

Using BRAHMS for the Species Plantarum Project

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Contributors to the Species Plantarum - Flora of the World Series are encouraged to download the BRAHMS software together with the Species Plantarum database template. The template has been designed to save time and editing effort of both authors and editors.

The BRAHMS software can be freely downloaded from www.brahmsonline.com. You must register to obtain an activation key. For further information, contact advisory@brahmsonline.com.

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Introduction

Scope of this document

This document provides guidelines on how BRAHMS is used to produce monographic outputs for the Species Plantarum Project. The principles applied here can be adapted for different flora or monograph series, for example the Kew Bulletin and the Journal of the Linnean Society.

The aim of the workshop sections is to get you started with monograph production. The workshops review the following activities:

- The installation of the BRAHMS software and the pre-configured template database provided for the Species Plantarum Project.
- The assembly of species and specimen data using Rapid Data Entry.
- The editing and refinement of these data within BRAHMS.
- The production of outputs and the transfer of these outputs to your word processor for final editing and monograph production.

Speed up and standardize

The objectives of using BRAHMS with the Species Plantarum Project are to **speed up and standardize** monograph production. The pre-configured Species Plantarum database is provided together with or with access to:

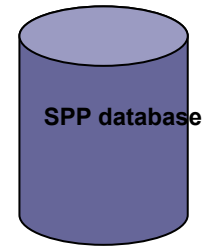
- Reference files of taxa, authors, botanical publications and geographic (TDWG) files.
- Base maps for map production (all countries) in SHP format for use with DIVA or Arc View.
- BRAHMS Rapid Data Entry file templates for species and specimen data entry.
- Reporting templates to produce the required SPP monographic outputs.

RDE vs. BRAHMS

Although data can be entered directly into a BRAHMS database, the use of the **RDE** method is recommended when new data are being added. RDE, an acronym for Rapid Data Entry, is a module of BRAHMS optimized for data entry efficiency. It can be used to enter different categories of data including the taxonomic names and specimens as discussed in this document. The full functionality of RDE is described under **Documentation > Rapid Data Entry**. Using RDE, data may be:

- Typed in from scratch.
- Transferred from other formats using the BRAHMS Import Wizard.
- In special cases, imported from web site downloads, for example IPNI.

→
RDE files are auto-
checked and
transferred into your
database.

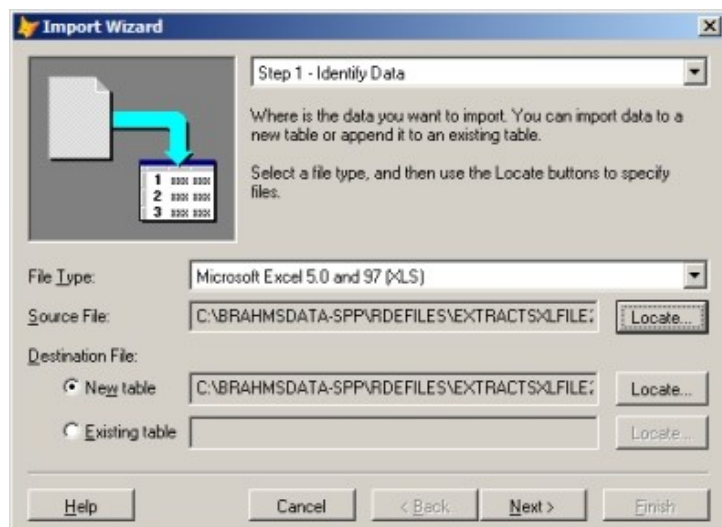


Within the database, data can be
freely edited, queried and used to
produce the required SPP outputs.

RDE (Collections) [c:\brahms5\rde_samples\tutorial\collectionsrde.dbf (alias= RDE)]							
TAG	DEL	COLLECTOR	PREFIX	NUMBER	SUFFIX	ADDCOLL	COUNT
		Went, F.A.F.C.		s.n.			Indone
		Koorders, S.H.		43238	b		Indone
		Boerlage, J.G.		s.n.			Indone
		Scheffer, R.H.C.C.		s.n.			Indone
		Steenis, C.G.G.J. van		4587			Indone
		Bakhuizen van den Brink, R.C.		4715			Indone
		Bakhuizen van den Brink, R.C.		2576			Indone
		Bakhuizen van den Brink, R.C.		4569			Indone
		Eyma, C.J.		93			Indone
		Blume, C.L.		1393			Indone
		Raap, H.		746			Indone
		Korthals, P.W.		s.n.			Indone
		Boerlage, J.G.	1	s.n.			Indone

The structure of RDE files for taxa or specimens can be edited rather like
Excel worksheets. The SPP project database is delivered with pre-formatted
RDE file templates for taxonomic names and specimen data.

RDE has a host of functions to assist with the optimization of data entry. Monographers can benefit by downloading data from relevant websites including **IPNI** and incorporating these data directly into RDE files.



Data already added into different formats, for example data held in Excel and Access files, can be transferred into RDE format using the BRAHMS Import Wizard.

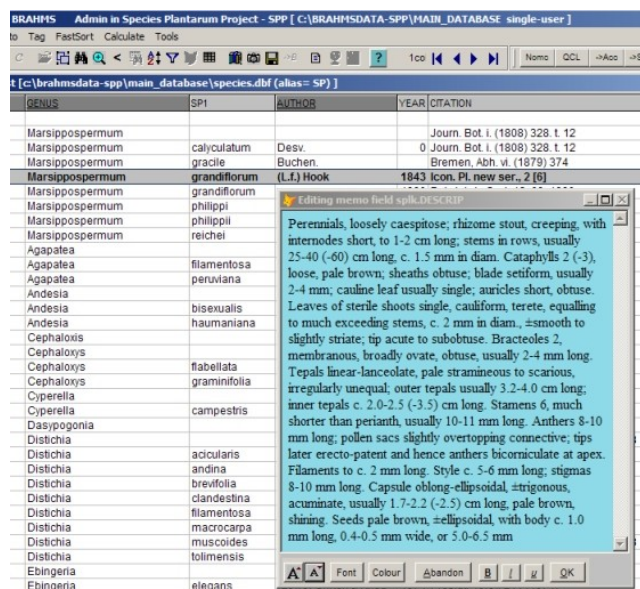
Editing data within BRAHMS

Data added directly to BRAHMS or transferred from RDE files can subsequently be edited. All of the data entry and editing tasks performed in RDE can be undertaken in BRAHMS itself. Typically, the monographer will use RDE to assemble as much data as possible, transfer these data into BRAHMS and then edit the data, gradually refining the database to the required level. At data stage more data can be added or data can be completely deleted.

Typical editing activities often performed inside BRAHMS rather than in RDE are the linking up of synonyms and type specimens, the addition of mapping references for specimens, the further entry of smaller numbers of species and specimen records and the general correction of data initially entered in RDE.

Advanced mode BRAHMS Admin in Conifers [C:\ALLBRAHMSDATA\CONIFERS single-user]												
File Edit View Goto Tag FastSort Calculate Tools												
Collections - main file [c:\allbrahmsdata\conifers\collections.dbf (alias= H5)]												
TAG	DEL	COLLECTOR	NUMBER	LOCALITY	LOCALITY NOTES	LAT	NS	LONG	EW	ALT1	DA	
		Furse, P.	2865	Iran, Mazandaran, Elburz Mts.	memo	36.200000	N	51.400000	E	760	2	
		Polunin, O.	5266	Lebanon, Jebel Liban, Harisa	memo	34.120000	N	35.570000	E	700	1	
		Chapman, G.W.	29	Syria, Al Ladhigiyah, Al Qadmus	memo	35.080000	N	36.050000	E	700	1	
		Balls, E.K.	2937	Morocco, Unknown	Memo	0.000000		0.000000		1550	2	
		Jury, S.L.	14207	Morocco, Haut Atlas, Marrakech, Oued N'Fis	memo	30.590000	N	8.130000	W	1260	1	
		Pampanini, R.	106	Libya, Cyrenaica, Al Jabal al Akhdar, Al Bayda	memo	32.460000	N	21.430000	E	0	1	
		Jepson, W.L.	s.n.	U.S.A., California, Mendocino Co., Fort Bragg	Memo	39.280000	N	123.460000	W	0	1	
		Pringle, C.G.	s.n.	U.S.A., California, Santa Cruz Co., Santa Cruz Mts.	memo	0.000000		0.000000		0	2	
		McMillan, C.	1620	U.S.A., California, San Mateo Co., Santa Cruz Mts.	Memo	37.150000	N	122.180000	W	0		
		Mason, H.L.	8147	U.S.A., California, Mendocino Co., Mendocino	Memo	39.200000	N	123.450000	W	0		
		Pringle, C.G.	s.n.	U.S.A., California, Mendocino Co., Mendocino	memo	39.200000	N	123.450000	W	0		
		Jepson, W.L.	4004	U.S.A., California, Monterey Co., Hooker's Hill	Memo	36.350000	N	121.550000	W	0		

Editing geographic data and mapping references in the main collection file.



Descriptive text and other facts can be added to families, genera and species.

Producing formatted outputs and maps

The task of assembling large amounts of data from specimens and bibliographic sources, editing these data, and preparing complex outputs including checklists, taxonomic treatments, specimen lists, maps and indexes, is a daunting and time consuming one for the researcher embarking on a new work. Using the appropriate database methods, the preparation of outputs such as those required for the Species Plantarum Project can be speeded up.

Data stored in BRAHMS can be assembled from all corners of your database and formatted to create an almost limitless range of checklist styles, monograph-related outputs, maps and indexes. Such outputs, although they have a different emphasis, are produced in a similar way. Reporting flexibility is restricted only by the data that have been entered into the database, not by the order the data were entered in or the original purpose they were entered for.

As explained in the main documentation, BRAHMS **Text Reporting** provides you with the ultimate control over your data and is used to produce more complex outputs including checklist and monograph outputs.

LY	GENUS	SP1	AL
aceae	Marsippospermum		
aceae	Marsippospermum	calyculatum	Di
aceae	Marsippospermum	gracile	Bi
aceae	Marsippospermum	grandiflorum	Hi
aceae	Marsippospermum	philippii	Hi
aceae	Marsippospermum	philippii	Hi
aceae	Marsippospermum	reichel	Bi

1. Marsippospermum grandiflorum (L.f.) Hook., *Icon. Pl. new ser.*, 2 [6]: tab. 533 (1843)

Juncus grandiflorus L.f., *Suppl. Pl.* 1: 209 (1781); *Marsippospermum calyculatum* Desv., *J. Bot. (Desvaux)* 1: 330 (1808), *nom. illeg.*; *Rostkovia grandiflora* (L.f.) Hook.f., *Fl. Antart.* 2: 357 (1847). T: Tierra del Fuego, *Baek*; holo: S; plants from the same gathering: 1774, *J.R.Forster*, & *G.Forster & Sparmann*; possible iso: C, *fide* B.Hansen & P.Wagner, *Allertonia* 7: 337 (1998).

Illustrations: W.J.Hooker, *Icon. Pl. new ser.*, 2 [6]: tab. 533 (1843); M.Barros, *Darwiniana* 10: 310, fig. 9 (1953); S.Parkinson, in D.M.Moore, *Fl. Tierra del Fuego* 320, fig. 254, 322, fig. 260 (1993).

Map: D.M.Moore, *Fl. Tierra del Fuego* 318 map 36 j (1993).

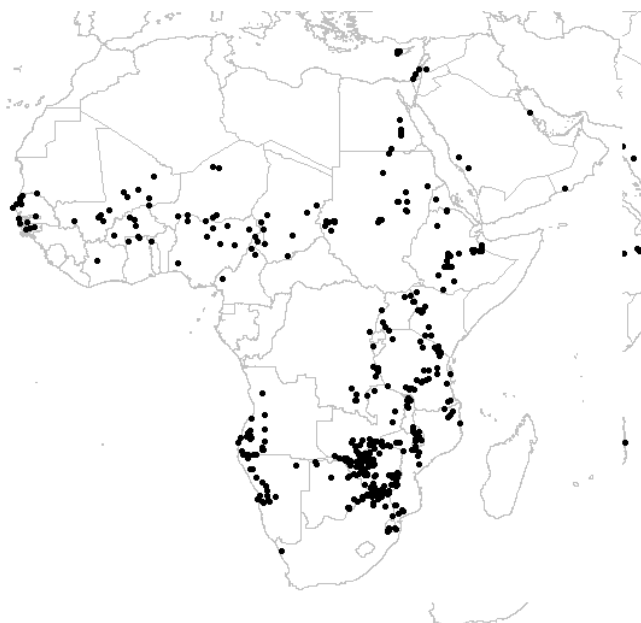
Perennials, loosely caespitose; rhizome stout, creeping, with internodes short, to 1–2 cm long; stems in rows, usually 25–40 (–60) cm long, c. 1.5 mm in diam. Cataphylls 2 (–3), loose, pale brown; sheaths obtuse; blade setiform, usually 2–4 mm; cauline leaf usually single; auricles short, obtuse. Leaves of sterile shoots single, cauliform, terete, equalling to much exceeding stems, c. 2 mm in diam., =smooth to slightly striate; tip acute to subobtus. Bracteoles 2, membranous, broadly ovate, obtuse, usually 2–4 mm long. Tepals linear-lanceolate, pale stramineous to scarious, irregularly unequal; outer tepals usually 3.2–4.0 cm long; inner tepals c. 2.0–2.5 (–3.5) cm long. Stamens 6, much shorter than perianth, usually 10–11 mm long. Anthers 8–10 mm long; pollen sacs slightly overtopping connective; tips later erecto-patent and hence anthers bicorniculate at apex. Filaments to c. 2 mm long. Style c. 5–6 mm long; stigmas 8–10 mm long. Capsule oblong-ellipsoidal, =trigonus, acuminate, usually 1.7–2.2 (–2.5) cm long, pale brown, shining. Seeds pale brown, =ellipsoidal, with body c. 1.0 mm long, 0.4–0.5 mm wide, or 5.0–6.5 mm long including the two whitish subequal tail-like appendages each 1.7–2.4 mm long. Fig. 2.

Southern South America, from Los Lagos, Chile, and Neuquén, Argentina, to Tierra del Fuego, and Falkland Is. 85: AGS, CLS. 90: FAL. Bogs, peaty grasslands, wet sands, moorland, usually at altitudes below 800 m. Map 3.

85. ARGENTINA SOUTH: Santa Cruz, Lago Argentino, Brazo Onelli, 700 m, *F.B.Voorst* 4602 (W); Tierra del Fuego, Isla de los Estados, Bahía Colnett, 28 Feb 1968, *D.M.Moore* 2043 (UPS); SW Patagonia, Cerro Buenos Aires, 900 ft, 4 Jan 1959, *P.W.James* 681 (BN). CHILE SOUTH: Hermite Is., Cape Horn, *J.D.Hooker* (K); Taitao Peninsula, San Rafael, between 46° and 47°, *M.Guindé* 476 (W); Tierra del Fuego, Bahía Blanca, *D.M.Moore* 2281 (H, K); Tierra del Fuego, Porvenir, *P.Duén* 261 (UPS); Los Lagos, Chiloé, Cordillera San Pedro, 8 Oct 1958, *Godley* 418c (BN). 90. FALKLAND IS.: W Falkland, Mt Cook, 800', *Vallentin s.n.* (K); Stanley Harbour, Klondyke, 14 Nov 1907, *C.J.F. Skottsbeg* 22 (LD, UPS).

2. Marsippospermum philippii (Buchenau) Hauman, *Anales Mus. Nac. Hist. Nat. Buenos Aires* 27: 295 (1915)

Screen showing a section of a generated report for the genus *Marsippospermum* in the Juncaceae. This part of the report includes the accepted taxon name with taxonomic treatment, details of illustrations and maps, text description, distribution and ecology summary followed by a list of cited specimens, all components formatted to SPP standard using a BRAHMS Text Report.



Many botanists find it difficult to produce simple black and white species distribution maps, often finding it necessary to seek help from GIS specialists. Assuming the necessary latitude and longitude points have been added to your specimen records, the production of maps for any geographical area is facilitated through the BRAHMS DIVA-GIS link. Base map data are available on the BRAHMS website.

Flexibility

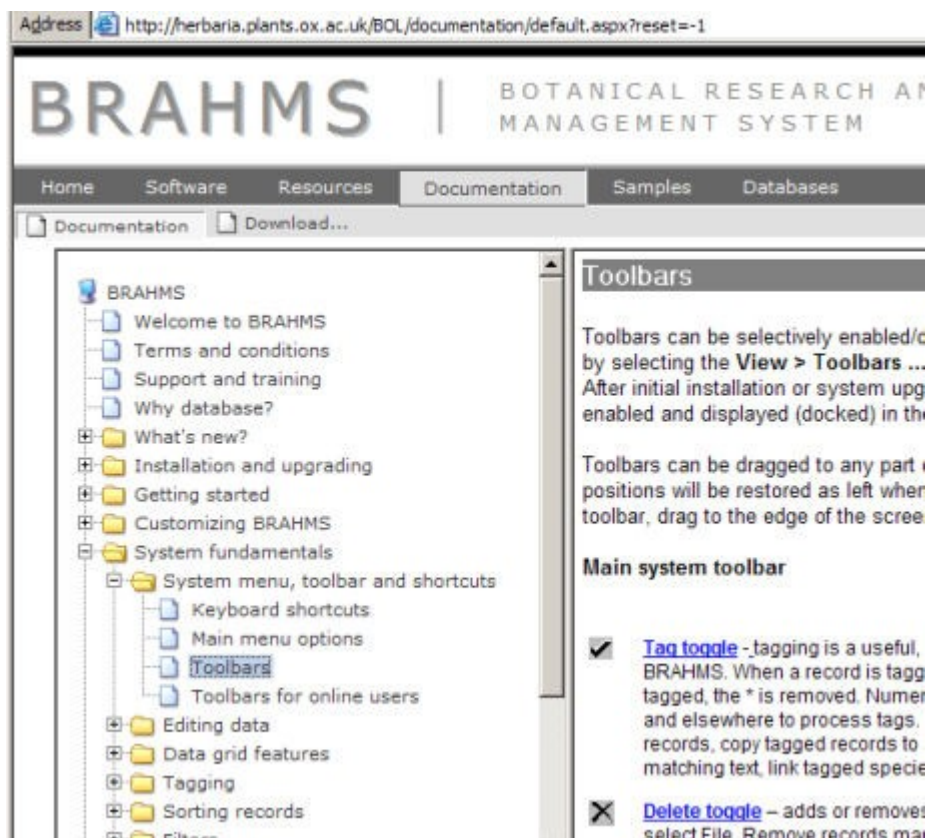
Aside from adhering to the formatting requirements of the **Species Plantarum Project**, **different** botanists will have their own specific data storage and reporting preferences and needs. You are not restricted to the data entry templates and reporting procedures reviewed here – rather, these are provided for guidance in the context of the **Species Plantarum Project**. For example, if you want to add additional fields for your specimens or species descriptions, you can do so. In the same way, you can add new reporting and map formats as needed.

Help and documentation links

Throughout this document, reference is made to the BRAHMS help document. An example from the text is '**Full details about backing up are provided under Documentation > Database maintenance > Backing up.**' This refers to the Documentation menu on the www.brahmsonline.com website – the direct link is <http://herbaria.plants.ox.ac.uk/BOL/documentation/default.aspx>.

Alternatively, a searchable help file can be downloaded from <http://herbaria.plants.ox.ac.uk/BOL/documentation/helpchm.aspx>.

The 50+ exercises provided at the end of the BRAHMS help file illustrate some of this flexibility.



BRAHMS documentation is extensive and is available to consult online or download as a searchable Windows CHM help file.

Workshop 1 – installations

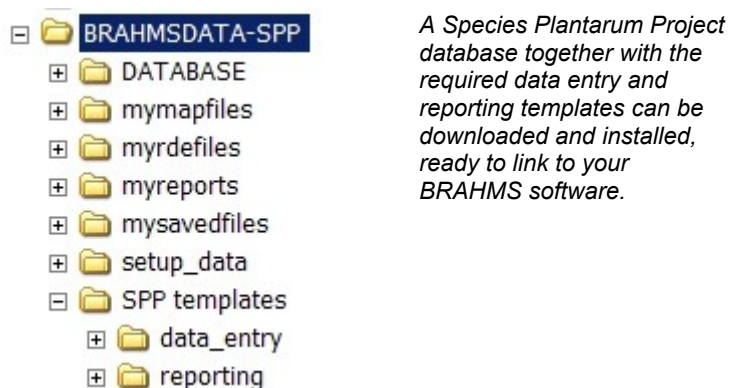
Installation of BRAHMS software

- Go to the BRAHMS software download page on <http://herbaria.plants.ox.ac.uk/BOL/software/default.aspx>
- Choose the **Download BRAHMS** option and save the single download file to your desktop (or any temporary folder). Run the setup file to install BRAHMS following the default settings. You can modify these if necessary.
- Registered users can login to and download an activation key. New users should register first. For help go to **Documentation > Installation and upgrading > System installation > Activation keys**.

Installation of the Species Plantarum template database

The SPP template database is an empty database that has been pre-configured for the Species Plantarum Project. It includes no taxa or specimen data. It does however include RDE file templates for data entry, useful reference files for taxa, authors and publication journals, the essential additional fields you need for species descriptions and the required report templates.

- Go to the BRAHMS Resources page on <http://herbaria.plants.ox.ac.uk/BOL/resources/default.aspx>
- Click on the **Species Plantarum Project** resource entry and download this to your desktop (or any temporary folder).
- Expand this zip file to C: (or another drive). This will create a folder called **C:\brahmsdata-spp** with various subfolders.



Installation of DIVA-GIS for mapping

If you want to produce species distribution maps from BRAHMS based on the specimens yet have no existing mapping software, we recommend that you install the free mapping system DIVA-GIS. If you already have mapping software (e.g. Arc View), you can use this.

- To install DIVA, download the single DIVA setup file (full installation) from <http://www.diva-gis.org/down.asp> to any temporary directory.
- Expand the downloaded zip file into the same temporary directory and then run the setup.exe file.

Download base map files

If you are planning to make maps, you should download some handy global **base maps** for a) countries and b) internal country boundaries – both for use with DIVA. As it happens, DIVA uses standard SHP files (as used by Arc View).

- Go to the BRAHMS website Resources page on <http://herbaria.plants.ox.ac.uk/BOL/resources/default.aspx>
- Download the zip mapping file **Country borders** to the \brahmsdata-spp\mapping\basemaps folder. Expand the zip file to the same folder. You can then delete the zip download.
- Repeat this procedure for the internal country administrative regions file, also provided on the Resources page.

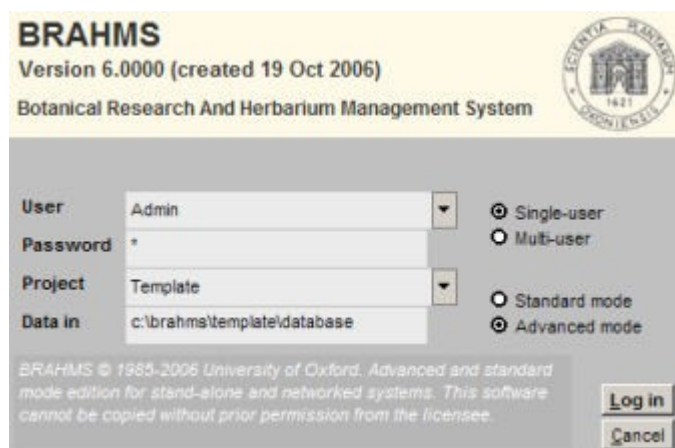
These base map files are now ready to open with DIVA when you reach the mapping stage later on.

Workshop 2 – initial setup

Login to BRAHMS

- Log into BRAHMS as user **Admin** using the default password **A**. Initially, choose the **Template database**. This empty database is included in the software download.

Note: if your BRAHMS setup did not automatically create a desktop shortcut, locate the BRAHMS.EXE program file in the default installation folder which would be \Program files\Brahms.



BRAHMS login screen selecting the Template database

Register the Species Plantarum database

- You need to connect the BRAHMS software to the SPP database by registering this pre-configured database in the database manager file. To do this, select **File > Database manager**.
- The database can be linked manually using the **Add** option. However, the quickest way is to now select **Tools > Add sample databases > Species Plantarum Project**. This action will register the SPP database in the BRAHMS database manager.

TAG	DEL	PROJECT NAME	PROJECT DATA DIRECTORY	PROJECT CODE	NETMO
*		Template	C:\BRAHMS\TEMPLATE\DATABASE	TEMPLATE	S
*		Leucaena	C:\BRAHMSDATA-LEUC\LEUCAENA	LEUC	S
*		Species Plantarum Project	C:\BRAHMSDATA-SPP\DATABASE	SPP	S

The database manager showing the registered Species Plantarum Project. The Template database is always present and is used to create new databases. In this screen, the Leucaena database, used throughout the BRAHMS training exercises, is also registered in the manager.

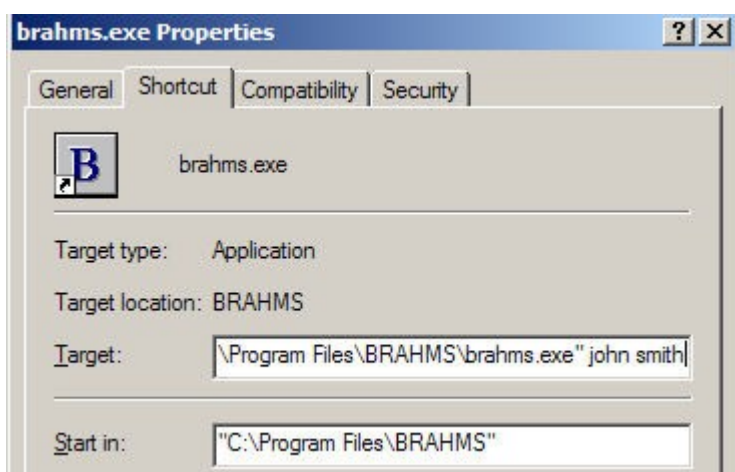
Log into SPP database – adding user name details

- Having successfully registered the SPP database, **log out** of BRAHMS and then **re-login** but this time choosing the **SPP database** from the project list provided on the log in screen.

Although you can continue to work as user Admin, we recommend that as a first step, you own user name and password. To do this:

- Select **Admin > System access and passwords > Users and passwords**.
- Click on the **Add** toolbar button. Add you name (e.g. 'John Smith') and password (e.g. 'JS') in the boxes provided. All other fields can be left with their default settings.
- You can now exit BRAHMS and once more, login but this time, select your newly added user name on the login screen, again choosing the SPP project.

Also note that assuming you have a desktop shortcut to BRAHMS.EXE, you can add your user name after the BRAHMS.EXE target as in the image below. When you login in, your user name is selected by default. The help file includes procedures.



After setting up a desktop shortcut, adding your user name after the Target file (BRAHMS.EXE) speeds up the login process.

Check system settings

Most setup options can be edited using the **Admin > Project configuration**. After you have used BRAHMS for a while, you may want to explore these options more fully, for example, opting to change some Data Grid features.

One useful option to set at the start is your Home Herbarium code – assuming you have one. To do this, select **Admin > Project configuration > General** and enter the code (e.g. OXF) in the box provided.

Check mapping settings

If necessary, you can edit the map configuration settings using the **Admin > Project configuration > maps** screen.

The SPP template database is pre-configured to set DIVA as the default mapping system and to locate DIVA.EXE in the default install location which is **c:\program files\diva-gis\diva.exe**.

By default, BRAHMS will expect latitude/longitude values to be entered in degree minutes seconds (DMS) format. If necessary, you can change this using the option provided on the **MAPS** configuration page. Map data storage is discussed in detail under **Documentation > Mapping**.

Some notes on database maintenance

It is best to be confident about database maintenance from the outset. Two issues are discussed here – backing up and re-indexing your database.

To back up, assuming all your various project data files are stored within the \Brahmsdata-spp folder (with its various sub-directories), all you have to do is to make a copy of this entire folder. We recommend you archive (or zip) files before backing up as this saves space and time. Copy the backed up files to a safe place on a networked drive or another disk. Full details about backing up are provided under **Documentation > Database maintenance > Backing up**.

Re-indexing checks over your database, removing records deleted since the last re-index and recreates all the index files associated with the various database files. Periodic re-indexing, while not essential (indexes are automatically kept up to date) can improve database performance. To re-index the opened database, select **Admin > Database maintenance > Re-index and pack data files**.

Workshop 3 – Entering taxa using RDE

Introduction


Ideally, you will start your project by preparing a list of names for your taxonomic group. It is usually better to do this (or some of it) before the specimen entry phase as it is very convenient to be able to consult your names list when adding specimens. Having said this, projects do often start with specimen entry or make a start with the assembly of specimen and taxon name data at the same time.

Creating a taxon RDE file


The SPP database is provided with a template RDE file for taxa named **spp-taxa-rdetemplate.dbf**. Rather than entering data into the template (you can do this), it is best to make a copy of the taxon template and enter data here. You may end up making several separate taxon RDE files, with the same or with different structures.

As a first step, you will copy this file in the RDE file manager.

- Select **Taxa > Add/edit data using Rapid Data Entry files**. This opens the RDE file manager for taxa. You will see the file **spp-taxa-rdetemplate.dbf** is already registered in the manager.
- Click once on the record that includes the RDE template file to select that record.
- Select **File > Create a blank data file > Create an empty file from the current RDE file**.
- When you do this, the template is copied and then registered in your RDE taxon file manager. To open the RDE file, dbl-click on the file name.

For an explanation of the various fields in the file, click on the  toolbar. Some fields (e.g. DESCRIP and DISTRIB) may not be represented in help list as these are what we call 'non-standard' BRAHMS fields. Non-standard fields are user defined fields and you can add as many of these as you like. Non-standard fields are described in the help section **Documentation > Rapid Data Entry > RDE files > Standard and non-standard fields**.

Changing the file structure


One of the advantages of using RDE files is that you can freely change their structure by adding or removing fields – or changing the field order. For example, the template SPP file includes the fields INV and LEGITIMACY, both explained in the  toolbar help. You may decide to exclude these fields from the RDE file either because you don't want to enter these facts about your taxon names or because you consider that this information can be edited in later on, directly into BRAHMS. Similarly, you may not need the fields RANK2, SP3 and AUTHOR3. Remove these fields as appropriate.

- To remove unwanted fields (or make any other changes), with the RDE file opened, select **File > Modify file structure**

A full description of this function is available in the documentation under **System fundamentals > Rapid Data Entry > RDE files > Modifying file structure**. These procedures apply equally to specimen RDE files.


Getting started with data entry

In the opened file, you can type freely data into the respective fields. Fields can be left completely blank if you have not data. Data are saved automatically when a file is closed – there is no special save function.

To add blank records, use the Add toolbar  or enter **Alt+A**. The chances are you will be working in one family or perhaps even a single genus. Thus the values in these fields will change rarely. After you have added a new record, you can press the **F4** key to copy a field from the previous record – or use **Ctrl+F4** to copy an entire record.

Because, at this stage, your actual database is empty, you can't yet make use of most lookup and AutoComplete functions- this will change as your database matures.

The characteristics of the data grid you are working in can be changed using the set up options provided under **Admin > Project configuration > Data grids**. Typical examples are whether you want to highlight the current record and whether or not you wish text to be 'selected' (black) when you move into a field.

Also note the TAG and DEL columns at the start of the file. The fields are found in all BRAHMS files allowing to select (tag) and mark records for deletion respectively. You can read up on these functions in the documentation under **System fundamentals > Tagging** and **System fundamentals > Editing data > Deleting records**. Thus, to tag a record, click on the  toolbar (again to remove tag). To highlight all tagged records, select **Tag > Highlight tagged > Highlighting ON**.

Although the SPP database is initially empty, some external reference files have been included with the project, notably for family, genus and author names and botanical publications. Using Shift+F9 in the FAMILY, GENUS, any of the AUTHOR fields or the JOURNAL field will open up a searchable list of names to select from.

You can open and edit the external taxa reference files using **Taxa > External reference files**. In the case of the family/genus file, you can use a **Tools** option to switch family names between Compositae/Asteraceae etc. The external botanical publications file can be opened using **Biblio > External reference files**.

Checking names online

If you are **online**, you can use the internet toolbar on the right of the screen to consult useful websites like IPNI, Kew's Electronic Plant Information Centre, TROPICOS and others. The toolbar options detect what name has been typed into the RDE file and then try to locate that name. In some cases the options are also field sensitive. Thus if the cursor is in the FAMILY field and you click on the IPNI toolbar, a search is made on that family.

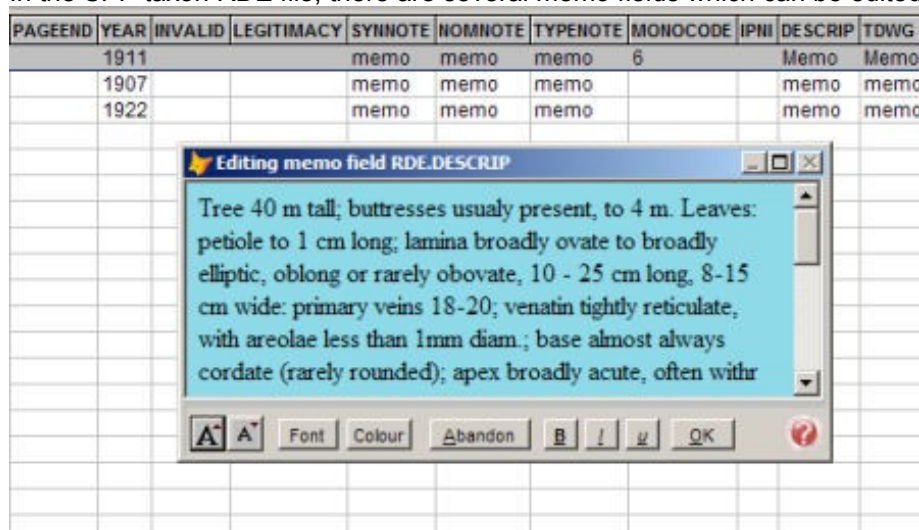
At this stage, in the RDE file, you may choose to enter all the details you have available on your taxa including text descriptions and even synonym links (see below for more on synonyms). On the other hand, you may enter only the essential details of the names and decide to edit the data after the RDE file has been transferred to BRAHMS.

A description of the main RDE fields for taxa

TAG	Used for selecting records
DEL	Mark a record for deletion
RDECODE	A unique numeric code required if using the SYNOF field in RDE
SYNOF	Numeric code pointing to the same number in RDECODE
TAXSTAT	Taxonomic status of name e.g. 'acc' for accepted name
FAMILY	Name of family
GENUS	Name of genus
SP1	First specific epithet
AUTHOR1	Author name for SP1
UNIQUE	A numeric code only need if 2 or more identical names are entered.
RANK1	Rank of SP2, e.g. ssp. Or var.
SP2	Second specific epithet
AUTHOR2	Author name for SP2
JOURNAL	Journal abbreviation name of protologue
VOLUME / PART	Volume for protologue
PAGESTART/PAGEEND	Page(s) of protologue
YEAR	Year of publication
SYNNOTE	Notes about synonymy
TYPENOTE	Notes about type
NOMNOTE	Other nomenclatural notes
MONOCODE	Monograph code
IPNI	IPNI reference
DESCRIP	Species description
TDWG	TDWG distribution summary


Editing memo fields for descriptions and other notes

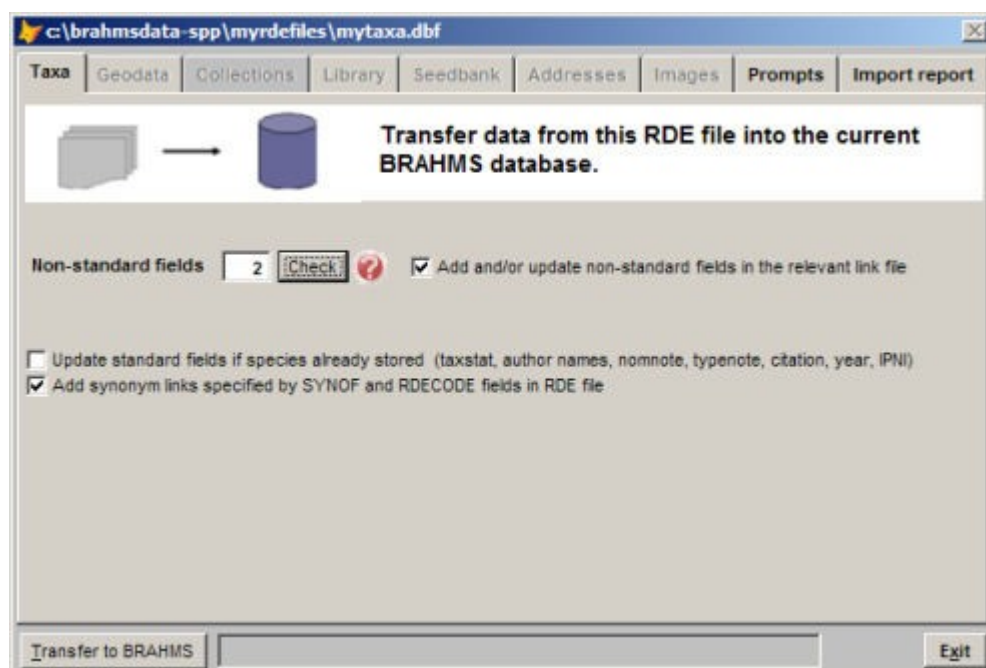
Memo fields are used to store variable amounts of text, ideal for descriptions. Memo fields are described in full in the help section **Documentation > System Fundamentals > Memo fields**. To open a memo field, you can dbl-click on the memo or enter Ctrl+M when the cursor is on it. In the SPP taxon RDE file, there are several memo fields which can be edited as appropriate.



Transfer the Taxon RDE file into BRAHMS

You can transfer an RDE file into BRAHMS at any stage. After doing so, you would normally keep the file as a back-up. Although it is possible to edit the original RDE file and transfer the edits into BRAHMS, after the transfer, it is usually easier to undertake editing inside BRAHMS. You may subsequently open, edit and transfer several more taxon RDE files rather than add all your data to one RDE file.

- To execute the RDE file transfer, close the file and select the  toolbar option. When prompted, 'Restrict to Tagged?', respond 'No' – unless you wish to selectively import tagged records.



The RDE transfer screen. Note that the screen is indicating that there are 2 non-standard fields. These are the DESCRIP and TDWG memo fields. As these fields are available in the species linked data file, they will be stored in the database.

- Click on the Transfer to BRAHMS button to proceed.
- To check these names have been safely stored in BRAHMS, select **Taxa > View edit species in database**.

Workshop 4 – entering specimen data using RDE


Creating a specimen RDE file

The procedures for entering specimen data using RDE are broadly the same as those for taxa – although there are more fields to consider.

The SPP database is provided with a template RDE file for specimens named **spp-specimens-rdetemplate.dbf**. Rather than entering data into the template (you can do this), it is best to make a copy of the specimen template and enter data here. You may end up making several separate specimen RDE files, with the same or with different structures.

As a first step, you will copy this file in the RDE file manager.

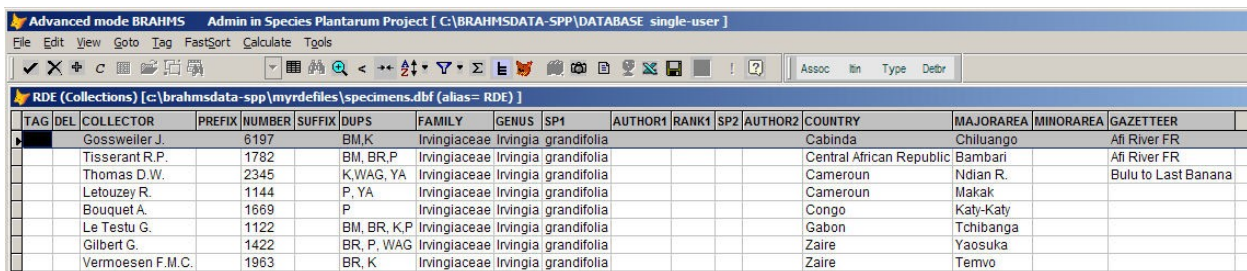
- Select **Collections > Add/edit data using Rapid Data Entry files**. This opens the RDE file manager for collections. You will see the file **spp-specimens-rdetemplate.dbf** is already registered in the manager.
- Click once on the record that includes the RDE template file to select that record.
- Select **File > Create a blank data file > Create an empty file from the current RDE file**.
- When you do this, the template is copied and then registered in your RDE collection file manager. To open the RDE file, dbl-click on the file name.

For an explanation of the various fields in the file, click on the  toolbar. As with the taxon RDE file, any non-standard fields will not be represented in help list.

Changing the file structure

As described for the taxon RDE above, you can add or remove fields using **File > Modify file structure** The scope to add and remove fields in specimen RDE files is greater than with taxa – as there are many more potential fields describing specimens.

Entering specimen data



TAG	DEL	COLLECTOR	PREFIX	NUMBER	SUFFIX	DUPS	FAMILY	GENUS	SP1	AUTHOR1	RANK1	SP2	AUTHOR2	COUNTRY	MAJORAREA	MINORAREA	GAZETTEER
		Gossweiler J.		6197		BM, K	Irvingiaceae	Irvingia	grandifolia					Cabinda	Chiluango		Afi River FR
		Tisserant R.P.		1782		BM, BR, P	Irvingiaceae	Irvingia	grandifolia					Central African Republic	Bambari		Afi River FR
		Thomas D.W.		2345		K, WAG, YA	Irvingiaceae	Irvingia	grandifolia					Cameroun	Ndian R.		Bulu to Last Banana
		Letouzey R.		1144		P, YA	Irvingiaceae	Irvingia	grandifolia					Cameroun	Makak		
		Bouquet A.		1669		P	Irvingiaceae	Irvingia	grandifolia					Congo	Katy-Katy		
		Le Testu G.		1122		BM, BR, K, P	Irvingiaceae	Irvingia	grandifolia					Gabon	Tchibanga		
		Gilbert G.		1422		BR, P, WAG	Irvingiaceae	Irvingia	grandifolia					Zaire	Yaosuka		
		Vermoesen F.M.C.		1963		BR, K	Irvingiaceae	Irvingia	grandifolia					Zaire	Temvo		

Above is a typical example of a specimen RDE file showing some of the main fields. To speed up typing, use the function key F4 to copy a field from above or Ctrl+F4 to copy an entire record. Numerous further copy and lookup settings can be configured and are described in the documentation.

A description of the main RDE fields for specimens

TAG	Used for selecting records
DEL	Mark a record for deletion
COLLECTOR	Name of collector
PREFIX	Prefix for collection field number
NUMBER	Collection field number
SUFFIX	Suffix for collection field number
DUPS	Known duplicates
FAMILY	Family name
GENUS	Genus name
SP1	First specific epithet
RANK1	Rank of SP2, e.g. ssp. Or var.
SP2	Second specific epithet
COUNTRY	Country of collection
MAJORAREA	Major country area
MINORAREA	Minor country area
GAZETTEER	Name of nearest place
LAT	Latitude
NS	N or S
LONG	Longitude
EW	E or W

Collector name formats

Although it is better to initially enter collector names in the format Surname + Initials as in 'Smith A.B.', it may be a requirement that collector names are later cited in a different format, e.g. 'A.B. Smith'. Within BRAHMS, all collector names can be assigned different formats for reporting purposes.

To edit the list of collector names and optionally provide a different print format, select **Collections > Collector and detby names**. Edit your alternative names into the alternative name column(s) provided. Further information is provided under **Documentation > Data in BRAHMS > Collector names > Using alternative collector names**. Alternative names can be included in reports (e.g. specimen citation lists) by default.

Entering map references

Specimen latitude and longitude are entered into the LAT and LONG numeric fields as available in RDE and in BRAHMS. The Species Plantarum template database is configured by default to use data in degrees, minutes and seconds (DMS) - or just degrees and minutes if seconds are unavailable. The DMS format can be switched to decimal degrees by default or on a record by record basis using the LLUNIT field. In the default DMS mode, entries would be added to the LAT field as follows:

LAT	NS	Notes
12.0	N	12 degrees north
8.43	S	8 degrees and 43 minutes south
30.2312	N	30 degrees, 23 minutes and 12 seconds north

Note that a) the minutes and seconds are added directly after the decimal point and b) the field NS is edited to N or S. The equivalent fields LONG and EW are edited in the same way. Further information is provided under **Documentation > mapping > Coordinate formats**.

Recording duplicate distribution

When adding data to RDE, you may have knowledge of the duplicate distribution of your specimens. These can be added as a comma separated string of herbarium codes to the DUPS field as in "FHO, K, MO, NY". The A-Z order is not important.

When you transfer an RDE file to BRAHMS, the system checks if all of your herbarium codes are in the herbarium list. If not, you will be prompted to add them.

Workshop 5 – editing synonymy and types

Introduction

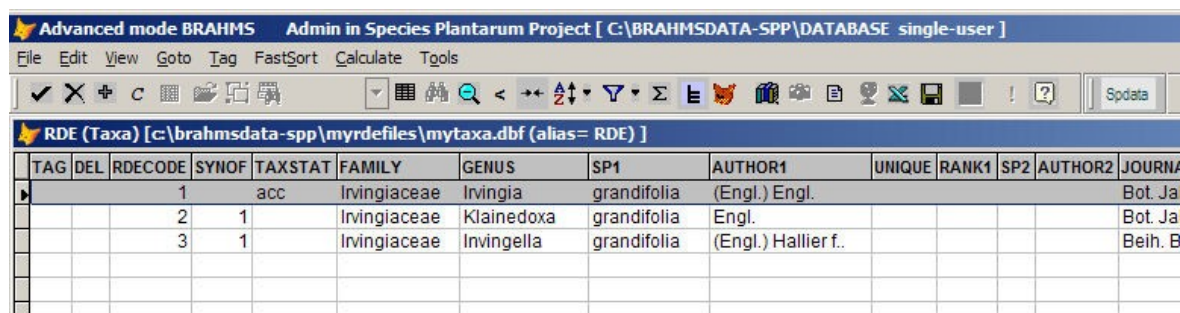
This section provides guidance on how synonym and type links can be created either in your RDE files or within BRAHMS itself. Although these links can be created at the RDE file level and transferred into BRAHMS, most BRAHMS users tend to work up the synonym and type links inside BRAHMS itself.

Linking synonyms in your RDE file

Assuming both the accepted name and the synonym(s) have been added as separate records in your taxon RDE file, you can link the synonym(s) to the accepted name in the file.

To make the links in the RDE file, the RDE file must include the numeric fields RDECODE and SYNOF. These fields are provided by default. They can be deleted if you intend to edit synonymy after the transfer to BRAHMS.

- To link a name as a synonym of another name, the accepted name must be assigned a unique number in the RDECODE field and that same number must be added to the SYNOF field of the synonym(s).



The screenshot shows the BRAHMS software interface. The title bar reads "Advanced mode BRAHMS Admin in Species Plantarum Project [C:\BRAHMSDATA-SPP\DATABASE single-user]". The menu bar includes File, Edit, View, Goto, Tag, FastSort, Calculate, and Tools. The toolbar contains various icons for file operations and data management. The main window displays a table titled "RDE (Taxa) [c:\brahmsdata-spp\myrdefiles\mytaxa.dbf (alias= RDE)]". The table has columns: TAG, DEL, RDECODE, SYNOF, TAXSTAT, FAMILY, GENUS, SP1, AUTHOR1, UNIQUE, RANK1, SP2, AUTHOR2, and JOURNAL. The data shows three records where RDECODE values 2 and 3 are linked to RDECODE value 1 via the SYNOF field.

TAG	DEL	RDECODE	SYNOF	TAXSTAT	FAMILY	GENUS	SP1	AUTHOR1	UNIQUE	RANK1	SP2	AUTHOR2	JOURNAL
		1		acc		Irvingia	grandifolia	(Engl.) Engl.					Bot. Ja
		2	1		Irvingiaceae	Klainedoxa	grandifolia	Engl.					Bot. Ja
		3	1		Irvingiaceae	Irvingella	grandifolia	(Engl.) Hallier f.					Beih. B

In the above example, the species with RDECODE values 2 and 3 have been linked as synonyms to of the species with RDECODE value 1.

Linking synonyms within BRAHMS

- Select **Taxa > View/edit species in database**.
- Use the **=>syn** toolbar option to make the current name a synonym of another name – you will be prompted to select this name.
- Use the **syn<=** toolbar option to make another name a synonym of the current name.

You can also use the **Nomc** toolbar option to open the full nomenclature editing screen.

The screenshot shows a Microsoft Access application window titled "Advanced mode BRAHMS Admin in Conifers [C:\ALLBRAHMSDATA\CONIFERS single-user]". The main view displays a table named "Nomenclature [c:\brahms_tempfiles\af\synlist.dbf (alias = SYNS)]".

TAG	TAXSTAT	YEAR	SYNCAT	SPECIES	CITATION
	acc	1972		<i>Juniperus excelsa</i> M.-Bieb. ssp. <i>polycarpus</i> (K. Koch)	Fl. Yerev.: 53. 1972.
	syn	1849	BAS	= <i>Juniperus polycarpus</i> K. Koch	Linnaea 22: 303. 1849.
	syn	1857	HOM	= <i>Sabina polycarpus</i> (K. Koch) Antoine	Cupress.-Gatt.: 47. 1857.
	syn	1984	HOM	= <i>Juniperus excelsa</i> M.-Bieb. var. <i>polycarpus</i> (K. Koch)	Phytologia Mem. 7: 34. 1984.
	syn	1884	HET	= <i>Juniperus macrocarpa</i> Boiss.	Fl. Orient. 5: 709. 1884.
	syn	1932	HET	= <i>Juniperus seravschanica</i> Kom.	Bot. Zurn. (Moscow & Leningrad) 17: 481. 1932.
	syn	1937	HOM	= <i>Sabina seravschanica</i> (Kom.) Nevski	Trudy Bot. Inst. Akad. Nauk S.S.S.R., ser. 1, Fl. Sist
	syn	1966	HOM	= <i>Juniperus polycarpus</i> K. Koch var. <i>seravschanica</i> (K.)	[Fl. Pl. W. Pakist. Afghan.: 7. 1964] Add. & Corr. Fl.
	syn	1990	HOM	= <i>Juniperus excelsa</i> M.-Bieb. ssp. <i>seravschanica</i> (K.)	Bot. Zurn. 75 (3): 407. 1990.
	syn	1932	HET	= <i>Juniperus turcomanica</i> B. Fedtsch.	in Fedtschenko & al. Fl. Turkmenii 1: 14. 1932.
	syn	1937	HOM	= <i>Sabina turcomanica</i> (B. Fedtsch.) Nevski	Trudy Bot. Inst. Akad. Nauk S.S.S.R., ser. 1, Fl. Sist
	syn	1990	HOM	= <i>Juniperus excelsa</i> M.-Bieb. ssp. <i>turcomanica</i> (B. Fe	Bot. Zurn. 75 (3): 408. 1990.
	syn	1967	HET	= <i>Juniperus polycarpus</i> K. Koch var. <i>pendula</i> Mulik.	Dokl. A.N. Armen. S.S.R. 45 (2): 86. 1967.
	syn	1990	HOM	= <i>Juniperus excelsa</i> M.-Bieb. ssp. <i>polycarpus</i> (K. Ko	Bot. Zurn. 75 (3): 407. 1990.
	syn	1976	HET	= <i>Juniperus excelsa</i> M.-Bieb. var. <i>farrana</i> P. N. Mehra	Nucleus 19 (2): 135. 1976.

*Editing names within BRAHMS using the nomenclature editing screen. This screen provides an immediate overview of the full nomenclature of a name and all related synonyms with options to manipulate synonym and type links. Use the **+Syn** and **-Syn** toolbars to create or remove synonym links. Note that a name may be edited to be a synonym of a name which is itself a synonym as in the case of Sabina polycarpus and others in this example.*

Linking types in your specimen RDE file

- Click on the **Type** toolbar button.
- A memo field called TYPOMEMO will be added to your RDE file and a screen opens where you can enter details about the type specimen (type category, where stored, typification species).

Linking types within BRAHMS

Types can be linked either from the main species or the main collection file.

- In the main species file (**Taxa > View/edit species in database**), use the **Type** toolbar option or open the main nomenclature screen using the **Nomc** toolbar.
- In the main collection file (**Collections > View/edit collections in database**), use the **Spec** toolbar option or open the specimen level edit screen.

In both cases, you will end up selecting a collection and then editing the specimen level details using the same screen as show below:

[illegible]

Workshop 6 – preparing Species Plantarum outputs

Introduction

With your data safely stored in BRAHMS, it is possible to prepare different types of outputs. Although the focus in this workshop is on the preparation of reports for the Species Plantarum Project, by modifying the procedures explained here or using different ones, you can pick and choose those data you wish to report on and how you wish these data to be presented. For example, although the printing of specimen labels or loan forms is not discussed here, the reporting principals are broadly the same.

In this workshop, you will prepare the central components of the Species Plantarum Project formatted output.

Querying data – making a taxon extract

As a first step in producing the outputs, you need to extract (query) your species list to make a selection of the 'accepted taxa' to include in your report. You do not need to worry about synonyms as these will be automatically gathered for you by the reporter. The querying of data is discussed in detail under **Documentation > Queries and extract files** and examples are provided under **Documentation > Training exercises > Data queries and extracts**.

To start with, it is recommended that you concentrate on a single species. Later on, you can use exactly the same procedures to report on many taxa at the same time.

- Select **Taxa > Extract/query data** to open the main querying form. If you have already done a search, you should click on the **Empty** button (lower screen) to clear away the previous search results.
- Click on the **Search taxa > Taxa** button on the top left of the screen. From the list of options in the white drop-down box, choose the **Individual species** option and then click on the **Search / Add to search list** button. This will open a species search form.
- Choose the individual species to work with. In the search string box and the bottom of this form, you can type in some genus letters + a space + some species name letters as in 'ir gr' to choose *Irvingia grandifolia*. If the number of genera in the database is large, you would need to enter more genus letters. The species search and select screen has other options to explore as you wish. When you have found the correct name in the list, click on the **Select** button on the species search screen.
- Finally, click on **Search now** to complete the query.

The above sequence of actions will create a taxon query file. Assuming the option **Auto-open extract file after a search** was ticked (default), the taxon query file will open automatically after your search. If the query file does not open (tick the auto-open option when you next do a query), then select the menu option **Extracts > Taxa**.

Report structure

The report you will now prepare will use a BRAHMS **Text Reporting** procedure. This will process data in your taxon extract file and generate your report in the following report sections

Accepted name	This will include the monograph code, accepted name with author and place and date of publication.
Synonyms and types	A list of synonyms organized in homotypic groups – together with the type specimen or notes about the type as with 'original material'.
Illustration	Note about illustration
Map	Note about map

Species description	Text description as entered into the species memo field DESCRIP
Species distribution summary with TDWG codes	Distribution summary as entered into the species memo field TDWG
Cited specimens	Specimen list formatted according to SPP requirements
Uses or other notes	Uses or other notes as entered into the species memo field USES

Preparing to report

As a next step, we need to run some **Tools** options in the taxon extract file to add some formatted features which will be included in our report. Note that these options must be used after each new taxon query/extract.

a) Formatting the accepted name

- Select **Tools > Formatting for reports > Format species name to FULLNAME**. Click on the OK button to accept the default settings – or modify if necessary. This processes all species names in the taxon extract file and formats them into the extract file memo field FULLNAME. The formatting includes XML mark up for print features.

b) Formatting synonyms and types



- Select **Tools > Formatting for reports > Synonyms and types**. This assembles a formatted summary of synonyms and type specimens to the extract file memo field TAXTREAT. The formatting includes XML mark up for print features.

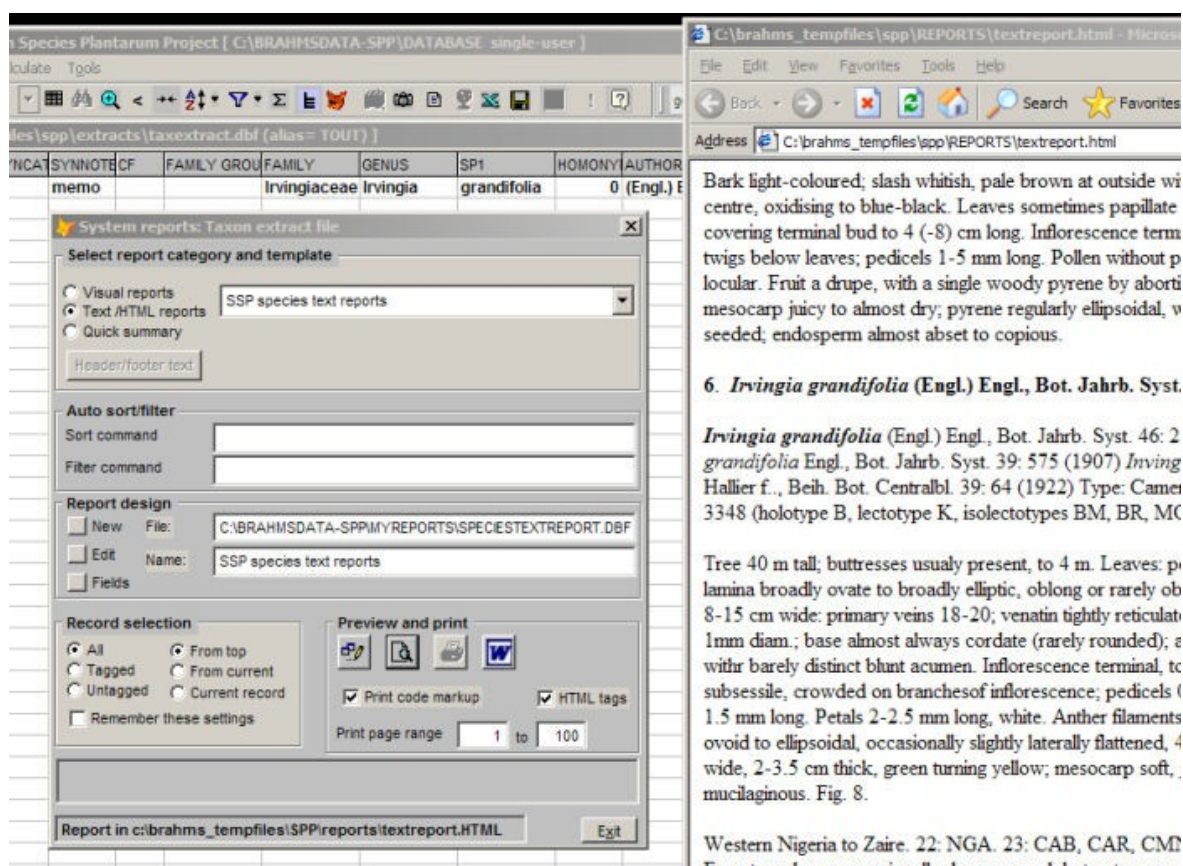
c) Specimen citation

- Select **Tools > Collection citation lists**. Ensure that the option **Fully formatted citation list** is selected on the screen. The SPP database has been provided with a pre-formatted specimen citation list. Click on Prepare list to format the list into the extract file memo field SPECLIST


Creating the report and transferring to a word processor

Having run the above mentioned Tools options, you can now prepare the report which will process all the taxa in your taxon extract file. In this example, there is only one species.

- Click on the **Reports toolbar** option 
- Select the **Text/HTML reports** option. The option 'SPP species text report' should be the default but if not, select this report from the available list.
- Now click on the Generate a text report button .



The report generation screen selected for Text/HTML reporting with the SPP species text report selected.

The report opens in an HTML file and can be copied using **Ctrl+A** followed by **Ctrl+C** and then pasted into a word processor document using **Ctrl+V**. If you use Microsoft Word, you can copy the report directly to Word using the  button on the reporting screen.

If you want to see how the report template has been set up or wish to make some alterations, select the **Edit** option on the report screen.

Preparing species distribution maps

Assuming you have installed **DIVA** and the **base map files** as explained in the **Prepare for mapping** section and you have entered some specimens with LAT and LONG values, you can easily produce a species distribution map. Further help is provided under **Documentation > Mapping** and **Documentation > Training exercises > Mapping**.


The SPP template database has been provided with a few simple map configuration options already setup. You can adjust these by choosing the relevant **Admin > Project configuration** options.

The following example produces a map for a single species in the genus *Leucaena*. These data are available on <http://herbaria.plants.ox.ac.uk/BOL/samples/leucaena.aspx>. Replace the *Leucaena trichandra* example with your own data as relevant.

Create data file to map in BRAHMS

- Select **Collections > Extract data**. Using the option **Taxa > Individual species**, select *Leucaena trichandra*.
- Open the extract file by selecting **Extracts > Collections** - assuming it is not auto-opened after your extraction.

Launch DIVA

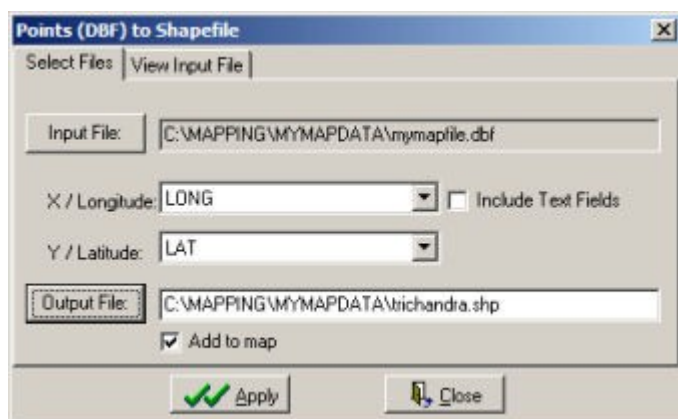
- In the collection extract file, click on the **Map**  toolbar button. The DIVA GIS option should be the default mapping software.
- Make a note of the path and file name of the map data file you are about to create. Now click on the Map button to prepare the required map file and open DIVA. If DIVA does not open, check that your map configuration link is correct in **Admin > Project configuration > File locations**.
- Later on, you will be able to open DIVA and automatically open a base map, ready to add your specimen points to.

Add the base map layer(s) and zoom to area

- In DIVA, select **Layer > Add layer** and locate a .SHP file to plot. Assuming you downloaded the BRAHMS base maps as described earlier, choose the CNTRY.SHP.
- You can add additional layers if needed including the ADMIN.SHP file described earlier.
- To select a different area on your base map, use the **Zoom** toolbar and drag a rectangle on your map. This can be done at any stage.
- To change the properties of a map layer such as the thickness of the map coastline, double-click the small map layer **rectangle** in the left DIVA margin and then double-click the small rectangle on the resulting properties form and set the layer properties as prompted. Note that these actions can be carried out on any layer listed in the left margin.
- For further notes on editing map layer properties, refer to the notes on [editing map areas and layers](#).

Add your map data points as a layer

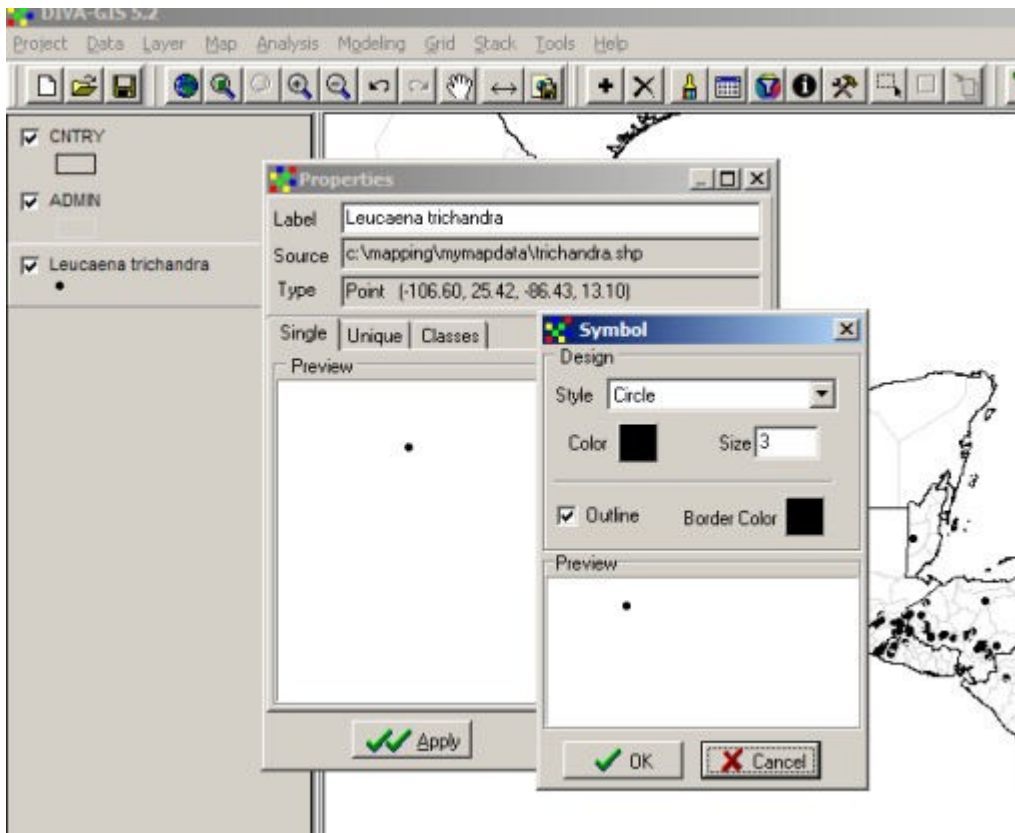
- To plot your specimen data on the selected base map, select **Data > Import points to Shape file > From dBASE (DBF)**. Click on the **Input file** option and locate the BRAHMS .DBF map file that you created above.
- As prompted, select the X field LONG (for longitude) and the Y field LAT (for latitude). Note that when you create a map file, these lat/long fields are already in the correct decimal format and -ve for South and West.



- The Input file is the .DBF map file you created in BRAHMS. This file includes the (now) decimalized fields LONG and LAT which are selected for the X and Y map coordinates. You must choose an **Output file** .SHP file for DIVA to create from your BRAHMS file.
- Use the **Apply** button to add the data points to the map.

Data points properties

- After adding the data points file, double click the **data file map layer** in the left margin (it will be the top one) to open the properties form for that layer.
- To change the **colour**, **symbol** and/or **size** of the points, double click on the point symbol and edit the settings as needed.




*Editing the Properties of the data points layer. Numerous further options are available, especially using the **Unique** and **Class** tabs on the Properties form – these are discussed in the BRAHMS documentation sections.*

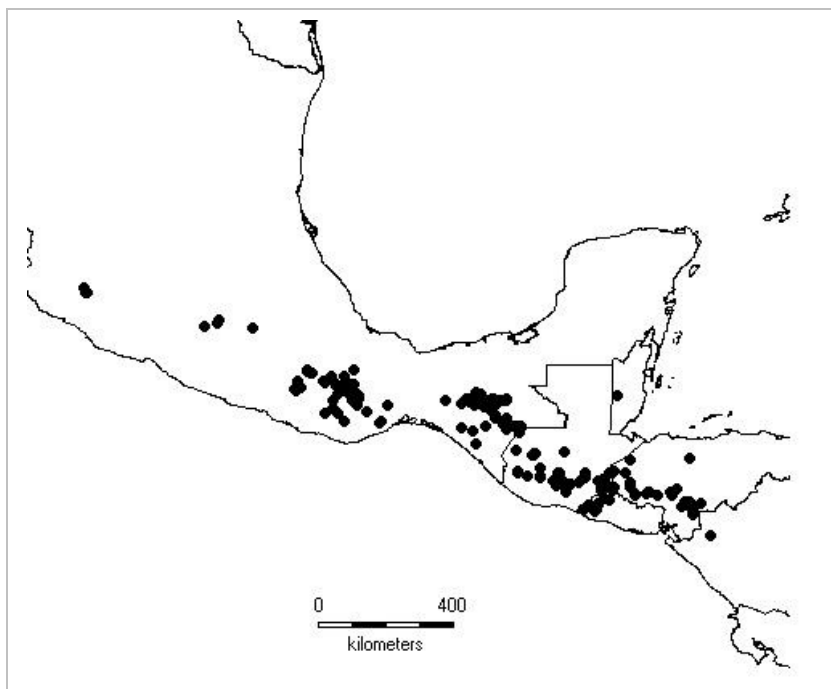
Final stages in Design mode

Note that in the bottom right corner of your map screen, there are 2 tabs **Data** and **Design**. So far you have been working in the **Data** screen. The final map will be produced in Design mode.

- Click on the **Design** tab and then click on the **OK** button in the left margin to redraw your map.

At this stage, if necessary, you can add a **map legend**, **scale bar** and other map features. These features are discussed in the documentation and training exercises.

To copy the completed map into Word or elsewhere, simply to copy the map to the clipboard in the Design screen using the Copy toolbar option  and then use **Ctrl+V** to paste the map into your document.



Simple species distribution map for Leucaena trichandra