unique identifier, be it a combination of the accession identifier and the qualifier, or a garden number. The only permissible exceptions occur when there is a group planting which can be treated for numbering purposes as a single individual, or when it is desired to treat all specimens of some native or common species collectively (see below).

We recommend the use of garden numbers because they make stocktaking easier. They might be the only label you need, especially if your garden is not open to the public (for those wanting name tags, we recommend using a second label). That number should then refer to a plant list (on paper or accessible on a smart device) to identify the plant name.

Each unique identifier remains permanently associated with an individual plant. It should not be re-used if that plant is removed or dies and remains unchanged if the plant is moved to another site, or if the identification or nomenclature is revised.

5.2 Native Trees and Shelter Belts

Consider whether to include native trees. It may be useful to know how many you have, and in what condition. One good option is to record large or prominent specimens only. Or you can use one accession number, and one garden number for all specimens in the same location (coded area). Group plantings of one species or variety, native or exotic, hedges etc, can also be recorded under a single number, with the comment '(Group)' or '(Group of [no. of plants])', '(Hedge),' etc.

5.3 Tagging and Listing

You will need the following equipment:

1. A copy of the area map, or the part of it covering the area(s) to be dealt with during this session.
2. Field notebook (or clipboard and paper), with columns for area code, garden number, identification, and comments; and a waterproof pen or pencil; or a pocket tape recorder or smartphone, and/or a tablet.
3. Serially numbered tags (a.k.a. garden numbers).
4. Plastic-covered or metallic wire (copper, aluminium, or stainless steel), and wire-cutters or pliers; or plastic (polypropylene) string/twine and knife or scissors.
5. Small hammer and supply of nails (preferably with a broad head, i.e., 'clout nails'): the 3 cm (1.25") long size is suitable for most trees but carry some 6 cm (2.5") long for thick-barked conifers; or brass screws and a screwdriver. Zinc (galvanized) nails have proved toxic to some species in some climates.

Before setting off, prepare enough wired tags to last the session. A few can be taken off at a time and rewired with a length (at least 20 cm) of plastic-covered or copper wire ready for attaching to the plants. Whichever type of tag is used, it is preferable to thread the wire through two holes in the tag, so that it will not blow in the wind and wear the holes or wire.

As each plant is recorded in the notebook or with an electronic device, a tag should be attached to it with the corresponding number. Where possible, the tag should be attached by a loop of wire or

plastic string round a convenient branch (not the main stem or leader). Allow plenty of room for growth. For larger trees, with no low branches, the wire or string can be tied to a nail or screw in the trunk.[6]

The tag should not be conspicuous or within reach of children and should be separate from the name label or display label – optional in a private collection.

Inspect tags and labels once a year, to see that they are still there and in good condition and that the fixing is not damaging the plant.

Before moving on to the next plant, check that all relevant information has been recorded in the field notebook, list or on the electronic device.

Plants which have not been identified should be included in the list under their numbers. Specimens should be collected for identification or confirmation with adequate leaves and flowers and/or fruits and labelled with the accession number (including qualifier). Depending on the type of plant, specimens will keep fresh in a sealed polythene bag in a refrigerator for 3-4 days. If the delay before study is likely to be longer, the specimen should go straight into a plant-press. Notes on habit, size, flower colour etc may be needed if the specimen is to be submitted to a specialist for naming.

5.4 Keeping Records up to Date

Once you have recorded all your plants in a computerised database system, it is particularly important to keep track of new plantings, re-sitings, losses, and other information.

It is also good practice to note down new information about your established plants on a regular basis: flowering dates as they occur, measurements as they are made, and so on.

It is also desirable to have a systematic stocktaking once a year (or over multi-year cycles for large collections). Choose a particular date (say between one planting season and the next) and try to make the stocktaking a routine at the same time each year.

6 International Transfer Format Version 2

In 1998, Botanical Garden Conservation International (BGCI) published the second version of its International Transfer Format (ITF2). As the name implies, it is used for exchanging plant records between botanical gardens. It might be superseded in the future, but the BGCI website states that ITF2 is the "most widely used standard for exchanging plant records" and that it is "used by over 800 botanic gardens worldwide".

It is also a simple standard and the data fields listed hereafter are aligned on this standard although not all fields needed in a living plant collection are included in the standard. IFT2 includes seventy-five field types which is much more than what is proposed hereafter. Note also that ITF2 considers verification data and source provenance data as essential.

[6] Only basic identification labels are covered in this document. There are other types of labels and tree label fixings not considered here.

The standard can be found on the website of the Biodiversity Information Standards (TDWG) association, previously known as the Taxonomic Databases Working Group with a series of other standards.

Another interesting document on the TDWG website is Plant Names in Botanical Databases (1994) by the late Dr Frank Bisby, which specifies how the scientific names of plants may be organised in botanical databases. ITF2 refers to this document.

7 Suggested List of Fields

7.1 Essential Fields

7.1.1 Scientific Name

ITF2, as well as the main botanical collection management software applications, break the plant name down into its components. Depending on the use intended for data, and surely if the plant records are managed in a relational database management system, the name may be best divided into separate fields for the genus, species, subspecies (subsp.), botanical variety (var.), form, cultivar group or cultivar. It is not normally necessary to add the botanical authorities, though it might be helpful if a species has one or more homonyms. cf. ITF2 as well as Bixby F.A (1994) for details. The existence or not of plant breeder's rights (PBR) belongs in this group of fields.

7.1.2 Accession Date

Date at which the plant was recorded in the plant record system.

7.1.3 Provenance Type Flag

A code to indicate the provenance of the plant. This code is especially important for plants of wild origin.

Value	*Description*
U	Unknown
W	Wild
Z	Propagule from a wild plant in cultivation
G	Garden origin

7.1.4 Accession Identifier

An accession represents a single taxon received from one place and at one time. It can cover several physical specimen plants. Data common to these plants, such as origin, date received, etc, are attached to the accession. Attributes such as girth, height, status, and verification are attached to the individual plant. The accession identifier must be unique and never be reused for another accession.
Technically, the simplest way to assign an accession number is to generate a serial number. However, most botanical gardens include the year in which the accession was received in the Accession Identifier, followed by a serial number (or a mix of numbers and letters), sometimes separated by a single dash. 2024-00001 would be the first accession of the year 2024 for instance.

7.1.5 Individual Specimen Qualifier

Each plant or group of plants belonging to the same accession and planted in the garden are then given a distinct qualifier. Qualifiers usually consist of a one or two-letter code starting with "A" or

"AA" or a two-digit number. The accession number and qualifier are usually separated by a space or an asterisk on labels: e.g. 2023-00001*A.

7.1.6 Garden Number

Alternatively, we recommend using a simple serial number for individual plants (see Tagging & Listing), called a garden number by Toomer (2010), a unique specimen plant identifier, distinct from the accession identifier. *Stricto sensu*, this garden number could be used as an individual specimen qualifier.

7.1.7 Individual Plant Location

This is the code used on the area map.

7.1.8 Individual Plant Status

A flag to indicate whether the plant is a current accession in the garden. Example:

Value	*Description*
C	Current in the living collections
D	Dead
T	Transferred to another garden

7.2 Optional Fields

7.2.1 Type of Cultivated Material.

How the plant was received. Examples:

Value	*Description*
P	Plants (whole)
S	Seeds or spores
C	Cutting
K	Rooted cutting
G	Grafted plant
L	Layer
D	Division (of clumps etc.)
S	Scion
V	Bulb
Z	Seedling

7.2.2 Source

The nursery or individual who supplied the plant.

7.2.3 Collector, Collection Number and Collection Locality

These details are especially important for wild-collected plant material or plants propagated vegetatively from a wild plant in cultivation. They can be expanded with many more fields, including GNSS coordinates.

7.2.4 Date Planted

The date when planted out in the garden in the given location.

7.2.5 Verification Data

Verifier's name, verification date, verification level, and verification literature are all data that can be recorded in a database.

7.2.6 Measurement Data

Measurements as height × girth or diameter measured at approx. 1.5 m above the ground unless otherwise stated, with the date measurements were made. Measurements can be split over several fields in a database.

7.2.7 Survey Date

Date the plant was last surveyed (important to plan new surveys).

7.2.8 Notes

This field was named DATA on the original IDS index card. It was designed as a catch-all field to record any information not covered elsewhere or in text format rather than code. Examples would be notes on cultivation, tree surgery, pruning, details of good flowering and fruiting years, awards, methods of propagation, and so on.

This list of fields is obviously not exhaustive. Collection holders can add any field they see fit. Refer to the International Transfer Format for more fields and more details on proposed fields.

8 The International Dendrology Society

The Society was founded to further cooperation in the study and science of trees and shrubs and to broaden the knowledge of its members. It has members in more than forty countries.

Applications for membership are invited from anyone interested in trees and shrubs, whether from a scientific or horticultural point of view, professional or amateur. Details may be found on International Dendrology Society website.

The IDS is also the driving force behind Trees and Shrubs Online, a reference website for woody plants hardy in the temperate parts of the world.

9 REFERENCES

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