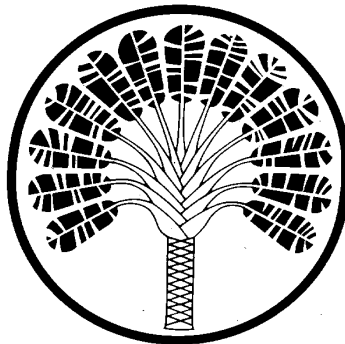# INTERNATIONAL TRANSFER FORMAT

FOR BOTANIC GARDEN PLANT RECORDS

VERSION 2

(This version is only available in electronic format)

Botanic Gardens Conservation International

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Acknowledgments

Foreword

Why in the 1ate 1990s is a transfer format for botanic gardens' plant collections data still needed? Data can be browsed over the World Wide Web, downloaded and reused, imported and exported to and from databases, spreadsheets, word processing documents, other formats and back again. So why do botanic gardens require guidance on data exchange?

The answer is that a transfer format meets the need for a clear standard defining botanic garden data fields. Whenever data is imported directly to a database, and then manipulated by the receiver, or is exchanged between institutions in different regions, countries or continents, users still have to know exactly which data section refers to which field. This is why the concept of an internationally valid transfer format for botanic garden plant records is still as relevant and useful today as it was when first defined eleven years ago.

The first version of the International Transfer Format for Botanic Garden Plant Records (ITF version 01.00) was published in 1987. It specified a fixed format, comprising three types of record. Each record had to be exactly 362 characters long, and every field of a record had a fixed position. Each constituent field had to be included in a record even if it did not contain any useful information, so that the next field of the record would begin in the correct position. When constructing actual ITF records, it was easy even for experienced users to make an mistake in the field spacing, causing all subsequent records to be out of sequence and unreadable.

Version 2 of the International Transfer Format for Botanic Garden Plant Records (ITF2) is much more flexible. By placing an identifying field name at the start of each field, the sender only needs to include those fields which contain relevant information. If at a later stage, the receiving institution needs more information, then ITF2 records containing only the supplementary information can be set up. An institution identifier and an accession identifier are always required in each record, along with the additional field names and information.

ITF2 also includes some facilities for self-extension of the Format. The New Field option enables sending and receiving institutions to include additional data fields that are not covered in this publication. Alternatively, cooperating institutions can use the principles of the ITF2 to set up their own unique exchange format, although such a format would no longer conform with ITF2.

The ITF2 is a suggested mechanism for exchanging plant records, identifying the most likely fields of conservation interest for botanic gardens. It is provided as a guidance document to botanic gardens to help them maintain and exchange their unique databases, and aid them with their difficult task of maintaining the world's plant diversity and allow botanic gardens to cooperate with other institutions and organisations throughout the world.

The choice of types of data field that are specified in ITF2 is biased towards the transfer of the types of information needed for the conservation and propagation of plants of 'conservation' interest. But the same principles can be applied to additional fields required for transference of more detailed propagation or tissue culture information. The editors have deliberately restricted the number of data fields in ITF2 in the interest of producing a manageable publication, although others may disagree on this point! Future versions may be considered including such extensions to the ITF. We would welcome your comments and suggestions.

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About this document

This document contains a complete description of version 2 of the International Transfer Format for Botanic Garden Records. It includes all the information which institutions will need when making use of the ITF2 to send or receive plant records in the ITF2 format. The annexes to this manual describe some of the problem areas which needed to be addressed during the definition of ITF2.

This version of the manual gives a complete description of ITF2. Institutions and individuals who continue to use ITF1 should continue to use the original version (version 01.00) of this manual.

If you have no previous knowledge of the ITF, begin by reading the ITF Overview section. Then read the ITF2 Architecture section.

If you are familiar with version 1 of the ITF, begin by looking to see what new features version 2 of the ITF includes, and then the section on the architecture of ITF2.

The detailed descriptions of individual ITF2 fields are in the ITF2 Field Specifications section.
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The International Plant Transfer Format – an Overview

The International Transfer Format for Botanic Garden Records (ITF) is an internationally-agreed standard format by which information about living plants, as held by botanical institutions, particularly botanic gardens, may be exchanged between organisations. It is a means for structuring the transfer of data or recorded knowledge about a single plant accession from an originating (sending) institution to a receiving institution. Botanic gardens and other horticultural institutions exchange plant material — but it is not so easy to pass the data recorded about the same plant material on in a readable format. Yet this data is as important as the material itself: plant provenance data or the keeping of 'accession records' is the key criteria as to what distinguishes a botanic garden from an ordinary garden or park.

This exchange can take place in conjunction with, or independently of, exchange of the plant material to which the data refers, for example:

- Sending of actual plant material with its provenance data attached in an electronic format e.g. on a diskette.

- Exchange of accessions data between botanic gardens in a national or regional network.

- Sending an institution's accession records to an international organisation such as BGCI or the World Conservation Monitoring Center (WCMC) enabling them to participate in a biodiversity or conservation survey; as well as receiving additional information about the relevant plant names back into the sender's database.

Nothing in the ITF2 specification itself describes how an ITF file is constructed by a sending institution, or how an ITF file is read or deciphered by a receiving institution. Thus the specification is independent of all types of hardware or software[1]. Conventionally, a sending institution that holds its plant records on a computer database would use its database software or custom-built software to prepare files in the ITF format for transmission to receiving institutions. But institutions that hold their plant records on a paper or cards would use manual methods to prepare ITF files. The ITF file could be transmitted via direct electronic means (e.g. electronic mail), in computer-readable form of disks, or even (in ITF2) as text in word-processable files.

The practical success of an ITF transfer will depend equally on the combined skill and diligence of the contact person and the institution sending correct 'up to date' accession information, and on the receiving institution interpreting and encoding the data correctly onto its database.   Good communications between sending and receiving institutions is a vital component to the success of an ITF data exchange.

The first version of the Format — ITF1

History and development

The first meeting to consider the development of a plant data transfer format was held by the IUCN Threatened Plants at Kew in July, 1985. The results of this and subsequent meetings were presented at the 1985 Conference on Botanic Gardens and the World Conservation Strategy held in

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[1] There is one exception to this statement: one can specify the character set in which an ITF2 file is written. See Page Descriptor section below.

the Canary Islands. The ensuing favourable response eventually led to to the drafting and publication of a first version of the ITF as a cooperative effort between the Botanic Gardens Conservation Secretariat (now BGCI), IUCN, WWF and the Taxonomic Databases Working Group for Plant Sciences (TDWG).

The first version (01.00) of the ITF was published in 1987 by the Hunt Institute for Botanical Documentation of Carnegie Mellon University, on behalf of the then Botanic Gardens Conservation Secretariat, and IUCN and WWF.

Further details of the development of version 1 of the ITF are described in the ITF1 defining document (see Bibliography).

The second version of the Format – ITF2

Features new to ITF2

There have been three major changes to the transfer format which have been incorporated into this second version of ITF, namely:

- There is only one type of ITF Record, instead of three.

- ITF2 allows for some fields to be variable-length fields. Thus fields which are designed to contain values of variable size (such as free text) can be only as large as is needed to hold their data, and the person constructing an ITF2 record is given additional flexibility in specifying an appropriate value for the field.

- ITF2 stipulates that each field value must be preceded by the name of the field, and followed by a specific delimiting character. This allows fields that contain data that does not need to be transferred, or does not exist, to be omitted from a transfer file. Thus an ITF2 record can be kept as short as necessary, and no 'unused' fields need to be included in it. The fields of an ITF2 record can be positioned in any order in a given record.

- Forty two (42) new types of field have been specified for ITF2. (N.B. types of field that are defined for both ITF1 and ITF2 are marked with an asterisk in the list of fields in Table 1.)

- ITF1 data fields were grouped into 8 sections:-

    A   File identification data
    B   Accession data
    C   Plant name
    D   Verification data
    E   Sexuality
    F   Source data
    G   Place of origin
    H   IUCN Conservation Category.

    The majority of these subsections have been kept for ITF2, except that section E fields (Sexuality) have been incorporated into a new Section G (Additional Data Groups) and Section H has been abolished (see the Fields section below for a list of the field sections in ITF2).

- The IUCN Conservation Category field (IUCNCAT) that was included in ITF1 has not been included in the main part of ITF2. This was done because the field represents taxon-based, rather than accession-based, data. However, ITF2 includes a supplementary facility to set up transfer file records for taxon-based data. These types of record can contain taxon-based data such as the conservation category and geographical range of a specified taxon, rather than of a specified accession). See Annex 2 for a description of this facility.

- Other non-accession fields that were excluded from the ITF1 were Authorities, Geographical Range and Economic Uses. Authorities were excluded because the citation and spelling of authorities vary greatly, even in the same database. In the description of 'Place for Origin' in ITF1, the full distributional range of plant was noted as not being included because this information could be supplied from taxonomic databases. This same comment could be applied to the economic uses of a taxon.

Details of authorities can be included in ITF2 records by using the Species Author field.

One consequence of the changes to ITF syntax is that the whole of an ITF transfer can now be specified in readable characters (see Example below) and read as a text tile. There is no restriction in ITF2 as to the (natural written) language in which an ITF2 transfer file is represented. One of the new ITF2 fields (Page Code Descriptor) enables the sending institution to specify the character set/language in which the file has been written. This enables the receiving institution to decipher the file accurately. (See the Page Code Descriptors section below.)

The structure of ITF2 is based on the ISO 8824 standard *Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1)*.

The development of ITF2

The International Transfer Format for Botanic Garden Plant Records was first published in 1987. The original ITF (version 01.00) in 1987 specified a total of 32 types of field, in order to be able to specify complete provenance data. As institutions set up their databases, based on this version, it became apparent that there were other categories of data that institutions wished to exchange. Other flaws were noted in version 01.00: because ITF1 was based on fixed-length fields, a transfer format was difficult to set up, as every record and field had to start at a particular character position; if entered wrongly even once, placed every subsequent record out of sequence and made some or all of the transfer file unreadable by the receiving institution.

Workshops for designing a second version of the ITF were held to address the above criticisms. To date there have been at least four International Workshops on three continents to try and update the Format to version 2. Following intense discussion, a total of 69 types of field were chosen as the most important data items attached to a single plant accession that were needed for transfer. ('Transfer' is defined as 'to move from one place to another' or 'valid for use by another'.) These plant accession fields (if transferred) would give a very comprehensive plant accession record, but it is recognised that not every botanic garden wishes to keep such complete details about a single accession, and that institutions have the need to keep more detailed records about categories of plant data that are not covered in this publication.

Next steps for the ITF: linking to the Biodiversity Information Conservation System

The Biodiversity Conservation Information System (BCIS) brings together twelve international organisations and networks concerned with the conservation of biodiversity. The members seek to pool data, information and expertise, in order to better decision-making to:

- Assess the nature and extent of threats to species, habitats and landscapes;

- Assist nations, intergovernmental agencies, conservation organisations and the commercial sector, to identify, prioritise and implement conservation objectives; and

- Build technical capabilities at national and local levels to enable equitable and representative inputs into issues of conservation concern.

BCIS members are international non-governmental organisations. They have mission statements that are directly related to the conservation and sustainable use of biodiversity. BGCI is one of the members. The other members are:

- BirdLife International

- Conservation International

- International Species Information System

  IUCN's Commission on
    - Ecosystem Management,
    - Environmental Law Programme,
    - Species Survival Commission
    - World Commission on Protected Areas

- The Nature Conservancy

- TRAFFIC International

- Wetlands International

- World Conservation Monitoring Centre.

BCIS members are engaged in setting up a network of products and services to achieve their goals. The publishers of this Transfer Format see one of the aims of the next stage of its development as making the botanic garden community, via the mechanism of the ITF, compatible with, and forming part of this international interdisciplinary biodiversity community.

ITF2 architecture

ITF2 specifies both the types of data that can be transferred and the structure within which this data is contained. The unit of structured data that is passed in a single 'act of transfer' is called an ITF2 'file' or 'transfer file'. Each (transfer) file comprises a hierarchy of 3 types of structure: files themselves, records and fields. A transfer file contains one or more records, and each record contains a series of fields, each of which holds one item of plant data. Each record must refer to a single accession in an institution. However, a single accession may cover more than one individual specimen, for example if the accession is in the form of seed or of plants that have been raised from seed; or if several individuals have been collected from one site at one time; or in the case of micropropagation. It must not, however, cover individuals of the same taxon collected from different places in successive years.

Files

In ITF2, a 'file' is defined as the total data and containing structure that comprises a single transfer of data. i.e. it is the total contents of the information transferred. Each file contains the following fields and records:

- A set of fields which act as a file header, giving information that relates to the transfer as a whole e.g. details of the sending institution, how the file is to be treated by receiving institutions etc. The first field of this header must always be the 'startfile' field.

- Each type of header field is individually described in Section A of the ITF2 Field Specifications section.

- One record for each of the accessions for which data is being transferred. The structure of a record is described in the Records section below. Records can be in any order within a transfer file.

- A concluding field to mark the end of the transfer file. This must always be the 'endfile' field. It is described in Section A of the ITF2 Field Specifications section.

Thus the overall structure of an ITF2 transfer file can be represented as:

startfile,*<Other file header fields>*,{*<first record of file>*}...{*<last record of file>*} endfile

Note that an ITF2 file does not specify any receiving institution, only the sending one.

Records

An ITF Version 2.0 Record includes all data associated with a single one of the accessions whose details are included in the current transfer. i.e. An ITF2 transfer file includes one record for each of the accessions whose details it includes. Each record contains one or none of each type of field defined below. The user has complete freedom as to which fields to include, except that no more than one field of each type may be included in each record.

Each record must begin with an open brace start-of-record character '{' and end with a closed brace end-of-record character '}'. Thus these are the only obligatory fields in an ITF2 record.

Fields

Each ITF2 record is the set of data items associated with a single accession, and each record is divided into a number of fields; each field contains one of those data items. Each record only needs to contain those types of field which the sender wishes to include.

Each field in an ITF record starts with the short form of its name (called the 'transfer code'). Then follows the data contained in the field. Each field must always finish with a comma (,).

The data that each field contains is of one of three categories:

- Numbers. Numerical data values are written as strings of digits with no enclosing parentheses. The number of digits needed, and any associated space characters, are specified in the individual field descriptions.

- A string of alphanumeric characters ("free text"). Text is written as a sequence of alphanumeric characters enclosed by double parentheses ("), e.g. "Jones, W.". These fields are usually variable-length i.e. any number of characters can be written. The following characters can also be used in free text: ! # $ % & ' ( ) * + , - . / and space.

    Any restrictions specific to individual fields are described in the relevant field descriptions in the ITF2 Field Specification section.

- A pre-determined codes (with a particular set of code values for each such field). The appropriate codes for each of these types of field is described in the individual field descriptions in Section 5.

The individual field descriptions in Section 5 refer to the *International Code of Botanical Nomenclature* (the "Tokyo Code") (Greuter *et al*., 1993) and the *International Code of Nomenclature for Cultivated Plants* (the "Cultivated Code") (Trehane *et al*., 1995). These are the agreed sets of rules by which botanists and horticulturists name plants. Both are cited in full in the Bibliography at the end of this manual.

Some types of field do not relate to accession records. These fields occur at the start and end of a complete transfer file; they contain information about the current transfer (e.g. date, name and address of the sending institution) which relates to the transfer as a whole but not to any of its individual accessions.

The detailed descriptions of the ITF2 fields are grouped into the following sections, depending on the type of data they hold:

A.   File Identification DataFields describing the file being sent and the sending institution Occur once in each transfer file.

B.   Accession Data   An accession's identifier combined with its holding institution's identifier combine to give an accession an identification that is unique world-wide. Other fields of this group provide further optional details about the number, status and type of specimens being sent.

C.   Plant Name   Full details of the plant name. Note that the ITF2 format (unlike ITF1) does allow for plant authorities, but stresses that on the grounds of their variability and the fact that they relate to taxa rather than

accessions, that they should not be included unless requested by the receiving institution.

D.   Verification Data   Details referring to the degree of confidence that can be placed in the data given in the Plant Name group of fields.

E.   Source Data   Provenance details of the current accession record.

F.   Place of Origin   Further provenance details about the original source location of the accession and its collectors.

G.   Additional Data   Other attributes of the accession that do not lie within the previous groups.

Fixed-length versus variable length fields

One important characteristic of database programs which may be used to set up or read ITF2 files is their ability to process variable-length or fixed-length data fields. Some database programs can only handle fix-length fields. Fixed-length fields have a set number of characters that can be held within this field. If more data is entered, it is not accepted and the field is truncated so that the data beyond the field's specified length is lost. Microsoft Access, Foxpro and other Dbase-type databases, other than the Memo fields, provide fixed-length fields.

Variable-length fields allow for any numbers of characters, up to the record length itself, to be entered in one field. A program which is used to set up or read these may only be able to display a certain number of characters of the field, but none of the data characters are lost and can all be displayed, after adjusting the window or report display lengths.

If you are preparing ITF transfer files and are using a database that can only deal with fixed-length fields, then we recommend that you make each variable-length field the length shown in the Recommended Length column of Table 1.

Page code descriptors

One of the new ITF2 fields is Page Code Descriptor. A page code descriptor is the number of a particular code page. Code pages are the means by which a personal computer operating system specifies the set of characters in which a text file is to be printed. Different code pages cater for the different national sets of alphabetic characters and their particular accents etc. Examples of code pages are those for printing English or french text, the various Scandanavian languages, Cryllic texts etc. Each code page has a unique code page descriptor e.g. 850 for Multilingual or 865 for Denmark and Norway.

You do not normally need to specify a page code descriptor value in an ITF2 transfer file. If you do not specify a value, ITF2 will use any default value set up by your own computer. This will usually be sufficient for transmission of ITF2 files to institutions which use the same set of alphabetic characters and numbers. You only need to specify a value if you are preparing ITF2 transfer files for a receiving institution that uses a completely different character set. In this case, refer to your systems administrator or printer documentation for a suitable page code descriptor value.

A sample ITF2 transfer file

The following example shows an ITF2 transfer file that has been generated by the Royal Botanic Gardens, Sydney. It contains two records: the first gives details of an accession of *Amyema pendulum*, the second of an accession of *Cynanchum pedunculatum*.

To facilitate the reading of the file contents, a tab character has been placed between each field identifier and its value, and a newline character after each field. These additional characters (and any other optional formatting characters) are not part of the ITF2 specification, but they could be included within a transfer file, provided that the receiving institution wishes, and is able, to receive the record in this form.

```
startfile
version     "ITF2",
numrec      2,
datefile    19951202,
institute   "Royal Botanic Gardens of New South Wales (NSW)",
contact     "Joe Brown",
address     "Royal Botanic Gardens, Mrs Macquaries Road, Sydney NSW 2000, Australia",
phone              612 2318164,
fax         612 2517231,
email       "j.brown@rbgsyd.gov.au",
pgcd        483
content     "ITF2 exchange data of various species.  The additional ASCII characters are also
            included to help file layout - Line feed/CR  = ASCII decimal characters 10 13 after each
            unit of information and Tab = ASCII decimal character 9 to separate the transfer code
            and the field text.",
{
insid       "NSW",
accid       "390839",
fam         "Loranthaceae",
gen         "Amyema",
sp          "pendulum",
isprk       "subsp.",
isp         "longifolium",
vnam        "Smith, B.M.",
vdat        1995,
prot        "wild",
cou         "AUSTRALIA",
iso         "AU",
pru         "NSW",
sru         "Central W. Slopes",
loc         "Mount Bolton, Moura",
latdeg             33,
latmin             15,
latdir      "S",
londeg             148,
lonmin      24,
londir             "E",
cnam        "Jones, W.",
cdat        190103,
```

```
hab        "On Eucalyptus macrorrhyncha.",
misc       "Donated from a private collection in 1979.",
}
{
insid      "NSW",
accid      248836,
fam        "Asclepiadaceae",
gen        "Cynanchum",
sp         "pedunculatum",
vnam       "Williams, K.V.",
vdat       1992,
prot       "W",
cou        "AUSTRALIA",
pru        "WA",
sru        "Fortescue",
loc        "Mount Lois.",
alt        800,
latdeg         22,
latmin         06,
latdir     "S",
londeg         117,
lonmin     44,
londir         "E",
geoacy         100,
hab        "Summit of mountain. Red loam derived from iron-rich shale.",
cnam       "Wilson, A.",
cid        "1031",
cnam2          "Rowe, J.",
cdat       19910911,
cnot       "Rare. Scrambler. Flowers white; fruit green, twinned.",
}
endfile
```

A variant of ITF2 for taxon-based data transfers

As mentioned above, the ITF2 format has been designed to hold data only about plant accessions. But a variant of the ITF2 record format has been designed to hold transfer data that is taxon-related rather than accession-related. An example of such data is the IUCN conservation category of a species, which is depends on the species as a whole rather than an particular accession of the species.

This variant has the same transfer form as the main format of ITF2 described above.

- Four fields are specified for use only within taxon-based ITF2 records. These are:

    - IUCN1   IUCN Conservation category 1 (pre-1994).

    - IUCN2   IUCN Conservation category 2 (post-1994).

    - IUCN2NOT   Free-text statement elaboration of value of IUCN2 category assigned – sent

if required by the receiving institution.

- ▪ GEORAN   Description of a taxon's geographical range.

Taxon-based transfers and this ITF2 variant are described further in Annex 2.

Using ITF2

Setting up a new database

Botanic gardens need to maintain a lot of information about their collections. When setting up a database to hold this data, a garden curator first has to decide what categories of data to hold:

- Some types of data provide information about a particular accession. Where was this particular plant collected, what were the conditions, and by whom was it donated or collected by. These fields can be called 'accession-based', they are the types of field catered for by ITF2.

- Other types of data, such as a plant's taxonomic range, its name and its naming authorities, relate to the plant's species as a whole, and are applicable to the all accessions of that species. These types of data (fields) are termed 'taxon-based'.

- When an accession is collected, propagation trials may be carried out to help cultivate the plant successfully. In this case, the plant material of a single accession may be represented by several plants. It is not always advisable to give each of these plants a separate accession identifier, as they all come from a common source. Thus there are 2 types of accession record:
  a) when seed is collected over a range of plants or;
  b) when multiple cuttings are taken from one plant in a unique location
  and somehow this information should be able to be transferred electronically using **Accession Specimen Numbers** and **Accession Material Type Flag**.

ITF2 includes 75 types of field (71 accession-based and 4 taxon-based). You may or may not need to keep all of this information. In fact, if this is your first plant collection database, it is highly recommended that you keep your database simple, and then add fields as experience and staffing levels dictate the necessity to expand your database. The more information you try to record, the more resources you will have to devote to maintaining the database over time.

If you are using a database that requires fixed-length fields, recommended lengths for fields which are nominally variable-length are given in Table 1.

A simple ITF-compatible database

Although ITF2 provides a total of 71 types of field for plant data, you do not need to collect and hold data for all of them. If you are in the first stages of setting up a plant collection database, then we recommend that you start with a subset of field types. The following fields would be a good set with which to begin. Other fields can be added later as further needs are identified and requirements refined.

1.   Accession Specimen Number
2.   Accession Status
3.   Family Name
4.   Intergeneric Hybrid Flag
5.   Genus Name
6.   Interspecific Hybrid Flag
7.   Species Epithet
8.   Infraspecific Rank Flag
9.   Infraspecific Epithet
10.   Vernacular Name
11.   Cultivar Name
12.   Rank Qualified Flag

13.   Identification Qualifier
14.   Verification Level
15   Verifier's Name
16   Provenance Type Flag
17   Donor's Accession Identifier
18.   Country of Origin
19   Primary Recording Unit
20   Locality
21   Primary Collector's Name
22   Collector's Identifier
23   Collector's Date

ITF2 field specifications

Table 1:   List of ITF2 fields

text   = Text field
N/A   = Not applicable
*   = ITF1 field
Recommended length   = For variable-length fields, recommended field length
                   for sender to specify when ITF2 record processed by
                   fixed-length-field database software.

Field name	Field full-name	Recommended length	Description section
startfile	Start of File	N/A	A.1
endfile	End of File	N/A	A.2
{	Start of Record	N/A	A.16
}	End of Record	N/A	A.17
version	ITF Version*	10	A.3
numrec	Number of Records in file*	14	A.4
datefile	Date of file*	8	A.5
institute	Name of sending Institution*	30	A.6
contact	Name of sending Contact	20	A.7
address	Sending Institution's address	text	A.8
phone	Telephone number of Institution	20	A.9
fax	Facsimile number of Institution	20	A.10
email	E-mail address of Institution	30	A.11
newfields	New Field Option	text	A.12
fileaction	File Action Flag*	1	A.13
pgcd	Page Code Descriptor	3	A.14
content	Description of File Contents & other Comments*	text	A.15
insid	Institution Code*	5	B.1
accid	Accession identifier*	12	B.2

| | accspe | Accession specimen numbers | 5 | B.3 |

Field name	Field full-name	Recommended length	Description section
accsta	Accession status*	1	B.4
acct	Accession material type	1	B.5
supfam	Suprafamilial Group Name	22	C.1
fam	Family	22	C.2
supgenrk	Suprageneric Rank	15	C.3
supgen	Suprageneric Name	22	C.4
genhyb	Intergeneric Hybrid Flag*	1	C.5
gen	Genus Name*	22	C.6
sgrk	Subgeneric Rank	15	C.7
subgen	Subgeneric Name/Group	22	C.8
sphyb	Interspecific Hybrid Flag*	1	C.9
spql	Species Qualifier*	6	C.10
sp	Species Epithet*	40	C.11
spau	Species Author	text	C.12
isprk	Infraspecific Rank/Hybrid Flag*	7	C.13
isp	Infraspecific Epithet*	40	C.14
ispau	Infraspecific Authors	text	C.15
isp2rk	Second Infraspecific Rank Flag	7	C.16
isp2	Second Infraspecific Epithet	40	C.17
isp2au	Second Infraspecific Author	text	C.18
vernam	Vernacular Names	text	C.19
culgrp	Cultivar-Group	40	C.20
cul	Cultivar name*	40	C.21
trades	Trade Designation Name	40	C.22
fulnam	Full name in a Text form to allow for horticultural type information	text	C.23

rkql	Rank Qualified Flag*	1	C.24

Field name	Field full-name	Recommended length	Description section
idql	Identification Qualifier*	9	C.25
vlev	Verification Level*	1	D.1
vnam	Verifier's Name*	20	D.2
vdat	Verification Date*	8	D.3
vlit	Verification Literature	text	D.4
vhist	Verification History	text	D.5
prot	Provenance Type*	1	E.1
prohis	Propagation History Flag*	2	E.2
wpst	Wild Provenance Status Flag	13	E.3
acclin	Accession Lineage	40	E.4
dont	Donor type Flag*	1	E.5
don	Donor*	20	E.6
donacc	Donor Accession Identifier*	12	E.7
mtr	Material Transfer Receipt Flag	1	E.8
mts	Material Transfer Supply Data Source	12	E.9
latdeg	Latitude degrees*	3	F.1
latmin	Latitude minutes*	2	F.2
latsec	Latitude seconds*	2	F.3
latdir	Latitude direction*	1	F.4
longdeg	Longitude degrees*	3	F.5
lonmin	Longitude minutes*	2	F.6
lonsec	Longitude seconds*	2	F.7
londir	Longitude direction*	1	F.8
geoacy	Accuracy of Geocode	6	F.9
cou	Country of Origin (full text)	40	F.10
iso	ISO Code of Country of Origin*	2	F.11

wgs	World Geographic Scheme	5	F.12
pru	Primary Subdivision of Country of Origin*	100	F.13

Field name	Field full-name	Recommended length	Description section
sgu	Specific Geographical Unit	100	F.15
loc	Locality*	text	F.16
alt	Altitude*	5	F.17
altacy	Accuracy of Altitude	4	F.18
altx	Maximum Altitude	4	F.19
altacyx	Accuracy of Maximum Altitude	4	F.20
dep	Depth	5	F.21
hab	Habitat	text	F.22
consta	Conservation Status (Threat)	text	F.23
cnam	Primary Collector's Name*	20	F.24
cid	Collector's identifier*	12	F.25
cnam2	Additional Collectors' Name	Text	F.26
cdat	Collection date*	8	F.27
cnot	Collection Notes	Text	F.28
culinf	Cultivation Information	Text	G.1
proinf	Propagation Information	Text	G.2
per	Perennation Flag	2	G.3
brs	Breeding System*	2	G.4
accuse	Accession Uses	Text	G.5
misc	Miscellaneous Notes	Text	G.6

Guide to the ITF2 field descriptions

This Section contains the descriptions of each of the data fields in ITF2. They are described in the same order as in Table 1 above. Each field description has the same format, with the following subheadings:

Full name:	Complete form of the field's name.
Transfer code:	Form of field name used when writing out an ITF2 record.
Description:	Function of this type of field.
Rules of Syntax:	Form of field: numeric, free-text, or coded (with list of possible code values and their significance, if applicable).
Rules of Information:	Guidance (if necessary) as to when this field needs to be included in an ITF2 record.
Guidelines:	Further guidance (if necessary) as what coded value should be
Example:	One or more examples of the use of this field.

A. FILE IDENTIFICATION DATA

The fields described in Section A are those found in the header of each ITF2 transfer file , and also the 'endfile' field which terminates the whole record.

A.1 **Start of ITF Version 2.0 File** *Transfer code:* startfile

Description: The beginning of the transfer file has the file identifier 'startfile' only.
Guidelines: To be found at the very start of an ITF file indicating the start of file.
Example: startfile

A.2 **End of ITF Version 2.0 File** *Transfer code:* endfile

Description: The end of the transfer file has the file identifier 'endfile' only.
Guidelines: To be found at the very end of an ITF file indicating the end of file. The editors have placed it here for convenience of describing the field together with 'startfile'.
Example: endfile

A.3 **ITF Version used of file** *Transfer code:* version

Description: The ITF Version used in the current ITF File.
Rules of Syntax: Alphanumeric, the version number prefaced by the acronym 'ITF' (all in uppercase).
Guidelines: The current version is ITF Version 2.0. Therefore, the entry in this field would be 'ITF2'. If the ITF transfer file was version number '2.1', then this information would be interchanged as 'ITF2.1'.
Example: version "ITF2",

A.4 **Number of Records in File** *Transfer code:* numrec

Description: The total number of records expressed as an integer.
Rules of Syntax: Integer only.
Example: numrec 200,

A.5 **Date of file** Transfer code: datefile

Description: The date of compilation of the current ITF file.
Rules of Syntax: Integer, year (4 digits) followed by month (2 digits) and then day (2 digits), without spaces between each.
1. In this notation, leading zeroes must be included for months and days, i.e. January is coded as '01' not '1' and the 4th day is coded as '04' not '4'.
2 If the day of the month is not known, then the last two digits should be omitted.

3. If the day and month are not known, the last four digits should be omitted and just the 4 digit year information transferred.

Examples: datefile 1963,   i.e. 1963
datefile 198511, i.e. November 1985
datefile 19510203,   i.e.3 February 1951

Guidelines: The ITF records the year as a full 4-digit number to facilitate the use of the system in the next century, as well as to track verifications from the previous century.

A.6	**Name of Institution Supplying Information**	*Transfer code:* institute

Description: The name in full of the institution sending the current ITF file.
Rules of Syntax: Free text
Example: institute "Botanic Gardens Conservation International (BGCI)",

A.7	**Contact Name**	*Transfer code:* contact

Description: The full name of the contact person within the institution.
Rules of Syntax: Free text
Example: contact "Diane Wyse Jackson",

A.8	**Address of Institution sending File**	Transfer code: address

Description: The full postal address of the sending institution.
Rules of Syntax: Free text
Guidelines: The address should be displayed as continuous text, no line breaks, only commas and spaces as required.
Example: address "Descanso House, 199 Kew Road, Richmond, Surrey, TW9 3BW, UK",

A.9	**Telephone Number of Institution**	Transfer code: phone

Description: The telephone number of the Contact Person.
Rules of Syntax: Alphanumeric
Guidelines: The use of national and international codes depends on the circumstances of the sending and receiving institutions.
Example: phone "+ 44 181 332 5953/4/5",

A.10	**Facsimile Number of Institution**	Transfer code: fax

Description: The facsimile number of the Contact person.
Rules of Syntax: Alphanumeric
Guidelines: The use of national and international codes depends on the circumstances of the sending and receiving institutions.
Example: phone "+ 44 181 332 5956",

A.11 **E-mail Address of Institution** Transfer code: email

Description: The email address of the Contact person.
Rules of Syntax: Valid e-mail address format
Example: email "bgci@rbgkew.org.uk",   N.B. email addresses are changed more often than addresses, phone or fax numbers.

A.12 **New Field Option** Transfer code: newfields

Description: This field allows the inclusion of types of fields that have not been specified in ITF2. The definition of new field types enables ITF2 to be used to transmit data that is of interest only to the specific sending and receiving institutions, in mutually-decipherable formats.
Rules of Syntax: The field identifier 'newfields', followed by a free-text string of alphanumeric characters enclosed in double quotes. The string comprises the following items, in order:
The transfer code of the new field (all lowercase) that is to be used in the transfer file.
An opening round bracket '('.
The full name of the field, followed by a semi-colon.
A free-text description of the field's format, followed by a semi-colon.
A free-text description of the new field's function , structure, format, documentary reference for the format, or any other relevant information.
A closing round bracket ')'.
Each **newfields** field can contain the definition of more than one new field. In this case, the individual new field definitions (as specified above) must be separated by a semi-colon and a space character.
The fields defined in a **newfields** field may be included in the current transfer files (after their definition) or in a subsequent transfer file.
Guidelines: An institution which is to receive newly-defined fields must make suitable arrangements to interpret them e.g. by programming any software used to accept ITF files.
This field is placed in the transfer file header, rather than in an individual record, so that it can be identified as early as possible, to enable the receiving institution to code or read fields of the type that it defines.
Example: The following use of newfields defines two field-types – 'pol' and 'arch':
newfields   "pol (Pollinator; alphanumeric - scientific name of pollinator and authority at lowest level name or epithet); arch (Plant architectural models; alphanumeric; F. Hallé et al. 1978. 'Tropical trees and forests', Springer-Verlag: Berlin)",

A.13 **File Action Flag** Transfer code: fileaction

Description: A field to indicate how the records of the file should be processed.
Rules of Syntax: Alphabetic; this field must consist of one of the values in the table below:

Contents of Field	*Meaning*
delete	Delete all records in file from institutional database receiving transfer file
insert	All records in file to be added to receiving database
update	Update relevant fields of all records in file in receiving database

Guidelines: This field should be used in conjunction with the **Description of File Contents and Other Comments** field (see below).

The 'delete' option is used when previously received collections are known to be sufficiently inaccurate that it is recommended that the specimen's record be removed from the receiving institution's database. The reason for this would be explained in the **Description of File Contents and Other Comments** field (see below).

The 'insert' option is used for new records being sent to the receiving database. This is the default value for all exchange data.

The 'update' option is used for records already held in the receiving database which have been modified and included in the current transfer file. This option would be used for returning redeterminations and other corrections to the receiving institutions.

Example: fileaction "update",

A.14	**Page Code Descriptor**	Transfer code: pgcd

Description: The International Page Code Number that is specified in the computer's disk operating system and which is normally used by the sending garden in the preparation of data.

Rules of Syntax: All valid international page code descriptors.

Guidelines: Different countries use different International Page Code Descriptors in the booting up of their local computers for the correct keyboard layout giving their local diacritic marks or accented characters. When a file is prepared with one International Page Code Number, but viewed with a different Page Code Number, the file can appear as corrupted, as the diacritics are interpreted with different symbols.

By knowing which Page Code Number the file was originally prepared in, the receiving institution can code conversion programs to receive the data more accurately.

Example: pgcd 850,   (Note: Data prepared with a Multilingual (Latin I) keyboard)

A.15	**Description of File Contents and other Comments**	Transfer code: content

Description: A brief description of the content of the current ITF File.

Rules of Syntax: Free text

Guidelines: Tabs, line feeds, carriage returns or other additional non printing characters should not be included in an ITF2 file unless specifically noted in content.

Example: content "The additional ASCII characters are also included in this file to help layout - Line feed/Carriage Return = ASCII decimal characters 10 13 after each unit of information and Tab = ASCII decimal character 9" to separate the transfer code and the field text.",

A.16   **Start of ITF Version 2.0 Record**   Transfer code: {

Description: The single character { indicating the beginning of an ITF Version 2.0 Record.
Rules of Syntax: Must contain the symbol '{' only.
Guidelines: To be found at the start of an ITF record indicating the beginning of the data of each record.
Example: {

A.17   **End of ITF Version 2.0 Record**   Transfer code: }

Description: The single character } indicating the end of an ITF Version 2.0 Record.
Rules of Syntax: Must contain the symbol '}' only.
Guidelines: To be found at the end of an ITF2 record indicating the end of the data of each record, prior to beginning the next record or the **endfile** identifier if it is the last record in the transfer file.
Example: }

B. ACCESSION DATA

This section comprises of the fields Institution Code, Accession Identifier, Accession Specimen Numbers, Accession Status and Accession Material Type. The combined transfer codes of **insid** and **accid** provide a unique accession identifier for every cultivated plant record in the world and therefore without these two fields, the record would not be a valid ITF2 record..

B.1   **Institution Code**   Transfer code: insid

Description: The code for the Institution to which the plant record refers. In ITF1 this was the Botanic Garden 5 letter code, shortname GARDCODE.

Rules of Syntax: The code must consist of an entry of 1-5 upper case letters (A-Z). This field must be transferred for every accession record.

Rules of Information: The entry in the field must be the code of the Botanic Garden as defined by the International Directory for Botanic Gardens.

Guidelines: The codes were designed originally for herbaria (IAPT codes), but have been adapted and developed further for Botanic Gardens by BGCI. Codes for the majority of botanic gardens have been published in Heywood *et al* (1990).

If a garden does not have a code, and does not have an herbarium which has a code, it should write to BGCI to agree on the code. BGCI is very happy for gardens to propose their own codes, but will insist that the value chosen has not been used already and is in accordance with its rules. Codes should be mnemonic for the location, e.g. ATLA or ATLIS for the Atlantis Sunken Botanic Garden, rather than reflect the acronym, e.g. ASBG in this example. In particular, the use of BG should be avoided for Botanic Garden.

Gardens need to be very clear about whether or not their satellite gardens have separate codes from the parent garden. This is left at the discretion of individual gardens. Once a choice has been made, it clearly cannot be changed easily.

When inserting the accession information into a receiving database, the **Institution Code** combines with the **Accession Identifier** to make up the Donor's accession identifier for each record. This is to allow for accession transfer tracking through botanic garden community; ie TCD1994-210 refers to accession 1994-210 at Trinity College Botanic Garden, Dublin, Ireland.

Example: insid "TCD",

B.2   **Accession Identifier**   Transfer code: accid

Description: The unique identifier of the record, often called 'Accession Number', used internally by the garden to record each accession.

Rules of Syntax: Alphanumeric. *This field must be transferred for every accession record.*

Rules of Information:

1.   The Accession Identifier should be a unique set of characters that identifies each accession in the garden's own record system.

2.   In the case of more than one sample of a single taxon from one collection site by the same collector - a single value of the Accession Identifier is permissible. It should be noted that once an accession has been recorded within the botanic garden setting, then subsequent collections of the same taxon from the collection site should be re-recorded as a new accession because the Accession's date history will differ making it a new record.

3. The same values of the Accession Identifier should not be used again when plants die or are given away.

4. The Accession Identifier for a plant should not be changed during the life of that plant. It is, however, permissible to assign a new accession identifier to a plant after it has been propagated.

Guidelines: Many gardens include punctuation within their Accession Identifier, e.g. 82-BG-24-31. It is good practice for gardens to be consistent on the punctuation included in the ITF.

Example: accid "97-0345",

B.3   **Accession Specimen Numbers**   Transfer code: accspe

Description: The current minimum number of specimens identified by the **Accession Identifier** only.
Rules of Syntax: Integer
Rules of Information: If the accession is dead, this field is not applicable.
Guidelines: This field does not differentiate between plant genotypes and plant clones. If 'clone information' is required, then **Accession Material Type** Flag can be transferred, and/or alternatively:

a) a note can be added in the **Miscellaneous Notes** field;

b) a sender/recipient agreed format for data exchange setup in **New Field Option** field;

c) In **Description of File Contents and other Comments** field, it can be stressed that the sending garden's ITF is using this field to outline the number of clones attached to a single accession id. This may be unique to this ITF file only, and other ITF files sent from the same institution may be using **accspe** in its wider sense.

This will be one field that gardens may have difficulty in keeping up to date, as it should record the current minimum number of specimens, not the number that were originally given that accession identifier. If transferred, it is recommended that the receiving institution verifies that **Accession Specimen Number** transferred tallies with the Accession Specimen Numbers physically received by the institution, as discrepancies will certainly occur depending on the reason why an ITF file is sent. i.e. if a file is sent without living material, then this figure should record the minimum **Accession Specimen Number**s that the garden is currently holding, <u>but</u> if sent with plant material, it should contain the minimum number being transferred to the other institution.

Example: accspe 1,

B.4   **Accession Status**   Transfer code: accsta

Description: A flag to indicate whether or not the plant is a current accession in the garden.
Rules of Syntax: If transmitted, then the Accession Status field must consist of one or more of the following characters:

Syntax	Meaning:
C	Current accession in the living collection
D	Non-current accession of the living collection due to death
T	Non-current accession due to transfer to another record system,

normally of another garden

	S	Stored in a dormant state
	O	Other' accession status - different from those above.

Guidelines:

1 In some systems, records of dead plants are left in the datafile and flagged as dead. In others, records of dead plants are put in a separate file or are deleted altogether; each of these two practices is quite suitable for the internal files. One advantage of keeping records of plants that appear dead is that roots may sprout or seedlings may appear years later.

2. Codes for material stored dormant in genebanks can be coded in this field. Field genebanks that are actively growing are to be assigned the code 'C'.

Example: accsta "C",

B.5   Accession Material Type Flag   Transfer code: acct

Description: A flag to indicate the type of material the current living accession is composed of.

Rules of Syntax: If transferred, the **Living Accession Material Type** must consist of at least one of the following characters:

Syntax	*Meaning:*
P	Whole plant
S	Seed or Spore
V	Vegetative part
T	Tissue culture
O	Other

Guidelines: If the value in the **Accession Status** field is 'D', then this field should not be transmitted.

If the accession consists of a combination of the above states e.g. a whole plant and stored seed, a combination of the above codes may be sent e.g. acct 'PS', However, it is recommended that gardens assign unique accession identifiers to material held in different states. This will be one field that gardens may have difficulty in keeping up to date, especially transferring the record to another institution when it should flag the type of living material being physically sent, not the material currently held at the sending institution.

Example: acct "S",

C. PLANT NAME

The definition of facilities for including plant names in ITF2 records is based on the rules given in *Bisby, F.A. (1994)*.

The full scientific (Latin) name of a plant includes the authors of the species and infraspecific names (where relevant). Full scientific names can be included in ITF2 records. However, if a full taxonomic name is not required, then an abbreviated ('limited') scientific name can be included in an ITF2 record to refer to the taxon. This 'limited' option is used according to the following rules:

- If a species name (but not an infraspecific name) is required then *only* the genus name and the specific epithet are needed. The authority is not required unless there is some possibility of confusion between this species and one or more of its homonyms.

- If the record refers to an infraspecific taxon then *only* the genus name, specific epithet and the lowest level infraspecific rank and infraspecific epithet are required. The authority is not required unless there is some possibility of confusion between this infraspecific taxon and one or more of its homonyms.

Hybrids present considerable problems for handling of their names in a computer. The present system handles them, but not perfectly (refer to **Intergeneric Hybrid Flag**; **Genus name**; **Interspecific Hybrid Flag**; **Species Epithet**; **Infraspecific Rank/Hybrid Flag**; **Infraspecific Epithet**). Annex 1 provides some notes on how hybrid names are constructed, with details on how to handle them in the ITF.

The present module does not contain any facility for synonyms, as this is not considered necessary for exchange of garden record data. Individual gardens may want to treat synonyms in different ways, depending on their needs. Since synonym information is taxon based, it has not been included in ITF2.

Although the application of vernacular (common) names is not as rigorously controlled as scientific names, they vary greatly and the same name may be applied to a number of taxa. However, institutions may wish to interchange this information and a suggested transfer is included (refer **Vernacular Names**).

The need for the names of higher groups such as suprafamilies and families are not required for the ITF, since each accepted generic name in the plant kingdom is unique. Furthermore, there is no agreement among taxonomists on the circumscription of plant suprafamilies and families. However, institutions may wish to interchange such data, especially if they are using the same higher classification system. Therefore, these fields are included (refer to **Suprafamilial Group Name**; **Family Name**).

In ITF version 1, it was decided to exclude authorities of the botanical names from the ITF. (The authority, in a botanical context, is the name, usually abbreviated, of the botanist(s) who assigned and/or published the name of the plant.) The reason for using authorities is generally stated to prevent confusion between homonyms (the same name having been used for two different taxa; all but one of these names will be technically illegitimate.) Although this is important for technical taxonomy, its effects on garden records are small and usually obvious. However, it has been decided to include the authorities of species and infraspecific names in the transfer file if these data are required. To avoid the variation in the citation of the names of authors, it is recommended that a published standard for the citation of authorities be used. One such standard is Brummitt, R.K. &

Powell, C.E. (1992) 'Authors of plant names' (Royal Botanic Gardens: Kew).

Identification Qualifiers

The following comments on Identification Qualifiers are relevant to the ITF fields **Identification Qualifier** and **Rank Qualified Flag**.

Botanists sometimes add various terms, such as '?', 'cf.' and 'aff.', to the name of a plant to indicate a degree of uncertainty of identification. This is often the case where a plant is taxonomically critical, or with garden plants that are of uncertain origin or that do not produce flowers or fruits. The term applies to the part of the name that immediately *follows* the term. They can be placed in front of any element of the name. It is important to note, however, that the meaning of the various terms is uncertain. There are no agreed definitions, and the distinctions between the various terms are small. So naturally those who identify plants should avoid using them wherever possible. But where they are used, garden record databases should include them so as to be able to record the uncertainty of the identification.

For conservation purposes, BGCI proposes to treat taxa qualified in this way as identified only to the level one above the rank qualified, i.e. a garden record of *Cypripedium* aff. *candidum* is treated not as a valid cultivation record of the threatened plant *Cypripedium candidum* but only as a record for the genus *Cypripedium*.

With infraspecific taxa and cultivars, no distinction is made between whether the term (e.g. 'aff.') is added before the rank of the qualified part of the name or after it. In other words, the ITF codes *Prunus maritima* aff. var. *gravesii* and *Prunus maritima* var. aff. *gravesii* are regarded as referring to the same taxon.

C.1	**Suprafamilial Name**	Transfer code: supfam

Description: The relevant suprafamilial name of the taxon referred to in the record.
Rules of Syntax: Alphabetic, any valid suprafamilial name with first letter in uppercase.
Guidelines: This field allows for material being sent for identification, particularly when even the family may not be known.

     The Suprafamilial Name depends on the classification system employed. As each institution will decide its own classification system, this field and the next two fields may not always be a useful part of the interchange standard**.** However, it is simple to ignore this information when loading the data (if it is not required or is unsuitable), but it may be useful when reviewing the taxonomic system under which the data has been compiled when loading the file into a database.).

     It should be noted that the Suprafamilial Rank is missing at this level, but this is because the data entered at Suprafamilial level has its 'rank' level implicit.

Example: supfam "Dicotyledonae",

C.2	**Family Name**	Transfer code: fam

Description: The family name appropriate to the **Genus Name** field entered in full.
Rules of Syntax: Alphabetic, any validly published plant family name with capitalisation of the first letter only.

Rules of Information: If the name of the family of the plant is unknown, then this field may contain the value UNKNOWN (in uppercase). In this case, the remaining name fields should not be transferred.

Guidelines: Since there is no universally accepted classification of plant genera into families, with several systems in use, the use of this field is optional. If institutions store family names or standard nomenclature in an abbreviated or encoded form, these must be expanded for transfer.

Example: fam "Fagaceae",

C.3 **Suprageneric Rank** Transfer code: supgenrk

Description: A field to indicate the rank of the suprageneric name of the plant.

Rules of Syntax: Alpha; any valid suprageneric rank, below the rank of family and above the rank of genus, capitalisation of the first letter only.

Guidelines: This field must contain the full name of the rank of the suprageneric group, e.g. 'subfamily'.

If more than one suprageneric category is needed to exactly identify a plant, use the **newfields** field to define the required suprageneric categories (subfamily, tribe or subtribe) and their taxonomic names. See Example 2 in section C.4 below.

Example: supgenrk "subfamily",

C.4 **Suprageneric Name** Transfer code: supgen

Description: The supra-generic name of the plant, preceded by its rank, entered in full.

Rules of Syntax: Alphabetic, any valid suprageneric name, below the rank of family and above the rank of genus. First letter only is upper case.

Guidelines: If the name of the genus of the plant is unknown, then (if transferred) this field does provide a higher level of identification than does the **Family** name field alone.

If more than one suprageneric category is needed to exactly identify a plant, use the **newfields** field to define the required suprageneric categories (subfamily, tribe or subtribe) and their taxonomic names. See Example 2 below.

Example 1: supgen "Papilionoideae",

Example 2: The following ITF2 record refers to a plant for which two suprageneric categories are specified (subfamily Papilionoideae and tribe Vicieae). The subfamily is specified using the **supgen** and **supgenrk** fields; the **newfield** facility is used to define new fields **supgen2** and **supgenrk2** for specifying the tribe:

startfile
(file information fields)
newfields "supgenrk2 (The tribe identifier within the subfamily); supgen2 (The tribe name)",
content " Because this file refers to Leguminosae - I wish to give both the subfamily name and the tribe name so 2 new fields have been added for transfer purposes",
{
accid "97-123"

insid "TCD"
fam "Leguminosae"
supgenrk "subfamily",
supgen "Papilionoideae",
supgenrk2 "tribe",
supgen2 "Vicieae",
gen "Vicia",
file details continue } endfile

supgen3 and **supgenrk3** can be defined in the same way if all three suprageneric categories (subfamily, tribe and subtribe) are required.

C.5	**Intergeneric Hybrid Flag**	Transfer code: genhyb

Description: A field to indicate whether the name in the **Genus Name** field refers to an Intergeneric hybrid or an Intergeneric graft chimaera.

Rules of Syntax: If the accession is an intergeneric hybrid, then the Intergeneric Hybrid field must consist of one of the characters in the table below:

Content of genhyb	*Nature of Name in gen*
H	an intergeneric hybrid collective name
x	an Intergeneric Hybrid
+	an Intergeneric Graft Hybrid or Graft Chimaera

Guidelines: 1. The rules associated with these values are outlined under **Genus Name** field.

2. For interchange and data storage purposes, the value in this field for an intergeneric hybrid is a lowercase 'x', not a multiplication sign (as specified in the International Code of Botanical Nomenclature), since the multiplication sign does not occur in the ASCII character set.

3. If an 'x' is placed in this field, then the genus name must be a valid intergeneric hybrid name, excluding the 'x'.

Example: genhyb "H",

C.6	**Genus Name**	Transfer code: gen

Description: The generic name of the plant, entered in full.

Rules of Syntax: Alphabetic characters, any valid genus name, first letter only is upper case.

1. The generic name must be a single word.

2. The first letter must be in uppercase (A-Z), the rest of the word in lowercase letters (a-z).

3. One or two hyphens are permitted in the word; no other characters other than the letters outlined above are permitted.

Rules of Information: This field must contain one of the following:

1. A validly published generic name under the International Code for Botanical Nomenclature (ICBN).

22 If the **Intergeneric Hybrid Flag** is not transferred, then this field must contain a non-hybrid name, validly published under the ICBN. If the name of the genus of the plant is unknown, then this field should not be transferred. In this case, the

remaining name fields should also not be transferred.

3. If the **Intergeneric Hybrid Flag** is 'H', then this field must contain a hybrid formula for an intergeneric hybrid name, validly published under the ICBN (check), e.g. Rhododendron x Vaccinium

4. If the **Intergeneric Hybrid Flag** is 'x', then this field must contain an intergeneric hybrid name, validly published under the ICBN, e.g. Halimiocistus for x Halimiocistus sahucii.

5. If the **Intergeneric Hybrid Flag** is '+' (a plus sign), then: this field must be the name of an intergeneric graft hybrid or graft chimaera, validly published under the Cultivated Code, e.g. Crataegomespilus for + Crataegomespilus dardarii.

Guidelines: One or two hyphens, no more, are permitted in generic names. All second-word elements (e.g. Roya in Fitz-Roya) should be made lowercase, e.g. as Fitz-roya. Other examples are Saxe-gothaea and Drake-brockmania.

Example: gen "Vicia",

| C.7 | **Subgeneric Rank** | Transfer code: sgrk |

Description: A code to indicate the rank of data transferred in the **Subgeneric Group.**

Rules of Syntax: The value entered must be one of the values in the table below.

Syntax	*Meaning:*
subgenus	A Subgenus
section	A Section
subsection	A Subsection
series	A Series
subseries	A Subseries

Guidelines: If the **Subgeneric Group Name** is not transferred, this field should not be transferred.

Example: sgrk "series",

| C.8 | **Subgeneric Group** | Transfer code: subgen |

Description: The subgeneric group of the plant entered in full.

Rules of Syntax: Alphabetic characters, any valid subgeneric group, capitalisation of the first letter only.

The subgeneric group must be a single word. The first letter must be in uppercase, the rest of the word in lowercase letters. One or two hyphens are permitted in the word; no other characters other than the letters outlined above are permitted.

Rules of Information: This field must contain a validly published subgeneric group name. If the genus of the plant is unknown, then this field must not be transferred.

Guidelines: If the species epithet of the plant is unknown, then (if transferred) this field does provide a higher level of identification than does the Genus field alone.

Example: subgen "Vicia",

C.9   **Interspecific Hybrid Flag**   Transfer code: sphyb

Description: A field to indicate if the **Species Epithet** field refers to a hybrid.

Rules of Information: If transferred, the **Interaspecific Hybrid Flag** must consist of one of the characters from the table below, which refers to the following situations in the **Species Epithet** field:

Content of sphyb	*Nature of Name in sp*
H	A hybrid formula for an Interspecific hybrid
x	A Nothotaxon name for an Interspecific hybrid
+	An Interspecific graft hybrid or graft chimaera

If the **Species Epithet** field is not transferred, then this field must not be transferred.

Guidelines: 1.   The rules associated with these values are outlined under **Species Epithet** field, see below.

            2.   The value stored in this field for a Nothotaxon name of an Interspecific hybrid is a lowercase 'x' not a multiplication sign (refer to Guidelines under **Intergeneric Hybrid Flag** above).

            3.   The terms 'hybrid formula', 'Nothotaxa' and 'Cultivar-Group' are explained with examples in Annex 1.

Example: sphyb "x",

C.10   **Species Qualifier**   Transfer code: spql

Description: This qualifier permits the **Species Epithet** field to be used for normal species names, as well as names of aggregrate (refer Guidelines 1, below) or segregate species.

Rules of Syntax:

            1.   If the **Species Epithet** field is not transferred, then this field must not be transferred.

            2.   If the **Interspecific Hybrid Flag** is transferred, then this field must not be transferred.

            3.   Otherwise the **Species Qualifier** consists of the characters in the table below, which refers to the following situations in **Species Epithet**:

Content of spql	*Nature of Name in sp*
agg.	An aggregate species
s. lat.	aggregrate species (*sensu lato*)
s. str.	segregate species (*sensu stricto*)

Rules of Information:

            1.   If the entry is agg., then the plant has been identified to an aggregate species, and not to any of the segregate microspecies within the aggregate.

            2.   If this field is transferred, then **Infraspecific Rank Flag** and **Infraspecific Epithet** fields must not be transferred.

Guidelines: 1.   An Aggregate species is a group of closely related species that are difficult to distinguish among themselves and is sometimes referred to as a whole by botanists as an aggregate species (usually with the Latin name followed by agg.); the constituent species are referred to as segregate species or microspecies. It is not possible to use the Aggregate concept at levels other than the species level.

            2.   The terms collective species or species groups are sometimes also used in plant names. They should be treated as for aggregate species.

Example: spql "agg.",

C.11   **Species Epithet**   Transfer code: sp

Description: The specific epithet of the name of the plant.
Rules of Syntax:
  1.   The specific epithet must be one word (except as in the cases of Rules of
        Information 1.1, 1.2, 3 and 4, below).
  2.   It must consist of lowercase letters (a-z), and may contain one or two hyphens.
  3.   The field should not be transferred if the species epithet is not known. (See Rules
        of Information 1.1 and Guidelines below).

Rules of Information:
  1.   If the **Infraspecific Rank/Hybrid Flag** is not included in the current record, this
        field must contain a validly published, non-hybrid specific epithet under the
        International Code for Botanical Nomenclature (ICBN), except in the following
        special cases:
        1.1   If the plant has not been identified to specific level, this field must not be
              transferred. Abbreviations such as 'sp.' should not be entered in these
              circumstances.
        1.2   If the plant represents a new species which has not been formally described,
              sp. nov, sp. A, sp. 1 (or other acceptable codes c.f. Greuter *et al* 1994)
              should be entered, if possible followed by a unique identifier, such as the
              collector's name and number or the locality.
  2.   If the **Infraspecific Rank/Hybrid Flag** is x, the entry in the field must be a
        Nothotaxon name for an Infraspecific hybrid, e.g. "tellmaniana" for *Lonicera* x
        tellmaniana.
  3.   If the **Infraspecific Rank/Hybrid Flag** is H, the entry in the field must be a
        Hybrid Formula, with the lowercase letter 'x' between the species epithets of the
        two parents, e.g. "*dichroanthum* x *griersonianum"* for *Rhododendron
        dichroanthum* x *griersonianum*.
        If only one parent is known, then enter the specific epithet of that parent alone
        (without the lower case letter 'x').
  4.   If the **Infraspecific Rank/Hybrid Flag** is a '+', then the entry in the field must be
        an Infraspecific Graft Chimaera e.g. "*correlata"* for *Syringa + correlata*).
  5.   If the **Species Field Qualifier** is 'agg.', then the entry in the field must be a validly
        published specific epithet under the International Code for Botanical
        Nomenclature (ICBN), used for the name of the group of species concerned. The
        abbreviation 'agg.' should not be included in the entry of this field.
Guidelines: The abbreviation 'sp.' is not used if a plant has not been identified to the species
                level (Rule of Information 1.1 above). However, institutions may wish to store
                this information or to program their own internal systems so that the abbreviation
                'sp.' is printed in any paper reports of such records.
Example: sp "tellmaniana",

C.12   **Species Author**   Transfer code: spau

Description: The author citation of the specific epithet (as given in **Species Epithet** field), in

standard or standard abbreviated form² (alpha; any valid author abbreviation, initials and first letter of surname in uppercase, and other character as described below).

Rules of Syntax:

1. The **Species Epithet** field should be filled with a valid name.
2. This field is omitted for the full name of a species aggregrate.
3. Alphabetic symbols (A-Z, a-z), including fullstops, pairs of brackets, apostrophes, ampersands (&) and spaces are all valid entries for this field.
4. For the citation of joint authors, it is recommended that '&' is used between the last two names, not 'et' or 'and'. If there are more than two authors, then a comma is used to separate all authors except for the last two.
5. Parenthetical author or authors in the recommended form enclosed in round brackets at the beginning of the field.

Guidelines: Names in other (non-English) alphabets may have to be transliterated into the roman alphabet for the receiving database. This field was omitted in ITF1 as it is mainly taxon-based – if transferred, it applies to this accession's details only.
A recommended guide for author names and their form is Brummitt & Powell, 1994.

Example: spau "Hook.",

C.13 **Infraspecific Rank/Hybrid Flag** Transfer code: isprk

Description: A field to indicate the rank or the nature of hybrid rank of the infraspecific name transferred in the **Infraspecific Epithet** field.

Rules of Syntax:

1. If the **Infraspecific Epithet** field is not transferred, then this field must not be transferred.
2. If the **Infraspecific Epithet** field is transferred, then this field must be one of the values in the table below or a combination of the codes separate by an 'x' to denote a hybrid (see examples):

Content of isprk	Alternate isp codes		Nature of Name in isp
ss	subsp.	or s	Subspecies
va	var.	or v	Variety
sv	subvar.		Subvariety
fo	form	or f	Form
sf	subf.		Subform
nss			Nothosubspecies
nva			Nothovariety
nfo			Nothoform

To allow precision where two similar ranks or two different ranks are involved in a hybrid, use the above two letter codes separated by 'x'. For examples:

Content of isprk	Nature of Name in isp
sxss	Hybrid between 2 subspecies
ssxva	Hybrid between a subspecies and a variety
ssxfo	Hybrid between a subspecies and a form
vaxsf	Hybrid between a variety and a subform

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² Brummitt, R.K. & Powell, C.E. (1992) Authors of plant names (Royal Botanic Gardens: Kew) is one recommended guide to author abbreviations.

... etc.

Guidelines: ICBN suggests that a nothotaxon need not be indicated as such; for example *Polypodium vulgare* nothosubsp. *mantoniae* (Rothm.) Schidley could be written *Polypodium vulgare* subsp. *mantoniae* (see ICBN Article H.3.4. Note 1), but because such a small modification was needed at this rank to retain this distinction, it was felt to be a pity not to keep the difference if required.

Unlike ITF1, **Cultivar-Group** epithets are no longer flagged in this field - (See **Cultivar-Group**).

Annex 1 explains the meaning of the various hybrid terms used above, in particular the differences between Hybrid Formulae Names, Nothotaxa and Cultivar-Group epithets.

Example: isprk "ss",

C.14 **Infraspecific Epithet** Transfer code: isp

Description: The epithet of the lowest infraspecific rank of the name of the plant.

Rules of Syntax:
1. The entry must be one word (except as outline in Rules of Information, below).
2. It must only consist of lowercase letters (a-z), and may contain one or two hyphens. No other characters are allowed (except in the case of Rules of Information 1.1 & 2, below).
3. The field may be left unfilled to indicate that the plant is not identified below the species level. It must not be transferred if the species epithet is not known.

Rules of Information:
1. If the **Infraspecific Rank/Hybrid Flag** is subsp. var., subvar., f. or subf., then the entry must be a epithet in the rank denoted by that field, validly published under the International Code for Botanical Nomenclature (ICBN), except in the following special case. Where a new infraspecific taxon has not been formally described, subsp. nov., var. nov., subvar. nov., f. nov., or subf. nov. may be entered, if possible followed by a unique identifier, such as the collector's name and number or the locality.
2. If the **Infraspecific Rank/Hybrid Flag** value indicates a Hybrid Formula, the lowercase letter x must be included between the species epithets of the two parents. (Examples 9 & 10 of Table 2)
   If only one parent is known, then enter the infraspecific epithet of that parent alone, without the lower case letter x. (Example 7 of Table 2).

Guidelines:
1. Under the rules of the International Code for Botanical Nomenclature (ICBN), every trinomial below the level of species is unique. Hence *Rhododendron arboreum* subsp. *delavayi* var. *peramoemum* can be known uniquely as *Rhododendron arboreum* var. *peramoemum*. Therefore the name can consist of the genus, the species and the lowest infraspecific taxon, qualified by its rank.
2. Annex 1 explains the meaning of the various hybrid terms used above, in particular the difference between Hybrid Formulae names and Nothotaxa.

Example: isp "delavayi",

C.15 **Infraspecific Author** Transfer code: ispau

Description: The author citation of the lowest infraspecific epithet, in standard abbreviated form.

Rules of Syntax: See under **Species Author** field, above.

Guidelines: See under **Species Author** field.

Example: ispau "Brown, J.S.",

C.16 **Second Infraspecific Rank Flag** Transfer code: isp2rk

Description: An additional field to indicate the rank of the second lowest infraspecific name (as given in isp2), which is at a higher level to that of the **Infraspecific Epithet** field. This is used when a full taxonomic name is required (see Guidelines below).

Rules of Syntax: See under **Infraspecific Rank/Hybrid Flag**, above. Note: these additional fields are for non-hybrid infraspecific taxa, not for hybrids, collective names or cultivars.

Guidelines: This field was not part of the ITF1 standard, but has been included for those institutions who wish to transfer and/or receive a complete taxonomic name in a form which is more easily inserted into a database than the **Full Name** field. When more than one infraspecific name is being transferred, the following fields refer to the lowest level infraspecific name: **Infraspecific Rank Flag**, **Infraspecific Epithet**, and **Infraspecific Author**; whereas, the **Second Infraspecific Rank Flag**, **Second Infraspecific Epithet**, and **Second Infraspecific Author** all refers to the second lowest level of infraspecific name (e.g. var. and subsp., respectively).

If institutions wish to transfer more than two levels of infraspecific names in this format, then the third lowest level has the number 3 included in the Transfer Code identifier (e.g. isp3rk, isp3, isp3au), and so on, as appropriate.

Example: isp2rk "var.",

C.17 **Second Infraspecific Epithet** Transfer code: isp2

Description: An additional field for the epithet of the second lowest infraspecific rank of the name of the plant, when a full taxonomic name is required (refer Guidelines under **Second Infraspecific Rank Flag** field, above).

Rules of Syntax: See under **Infraspecific Epithet** field, above. Note: these additional fields are for non-hybrid infraspecific taxa, not for hybrids, Collective names or cultivars.

Guidelines: This field is not part of the original ITF1 standard (refer to Guidelines under **Second Infraspecific Rank Flag** field, above).

Example: isp2 "rodriguesii",

C.18 **Second Infraspecific Author** Transfer code: isp2au

Description: An additional field for the author citation of the second lowest infraspecific epithet, in standard abbreviated form.

Rules of Syntax: As for **Infraspecific Author**.

Rules of Information: See under **Infraspecific Author** field, above. Note: these additional fields are for non-hybrid infraspecific taxa, not for hybrids, Collective names or cultivars.

Guidelines: This field is not part of the ITF1 standard (refer Guidelines under **Second Infraspecific Rank Flag** field, above).

Example: isp2au "Jones, J.W.",

C.19   **Vernacular Names**   Transfer code: vernam

Description: A free text field to allow for the inclusion of vernacular (common) plant names.

Rules of Syntax: Vernacular name which is optionally followed by language and/or locality of each name in round parentheses ( ).

Guidelines: Because the same vernacular name can be used for unrelated taxa in different localities, it is recommended that the additional information in parentheses be entered, as it helps source the given vernacular name.

Example: vernam "Sweetpea (UK)",

Cultivated Plant Names

Rules for naming agricultural, forestry and horticultural plants have recently been revised in the *International Code of Nomenclature for Cultivated Plants* (ICNCP) (Trehane *et al*, 1995). ITF2 ensures compatibility with this code by introducing two new fields, the **Cultivar-Group Epithet** and **Trade Designation**, in addition to the **Cultivar Epithet** field which existed in ITF1. These three fields enable plants in cultivation to be named accurately in accordance with the rules of the ICNCP. For full details of the application of these rules, the reader should consult the reference given above. In practice, the only names that may be used in this code are the Cultivar epithet, the Cultivar-Group epithet, and the Trade Designation (or other similar trade name). Most plants arising in cultivation will not have epithets at all three ranks.

Signs to indicate hybrids (x) or graft chimera (+) must NOT be used in any of these three fields – they should be flagged in the appropriate field. Authors' names are not required by the ICNCP, and should not be appended to the names given at any of the three ranks.

The following three examples show the fields required for particular types of cultivars:

Brassica oleracea Cauliflower Group: gen "Brassica"
                                                   sp "oleracea"
                                                   culgrp "Cauliflower"

Dracaena fragrans (Deremensis Group) 'Christianne':   gen "Dracaena"
                                                   sp "fragrans"
                                                   culgrp "Deremensis"
                                                   cul "Christianne"

Choisya ternata 'Lich'   gen "Choisya"
(Trade designation Sundance)   sp "ternata"
                                                     cul "Lich"

trades "Sundance"

Hybrids are not allowed for at any of the three ranks, but these can be tracked using the parentage fields.

C.20   **Cultivar-Group**   Transfer code: culgrp

Description: The Cultivar-Group epithet of a plant.
Rules of Syntax:
1.   An entry in this field should consist solely of the Cultivar-Group epithet.
2.   If the accession cannot be assigned to a Cultivar-Group, then the field should not be transferred.
3.   A Cultivar-Group epithet must be a word or phrase of not more than three words, normally in a modern language. This epithet must not contain any punctuation other than apostrophe ('), comma (,), hyphen (-), or period/full stop (.).

Rules of Information:
1.   The Cultivar-Group epithet must be established under the rules of the ICNCP. This field should NOT contain a cultivar epithet or trade designation.
2.   The first letter of each word of Cultivar-Group epithet should be upper case, unless linguistic practice dictates otherwise (e.g. prepositions.).
3.   The Cultivar-Group epithet should NOT be enclosed in parentheses (these can easily be appended to the information contained in this field in output programs if required).
4.   If more than one Cultivar-Group has been designated for a particular cultivar, separate each of these Cultivar-Group epithets with a semicolon. For example, "xxxx; yyyy;"

Guidelines:
1.   A Cultivar-Group is an assemblage of similar, named cultivars within a genus or species (including hybrid genera and species). For futher details, see Article 4 of the ICNCP.
2.   Cultivar-Group epithets are written as contained between round (parentheses) or square brackets when a cultivar epithet or trade designation is given; if no cultivar epithet or trade designation is given then these brackets are omitted. The word 'Group' always terminates the Cultivar-Group epithet: e.g. *Brassica oleracea* Cauliflower Group, *Dracaena fragrans* (Deremensis Group) 'Christianne' or *Dracaena fragrans* [Deremensis Group] 'Christianne'.
3.   The word 'Group' should not be transferred. However institutions may wish to store the word internally and strip it out for transfer, or to program their own internal systems so that the word 'Group' is printed in any hardcopy reports of such records. (See Guidelines 2).
Example: culgrp "Deremensis",

C.21   **Cultivar Epithet**   Transfer code: cul

Description: The cultivar epithet of the plant.
Rules of Syntax: The entry should consist solely of the cultivar epithet. The abbreviation 'cv.' should not be used (except under Rules of Information 2), nor should the entry be enclosed in single quotes (these should be added in printed outputs only, not transferred by ITF).

Rules of Information:
1. The cultivar must be a valid name published under the International Code of Nomenclature for Cultivated Plants (see Article 17).
2. If the taxon is known to be a cultivar but does not yet have an epithet established or determined, the abbreviation 'cv.' should be entered in the field.
3. The first character of each word in a cultivar epithet should be in upper case (capitals), unless linguistic practice dictates otherwise (e.g. prepositions).

Guidelines: 1. A cultivar is part of the variation of cultivated plants being clearly distinguished by attributes that are distinct, uniform, stable and are retained when propagated by a suitable means. For further details, see Article 2 of the ICNCP.
2. The cultivar epithet is written in outputs enclosed in single quotes, e.g. *Citrullus lanatus* 'Sugar Baby'. Double quotation marks or the abbreviation prefix 'cv. ' are NOT permitted under the ICNCP.

Example: cul "Sugar Baby",

C.22　　　　**Trade Designation**　　　　　　　　　　Transfer code: trades

Description: The marketing name of a taxon which is used in place of the accepted cultivar epithet.

Rules of Syntax:
1. An entry in this field should consist solely of the trade designation, if applicable.
2. If the accession does not bear a trade designation, this field should be left blank.

Rules of Information: The trade name must be a valid name published under the International Code of Nomenclature for Cultivated Plants and accepted by the International Registration Authority for the group concerned.

Guidelines: Trade designations are not acceptable epithets under the Rules of the International Code of Nomenclature for Cultivated Plants. They are coined solely for marketing purposes and are used in place of, or in addition to, a cultivar epithet.

Example: trades "Sundance",

C.23　　　　**Full Name**　　　　　　　　　　　　Transfer code: fulnam

Description: The full name of the plant, including full author citation, hybrid name, hybrid formula, collective name, cultivar name (as appropriate).

Rules of Syntax: All previous rules, as described under the above name fields apply in this field. Free text field.

Guidelines: This field allow the full taxonomic name (including author citation), horticultural tradenames and patents, as well as quadrinomials or pentanomials. The reduction of a plant name to a trinomial (as in strict ITF1 format) results in the loss of much of the nomenclatural and associated information.

Example: fulnam "Rhododendron cinnabarinum subsp. cinnabarinum x subsp. xanthocodon",

C.24　　　　**Rank Qualified Flag**　　　　　　　　Transfer code: rkql

Description: The lowest name/epithet of the taxon qualified by the entry in field **Identification**

Qualifier field (see below).

Rules of Syntax: If the **Identification Qualifier** field is transferred, then the entry in this field must be one of the values in the table below:

Content of Field	Rank qualified
B	Below Family
F	Family
G	Genus
S	Species
I	first Infraspecific Epithet
J	second Infraspecific Epithet (new for ITF2)
C	Cultivar

In each of these cases, the entry in the field that is qualified (e.g. Species, Cultivar) must be transferred. If the **Identification Qualifier** Field is not transferred, then this field must not be transferred.

Example: rkql "G",

C.25 **Identification Qualifier** Transfer code: idql

Description: A standard term to qualify the identification of the taxon when doubts have arisen while comparing the plant and the plant description; see introductory note (under C. Plant Name) and previous field.

Rules of Syntax: If the identification does not require qualification, then this field must not be transferred.

If there is any doubt about the identification of the plant record, then this field must contain one of the following:

Conventional Notation	Meaning
aff.	Akin to or bordering
cf.	Compare with
Incorrect	Incorrect
forsan	Perhaps
near	Close to
?	Questionable

Most of above meanings are taken from Stearn, W.T. (1983).

Guidelines:
1. The 'Incorrect' coding has been introduced into ITF2 to mark an identification where the name applied is definitely incorrect, but a new name has not yet been assigned.

2. At the generic level, the symbol '?' is normally the only identification qualifier used.

3. The symbol '?' is to be interpreted as 'possibly not' the correct name of the rank nominated in the Rank Qualified Flag (**rank**) field. The '?' clarifies which name or epithet is questioned (usually the lowest rank).

4. The '?' symbol is not to be used to express doubts concerning the lumping or splitting of certain taxa.

Example: idql "cf.",

Table 2:   Examples of plant names expressed in ITF2

1. **A species**:
   Lilium regale
   gen "Lilium", sp "regale",

2. **An infraspecies**:
   Cypripedium calceolus var *pubescens*
   gen "Cypripedium", sp "calceolus", isprk "var.", isp "pubescens",

3. **A series**:
   Rhododendron ser. *madenii*
   gen "Rhododendron", sgrk "ser.", subgen "madenii",

4. **A cultivar**:
   Pelargonium zonale 'Pink Baby'
   gen "Pelargonium", sp "zonale", cul "Pink Baby",

5. **A nothotaxon name for an infraspecific hybrid**:
   Rhododendron x *praecox*
   gen "Rhododendron", sphyb "x", sp "praecox",

6. **A group hybrid**:
   Brassica oleracea (Acephala Group) 'Bornick'
   gen "Brassica", sp "oleracea", culgrp "Acephala", cul "Bornick",

7. Interspecific hybrid formula (with only one parent known
   Rhododendron x *wardii*
   gen "Rhododendron", sphyb "x", sp "wardii",

8. **A hybrid between 2 subspecies of the same species**:
   Asplenium trichomanes subsp. *quadrivalens* x *Asplenium trichomanes* subsp. *trichomanes*
   gen "Asplenium", sp "trichomanes" isprk "ssxss", isp "quadrivalens x trichomanes",

9. **A hybrid between 2 infraspecific ranks of the same species**:
   Cochlearia officinalis subsp. *officinalis* x *Cochlearia officinalis* var. *alpina*
   gen "Cochlearia", sp "officinalis", isprk "ssxva", isp "officinalis x alpina",

10. **A hybrid between 2 subspecies of different species**:

Asplenium adiantum-nigrum subsp. *onopteris* x *Asplenium trichomanes* subsp. t*richomanes*
gen "Asplenium", sphyb "H", sp "adiantum-nigrum x trichomanes", isprk "ssxss", isp "onopteris x trichomanes",

D. VERIFICATION DATA

This set of fields indicates the degree of confidence that can be placed in the identification of the plant's name. Clearly, in the course of its life in a particular botanic garden, an individual species may be identified several times, by different people, possibly with different results. The garden should send the information they regard as most accurate and relevant. Usually this field refers to the most recent identification, but individual gardens will rely on their own knowledge in such situations. The confidence in a plant name is also influenced by the quality of the references used for identification.

D.1	**Verification Level**	Transfer code: vlev

Description: The level to which the identification of the plant has been verified.

Rules of Syntax:

If transferred, the entry must be one of the values in the table below:

Syntax	*Meaning*
U	It is not known if the name of the plant has been checked by an authority.
0 (Zero)	The name of the plant has not been determined by any authority
1	The name of the plant has been determined by comparison with other named plants
2	The name of the plant has been determined by a taxonomist or other competent person using the facilities of a library and/or herbarium, or other documented living material
3	The name of the plant has been determined by a taxonomist who is currently or has been recently involved in a revision of the family or genus
4	The plant represents all or part of the type material on which the name was based, or the plant has been derived therefore by asexual propagation

Guidelines: Accessions may have multiple verifications; for transfer, please use the name currently accepted in the establishment holding the accession, verified to the highest level. The code 'U' has been introduced in ITF2 to make the distinction between a plant not determined ever, or not known to have been determined.

Example: vlev "U",

D.2	**Verifier's Name**	Transfer code: vnam

Description: The name of the person or persons followed by their institution who verified the identification of the plant, as qualified in the previous field.

Rules of Syntax: Alphabetic. If Verification Level field (**vlev**) is U or zero, then this field is not applicable and should not be transferred.

Guidelines:
1. The verifier's family name (surname - with initial letter uppercase) followed by comma and space (,) then initials of given names (in uppercase and each followed by a full stop, without spaces). Titles should be omitted.
2. If two names are needed, each name (as formatted in point 1 above) is separated by a comma and a space. If several names are needed, then the first name (as formatted in point 1 above) may be followed by 'et al.'.

3. It is recommended that the verifier's institution also be cited (as acronym) in round parentheses.

Example: vname "Waldren, S. (TCD)W",

D.3 **Verification Date** Transfer code: vdat

Description: The date on which the name of the plant was verified.

Rules of Syntax: Integer, year (4 digits) followed by month (2 digits) and the day (2 digits), without spaces between them. If Verification Level field (**vlev**) is U or zero, then this field is not applicable and should not be transferred.

1. In this notation, leading zeros must be included for months and days, i.e. March is coded as '03' not '3' and the 6th day is coded as '06' not '6'. 8th October 1974 would be expressed as 19741008; 9th February 1912 as 19120209.

2. If the day of the month is not known, the last two digits should be omitted; for example April 1881 would be transferred as 188104.

3. If the day and the month are not known, the last four digits should be omitted and just the four digits of the year information interchanged.

Guidelines: The ITF records the year as a full 4-digit number to facilitate the use of the system in the next century, as well as to track verifications from the previous century.

Example: vdate 19930212,

D.4 **Verification Literature** Transfer code: vlit

Description: Citation of literature used for identification.

Rules of Syntax: Alphanumeric, free-text field; cite each journal or book title, followed by volume, year and pages (as relevant), each component separated by comma and space.

Guidelines: Where multiple references are used, the most useful reference should be mentioned first, and each reference is separated by semi-colons ';'.

Example: vlit "Curtis Botanical Magazine Volume 19, Part 4, November 1997 page 192",

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D.5 **Verification History** Transfer code: vhist

Description: Annotation of previous identifications, stating plant name, verifier, date, and reference.

Rules of Syntax: Alphanumeric, free-text field.

Guidelines: This field combines the previous single entry fields of **Verification Level**, **Verifier's Name**, **Verification Date** and **Verification Literature** into one free text field, separated by a semicolon (;) for each unique verification, when the plant is re-inspected and re-verified. It should be noted that free text make 'databasing comparisons and selection' more difficult. An alternative suggestion is to keep these fields separate and call them **vlev2 vnam2 vdat2 vlit2** and **vpnam2**[3] for example, moving on to **vlev3, vnam3 vdat3 vlit3 vpnam3** etc. as re-verification makes the new fields necessary.

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[3] **vpnam** - the verified plantname given at this verifcation/identification if different to the current plantname

If this second option is used, then the new field names should be noted in the **New Field Option** section of the file header. There is no 'recommended' alternative as to which method is better - **Verification History** in ITF2 has been combined because in the majority of cases, institutions will view this field as of historical interest, and will not be working 'actively' on selecting and comparing this field

Example: vhist "1 Szwed, W 198303 THAISZIA vol 1, no.2 1992; next verification history",

E. SOURCE DATA

This set of fields records the source of the accession, i.e. how the botanic garden obtained the living plant. This is vitally important for conservation purposes, where plants of known wild source origin are far more valuable than plants whose origins are not known.

The first two fields provide a key to the types of sources for the accessions. It is important that these be completed as far as possible. The remaining, more extensive fields provide the actual data on the source of the plant, such as information on the collector(s) and about the location where the plant was obtained.

E.1 **Provenance Type Flag** Transfer code: prot

Description: A code to indicate the provenance of the accession.
Rules of Syntax: If transferred, the entry must be one of the following values:

Syntax	*Meaning*
W	Accession of wild source
Z	Propagule(s) from a wild source plant in cultivation
G	Accession not of wild source
U	Insufficient data to determine which of the above categories apply

Rules of Information: The terms outlined above are defined as follows:

W   Accessions which originate from material collected in the wild. The accession has not been propagated further, except in the case of plants that may have been grown on from the original stock. The accession may have come directly from the wild, or from a botanic garden or gene bank acting as a distribution centre. Recent accessions in this category should have accompanying collection data, but the category may also include older accessions which are known to be of direct wild origin but which do not have such additional data.

Z   Accessions derived by propagation directly from an original wild source plant. The method of propagation must be recorded in the Propagation History field. If the propagation is not directly from the original wild source plant, a complete history of the intermediate propagation steps must be known, otherwise the accession should placed in the following category.

G   Accessions derived from cultivated plants where the immediate source plant does not have a propagation history that can be traced in detail to a wild plant. This category normally includes all cultivars.

U   Accessions where there is insufficient data or knowledge to know which of the three above categories applies.

Guidelines: It is recommended that gardens should always note the **Provenance Type Flag** of an accession, as plants of wild source are of particular interest for conservation purposes.
Example: prot "W",

E.2 **Propagation History Flag** Transfer code: prohis

Description: A code to indicate the nature of the production of the plant material being accessioned, for use in association with the previous field, **Provenance Type**.
Rules of Syntax: A single or two letter uppercase alphabetic letter, as designated below.

Syntax	Meaning
I	Individual wild plant(s)
S	Plant material arising from sexual reproduction (excluding apomixis)
SA	From open breeding
SB	From controlled breeding
SC	From plants that are isolated and definitely self-pollinated
V	Plant material derived asexually
VA	From vegetative reproduction
VB	From apomictic cloning (agamospermy)
U	Propagation history uncertain, or no information.

Guidelines: 1.   The second character is optional to provide more detailed information to be recorded. It is recommended that both characters are used wherever possible.

2.   The value 'I' refers to complete individuals (or rametes) that have been removed from the wild, or to accessions which are growing naturally within the area of the establishment to which the record system applies. For example, this allows for individuals or groups of individual growing naturally (i.e. not deliberately introduced) in reserve areas to receive full accession status.

3.   Seed set by apomixis should be coded 'VB' rather than by any of the 'S' codes.

4.   Most wild collected seed will be the result of open breeding, and even taxa which are fully self-compatible will normally show a small amount of outbreeding. Only if it is absolutely certain that wild-collected seed was set as the result of selfing (e.g. cleistogamy, controlled selfing etc.) should the entry be set to 'SC'. Occasionally wild-collected seed will be the result of controlled experimental pollinations, where the entry should be set to 'SB' (or 'SC' if selfed), but the majority of wild seed should be coded 'SA'.

5.   Where material has been derived from cuttings, divisions, or other vegetative propagules (including material for micropropagation) of wild plants, the entry should be set to 'VA', and not 'I'. Such vegetative propagules may potentially differ slightly from the wild individual by somatic variation.

6.   If the accession is of wild provenance (Provenance Type = W), Propagation History cannot be U.

7.   If Propagation History is 'I' (individual wild plants), Provenance Type must be 'W'.

8.   'U' should be used if there is insufficient information.

Example: phist "I",

For conservation purposes, accessions may be conveniently graded as 1, 2, or 3.

Grade 1 plants are of the greatest importance to the conservation of wild species. The plant material is a genetic sample of the wild population. Sexually produced material is to be preferred to clonal material when available as this is capable of expressing greater genetic variation, and because there is a slight chance of somaclonal variation occurring in clonal material; i.e. in terms of the **Provenance Type Flag** and **Propogation History Flag** values:

W S	Plants grown from seed collected in the wild and
W SA	germinated in the garden
W SB	
W SC	
W V	Plants grown from wild-collected cuttings
W VA	

    W VB

    Z V   Cuttings grown from a garden-grown plant of
    Z VA   known wild origin
    Z VB

    W I   Individual growing *in-situ*, or individual removed from the wild.

Grade 2 plants. It is very difficult to recreate natural breeding conditions in cultivation and therefore plants derived from this source can deviate genetically from wild plants as they may have been affected by the artificial conditions of cultivation. For example, genetic modification can come about by inbreeding depression or by selection of plants that are fittest under cultural rather than wild conditions. However, in certain circumstances, Grade 2 plants can have great relevance to conservation: the controlled breeding of plants that do not reproduce in the wild would be one example; i.e.

    Z SB   Seed sample set under controlled breeding of garden grown   plants of known wild origin.
    Z SC   Seed produced by open breeding in a situation where a species is so isolated from close relatives that there is no chance of hybridization or where any hybrid would be so obvious that it would be immediately noticed (i.e. monotypic genera).

Although all Z S propagated material is counted as grade 2 plants, the above examples <u>may</u> sometimes be differentiated as 'being of greater conservation value' than a Z S or a Z SA propagated plant.

Grade 3 plants may include plants of great relevance to the conservation of cultivated plants, e.g. old crop varieties or when no grade 1 or 2 material is left; i.e.

    G SA   Seed set by botanic garden plant of unknown origin by open breeding.
    G VA   Plant grown from cuttings of garden/cultivated plants i.e. plants 'not of wild origin'.

Guidelines: It is unlikely that collectors' data would be available when the accession has a **Provenance Type Flag** 'G' or 'U'.

E.3	**Wild Provenance Status Flag**	Transfer code: wpst

Description: A code to clarify the status of a recorded 'wild' provenance accession.
Rules of Syntax: The entry must be one of the four 'wild' provenance status flags as shown

Syntax	*Meaning*
Wild native	Endemic found within its indigenous range
Wild non-native	Plant found outside its indigenous range
Cultivated native	Endemic known to have been cultivated and reintroduced or translocated within its indigenous range.
Cultivated non-native	Plant known to be cultivated and found outside its indigenous range.

Guidelines: This field is trying to provide a means to record the status of an accession in its

collection site that is compatible with the Plant Occurrence and Status Scheme (POSS) standard version 2.0 (Gillett *et al.*). The main use of this scheme is to describe plant distributions in databases; the data therefore relates to taxa rather than accessions, and as such, is beyond the realm of botanic garden accession managers.

However this field flags a plant accession as a 'native' or an 'exotic' as a part of its source data, which is useful for 'plant management' and may increasingly become of interest use to organisations storing plant distribution data.

Example: wpst "Wild native",

E.4   **Accession Lineage**   Transfer code: acclin

Description: The purpose of this field is to trace the lineage of an accession to either one or two immediate parent accession ids. Accession codes provided in this field identify both the accession AND the garden holding that accession.

Rules of Syntax:

1. It is obligatory that the accession id be preceded by the parent's garden code to avoid ambiguity, and allows accessions be traced as they are passed from one garden to another.

2. Where an accession has arisen by selfing or any method of asexual reproduction, the accession parent should indicate the identifier of the source material, preceded by the garden code of the establishment holding the source accession.

3. Where an accession has been derived from a specific cross, the accession identifier of the male (pollen) parent should be given before the accession identifier of the female (seed) parent; in both cases the garden code should precede these identifiers. The two accession identifiers should be separated by commas.

4. If it is not known which is the pollen parent, the two accession identifiers should be separated by a forward slash (/)

5. The exact method of propagation (selfing, vegetative etc.) is defined by the **Propagation History** field, and does not need to be recorded in the **Accession Parent** field.

Examples: 1. If the value for Accession Parent is "TCD19930026", this indicates that the accession was derived from the specimen(s) assigned to the accession number 19930026 held at Trinity College Dublin. The accession may have been derived by selfing or by asexual propagation, this will be indicated by the value assigned to the Propagation History field.

2. If the value for the Accession Parent is "K19650056,NSW19741234", this indicates that the accession is derived from a cross between the pollen parent 19650056 held at the Royal Botanic Gardens, Kew, UK and the seed parent 19741234 held at the Royal Botanic Gardens, Sydney, Australia.

Guidelines: Due to the complicated issues involved in lineage, it has been decided that it is beyond to scope for the ITF to be able to track lineage indefinitely. If an institution wishes to track lineage 'further back', then a separate ITF file or accession record can be sent which details the immediate parentage for each parent as separate ITF accession id. The onus is on the receiving garden to assemble the complete lineage for an accession, if required.

Example: acclin "K19650056",

E.5   **Donor Type Flag**   Transfer code: dont

Description: A code to indicate the type of immediate donor from which the accession was obtained. This may not be necessarily be the original collector of wild material.

Rules of Syntax: A single uppercase alphabetic letter, as designated below.

     1.   The entry must consist of one of the following characters:

Syntax	*Meaning*
E	Expedition
G	Gene bank
B	Botanic Garden or Arboretum
R	Other research, field or experimental station
S	Staff of the botanic garden to which record system applies
U	University Department
H	Horticultural Association or Garden Club
M	Municipal department
N	Nursery or other commercial establishment
I	Individual
O	Other

     2.   If there is doubt as to which entry is correct, or if more than one entry applies (e.g. a plant collected by the botanic garden staff on an expedition), a garden should be consistent in its use.

Guidelines: The purpose of this field is to allow the inclusion of information about the content of the **Donor** Field. If the value for **Donor Type Flag** is O, the **Donor** field description should be worded so as to indicate the type of donor. It should be noted that not all members of the ITF2 Review group viewed this data as important for transfer with an accession record. It was one of the original fields in ITF version 01.00 and as such is retained.

Example: dont "S",

E.6   **Donor**   Transfer code: don

Description: The person, institution or business from which the accession was obtained.

Rules of Syntax: Free text field.

Rules of Information: Plant material may come to a garden from many sources and in various ways. The information under these headings cannot be coded or fully standardised.

Guidelines: 1.   Accessions obtained directly from the wild, are usually received from the collector. If the collectors' information is given, and this field is not transferred, then it can be presumed that the collector was the donor. Alternatively, insert "See collector's information", or similar text, in this field.

     2.   Accessions obtained from other Botanic Gardens. Instead of the name, use the standard Institution Code e.g. K, CGG, AAH, MO.

     3.   Accessions obtained from private individuals. The minimum information should be the name (surname, comma, space, initials with full stops) and country. More detail, such as town and province, could be added if space permits.

     4.   Accessions obtained from horticultural or specialist plant societies. The name of the society (truncated as necessary) followed by the name of the country in which the society is based. Avoid abbreviations where the meaning is not clear.

5. Accessions obtained from gene banks, urban parks, garden centres or commercial suppliers. The name of institution (truncated as necessary) followed by the name of the country in which the institution is based.

Example: don "TCD",

E.7   **Donor's Accession Identifier**   Transfer code: donacc

Description: Used when an accession is transferred from one garden or gene bank (or other institution that maintains a record system) to another, this is the unique identifier from the previous garden or other institution's record system.

Rules of Syntax: Alphanumeric. It must be prefaced by the garden code of the donating botanic garden.

Rules of Information: If the plant was originally collected by or for the garden from the wild, or came from a source that did not have a record system, this field should be left blank.
Otherwise, the **Donor's Accession Identifier** should be a unique set of characters that identifies each accession in the donor's record system. Or in the case of multiple accessions of the same taxon from one collection site or multiple plants derived from a single seed sowing, a single value for the **Donor's Accession Identifier** field is permissible.

Guidelines: This field is not the Collector's number for the accession; that data are held under the **Collector's Identifier** field.

Example: donacc "TCD76-234"

PWJ wishes to draft this more fully after Cape Town Congress

E.8   **Material Transfer Receipt Flag**   Transfer code: mtr

Description: Since the Convention of Biological Diversity (CPD) in 1992 when an accession is transferred from one garden or gene bank (or other institution that maintains a record system) to another, it is subject to a Material Transfer Agreement. This field is a boolean (True/False) type field, stating whether or not this accession was received with a Material Transfer agreement attached.

Rules of Syntax: Yes/No

Rules of Information: If the plant has been collected from the wild or the accession has been transferred since 1992, then this field should be coded Yes. Plants collected prior to 1992 do not legally come under the CPD Agreement, but the donating garden may attach a Material Transfer Receipt Agreement to the accession for ethical reasons.

Guidelines: ????

Example: mtr "Y"

E.9   **Material Transfer Supply Data Source**   Transfer code: mts

Description: Since the Convention of Biological Diversity (CPD) in 1992 when an accession is transferred from one garden or gene bank (or other institution that maintains a record system) to another, it is subject to a Material Transfer Agreement. This

field is a text field, giving the Data source id of the Material Transfer Supply Agreement between ITF sender and the ITF Recipient .

Rules of Syntax: Alphanumeric. It must be prefaced by the garden code of the donating botanic garden.

Rules of Information: If the plant has been collected from the wild or the accession has been transferred since 1992, then this field should not be blank. However it is understood that Botanic Gardens are only beginning to understand the implications of the CPD, and what it means to their collections, so that it is unlikely that this field has been filled. Otherwise, the **Material Transfer Supply Data Source** should be a unique set of characters that identifies a data record in the donor's Data Sources record system.

Guidelines: ????

Example: mts"TCD-DS1234"

F. PLACE OF ORIGIN

This group of fields deals with all the descriptive and coded information that describes the geographic position from which a plant was collected, including supporting data such as altitude, depth (for aquatic plants), and degree of precision in citing the locality details, together with the names of the collectors.

Where relevant, all of the standard ITF2 fields in this group refer to the original wild-source collection information. That is, the information recorded in these fields (e.g. **Collection Date**, **Primary Collector's Name**, **Country of Origin**, **Habitat**, **Locality**, **Collection Notes**, **Primary Subdivision of Country of Origin**, **Secondary Subdivision of Country of Origin**, **Specific Geographic Unit**), all refer to the original wild-source collection.

The data held in the 'Place of Origin' group of fields which records the location of a collection is held in a set of 5 groups of fields. These are:
- Latitude and Longitude in degrees and minutes;
- Political country (full name and code), using the ISO scheme (ISO, 1990b);
- Basic Recording Unit of the World Geographical Scheme (Hollis & Brummitt, 1992);
- A defined subdivision of the ISO unit:
  - Primary subdivision of Country of Origin;
  - Secondary subdivision of Country of Origin;
- The locality:
  - Specific Geographical Unit;
  - Locality in text format.

Because of the importance of biodiversity and conservation, ITF2 includes a specific field for conservation reserves (**Specific Geographical Unit**) rather than including it in **Locality** as in ITF1. This information relates to the place where the plant was collected, not to the full distribution range of the plant. The latter is not incorporated in ITF2 because it should be supplied to garden record databases from taxonomic, conservation or geographic databases.

Annex 2 gives further information on the transfer of 'non accession based' or taxon data.

ITF records the original wild-source collection information. However, if the accession was taken from a secondary source (e.g. cultivated material, of known or unknown wild source), and the **Place of Origin** and **Collection** fields were to be recorded for the secondary source, then it is suggested that the relevant field identifiers should all be prefaced by the word 'Subsequent' and the relevant Transfer Codes would be prefaced by a lowercase **'s'**. That is, the field which contains the information about the collector's name of the current accession which was taken from cultivated material would be known as 'Subsequent Collector's Name' and the Transfer Code would be **'scnam'**. The same Rules of Syntax apply as for the relevant 'primary' data fields.

If ITF files are transferred using these fields, it is recommended that the **Description of File Content and Other Comments** fields are used to advise file recipients of its use.

A example of the above might be when plant material is taken from a location where it is known 're-introduction' or translocation has taken place.

Editorial Note: There have been many discussions as to how to portray the accuracy of geographical codes, especially with the inherent inaccuracy in the higher latitudes. ITF2 has opted to keep the option simple, all Geographical Information System (GIS) recording units convert into Latitude and

Longitude and can be reconverted back again if required.

F.1   **Latitude, Degrees**   Transfer code: latdeg

Description: The degrees of latitude of the collection locality.
Rules of Syntax: Integer, any valid and geographically meaningful latitude in degrees.
Rules of Information: Degrees - within the range 0 - 90.
Guidelines:
> 1.   Sensitive location information for rare and/or endangered plants can be omitted from the interchange record by not transferring the seconds from the latsec and lonsec fields for latitude and longitude, respectively
> 2.   If the latitude is not known, then this and the following latitude fields should not be transferred.
> 3.   If this field is transferred, then the last latitude field (**Latitude, Direction**) must consist of one of the letters 'N' or 'S' (for North or South).
> 4.   The geographical referencing data information must be interchanged as latitude and longitude in degrees, minutes, seconds and direction. Decimal degrees must be converted to degrees, minutes and seconds before the data are interchanged..
> 5.   Grid references should be converted to degrees, minutes, seconds and direction before data are interchanged.

Example: latdeg 22,

F.2   **Latitude, Minutes**   Transfer code: latmin

Description: The minutes of latitude of the collection locality.
Rules of Syntax: Integer, any valid and bio-geographically meaningful latitude in minutes.
Rules of Information: Minutes - within the range 0 - 59.
Guidelines:
> 1.   If the latitude degrees (**Latitude, Degrees** field) is not known, then this and the following latitude fields should not be transferred.
> 2.   If the latitude minutes (**Latitude, Minutes** field) is not known, then this and latitude seconds (**Latitude, Seconds** field) should not be transferred.

Example: latmin 05,

F.3   **Latitude, Seconds**   Transfer code: latsec

Description: The seconds of latitude of the collection locality.
Rules of Syntax: Integer, any valid and bio-geographically meaningful latitude in seconds.
Rules of Information: Seconds - within the range 0 - 59.
Guidelines: If the value for this field is unknown, then this field should not be transferred. This field, although known, may also be deliberately omitted in order to keep sensitive locations imprecise.

Example: latsec 01,

F.4   **Latitude, Direction**   Transfer code: latdir

Description: The standard abbreviated direction of latitude of the collection locality.

Rules of Syntax: Alphabetic, N or S.
Guidelines: If **Latitude,Degrees** field is transferred, then this field (latdir) must consist of one of the letters 'N' or 'S' (for North or South).
Example: latdir "N",

F.5 **Longitude, Degrees** Transfer code: londeg

Description: The degrees of longitude of the collection locality.
Rules of Syntax: Integer, any valid and bio-geographically meaningful longitude in degrees.
Rules of Information: Degrees - within the range 0 - 180.
Guidelines: 1. Exact location information for rare and/or endangered plants can be omitted from the transfer record by not transferring the seconds from the **latsec** and **lonsec** fields for latitude and longitude, respectively
2. If the longitude is not known, then this and the following longitude fields should not be transferred
3. If this field is transferred, then the last longitude field (**Longitude, Direction**) must consist of one of the letters 'E' or 'W' (for East or West)
4. The geographical referencing data information must be interchanged as latitude and longitude in degrees, minutes, seconds and direction. Decimal degrees must be converted to degrees, minutes and seconds before the data are transferred
5. Grid references should be converted to degrees, minutes, seconds and direction before data are transferred.
Example: londeg 103,

F.6 **Longitude, Minutes** Transfer code: lonmin

Description: The minutes of longitude of the collection locality.
Rules of Syntax: Integer, any valid and bio-geographically meaningful longitude in minutes.
Rules of Information: Minutes within the range 0 - 59.
Guidelines: 1. If the longitude degrees (**Longitude, Degrees** field) are not known, then this and the following longitude fields should not be transferred
2. If the longitude minutes (**Longitude, Minutes** field) are not known, then this and longitude seconds (**Longitude, Seconds** field) should not be transferred.
Example: lonmin 05,

F.7 **Longitude, Seconds** Transfer code: lonsec

Description: The seconds of longitude of the collection locality.
Rules of Syntax: Integer, any valid and bio-geographically meaningful longitude in seconds.
Rules of Information: Seconds within the range 0 - 59.
Guidelines: If the value for this field is unknown, then this field should not be transferred. This field, although known, may also be deliberately omitted in order to keep sensitive locations imprecise.
Example: lonsec 01,

F.8   **Longitude, Direction**   Transfer code: londir

Description: The standard abbreviated direction of longitude of the collection locality.
Rules of Syntax: Alphabetic, E or W.
Guidelines: If **Longitude,Degrees** field is transferred, then this field must consist of one of
                    the letters 'E' or 'W' (for East or West).
Example: londir "E",

F.9   **Accuracy of Geographical Referencing Data**   Transfer code: geoacy

Description: The accuracy of distance of the collection.
Rules of Syntax: Integer, in metres;
Guidelines: The area of possible location is a circle of radius from the accession's recorded
                    latitude and longitude position equal to the stated distance in kilometres. If the
                    latitude and longitude are not known, or the accuracy is in doubt, then this field
                    should not be transferred. It should be noted that the 'accuracy' of latitude and
                    especially longitude positions will vary depending on global location - accurate
                    Locality notes are very necessary to help relocating plant material.
Example: geoacy 100,

F.10   **Country of Origin**   Transfer code: cou

Description: The country of origin of the plant, entered in full.
Rules of Syntax: Alphabetic, Standard full political country name.
Rules of Information: If the name of the country where the plant was collected is unknown, then
                    this field may contain the value UNKNOWN (in uppercase). In this case, the
                    following **ISO code for Country of Origin** field must have the entry 'XX' or 'XY'.
                    All remaining 'place of origin' fields should not be transferred.
Guidelines: It is recommended that the spelling of the country should be as recognised by the
                    International Standards Organization (ISO) based in Geneva, Switzerland.
Example: cou "Vietnam",

F.11   **ISO code for Country of Origin**   Transfer code: iso

Description: The 2 letter code for the country from where the plant was collected, using the
                    codes assigned by the International Standards Organization (ISO).
Rules of Syntax: The code must consist of 2 uppercase letters (A-Z).
Rules of information:
                    The entry in the field must be a valid entry as defined by the International
                    Standards Organization (ISO Standard 3166).
Guidelines: The ISO area codes are assigned by the International Standards Organization (ISO)
                    and are available from national standards organisations in member states. BGCI
                    can provide copies if need be. The ISO standard declares that 'The series AA,
                    QM-QZ, XA-XZ, and ZZ are available for individual use'. Users should be

careful not to use such codes in the ITF.

Example: iso "VN",

F.12 **World Geographical Scheme** Transfer code: wgs

Description: A location code from the World Geographical Scheme for Recording Plant Distributions by S. Hollis and R.K. Brummitt.

Rules of Syntax: The entry in the field must be a valid entry from the above publication.

Rules of Information:

    1.   This code contains up to 5 characters when taken to the complete Level 4 of the World Geographical Scheme.

    2.   Every code is unique, so that the Level 1, 2 and 3 codes must also be recognised if given in lieu of the complete Level 4 code.

Guidelines: Refer to World Geographical Scheme for Recording Plant Distributions by S. Hollis and R.K. Brummitt.

Example: wgs "VIE-OO",

F.13 **Primary Subdivision of Country of Origin** Transfer code: pru

Description: The primary recording unit which is the highest order subdivision recognised by the **Country of Origin**.

Rules of Syntax: Alphabetic, accepted by or agreeing with the Hollis & Brummitt standard full Complete 4-level Geographical area, written in full (not coded).

Rules of Information:

    1.   The entry in the field must be a valid entry as defined by Table (Hollis & Brummitt 1992).

    2.   If the entry is not part of the Hollis & Brummitt standard, then it must be equivalent to the entries in this latter standard. For example, this field is expected to contain State, Province, and other comparable geographical regions.

Guidelines: Complete 4-level Geographical scheme (see Table 4 in Hollis & Brummitt). Only one of the above codes need be recorded in the institution's internal database, but it was felt necessary to separate the codes for institutions that are using the World Geographical Scheme - Plant Taxonomic Database Standard No. 2 as their primary recording unit.

Example: pru "North West Vietnam",

F.14 **Secondary Subdivision of Country of Origin** Transfer code: sru

Description: The secondary recording unit which is the second highest-order subdivision of **Country of Origin** field.

Rules of Syntax: Alphabetic, written in full or any valid regional code or abbreviation.

Rules of Information: This field contains the district or region from which the specimen was collected, usually a subdivision of State or Province.

Example: sru "Hoang Lien Son",

F.15   **Specific Geographic Unit**   Transfer code: sgu

Description: The specific geographic recording unit describes specific conservation areas and other nature reserves/protected areas of **Country of Origin** field.

Rules of Syntax: Alphanumeric, written in full.

Rules of Information: The field consists of the name of a defined conservation area, such as national or state parks, forest reserves, nature reserves, conservation or heritage parks.

Example: "Sapa",

F.16   **Locality**   Transfer code: **loc**

Description: The locality where the plant was collected within the country and country units assigned in the previous two fields.

Rules of Syntax: Alphanumeric, written in full.

Guidelines: The field is an area of free text. One useful way to record **Locality** is to note distance and direction from a nearest named location on a map - always give details on the map used, especially if grid references are included. Precise **Locality** notes should be made to help relocation of the plant material.

Example: loc "Left of the noticeable very large rock half way up the West Path",

F.17   **Altitude**   Transfer code: alt

Description: The altitude of the collection locality or if the collection is from an altitude range, then the minimum altitude of the collection locality, in metres above or below sea level.

Rules of Syntax: Integer, any geographically reasonable altitude in metres between the range of -400 (Dead Sea) to 8393 (Mt. Everest)

Guidelines: Altitudes in feet should be converted to metres before interchange. Negative values indicate terrestrial altitudes below sea level (depressions), not aquatic environments.

             Depths in aquatic environments are given by noting the altitude at the surface of the water and then giving a value in the **Depth** field of metres below the water surface.

Examples:

ITF2 id & value	Meaning
alt 200,	200 metres above sea level
alt -200,	minus 200 metres below sea level in a terrestrial setting.

ITF2 id & value	Meaning
loc "...... etc",	Aquatic setting (lake) at an altitude of 1025 metres exactly,
alt 1025,	accession found at a depth of 5 metres in the locality
altacy 0,	described.
dep 5,	

F.18 **Accuracy of Altitude** Transfer code: altacy

Description: The accuracy of the altitude estimation, or when a range of altitudes given, then the accuracy of the minimum altitude estimation, in metres.

Rules of Syntax: Integer, in metres. If degree of accuracy is unknown, then this field should not be transferred.

Guidelines: Refer to examples in 'Guidelines:' of the **Altitude** field and **Accuracy of Maximum Altitude** field. If the **Accuracy of Altitude** field is omitted, then it should be assumed that the level of accuracy is not known.

F.19 **Maximum Altitude** Transfer code: altx

Description: The maximum altitude when the collection is cited as being taken from within an altitudinal range, in metres above or below sea level (cf. depth).

Rules of Syntax: Integer, any geographically reasonable altitude in metres.

Guidelines: Altitudes in feet should be converted to metres before interchange. Negative values indicate terrestrial altitudes below sea level (depressions), not aquatic environments.

Examples: See examples in **Accuracy of Maximum Altitude** field.

F.20 **Accuracy of Maximum Altitude** Transfer code: altacyx

Description: The accuracy (in metres) of the maximum altitude estimation when the collection is cited as being taken from within an altitude range.

Rules of Syntax: Integer, in metres. If degree of accuracy is unknown, then this field should not be transferred.

Guidelines: Refer to 'Guidelines:' of the **Altitude** field.
The two fields **Accuracy of Altitude** and **Accuracy of Maximum Altitude** are given to record the accuracy of the altitude when a collection is made over an altitude range. The **Accuracy of Altitude** field refers to the accuracy of the value recorded for the lower **Altitude** field, and **Accuracy of Maximum Altitude** applies to the value in **Maximum Altitude** field. If the collection altitude only refers to one value, then only **Altitude** field and the **Accuracy of Altitude** should be transferred.

Examples: If a collector harvests seed from a number of bushes growing on a mountain side, then **Altitude** field refers to the lowest altitude, and **Maximum Altitude** field to the highest altitude. The collector may have a very accurate altitude reading for the lowest position, but only an approximation for the upper range. Therefore the accuracy of value in the **Accuracy of Altitude** field would be different to that recorded in the **Accuracy of Maximum Altitude** field. By filling out the two Altitude fields, the data receiver knows that seed has been collect over a range of plant material; i.e.:

ITF2 id & value Meaning
alt 100,   Seed collected over a range of plant material, with an
altacy 5,   accurate lower altitude reading of 95 to 105 metres, but with the upper
altx 250,   altitude limit anywhere between 225 and 275 metres.

altacyx 25,
Another example is when a collector harvests seed from only one plant source, for which he has an inaccurate altitude reading; i.e.:

ITF2 id & value Meaning
alt 1000,   This plant was collected at an altitude anywhere between
altacy 100,   900 and 1100 metres.
Note: if either **'Altitude Accuracy'** field is omitted, then it should be assumed that the level of accuracy is not known, as opposed to an exact value being given. A reading of zero in either field implies an exact value or zero.

F.21   **Depth**   Transfer code: dep

Description: The depth of the collection locality beneath the water surface in metres.
Rules of Syntax: Integer, any reasonable depth in metres.
Guidelines: Depth in feet and fathoms should be converted to metres before transfer. (Only complete metres are to be recorded, due to cultural differences between a decimal point or comma which could lead to confusion when receiving the transfer).
Depth accuracy is not recorded, as it is presumed a measured stick or a depth gauge would be used which is sensitive to pressure; tidal conditions should also be taken into account and these conditions noted in **Locality** field.
Depth below ground surface, i.e. from within a terrestrial cave; should be accurately described in **Locality** field, and not in this field, which refers to aquatic plants.
For accurate information on a locality's depth, the latitude fields (**latdeg latmin latsec latdir**) longitude fields (**londeg lonmin lonsec londir**) and especially **Locality** field should be used. The **Locality** field should also include details on collection method and water conditions at the time of collection:
Example: ITF2 id & value Meaning
alt 1000,   Plant taken from an aquatic setting (i.e. lake) at an altitude
dep 5,   of 1000 metres with the **Accuracy of Altitude** not known at a depth of 5 metres.
loc   "A compass bearing of 83 degrees from 2nd buoy marking water channel, 210 degrees from large rock from shore and 300 degrees from car park sign was noted to mark the exact location of the boat's position when diving at that time. It should be noted that the time was mid-tide.",

F.22   **Habitat**   Transfer code: hab

Description: Information on the habitat of the accession including its directional aspect, the habitat geology and soil type as well as the associated species of the community from which this accession was collected.
Rules of Syntax: Free text.
Guidelines: This information is usually provided by the original collector.
Example: hab "Accession found on the north westerly slope on the Pirates Lookouts with a heavy clay based soil type",

F.23   **Conservation Status (Threat)**   Transfer code: consta

Description: An outline of any perceived threats (potential or real) in the above habitat.
Rules of Syntax: Free text.
Guidelines: This information is usually provided by the original collector.
Example: consta "Plant is found close to a tourist wilderness trail, which is becoming more used, and therefore subject to some erosion.",

F.24   **Primary Collector's Name**   Transfer code: cnam

Description: The name of the (primary) person who collected the plant from the wild and whose collection number is cited in the next field (refer **Collector's Identifier**).
Rules of Syntax: Alphabetic, any valid collector's name, primary collector's family name (surname) followed by comma and space (,) then initials (all in uppercase and each separated by fullstops). All initials and first letter of the collector's family name in uppercase. For example, Wilson, B.K.
Rules of Information: The collection number of the record (refer **Collector's Identifier**) is regarded as being assigned by the primary collector of the material (as cited in this field). If more than one collector is associated with the collection number, then the names of these collectors should be cited in this field, with the comma and space used to separate these multiple collectors. For example, Tan, F., Jeffreys, R.S. If only one person collected the material from the wild, as represented by this record, then the person's name must be entered only into this field.
Guidelines: Titles should be omitted.
Example   cnam "Tan, F., Jeffreys, R.S.,"

F.25   **Collector's Identifier**   transfer code: cid

Description: The number of the collection as assigned to it by the primary collector(s) (previous field).
Rules of Syntax: Alphanumeric. If the **Primary Collector's Name** is unknown, then this field would normally not be transferred.
Rules of Information: The **Collector's Identifier** should be the number assigned by the collector(s) at the time of collection. The number should not be reused for other collections by the same collector.
Guidelines: Very often a collector's name and number is the key to locality data of great value to the conservation of wild plants.
Example: "12/12/89-123",

F.26   **Additional Collectors' Name**   transfer code: cnam2

Description: The name of the person(s) who collected the plant (from the wild) together with the primary collector.
Rules of Syntax: Alphabetic, any valid collector's name, the additional collector's family name

(surname) followed by comma and space (,) then initials (all in uppercase and each separated by full stops). Refer to **Primary Collector's Name** field for further details.

Rules of Information: Remember that the collection number of the record (refer **Collector's Identifier**) is regarded as being assigned by the primary collector of the material, not by the additional collector(s). In the following example of multiple collectors: Peng, C-I. 1356 and Cooper, R.S. ; 'Peng' is regarded as the primary collector, with the collection number belonging to his collection series, whereas 'Cooper' is regarded as the additional collector because the collection number does not belong to his/her collection series. In this example, 'Peng, C-I.' would be transferred in the refer **Primary Collector's Name** field, whereas 'Cooper' would be transferred in this field (**Additional Collectors' Name**).

If there are multiple additional collectors, then the names of these collectors should be cited in this field, with the comma and space used to separate these multiple collectors. For example, Campbell, E.D., Lindley, S.A.

Titles should be omitted.

F.27	**Collection Date**	Transfer code: cdat

Description: The dominant date on which the material was collected, as represented by this record.

Rules of Syntax: Integer, year (4 digits) followed by month (2 digits) and then day (2 digits), without spaces between each unit of information.

1. In this notation, leading zeros must be included for months and days, i.e. January is coded as '01' not '1' and the 4th day is coded as '04' not '4'.
2. If the day of the month is not known, then the last two digits should be omitted. Example: March 1901 would preferably be transferred as 190103.
3. If the day and month are not known, the last four digits should be omitted and just the 4 digit year information interchanged.

Guidelines: ITF2 records the year as a full 4-digit number to facilitate the use of the system in the next century, as well as to track collections from the previous century. If plant material was collected over a range of dates - without any clearly identified dominant date, then a year should be entered in this field, and the collection dates entered as free text along with any relevant details in the **Collection Notes** field. It is important to have a clearly defined date as to when an accession was collected because if subsequently, it is never relocated, perhaps presumed extinct - the date recorded is when the species was last seen in that locality.

Examples: cdat 19851109, 9 November 1985
date 19510203, 3 February 1951

F.28	**Collection Notes**	Transfer code: cnot

Description: This field describes information about this plant record, including habit, shape and colour of vegetative and reproductive parts of the plant. If the record has no dominant collection date, then a year can be entered in the **Collection Date** field and a range of collection dates can be added in this field along with 'date stamped' notes.

Rules of Syntax: Free text.
Guidelines: This information is usually provided by the collector.
Example: cnot "Accession source is in bad condition, therefore only 2 cuttings were taken",

G. ADDITIONAL DATA

ITF1 did not allow any means to transfer cultivation or miscellaneous details that may be relevant to individual accessions. The majority of these fields allow for free text, but more sophisticated fields could be exchanged using the **New Fields Option** technique between individual institutions.

G.1   **Cultivation Information**   Transfer code: culinf

Description: Allows for cultivation information to be passed as free text in order to help the receiving garden care for the transferred accession.

Rules of Syntax: Free text.

Guidelines: Use the **New Field Option** if further field division is required for cultivation information.

Example: culinf "Spraying with insecticide early summer to reduce infestation of red spider mite is recommended",

G.2   **Propagation Information**   Transfer code: proinf

Description: Allows for information about any propagation requirements to be passed as free text in order to help the receiving garden propagate the transferred accession.

Rules of Syntax: Free text.

Guidelines: Use the **New Field Option** if further field division is required for propagation information.

Example: proinf "Cuttings of plant may be taken throughout the summer, when it roots more successfully",

G.3   **Perennation Flag**   Transfer code: per

Description: A code to indicate the means of perennation, providing a means of noting living plant accessions that require regular curatorial monitoring.

Rules of Syntax: The entry must consist of one of the values in the table below:

Syntax	Meaning
M	Monocarpic plants
MA	Annuals
MB	Biennials and short-lived perennials
ML	Long-lived monocarpic plants
P	Polycarpic plants
PD	Deciduous polycarpic plants
PE	Evergreen polycarpic plants
U	Uncertain which of the above applies.

Rules of Information:

1. If sufficient detail is available, it is recommended to use the appropriate two-character code, rather than the corresponding one-character code.
2. Polycarpic plants are individuals which are capable of flowering/fruiting over several seasons. They should be coded 'PD' if known to be deciduous, or 'PE' if known to be evergreen.

3. Monocarpic plants are here defined as those which can be expected to die after flowering or fruiting. Their life cycle may last from several months to many tens of years, possibly centuries. Curatorial action will be needed to ensure that genetic material from these plants is not lost when the mother plant dies. Living plant accessions that contain 'M' in this field require regular examination by garden staff, particularly accessions of conservation value.

4. Long-lived monocarpic plants which grow for several years and then die after flowering are here defined as those whose life cycle can usually be expected to last more than three years; they should be coded 'ML'. Where the life cycle is known to be of short but uncertain duration, the accession would be better coded as 'MB', indicating closer curatorial attention be paid than would be necessary with accessions that are definitely long lived.

5. Short-lived monocarpic and biennial plants are here defined as those which complete their life cycle in between one and three years; they should be coded 'MB'.

6. Annual plants are here defined as plants which normally complete their life cycle in 12 months or less; they should be coded 'MA'.

7. Certain long-lived plants which may have monocarpic rosettes (e.g. various *Agave* spp.) may produce offsets; if offset production is regular and certain, the field should be coded 'PB'. Where there is any doubt as to whether such offsets are produced, or if they are produced only occasionally, the field should be coded 'ML' to flag curatorial staff that more immediate action is needed in order to maintain the accession.

Guidelines: 1. The purpose of this field is to provide brief information about the life history of the accession which is relevant to horticultural practices. This can act as a flag for curatorial action where monocarpic accessions may be lost. It is not intended to accurately describe the life form of the accession, but to provide a method of identifying certain accessions that need to be frequently regenerated, such as annuals.

2. Flagging deciduous polycarpic accessions may insure against accidental loss.

Example: per "P",

G.4	**Breeding System**	Transfer code: brs

Description: A code to indicate the breeding system of the accession.

Rules of Syntax: Alphanumeric.

1. The entry must be one of the values in the table below:

Syntax	Meaning
M	'Male', defined as plants that do not produce functional female flowers
F	'Female', defined as plants that do not produce functional male flowers
B	The accession includes both 'male' and 'female' individuals as described above
Q	Dioecious plant of unknown sex
H	The accession reproduces sexually, and possesses hermaphrodite flowers or is monoecious
H1	The accession reproduces sexually, and possesses hermaphrodite flowers or is monoecious, but is known to be self-incompatible.
A	The accession reproduces by agamospermy
U	Insufficient information to determine breeding system.

2.	This field should be coded M, F, B or Q only if accessions are known to be dioecious. B should be used where an accession contains several individuals, some of which are functionally male and others female. The field should be set to Q if the accession is thought or known to be dioecious, but the sex has not been determined.

3.	Most plants are hermaphrodite or bisexual, i.e. their flowers have both male and female parts. For these and monoecious taxa, where separate male and female flowers are borne on the same individual, the field should be coded H. For such taxa where self-incompatibility is known, the field should be coded H1.

4.	For accessions which are known to reproduce by agamospermy, that is seed is set without sexual fusion, the field should be set to A.

5.	Exceptionally, where it is not possible to decide which of the above codes apply, for example with a new or unknown taxon or tissue-culture sample, the field should be coded U.

Guidelines:	Flagging accessions which are known to be self-incompatible may help propagation of the taxon, but care should be taken to ensure the taxon has been demonstrated to be self-incompatible. Failure to set seed does not in itself demonstrate self-incompatibility.

This field records the sexuality and breeding system of accessions. The main purpose of this is to highlight accessions which require outcrossing for sexual reproduction (dioecious and self-incompatible taxa), so that appropriate procedures can be used in propagating such accessions. The field does not therefore attempt to fully describe the breeding biology of an accession. It expands the information provided by the field 'Sex' in ITF version 01.00.

Example:	brs "A",

G.5	**Accession Uses**	Transfer code: accuse

Description:	The description of the (economic) uses of this accession. The term 'economic uses' is used in a very wide sense and incorporates medicinal uses.

Rules of Syntax:	Free text.

Guidelines:	An ITF record is accession-based and the information transferred refers uniquely to the economic use of the plant accession record being interchanged. This is different from the taxon uses (taxuses) that is applied to the Taxon in general. (See Annex 2)

For further information on the transfer of taxon-based information, including conservation categories and economic uses, refer to Annex 2. One relevant standard is Cook, F.E.M. and Hastings, L.H. (1995). 'Economic Botany Data Collection Standard' (Royal Botanic Gardens: Kew). This standard was prepared for the International Working Group on Taxonomic Databases for Plant Sciences (TDWG).

Example:	accuse "Any free text is allowed",

G.6	**Miscellaneous Notes**	Transfer code: misc

Description:	Any additional information to be transferred pertaining to the accession, but not catered for in the preceding fields.

Rules of Syntax: Free text.

Guidelines: This field is to include any information, such as the state of health of a specimen when sent, which is important to a receiving garden. Because such data is often transient, it is better to include it here rather that give it 'field' status.

Example: misc "Accession's health in garden is not in good condition, and therefore cuttings are being transferred to Micropropagation Unit.",

Annexes

The Annexes to the ITF2 format Specification each deal with a particular issue which had to be addressed in the process of designing ITF2:

Annex 1:   **Treatment of names of hybrids by ITF2**. Discusses the different systems of naming hybrids with which the ITF needs to be able to deal.

Annex 2:   **A variant of the ITF2 Format for transferring plant taxon-based data**. Describes the variant form of the ITF2 Format that is designed to enable the transfer of data which can be regarded as applicable to a particular plant taxon rather than a particular accession.

Annex 3:   **Suggested formats for an Accessions Record Form and a Collectors Record Form.** Gives suggested pro-formas for recording collection and accession data, based on the ITF2 field types.

Annex 1 – Hybrid Names

The names of hybrid plants are by the far the most difficult type of plant name with which a computerised record system has to deal. They cause great problems for any computerised system because they often require a doubling of name-fields. The ITF2 Format covers most (but not all) of such cases. This Annex provides the botanical background to the coverage of hybrids in the formal definitions above.

Sexual Hybrids

Hybrids produced by sexual crossing can be named in one of three ways (A, B or C below); A and B are governed by the Tokyo Code (Greuter *et al.*, 1993), C by the Cultivated Code (Trehane *et al.*, 1995).

Hybrid Formulae

In this method, the names of the parent taxa are connected by the multiplication sign (x) (interpreted on typewriters and word-processors as the lower case letter 'x').

Where the female parent is known, it is usual to list this first. Alternatively, the sexes can be indicated by the characters (M) and (F) after the names, or by the conventional signs ♂ used in science for male and female. For many garden plants, however, the direction of the cross is not known and so these refinements are not covered by the ITF. Similarly the abbreviations 'M' and 'F' should not be added to names in the ITF.

Examples:

> *Acer davidii* x *rufinerve*
> *Polypodium vulgare* subsp. *prionodes* x subsp. *vulgare*
> *Rhododendron cinnabarinum* subsp. *cinnabarinum* x subsp. *xanthocodon*
> *Magnolia campbellii* subsp. *mollicomata* x *Magnolia sprengeri* var. *elongata*

As the above examples show, formulated hybrids can be very complex and it is difficult to plan for all permutations. ITF2 allows the option to transfer more than a trinomial botanical name (unlike ITF1) but it is accepted that it may not be able to cope successfully with all hybrid formulae. The additional free-text field **Full Name** gives the sender the option of dividing the plant name into its ITF fields, and also sending the name it as a complete text field (as a cross-check).

Nothotaxa (Hybrid Names)

Here the hybrid has been given a botanical name of its own, which is preceded by a multiplication sign (without a space in between). On a typewriter, however, normally a capital or lower case 'X' or '‛x' is used, with preceeding and following space characters.

Nothotaxa (Hybrid names) are the commonest method of referring to hybrids. Nothotaxa cover all the progeny of any particular hybrid combination, rather than the progeny of a single specific cross between those parents.

Examples:

x *Cupressocyparis* (refers to all crosses between species of *Cupressus* and *Chamaecyparis*)anniana (refers to all crosses between *L. sempervirens* and *L. tragophylla*)

Cultivar-Group Epithets

These are collective epithets used only in relation to cultivated plants. A Cultivar-Group may consist variously of:

- two or more similar named cultivars;
- all the plants formerly placed in a botanical taxon which is no longer recognised as such, but which it is still useful to recognise in cultivation e.g.*Rhododendron boothii* Mishmiense Group (*R. michmiense*);
- all the progeny of a known parental combination which share one or more characters and which it is useful to recognise as a unit e.g *Lilium* Celica Group (*L.* 'Pumpkin Sweet' x *L.* 'Unique').

Cultivar-Group epithets must consist of no more that three words in a modern language, unless based on an accepted cultivar epithet or other accepted Latin epithet to which the word 'Group' is appended. When required 'Group' may be shorted to 'Grp'. Cultivar-Group names should not include the words: 'cross', 'form', 'grex', 'group' (except as the final word), 'hybrid', 'mutant', 'seedling', 'selection', 'sport', 'strain', 'variety', the plural of these words, or the words 'improved' or 'transformed'.

If a cultivar-group epithet is used in conjunction with a cultivar epithet then the group epithet must be placed in either round or square brackets, and placed either immediately before or immediately after the cultivar epithet e.g. *Hydrangea macrophylla* (Hortensia Group) 'Ami Pasquier' or *Hydrangea macrophylla* 'Ami Pasquier' [Hortensia Group]

When used without reference to a cultivar, the cultivar-group epithet should not be placed in brackets e.g. *Hydrangea macrophylla* Hortensia Group.

It should be noted that the cultivar-group epithet may at the same time be used in a cultivar sense, e.g. *Rhododendron* (Fabia Group); 'Fabia' represents the RHS awarded clone of this cultivar-group.

The term 'grex' is now restricted for use in orchids alone. Orchid grex epithets do not incorporate the word 'group' or 'grex' and are not placed in brackets when used in conjunction with a cultivar epithet. A grex epithet applies to all the progeny of two parent plants which bear the same pair of specific names and/or grex names. This applies to each and every crossing of the parents irrespective of the cultivars used and the direction of the cross. E.g. any plant of the grex *Odontoglossum* Opheon crossed with any plant of the species *Odontoglossum crispum* will fall within the grex *Odontoglossum* Royal Ballet.

Graft-chimaeras

Graft-chimaeras are composed of tissues from two or more different plants which originate by grafting and are not hybrids. When the component taxa of a graft-chimaera are different genera, a new Latin name may be formed by combining the generic names of the component genera, preceded by the addition sign '+'. This generic name must not be the same as the nothogenus of the same genera.

A graft-chimaera cultivar epithet is formed as for any other cultivar. Distinct graft-chimaeras

arising from the same component taxa are treated as separate cultivars and named accordingly. E.g. *+Crataegomespilus* 'Dardarii' and *+Crataegomespillus* 'Jules d'Asnières'.

Annex 2 – A variant of the ITF2-format for transferring taxon-based plant data

Accession information and taxon information in the same ITF record transfer - what are the problems?

The first version of the ITF dealt only with individual plant accession information, with the exception of the IUCN Conservation Category code field, which refers to a particular plant taxon rather than to an accession. This field was included so that the IUCN Threatened Plants Unit could enter the Conservation Category of species whose details were sent to them from gardens, for inclusion in the gardens' own databases.

Problems arose when a receiving garden tried to process an ITF1 file and only extract the IUCN Conservation Category Code. The ITF1 file could include many 'flat file' records of accession-based information.

Was a Conservation Category to be inserted into each accession record, and if the IUCN category field was updated, how would the garden change all the individual accession IUCN conservation category fields? Alternatively, if the receiving garden had a relational database in which taxon information was held at the plant-name level, with accession information being held relationally attached to each plant-name, did they want to have to process each received ITF record on an accession basis, ignoring each of the 31 fields preceding the IUCN conservation category just to extract this one field?

In practice this could mean that conservation data would be duplicated in a file transfer, especially when a garden had multiple accessions of the same plant name. This would also pose a problem to the receiving garden, especially if, as is increasing usual, it used a relational database. The next accession record might include the same IUCN Category code for the same plant name, and the date and time stamp would be later than when the IUCN category was first updated, so would it be overwritten many times by each accession record. Alternatively, was the receiving garden to ignore all subsequent records for the same plant name accession?

In practice, many gardens preferred 'printed hard copy' as opposed to electronic file transfer format, so that such decisions could be made manually, and not by having to code suitable computer software.

Many of the suggestions that the ITF version 2 Working Group received were for additional fields which were taxon-based. The inclusion of these fields in ITF2 would have posed similar problems. Hence it was decided to completely exclude taxon-based fields from ITF2.

Solution to the data processing of Accession and Taxon based information

The ITF version 2 Working Group agreed with the reasons given for the exclusion of taxon-based data from ITF1, but acknowledged that for a variety of reasons, taxon-based data must be allowed to be transferred. *The solution arrived at was to clearly identify information that the sender knows to be attributed only to the individual accession records, as opposed to more general information that can be ascribed to a plant name or taxon.* It is then clear where the data should be entered in the receiving database.

All ITF records of any version, current or future, refer only to plant accession fields. Each field transferred describes information that is unique to that accession or record identifier only. Nevertheless, the same principles that apply to the sending or receiving of an ITF record, can be used to deal with taxon or plant name information. The only difference is that the receiving garden knows that this information refers to the plant name or taxon in general e.g. authorities, geographical ranges, synonyms, economic uses, or propagation information.

The receiving garden can now clearly identify whether the information is accession or taxon based, and should be able to program the receiving software computer code accordingly. In practice (in the case of relational databases), many of the fields will be duplicated in the taxon and accession files, although the accession duplicate fields would be likely to be empty, unless the information is unique to that accession record only.

This practice of having duplicate fields in the different file of a relational databases no longer implies that this will automatically lead to data updating difficulties, problems with data storage and disks being overloaded due to information technology improvements in the last decade. These problems occurred when duplicate material was re-entered in 'flat file' fixed length type databases. For example, the economic uses of a taxon would usually be held at the plant name level. If it was also entered for further use at the accession level, then the botanic garden would recognise that this particular accession had properties that made it unique from the other accessions of the same taxon and could treat it accordingly.

Thus it no longer made sense to maintain the IUCN conservation category at an accession file level, but to transfer it at a plant name or taxon file rank.

The IUCN global plants red list is maintained by the World Conservation Monitoring Centre (WCMC) in Cambridge.[4] Botanic Gardens Conservation International (BGCI) holds a subset of this data which is updated regularly from WCMC. These organisations have agreed that they will transfer the data back to gardens in an identical format.

The variant format for taxon-based transfers will follow the field descriptors and the transfer methodology specified for the main ITF2 format, and so will not be reproduced in this section. The additional field specified for use in taxon-based transfers are described below.

The following is an example of a ITF2 transfer file which contains a single taxon-based record:

startfile	
numrec	number of records in this file
institute	full name of institution supplying information
datefile	date to which the file refers
contact	contact name
address	postal address
phone	telephone number
fax	fax number
email	email address
content	description of contents of the file and other comments

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[4] The World Conservation Monitoring Centre, 219 Huntington Road, Cambridge, CB3 0DL. Tel: +44 1223 277314
Fax: +44 1223 277136 e-mail: wcmc@wcmc.org.uk

newfields	optional field to describe any new fields added to the ITF2.
{	start of a record
fam	Sent if required by receiving institution
supgen	if applicable
genhyb	if applicable
gen	Genus - Always sent
subgen	If applicable
sphyb	If applicable
spql	If applicable
sp	Species - Always sent
spau	Sent if required by receiving institution
isprk	Infraspecific Rank - sent if applicable
isp	Infraspecific Species - sent if applicable
ispau	Authority of Infraspecific epithet, sent if required by receiving institution
isp2rk	If applicable
isp2	If applicable
isp2au	If applicable and requested
iucn1	Always sent
iucn2	Sent if updated
iucn2not	Explanation of IUCN2 reasoning - sent if required by receiving institution
wgs	BRU from Brummitt (1992). Sent if required by receiving institution
georan	Geographical Range in full text. Sent if required by receiving institution.
taxuses	Taxon Economic Uses. Sent if required by receiving institution.
}	end of a record
{	start record
	more record details
}	end record
endfile	

Taxon-transfer-only fields

The following four fields may be used in taxon-based transfer records only:

IUCN Category (version 1)   Transfer code: iucn1

Description: The IUCN Conservation Category assigned in the pre-1994 scheme.

IUCN Category (Version 2)   Transfer code iucn2

Description: The IUCN Conservation Category assigned from the 1994 IUCN Red List Categories (as approved by the 40th Meeting of the IUCN Council on 30 November 1994).

IUCN Category Note   Transfer code iucn2not

Description: Amplification of IUCN categories
Rules of Syntax: Free text.
Guidelines: Any text that gives any further explanation of the IUCN categories assigned to the
                     taxon of this record.
Example: "General text field giving additional data to support the IUCN2 category"

Geographical Range   Transfer code georan

Description: The georaphical range of this taxon
Rules of Syntax: Free text.
Guidelines: Any text that gives a description of the geographical range of the taxon specified
                     in this record.
Example: "Mountains of S. & C.Europe, from 1000 to 2300m; also at low altitudes in S.E.
                     Russia and W. Kazakstan."

Annex 3 – Suggested formats for an Accessions Record Form and a Collectors Record Form

The following two forms represent two specific suggestions as to how ITF2 can be used by botanic gardens when deciding how to record plant data. They offer a suggestion as to how botanic gardens can structure the data that they acquire, in both the collecting and accession phases.

*Indicates an ITF1 field   *Accession Id:

                                                              *Institutional Id:

Accession Record Form: *Accession Status:
                                                              Location
                                                              IUCN Cat:

Suprafamilial Name: *Intergeneric Hybrid:
Family: *Genus:
Suprageneric Rank: *Infraspecific Hybrid:
Suprageneric Name: *Species Qualifier:
Subgeneric Rank   *Species:
Subgeneric Name: *Infraspecific Rank/Hybrid:
Vernacular Names: *Infraspecific Epithet:

Species Authors:
Infraspecific Authors:

Cultivar Group:
*Cultivar Name: Trade Designation:
Full Name:
*Rank Qualified Flag: *Identification Qualifier:

_____
Verification Details:

*Level (U, 0 - 4)   *Name: *Date:
Literature:
History:

_____
Source Details:

*Latitude: *Longitude: *Altitude
*Country: World Geographical Scheme:
*Primary Division:
Secondary Division:
Specific Geographical Area:
*Locality: Depth:
Habitat: Additional Altitude Info:
Threats:

*Provenance: (W G Z U)   Wild Provenance Status Flag:

_____
Additional Information: Material Transfer Receipt Flag :   Yes/No

*Donated by: *Donor Description: *Donor id:
*Propagation History Flag: Accession Lineage:
Propagation Info:
Cultivation Info:
Perennation Flag: *Breeding System: Accession Uses:

Miscellaneous Notes:

*Indicates an ITF1 field

Collectors Record Form:

*Accession Id:

*Institutional Id:

Primary Collector: Collector's id: Date:

Additional Collectors' Names:

Collection Notes:

*Country: World Geographical Scheme:
*Primary Division

Suprafamilial Name: *Intergeneric Hybrid:
Family: *Genus:
Suprageneric Rank: *Infraspecific Hybrid:
Suprageneric Name: *Species Qualifier:
Subgeneric Rank   *Species:
Subgeneric Name: *Infraspecific Rank/Hybrid:
Vernacular Names: *Infraspecific Epithet:

Species Authors:
Infraspecific Authors:

Cultivar Group:
*Cultivar Name: Trade Designation:
Full Name:
*Rank Qualified Flag: *Identification Qualifier:

Source Details:

                                            Geocode: Accuracy:
*Latitude: *Longitude: *Altitude
Secondary Division: Max: Accuracy:
Specific Geographical Area: Min: Accuracy:
*Locality: Depth:

Habitat Description:

Threats Description:

Wild Provenance Status Flag:
- Wild Native
- Wild non-native
- Cultivated native
- Cultivated non-native

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