Getting started with BRAHMS

Updated March 2024

This guide provides a rapid walk-through of key functions and features available in BRAHMS. No previous experience using the software is expected.

The larger BRAHMS manual covers all aspects of system operation including administration, configuration, connections to data stores, import and export, Rapid Data Entry, editing, report design, image management and mapping.

The examples in this guide mostly refer to the demo conifer database but you can use another database as available. You can also request a quick migration of your own data, free of charge.

Mostly, this guide does not focus on functions that apply to specific modules (for example those that work with museum collections, botanic gardens and seed banks). Rather, it deals with functions that apply to all modules. Having said that, the conifer demo database is 'preserved specimen' oriented.

If you have not installed BRAHMS or connected to a database, refer to the installation guide.

For licensing enquiries, contact brahms@innovation.ox.ac.uk
To obtain an evaluation version, visit https://herbaria.plants.ox.ac.uk/bol/brahms/software/evaluations Technical enquiries, contact brahms@biology.ox.ac.uk

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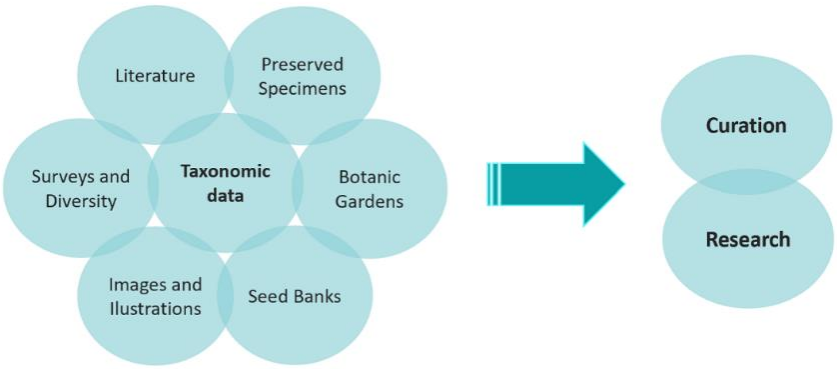
Introduction

BRAHMS is a scalable management system for preserved and living natural history collections as well as those undertaking floristic or taxonomic research. Its development is based on almost 30 years of database implementation. It manages biodiversity data.

For researchers, collection managers in museums, botanic gardens, herbaria and seed banks, BRAHMS helps to optimise the value of your data for management and research, increasing outputs and productivity.



Data integration for research and collection management is a key objective with BRAHMS.

Some database project examples:

- Manage your herbarium, grasshopper or beetle collection.
- Develop a comprehensive botanic garden or seed bank management database.
- Create a catalogue of fungi.
- Produce an annotated checklist for any specific area or region.
- Create an online portal to search and display your data, images and maps.
- Help prepare a monograph for a taxonomic group.
- - or all of these combined as part of a larger, integrated natural history database.

Online training videos can be found on: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos

Building a BRAHMS database

Introduction

The development of a well organised database is often a key activity for curators, collection managers and researchers. The strategy adopted varies depending on your resources; the amount of data you have; and your overall objectives. In all cases however, the paths to successful database development are similar.

Hardware

For individual researchers running their own show, the software and the database will most likely be installed on a personal computer running Windows or on a Mac with Windows emulation. Aside from having sufficient disk space and as much RAM as possible (8GB or ideally more), there are no special requirements other than that the .NET version is sufficiently up to date. Performance is broadly related to how well resourced your infrastructure is.

For institutions with large collections and potentially many simultaneous users, the database will be stored on a server. The server will need sufficient disk space and adequate RAM. If you try to run any large database on an inadequately resourced server, performance may be poor.

The BRAHMS software itself will either be installed on individual client workstations or in a shared location. You can also have a set up with remote server log in by users located on different sites. Cloud solutions are ideal for BRAHMS and if you are interested to explore this, contact the BRAHMS project. On larger networks, the set up you adopt will be fine-tuned to achieve the maximum performance, a specialised IT task not further discussed here.

Cutting corners on hardware set up is something of a false economy when it comes to establishing a healthy database environment, all the more so when there are large databases and many users.

Data migration

You may have data in BRAHMS v7; in Excel; in Access; or in another bespoke database package. These data can be migrated into BRAHMS v8. Databases in BRAHMS v7 can be automatically upgraded to v8. Contact the BRAHMS project and we will do this for you. Data in Excel can usually be imported via the BRAHMS Rapid Data Entry module (RDE) component. Data held in other packages will require some form of migration input.

Optimising data capture

Data entry efficiency can be optimised for all projects. While smaller number of records can be added directly into BRAHMS, the recommended procedure for larger scale data capture and processing data backlogs is to use Rapid Data Entry (RDE). A section on using RDE is included in this document and in the main manual. Mastering RDE is easy and certainly worthwhile when you are processing a lot of new data.

Query and analysis

BRAHMS is provided with flexible query functions. You can query your data on any combination of fields and save complex queries for future use. There are also numerous further features for viewing, sorting, filtering, calculating and analysis. Data grids are virtualized, ensuring they are fast even if you are working in tables with millions of records.

Exporting and reporting data

All data can be exported to Excel or CSV – and all such exports respect your currently selected column views, applied filters and sort order. You can also export data as Darwin Core Archive (DwC-A) format. You can also export your entire database to XML files.

Aside from using the basic data export options, you can create report templates for lists, labels, loan forms and others. Learning to design cool report templates is one aspect of mastering BRAHMS where users can go the extra mile, delving into the report design options as laid out, for example in https://www.stimulsoft.com/en/documentation . The BRAHMS guide has a section on report design and we also have a few videos: https://www.youtube.com/user/StimulsoftVideos .

Mapping and map point editing

Procedures for creating maps using different GIS options such as QGIS are reviewed in the manual map section. Bear in mind that if you are online, you have access not only to the in-built mapping tools but also the map point location editor. One of the handiest features in BRAHMS is the ability to view data records and map points together, dynamically linking these to highlight the current data record, and respect filters.

Getting more detail on some of the key BRAHMS modules

The following sections can be found in the main BRAHMS guide:
https://herbaria.plants.ox.ac.uk/bol/content/software/v8/BRAHMS_Manual.pdf

- A closer look at taxa and related data
- Collection Events
- Museum and herbarium specimens
- BRAHMS for Botanic Gardens
- BRAHMS for Seed Banks and Seed Conservation Projects

Register and log into the demo database

If you haven't installed BRAHMS and/or do not have a link to the conifer database or any another database, refer to the installation guide: https://herbaria.plants.ox.ac.uk/bol/content/software/v8/BRAHMS_installation.pdf

If you do not have a BRAHMS licence key, please register here: https://process.innovation.ox.ac.uk/software/p/14165t/brahms-trial/1 or write to BRAHMS@biology.ox.ac.uk.

There are 2 main ways you can register and log into the conifer demo database.

Method 1: Download the conifer database in SQLite

- From https://herbaria.plants.ox.ac.uk/bol/brahms/support/conifers choose the option 'Download the v8 SQLite demo database'. This will download coniferdbv8.zip. Open the zip to create a single file called brahms.db.
- If you don't have a folder Document\BRAHMS, create it. If logged in before, the folder will exist.
- Copy the brahms.db file to your Documents BRAHMS folder. If that file already exists in that folder, overwrite it with your downloaded file.
- Log into BRAHMS choosing the default Personal data location. Any problems, refer to: https://herbaria.plants.ox.ac.uk/bol/content/software/v8/BRAHMS_installation.pdf
- When you log in, choose BRAHMS Authentication. The default conifer database username is 'Demo' and the password is 'demo'. The password is case-sensitive.

Logging in to the Personal Data Location using BRAHMS authentication.

Method 2: Download the conifer XML folder

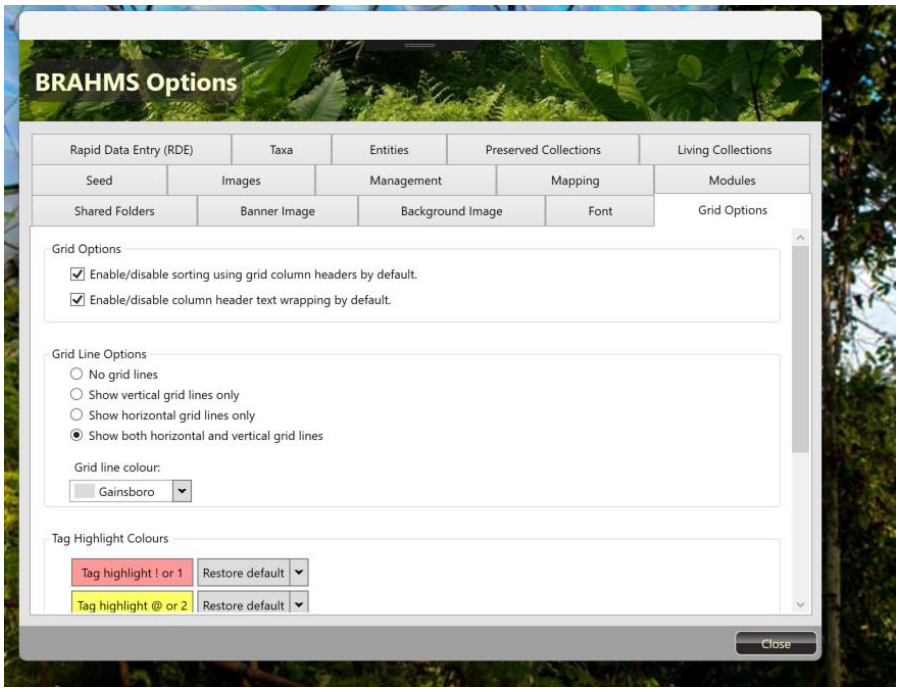
- From https://herbaria.plants.ox.ac.uk/bol/brahms/support/conifers, choose the option 'Download the demo database in XML format'. This will download a zip file called 'conifer_xml_feb2023.zip' or similar. Expand the zip to a new folder. This will result in a series of XML files.
- Log into BRAHMS choosing the default Personal data location. Any problems, refer to: https://herbaria.plants.ox.ac.uk/bol/content/software/v8/BRAHMS_installation.pdf
- In a new BRAHMS system, this is an empty data store. When you log in, you can choose Windows authentication. The first log in to a data location will auto-add the log in you first use. This is something you can alter later on.
- As initially, the data location has no registered database project, the **Database Project Manager** auto-opens. Select the Import option, navigate to the conifer XML folder and select the XML file listed by BRAHMS - DatabaseProject.xml. This will then trigger the import of the conifer database to your personal data store.

Note – the same XML folder can be imported into PostgreSQL and MSSQL SERVER data stores.

Task 1: Some setup options

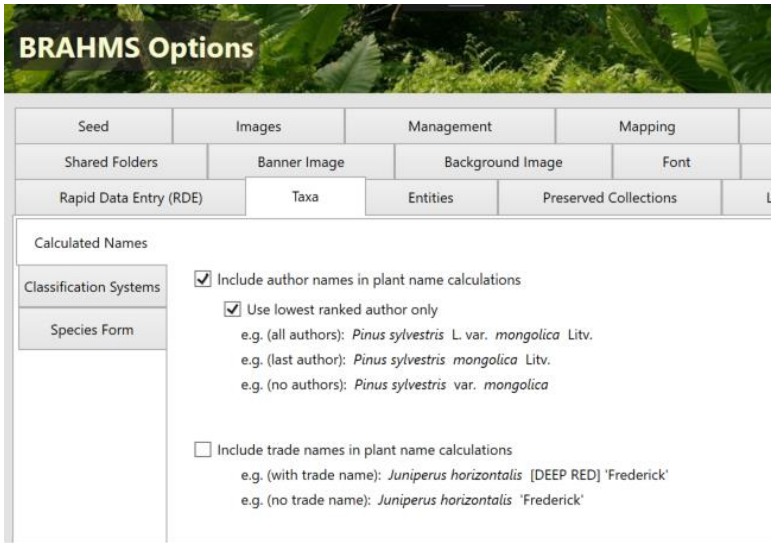
- Select **System > Options**

On networked systems, the ability to edit set up options will be restricted – depending on your user permissions. However, as a personal user logged in with Admin rights, you have access to all options. A few are discussed here to get you started.



- Choose **Taxa** to configure how calculated taxa names appear.
- Select **Grid Options** to set how data grids appear and to set Tag colour options.
- Select **Background Image** to personalise the application.

There are many other settings, e.g. to configure plant numbering and Rapid Data Entry features – these can be checked out later on, as appropriate for your project.



Picking on one example on the Taxa tab, you can control how the calculated field #Full Name appears in your system. Some projects prefer to see all authors, others not. Bear in mind, when creating reports, species names, with or without authors, can be formatted in any way you like.

Task 2: Adding a user account and setting permissions

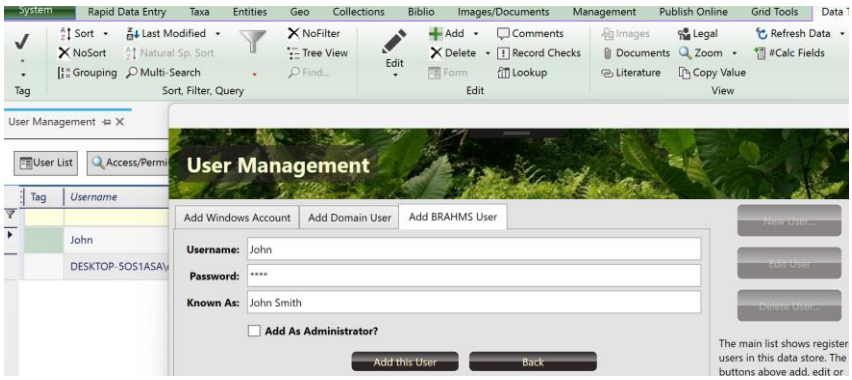
Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#useraccount

Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#userpermissions

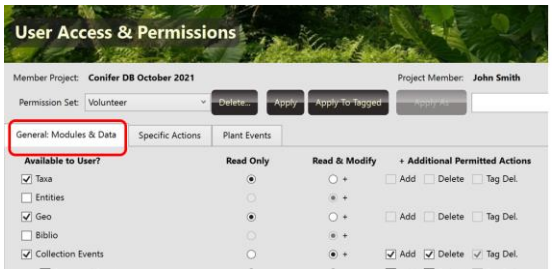
Adding users and setting permissions is described in detail in the BRAHMS guide. You can add users with BRAHMS, Local Windows account or Domain account authentication. Users can be assigned access and permissions to one or more databases. With Windows or Domain accounts, users will not require any additional password to log into BRAHMS.

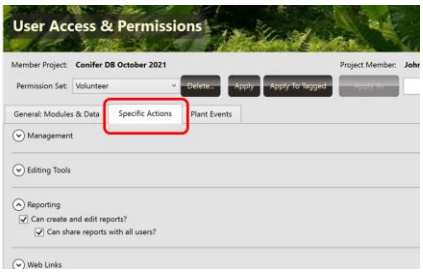
In this example, add a new *BRAHMS authentication* user and assign this user permissions.

- Log into the demo database and select **System > Manage Users and Permissions**.
- Choose the **User List** option above the grid (or use **Add** on **Data Tools**).
- Select **New User > Add BRAHMS User** adding the Username, Password and 'Known As' name. Do not set the user as an Administrator.



- Select Create this User and follow through with **Add this user**.
- Close the user form and select the new user on the **User Management** data grid.
- Then select the **Access/Permissions** option.





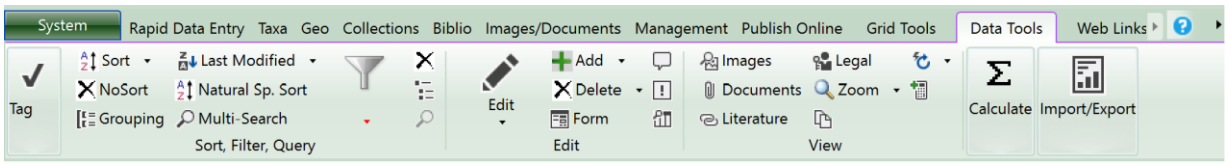
After editing some settings on the General and Specific Action tabs, assign new permission role name (here 'Volunteer') and use the **Apply As** option to save the settings and assign this Permission Set to the current user.

In practice, a larger project may have many different permission sets to apply to different users.

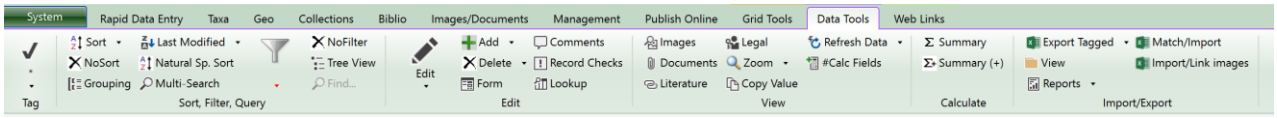
Task 3: Opening tables and using data grids

Working on a small or low resolution screen?

If you are working on a small screen and/or have the screen resolution set to lower values, the toolbars may collapse as shown in the screen below.



Note that the Calculate and Import/Export toolbar options have collapsed. In these cases, you need to click on the larger icons to expand the options.



The same toolbar on a higher resolution screen.

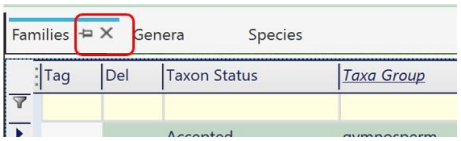
Opening and closing tables in data grids

By default, BRAHMS uses data grids with context sensitive toolbars to browse, locate, sort, edit, query and analyse your data. Data tables are opened using a single click on the selected menu entry.

- On the **Taxa** menu, click once on **Families**.

When a table opens, the toolbar changes to **Data Tools –** this is where most of the general processing options are to be found. For Taxa specific tools or if you want to open another taxa table, return to the **Taxa** menu.

- To close the table, select the **X** next to the opened table name.



Closing a table using the X mark next to the table name.

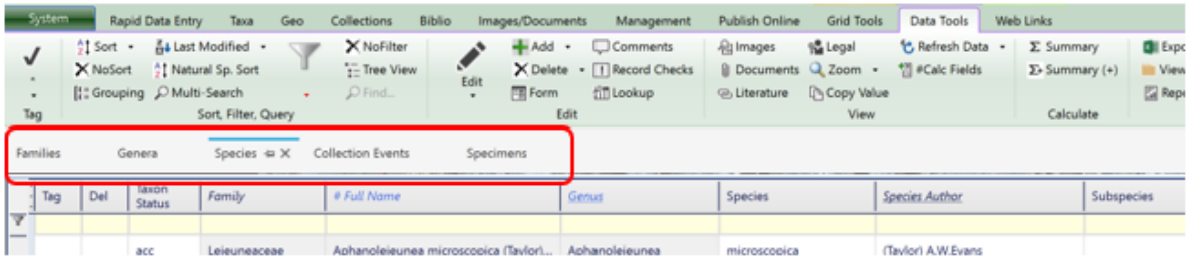
- Alternatively, to close tables, use **Alt+X**. Function keys such as **Alt+X** are listed using **Shift+F1** when in any data grid. A grid must be active to do this. Refer to the section on navigation and function keys.

Opening multiple tables

See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#multiple

You can open and utilise different tables at the same time. The task here is to open the main family, genus, species and collection events tables.

- On the **Taxa** menu, click once on **Families**.
- Return to the **Taxa** menu and click on **Genera**. Repeat this now for **Species**. Note that each time you open a table, the Data Tools toolbar is activated – so you have to return to the **Taxa** menu.
- Finally, on the main menu, select **Collections** and choose **Collection events** and then **Specimens**.



Each table has a tab which can be selected to view the data in that table.

Task 4: Docking tables, forms and other windows

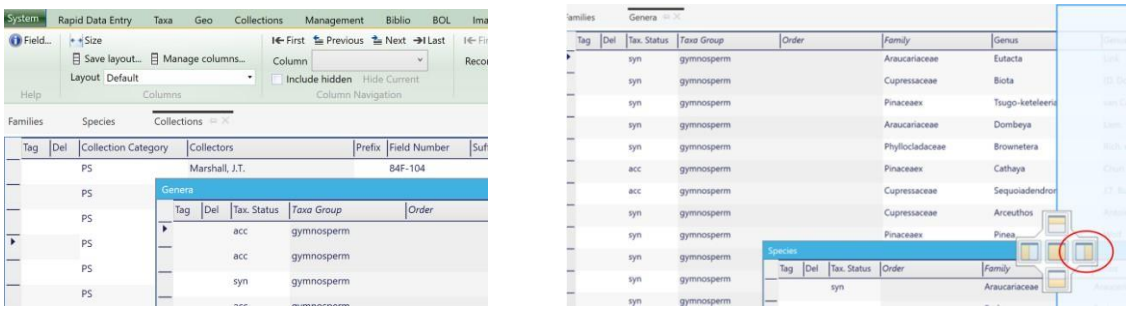
See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#multiple

Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#opendocklink

To view two or more of the tables opened in the last exercise at the same time, use the docking features. Tables can be detached from a centrally docked position and docked to the side, above or below another table – or dragged to a different monitor. Forms, images, external web sites, maps, query tools and others are all dockable.

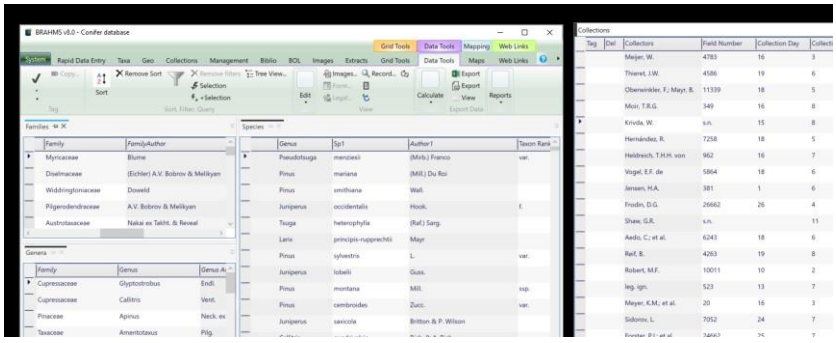
Positioning tables and other items takes a little practice - there are many potential docking arrangements. The tasks here assume one monitor – but if you have two or more, take advantage of these to display tables and other screens fully undocked.

- Drag table tabs to undock them. Initially, it can be a little tricky to grab the tab correctly. When you drag any table to undock it, a series of yellow 'docking boxes' appear.
- Drop the table on one of these docking options – the central box redocks the table as it was.
- As a first try, drag the genus table and re-dock this by placing and releasing your mouse pointer over one of the yellow docking points. Repeat for the species table.

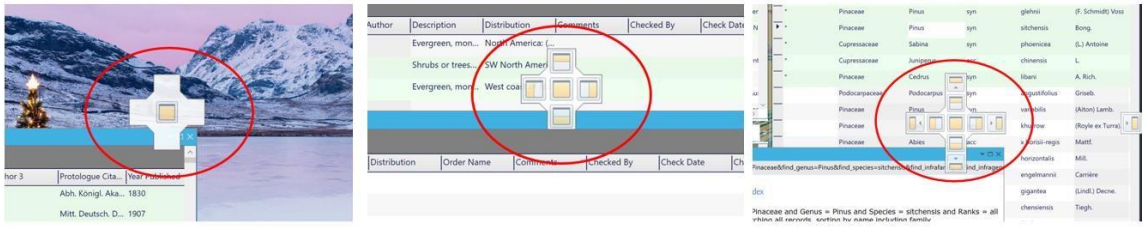


Here the genus table has been undocked and is floating above the other tables. And the species table is about to be docked to the right.

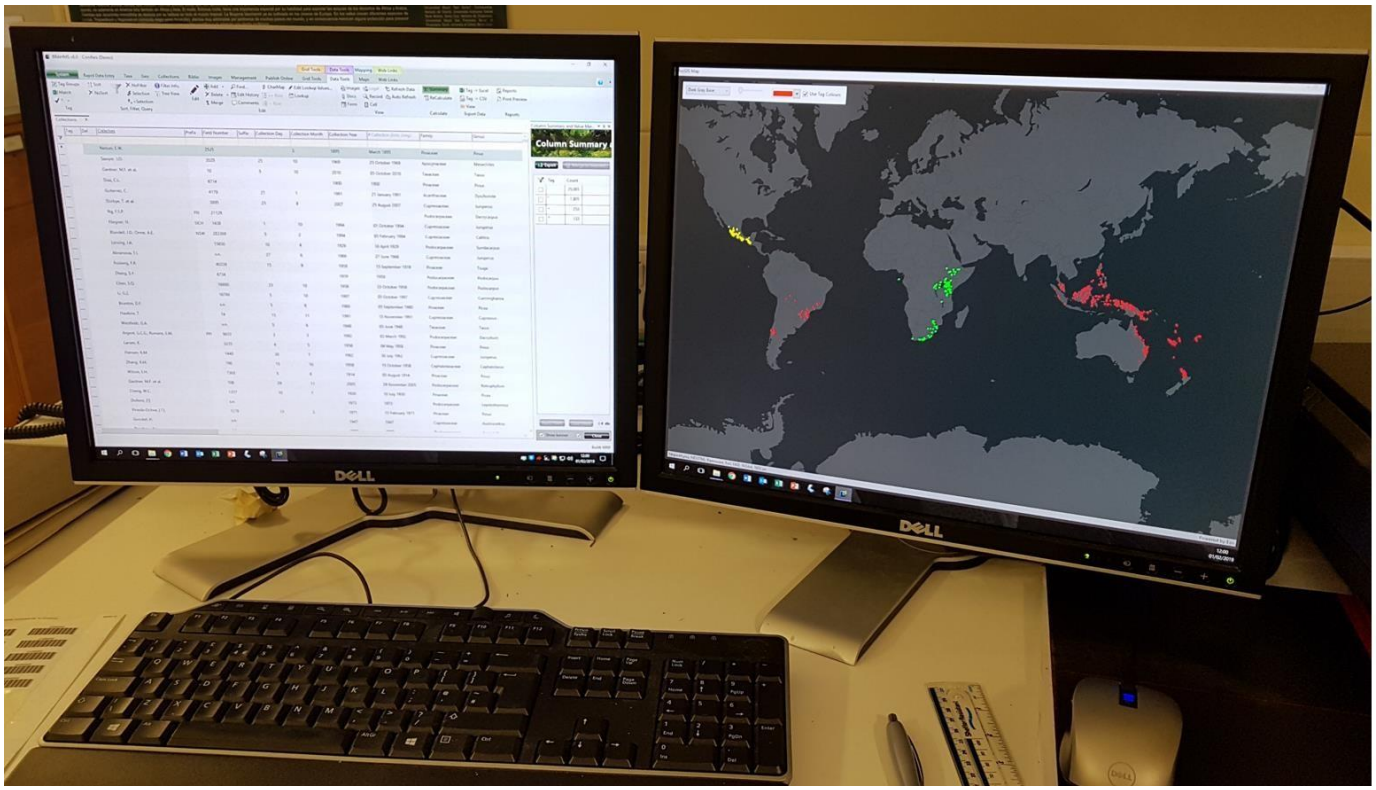
- Repeat this with the collection events table, docking elsewhere or moving it to a different monitor.



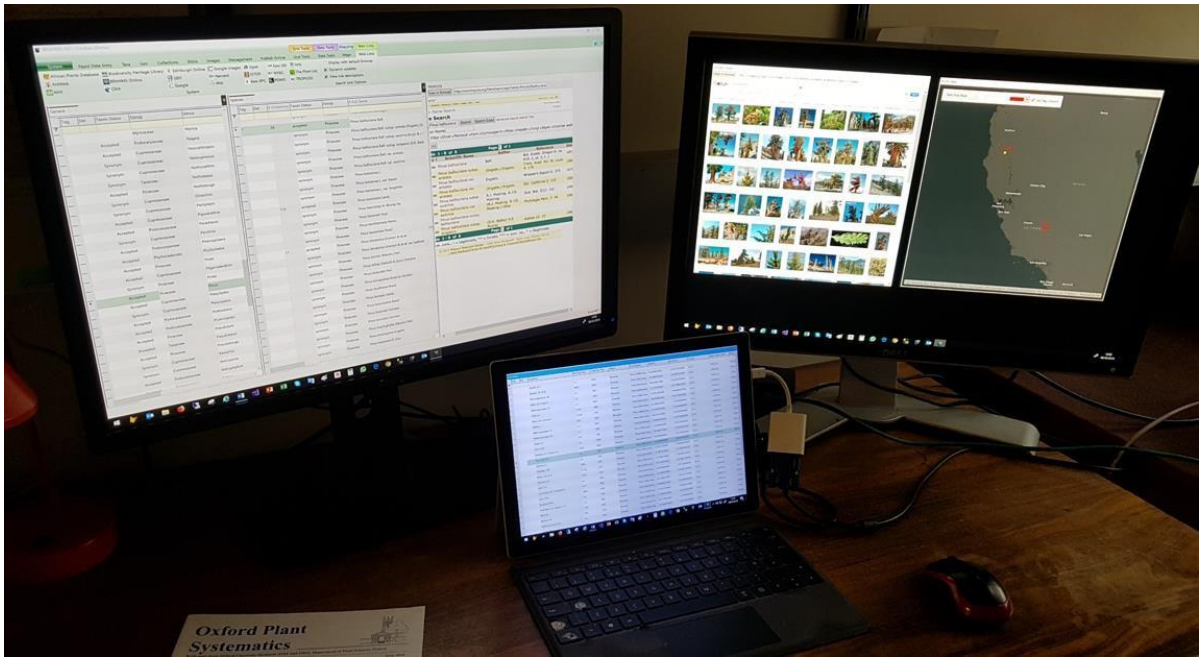
The various tables rearranged with collections events dragged off the main application



The yellow docking points appear when you drag a table from a docked position.. Docking options vary depending on the windows opened. Some experimentation is required.



Map screen undocked and dragged to separate monitor. In this example, data records have been tagged using different colour symbols, these reflected on the map. A column summary on the Tag column is also active and docked to the right of the main grid.



Left monitor with genus and species tables docked next to the TROPICOS Weblink. The collection events table is shown in the lower small screen and an ArcGIS map with Google Images on the left monitor. The events table is set to update to the selected species record – together with the map and the images.

Task 5: Short cut keys (F-Keys)

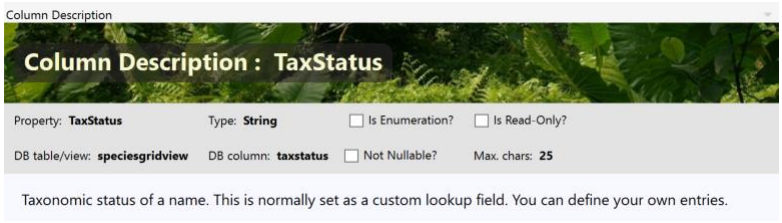
It may be useful to print this page at it lists all the handy shortcuts keys to help speed up activities across all database tables. You can also open this list using **Shift +F1** from any active grid.

Function keys

Modifier	Key	Action
	Delete	Toggle records delete flag and move to next record
	End	Go to last column
	F11	Toggle advanced query tool visibility
	F4	Copy field from record below (edit mode only)
	F5	Refresh data grid
	F6	Toggle records tag and move to next record
	F7	Toggle Zoom visibility
	F8	Toggle column manager visibility
	F9	Open value look-up for a read-only field if available (edit mode only)
	Home	Go to first column
	PgDn	Scroll down
	PgUp	Scroll up
Alt	F11	Create grid column range filter
Alt	F2	Toggle Sigma summary (+) visibility
Alt	I	Copy and increment numeric field from record below (edit mode only)
Alt	M	Toggle magnifier window
Alt	V	Toggle visibility of record verification tool.
Alt	X	Close the active grid view
Alt	Z	Toggle Zoom visibility
Alt, Control	Z	Toggle grid cell content viewer visibility
Control	E	Toggle edit mode for the current grid
Control	End	Go to last row and column
Control	F11	Deactivate all currently applied filters
Control	F2	Toggle Sigma summary visibility
Control	F4	Copy current record to a new record (edit mode only)
Control	F5	Remove any existing sorts
Control	F6	Untag all records in the grid
Control	G	Toggle visibility of grid data grouping area.
Control	H	Toggle Find and Replace
Control	Home	Go to first row and column
Control	I	Field Help...
Control	K	Copy current cell value to clipboard
Control	L	Open value look-up for a read-only field if available (edit mode only)
Control	N	Add a new record
Control	P	Toggle grids print preview visibility
Control	R	Toggle Reporter visibility
Control	T	Show tagged records only
Control	U	Show my data only
Control, Shift	?	Show related data record counts
Shift	F1	Toggle this list of shortcuts
Shift	F11	Set current cell value as a quick filter
Shift	F12	Append current cells value to quick filter list
Shift	F2	Toggle grid form visibility
Shift	F4	Copy and increment numeric field from record below (edit mode only)
Shift	F6	Tag all records in the grid
Shift	F7	Toggle grid cell content viewer visibility
Shift	F8	Cycle column autofit widths

Column Help

Using **Ctrl+ I** on any column open, you can see the properties of that column



Also, assuming you have database permissions, you can use Edit Description to add/edit the descriptive help text for that column (in any language).

Task 6: Data grid navigation, F-keys, Zoom, Context menu

Navigation

There are a few tricks to learn to move efficiently between columns and rows in BRAHMS data grids. BRAHMS draws data from your data store into the grids and presents these data with low-lag data virtualization, storing as much data as possible in memory. As you scroll up or down, the system retrieves the relevant data to memory and refreshes the opened grid.

- Close all the tables used in the previous task.
- Select **Collections > Collection Events** to open the events table. Activate the grid by clicking in any data cell. The default mode for data grids is read-only mode, nothing can be edited.

Action in non-edit mode	**Keys**
Move to the next / previous column	Right / Left Arrow
First/Last column	Home / End keys
First/Last row	CTRL Home / CTRL End
Next /Previous row	Down / Up arrow
Scroll up and down	PgUp / PgDn
Select or activate a column or cell	Click in the cell
Action in edit mode	**Keys**
Move to the next / previous column	TAB / Shift TAB
Next /Previous row	Down / Up arrow or use Alt+Arrows in memo or numeric fields

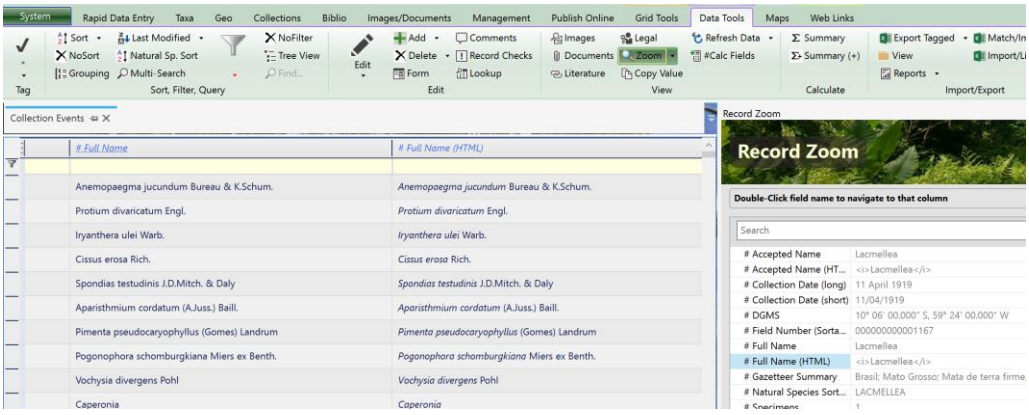
Function keys

The list of available keys is provided in a previous section. If you have not printrd out the list, you can open using **Shift+F1**. Some examples:

- Press **F6** several times to tag a few records. Pressing **F6** on the same records will un-tag them.
- Press **Ctrl+T** to set a filter on the tagged records.
- Press **Ctrl+F11** to remove all filters.
- Press **Ctrl+E** to enter edit mode. **Ctrl+E** again to exit edit mode.
- Press **Alt+X** to close the current table.

Record Zoom to sum record and to quickly go to a column

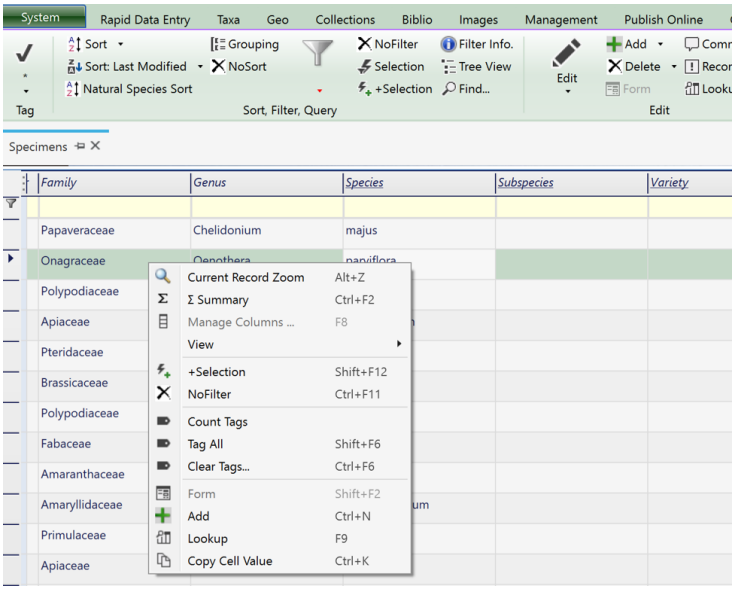
The record **Zoom** function is a great way to summarise and view the current record in any table – but you can also use it to navigate to a column.



Double-click on the Zoom field header name e.g. '# Full Name (HTML) to go to that column. If it is not visible, it will be made visible.

Using a right-click on data grids for context menu

Right-clicking on data grids opens up a short-cut menu to widely used options.



The functions offered here are all available on the main toolbar. Most have shortcut F keys.

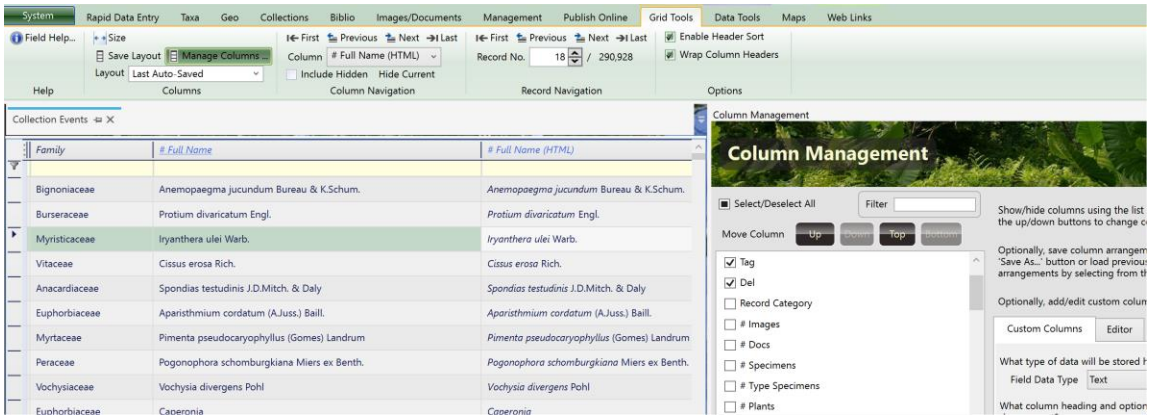
Task 7: Column Manager

Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#columnviewvideo

Selecting fields to view

When you open a table, the default data grid columns will be visible. You can adjust and save new column views using the **Column Management** options. This applies to all tables. Selecting a particular set of visible columns is a handy way to view selected data and speed up specific editing tasks.

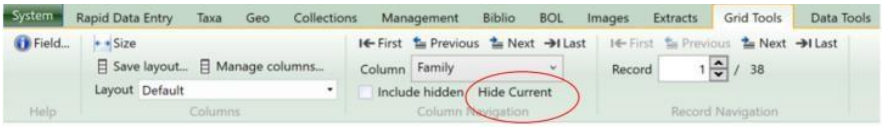
- Select **Collections > Collection events** then **Grid Tools > Manage Columns.** You can also use **F8** or a right-click on the data grid to open the Column Manager. In practice, using **F8** is usually the fastest way to open the form.



The Column Management Tool allows you to select visible columns. You can use the Filter option at the top of this form to locate columns by name. Note that there are options to move the field positions.

Another way to adjust visible columns and field order is to right-click on any of the column headers. This opens a dialogue form with options to show hidden columns and alter the column order. You can also drag column headers to change order and size. And here's another handy way to hide columns:

- Click anywhere on the **Family** table to make it the active table. Now click in a field you want to hide. Select the **Grid Tools** tab and then **Hide Current** – this hides the selected field.



Saving a view

You can save a view using **Save layout** on the Column Manager form itself or from the **Grid Tools** toolbar. This will create a small *data grid view* file with a file extension '.dgv'. The file is saved to your Documents\BRAHMS\Columns folder. You can create as many views as you want, choosing the view using the **Layout** dropdown. You can share views with all user on your BRAHMS database by copying the .dgv file to the designed Shared folder as specified in your set up options.

Deleting a view

Deleting a .dgv file from the Columns folder will remove it from your list.

Task 8: Querying the database

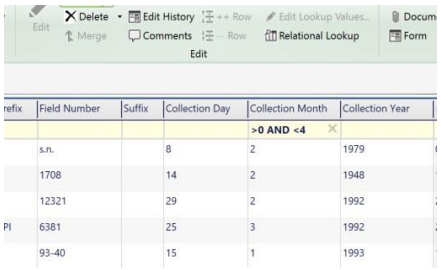
Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#datagridfilters

Using the data grid filter row

See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#explore

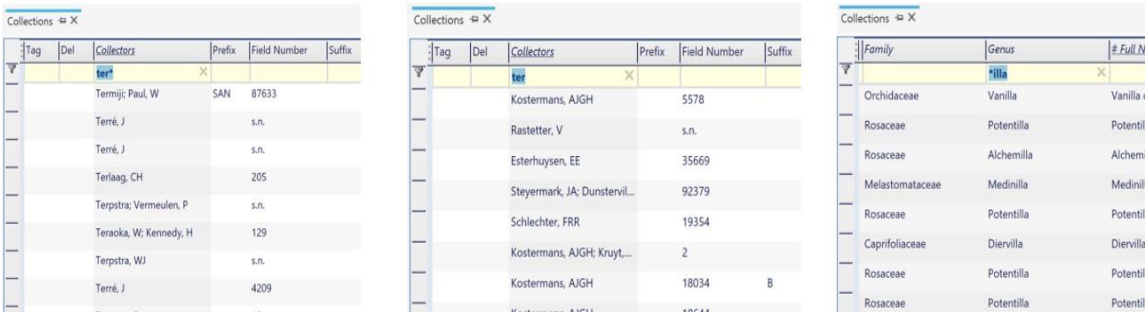
- Open the main file collection events table using **Collections > Collection Events**.
- Enter values into the yellow grid filter row as shown below. You can use operators *, =, <, >,<=, >= and combine values using capitalized AND/OR statements. You can use keywords NOT and NULL. <> means not. Thus, adding <> NULL shows non-empty records. The grid filter bar is an efficient way to apply single or multiple filters and locate records. Note that you must use capitalized key words such as AND and OR.

Using the grid filter row, you can add values to as many columns as needed. For text strings, the default filter mode is 'includes'. Use = to make a precise match.



An example in the Month field using the operators < and >.

- You can use * to select 'starts with' and 'ends with', thus:



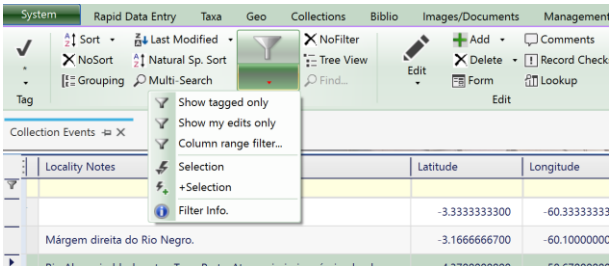
Setting a filter where collector name starts with 'ter (left) or includes 'ter' (centre) and right, where the genus ends 'illa'.

Using Selection and +Selection

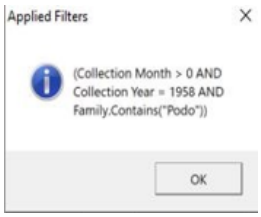
You can set filters on current cell values using the **Selection** and **+Selection** options.

- Open the main file collection events table using **Collections > Collection Events**. Set a filter on a cell value by clicking on the value and then the **Selection** toolbar. This option overrides any previous filters.

- You can add multiple cell-based queries using the **+Selection** option. As soon as you select **Selection** rather than **+Selection**, the filter will be again restricted to a single value.



Using the Selection options on the Filter dropdown. On the same dropdown, you can use the Filter info option to check filter settings.

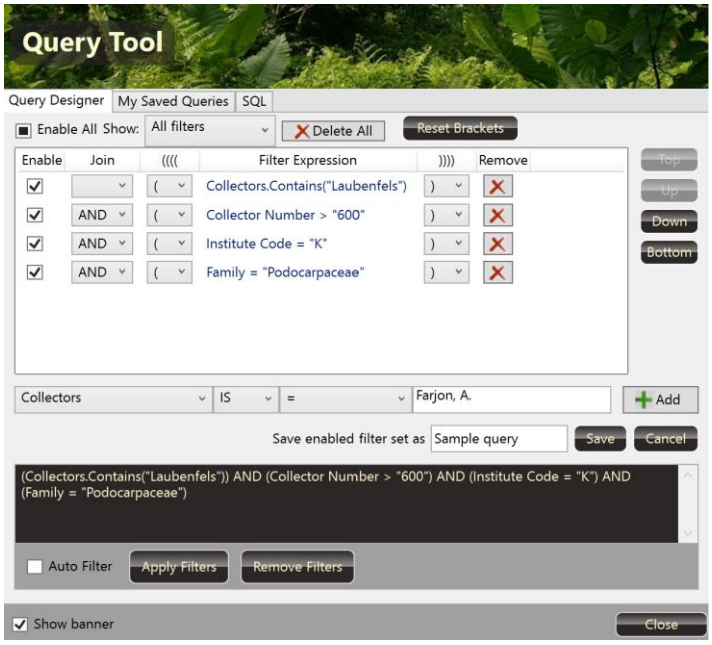


Checking filter settings

The main Query tool

Using the main query tool , you can create and save commonly used queries. Refer to the Find, Filter and Query section of the main guide https://herbaria.plants.ox.ac.uk/bol/content/software/v8/BRAHMS_Manual.pdf

The Query tool can be a faster way to run queries, especially in large databases and where you are using > 1 query parameter. This is because the query is sent to the database in one go rather than as separate queries (as is the case with the grid filter row).



Task 9: Calculated fields

What are calculated fields?

Many BRAHMS tables have fields which are calculated. These usually start with #. Many are numeric totals. Most of these fields are not automatically updated – there is a special recalculation tool used to update them. This tool can be auto-run overnight using a Windows Task but this Task is not further discussed in this guide.

Numeric totals examples:

- Most tables: # Images - total number of images linked to the current record.
- Species table: # Collection Events - total number of collection events per species.
- Country table: # Species – total number of species collected per country.

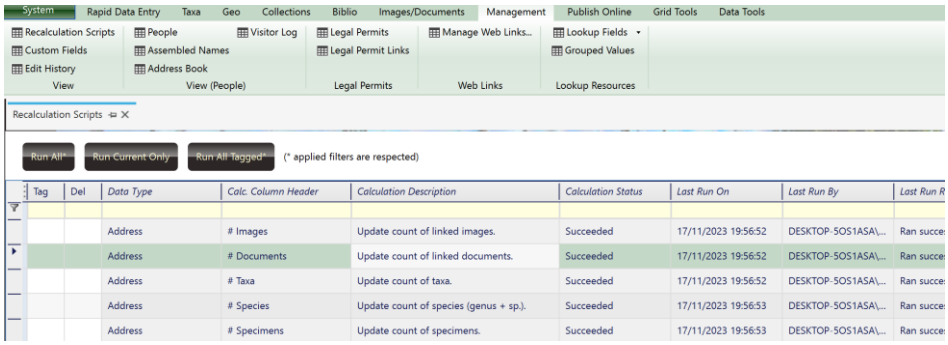
Text examples:

- Species table: # Full Name – the full species name calculated based on your set up options.
- Species table: # List Syn. A-Z – a list of synonyms for the current species record.
- Gazetteer table: # Full Gazetteer – a collation of text fields from country to location name.

Updating calculated fields

To update all # Calc Fields for your database:

- Select **Management > Recalculation Scripts**
- Then select **Run All** which will update # Calc Fields for the entire database. This process may take a few minutes in the conifer demo database.

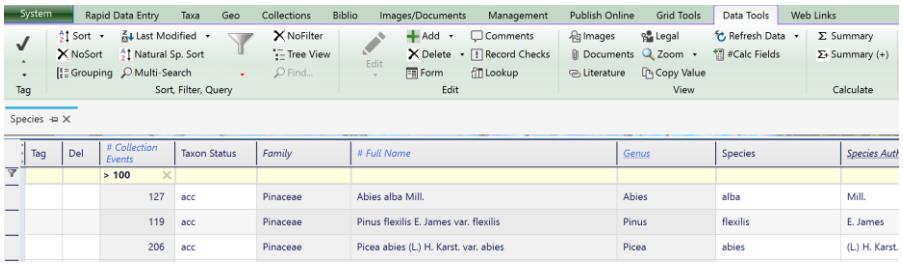


Use Run All to update all Calc Fields in your database.

Viewing #Calc fields

Most calculated fields, by default, are not visible in the tables. You need to select the ones you wish to view in the data grids.

- Select **Taxa > Species** and then you can open the **Column Manager** (as in the previous task) to add one or more # fields.
- You can also use **# Calc Fields** on the Data tools toolbar to view all # Calc Fields per table (on/off toggle).



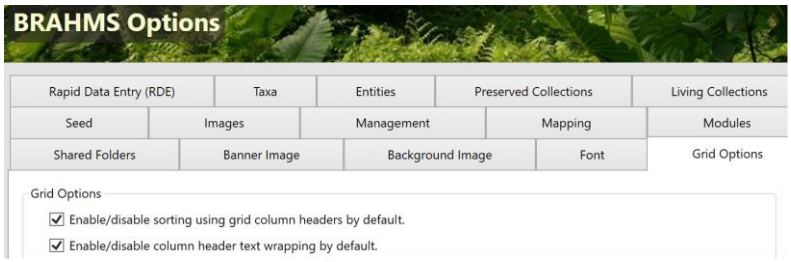
Using a grid row filter on a #Calc Field in the species table – showing species that have > 100 collection events.

Task 10: Sorting Records

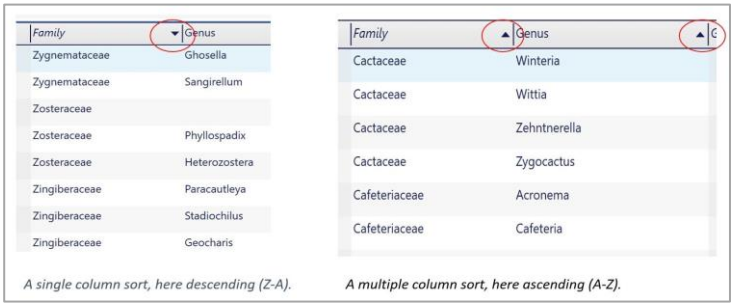
See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#sorting

Sort on single or multiple data grid columns

If column sorting is enabled, tables can be sorted on single columns by clicking on the column header, Shift Clicking on multiple column headers … or using the Sorting Tool. To use header-click sorts, make sure this option is enabled by setting *Enable Header Sort* on the Grid Tools toolbar. You can also set this on by default for all tables in **System > Options > Grid options**.

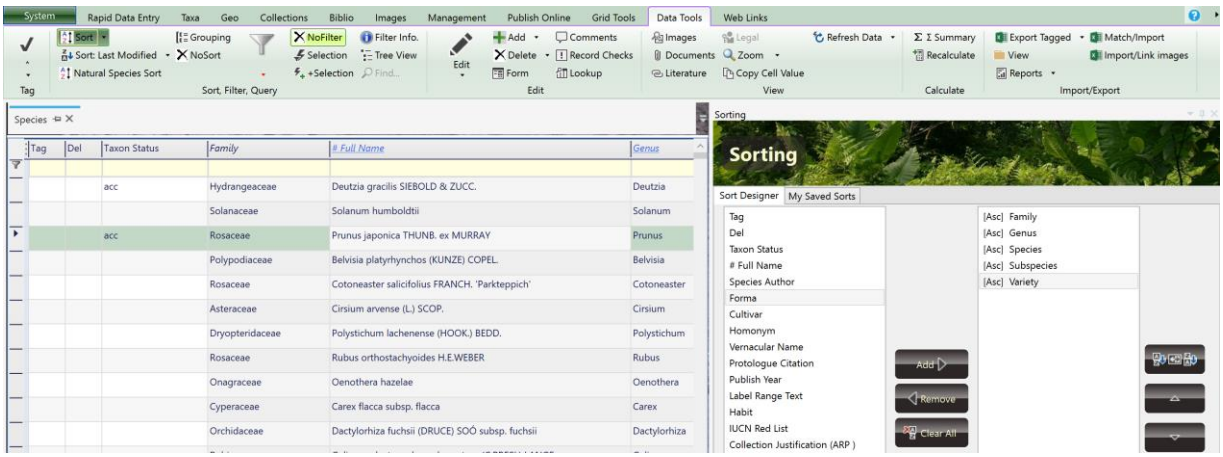


- Select **Taxa > Genera** to open the main genus table.
- Click once on the Family column header to sort A-Z. Click the same column header again to sort Z-A. Click a third time to remove the sort.
- You can combine as many columns as needed using **Shift Click** on columns headers.



Saving complex sort commands

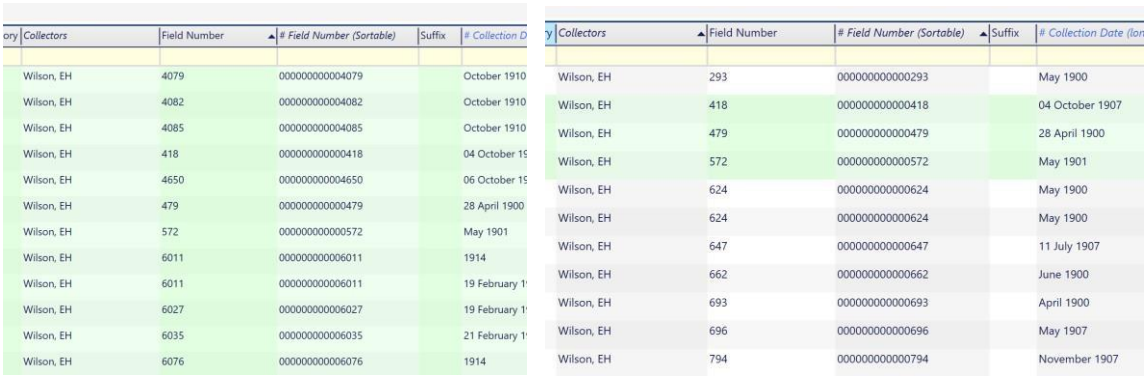
Using the **Sorting tool**, you can add fields of any type to create complex sorts. You can save these sorts using the **Save** option provided.



Using the sort form, any combination of character, numeric, date and logical field can be selected to sort your records. Complex commands can be named and saved for future use.

Sorting collection events by collector and number

Collection event field numbers are alphanumeric and thus, by default, sorting the field number column AZ gives an incorrect sort order.



Collectors	Field Number	# Field Number (Sortable)	Suffix	# Collection D
Wilson, EH	4079	000000000004079		October 1910
Wilson, EH	4082	000000000004082		October 1910
Wilson, EH	4085	000000000004085		October 1910
Wilson, EH	418	000000000000418		04 October 19
Wilson, EH	4650	000000000004650		06 October 19
Wilson, EH	479	000000000000479		28 April 1900
Wilson, EH	572	000000000000572		May 1901
Wilson, EH	6011	000000000006011		1914
Wilson, EH	6011	000000000006011		19 February 1
Wilson, EH	6027	000000000006027		19 February 1
Wilson, EH	6035	000000000006035		21 February 1
Wilson, EH	6076	000000000006076		1914

Collectors	Field Number	# Field Number (Sortable)	Suffix	# Collection Date (lon
Wilson, EH	293	000000000000293		May 1900
Wilson, EH	418	000000000000418		04 October 1907
Wilson, EH	479	000000000000479		28 April 1900
Wilson, EH	572	000000000000572		May 1901
Wilson, EH	624	000000000000624		May 1900
Wilson, EH	624	000000000000624		May 1900
Wilson, EH	647	000000000000647		11 July 1907
Wilson, EH	662	000000000000662		June 1900
Wilson, EH	693	000000000000693		April 1900
Wilson, EH	696	000000000000696		May 1907
Wilson, EH	794	000000000000794		November 1907

*As can be seen here on the left, sorting these Wilson, EH collections on **Field Number** gives a bad result. This is resolved using the calculated field # Field Number (sortable) shown on the right which pads the number field with zeros.*

- To display this field, select **Grid Tools > # Calc Fields**
- You could now sort the collection events table on the Collectors + Field Number (sortable) fields but in reports, still refer to the column Field Number. NB If you do not see data in the sortable field number field, use **Data Tools > Calculate > Recalculate**.

In reports, you can auto-sort on the Field Number field avoiding the need to use the above calculated field. The procedure is explained in https://herbaria.plants.ox.ac.uk/bol/content/software/v8/brahms_manual.pdf section Reports and Report Templates > Sorting alphanumeric fields numerically in reports.

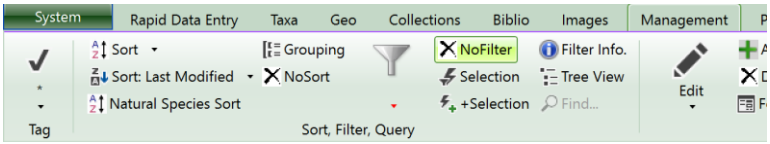
Date sorting

Records can be sorted on date fields. For example, you can sort on the audit fields *Created By, Created On, Last Modified By* and *Last Modified On* and such sorts are useful for a variety of purposes.

When you add a new record, the data grid is auto-sorted on the *Created On* field. But you may find it useful to sort on this field (click on field header) at other times, perhaps in combination with other fields.

For example, to view records most recently added, you can sort on *Created On*, clicking the column header twice to bring the most recently added record to the top of your data grid.

If you want to sort collection events by date, sort on year, month and day in that field order, shift clicking on fields for multiple selections.



You can also easily sort on the Last modified date, or using the dropdown on that toolbar option, Date Created.

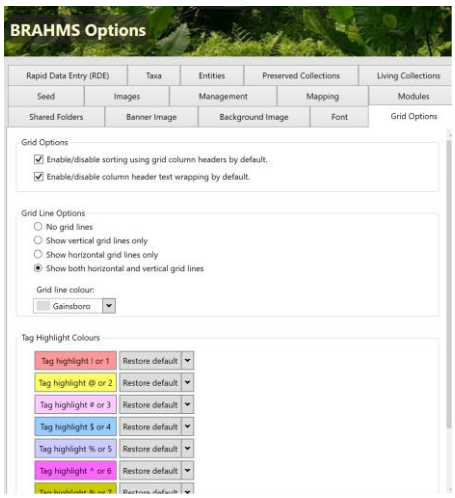
Task 11: Tagging functions

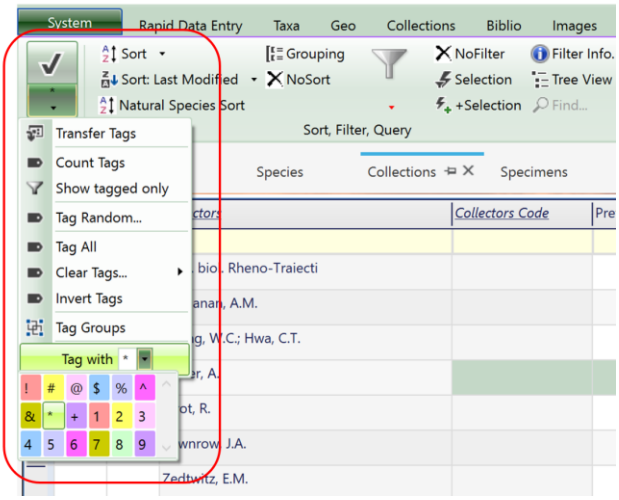
See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#tagging

Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#tagsandmaps

Tagging records

Tagging refers to the addition of a single character to the TAG field. This field is available in all tables in the first column. Tagging has multiple uses throughout BRAHMS with record selection and grouping. While the default tag symbol is *, you can tag records with different symbols or numbers. Each of these can be assigned a colour. Tags are user-specific, thus one users' tags do not interfere with those of another working in the same table.



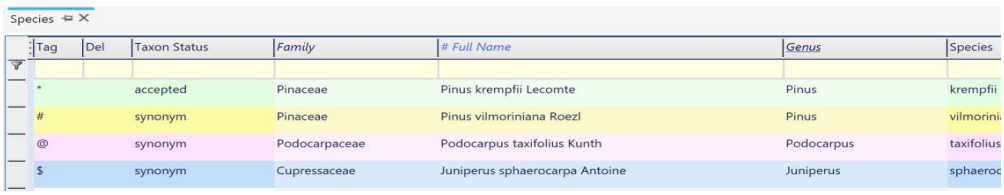


- Select **System > Options > Grid Options** to edit the default colour options.
- Clicking on the **Tag** option on the **Data Tools** toolbar (or using **F6)** adds the selected symbol to the TAG field.

Tag related options

The Tag toolbar dropdown provides a list of handy tagging options:

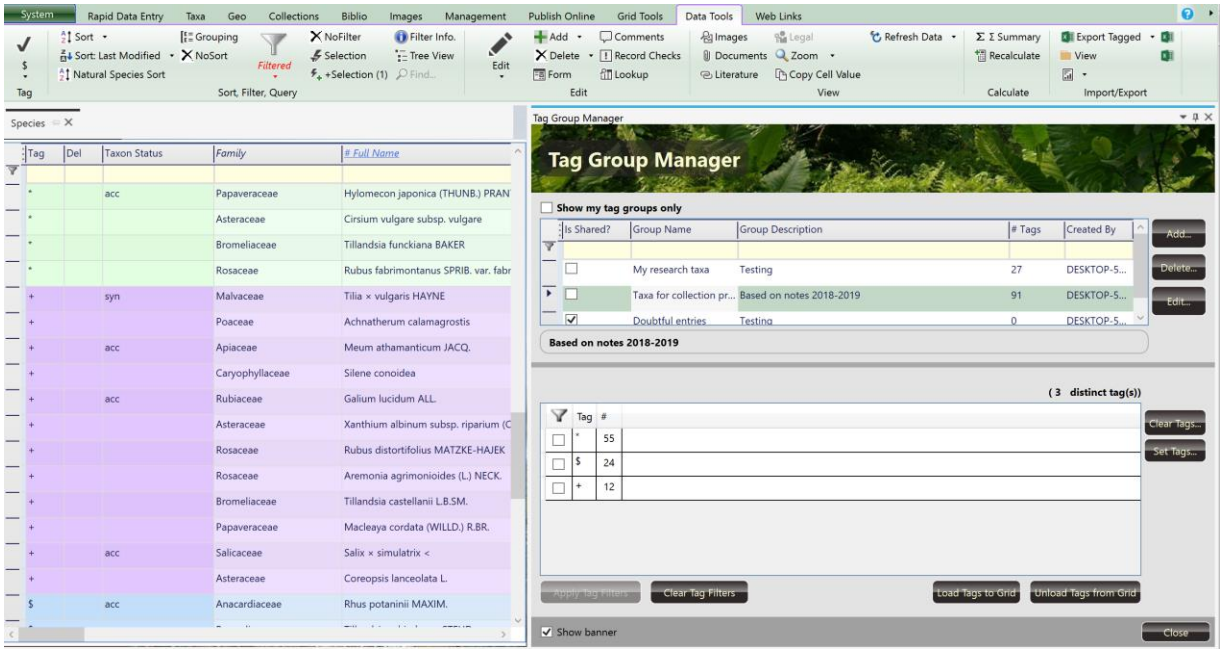
Transfer tags	Copy tags to parent or child tables.
Count tags	A count of all tagged records.
Show tagged only	Show only tagged records *
Tag Random	Tag a specified number or % of records.
Tag all	Tag all records in table – respecting any filters
Clear all grid tags	Remove your tags from all tables – does not respect filters
Clear current grid tags	Remove your tags from the current table – respecting current filters
Invert tags	Tagged records are set to no tag; records that had no tag are tagged *
Tag Groups	Create a saved group of tagged records.
Tag with	Choose tag symbol from list.



Records tagged with a variety of symbols.

Tag Groups

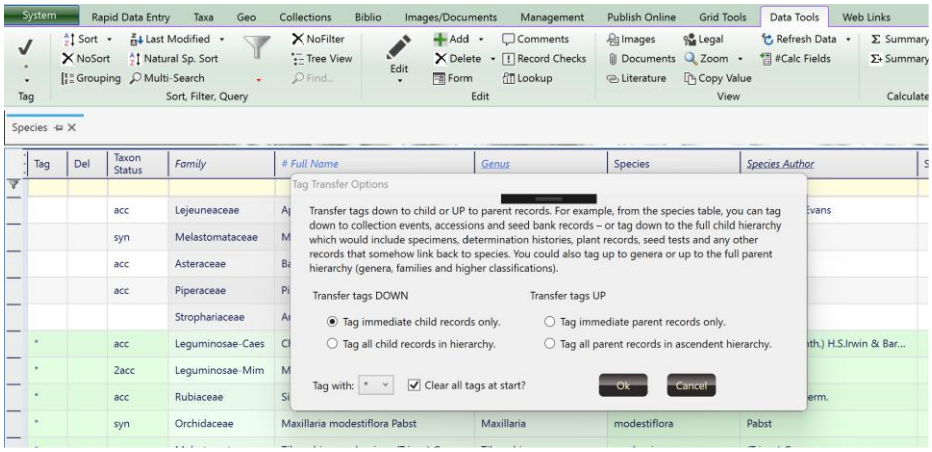
By using **Tag > Tag Groups**, you can create and save 'groups' based on your tagged records. Tag groups can be shared with other users.



Some sample tag groups in the species table. One of these groups (Doubtful entries) is shared and thus can be seen by other database users.

Tag Transfers

Tag > Transfer tags provides options to copy tags to related tables, either up or down a data hierarchy. This tool has multiple applications throughout BRAHMS.



For example, in the species table, tagging down would copy tags to child records including collection events and living accessions. By select the 'Tag all child records', the tags will also be copied to the plants, specimen and determination history tables – and any others in the hierarchy.

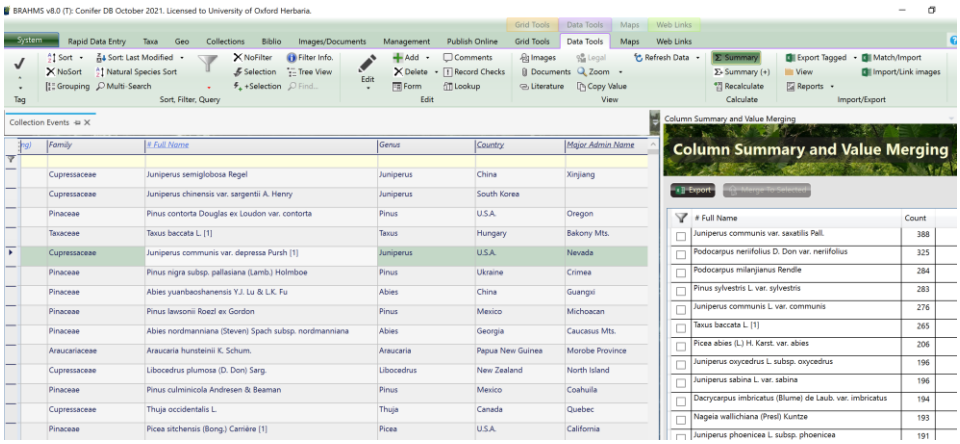
Task 12: Summaries by data column

See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#colsum

The column summary option lists the different values in the selected column, providing the total number of records per value.

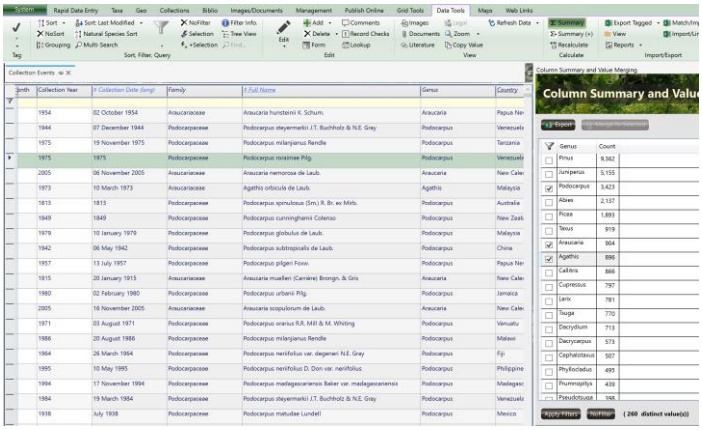
Summary for single columns

- Select **Collections > Collection events**.
- Locate and click in the column # Full Name and then select the **Summary** option on Data Tools. If you do not see the summary option, refer to the section on small screens.



*Here, the summary shows the number of collection events per species. Moving to a different column will update the summary, assuming **Auto-update on column change is selected**. Click on the summary columns to sort by field name or count.*

Apply filters on one of more values



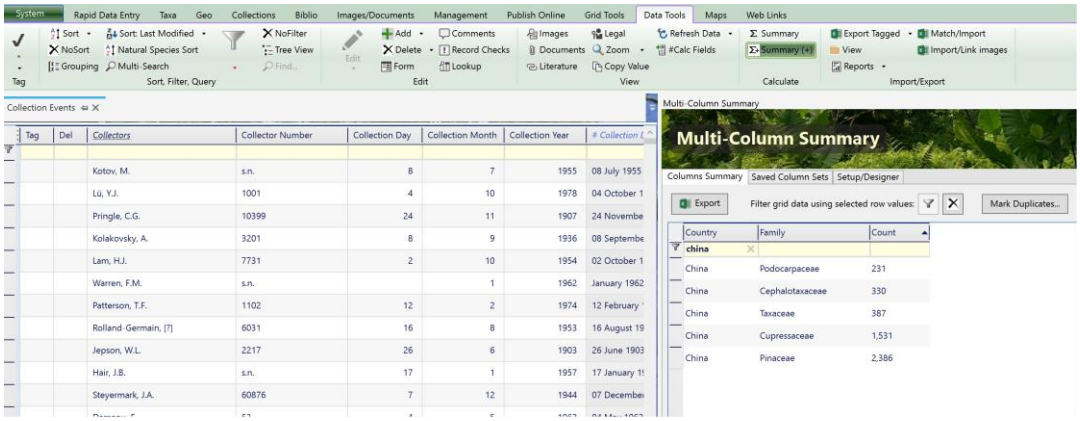
*The summary option can also be used to apply filters on one or more selected values. Y*ou can save a summary list to Excel using the **Export** option provided on the summary form.

Multi-column summaries

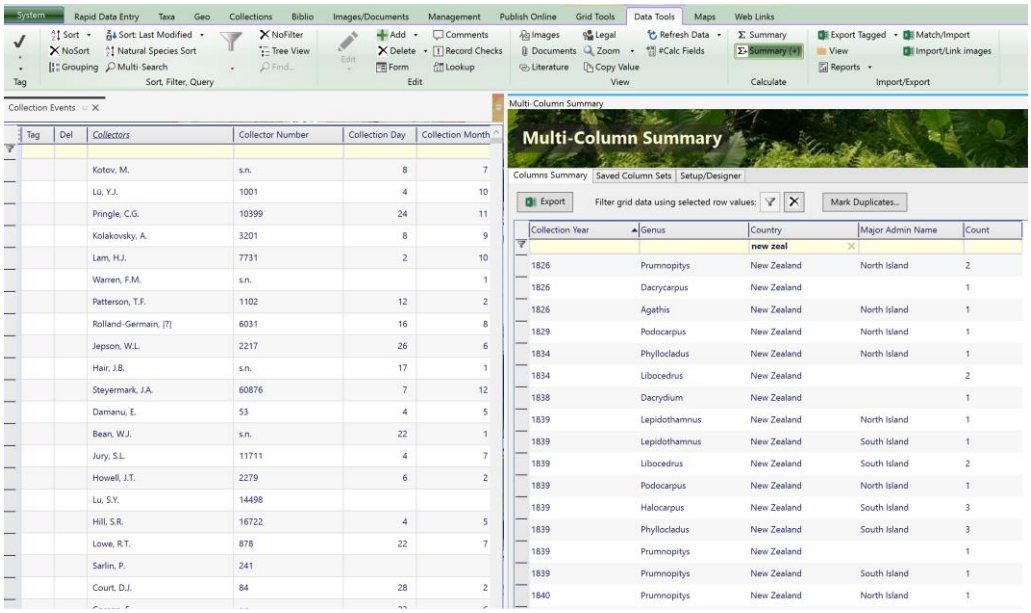
You can also create summaries on 2 or more columns as selected from your visible columns list.

As an example based on data in the conifer training database, you may want to know how many collections were made per country per family.

- Select **Collections > Collection events**.
- Make sure the columns you need are visible. If not, use the Column Manager to enable them.
- Select **Summary (+)** on the **Data Tools** toolbar.
- Using the options provided, add the columns that you want to use to calculate the totals.
- Select **Load Summary**.



The list created can be sort and filtered. In this example, the China filtered list is sorted by total collections per family.



In this example, the number of collections per genus per year per region for New Zealand is calculated.

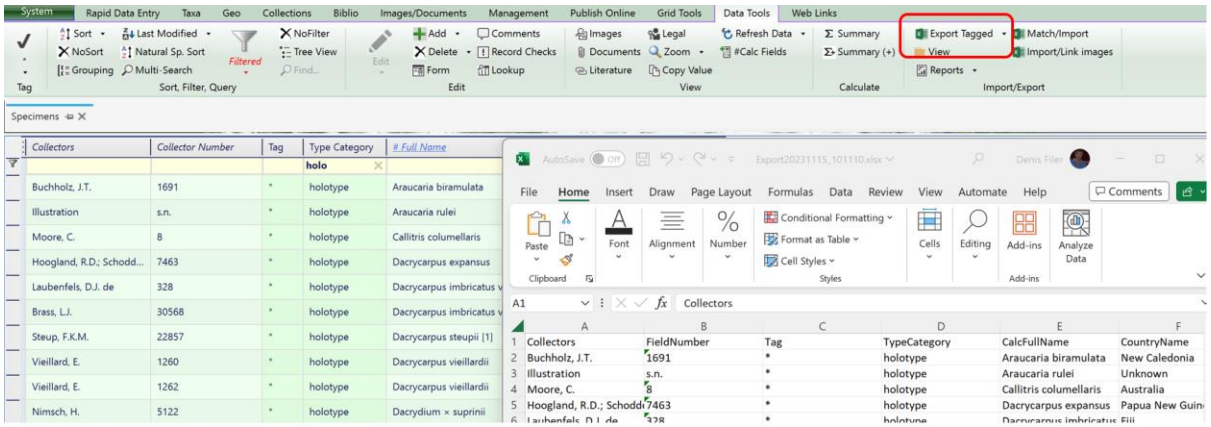
Task 13: Saving data to Excel

See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#exporting

Data are easily exported to Excel /csv spreadsheets using the **Export Tagged** option on **Data Tools**. Exporting works only with tagged records. Exports respect applied filters, your currently selected column view and any sorting you may have applied.

In this task, export specimen data from BRAHMS, sorted by family and species name, restricting the export to some columns and the filter selection to holotypes. Adjust filters as necessary, depending on your data.

- Select **Collections** from the main menu and choose 'Preserved Specimen' using the Category drop down.
- Select **Specimens** to open that table.
- Now press **F8** or select **Grid Tools > Manage Columns** and here you can remove any columns you don't want to export and sort the table as wanted.
- Locate the Type Category column and enter 'holo' in the filter bar to apply a filter on Holotypes.
- Select **Tag > Tag all** – this will tag records within your filter group.
- You can now use the **Export Tagged** option to save the tagged records. If you do not see the Export option, refer to the section on small screens.



Exporting tagged records to Excel.

You can list all saved files using the **View** option on the Export Data toolbar section.

Task 14: Adding and Deleting records

Adding records

New records are easily added to your database. If you are working on a non-personal database, you may need permission to add/edit data in different tables. But if you are logged in as Admin level to the training database, you will have full access to all functions.

Adding records efficiently in bulk is a separate process that uses the BRAHMS module called Rapid Data Entry (RDE). This is discussed elsewhere. This section looks at adding records one by one.

When you add a new record, the record will appear at the top of the table. The 'Added On' and 'Added By' database audit fields are updated for all new records.

- Select **Taxa > Species** to open the main species table.
- Select the **Add** option on the main toolbar. The system will automatically go into **Edit mode.**

Note: if you are not in **Edit mode**, all records will be read-only.

- When you add a record to the species table, the **Genus Selector** form auto-opens. This is because a genus name (even if indet.), is required. If the genus you want is not yet stored in your genus list, you will need to add that first using **Taxa > Genera**.

When you add a genus name to the species table, the family and any higher level classification is also added.

- You can now proceed to add in more data to the new record – for example the species name itself and infra names if you have.
- Using the toolbar **Form** option, you can add and edit data using the form rather than the grid. Forms are further discussed below.

The same procedures can be used to add records to all tables. There will be some variations as required fields will vary from table to table.

Deleting records

In all BRAHMS tables, record deletion is a 2-stage process.

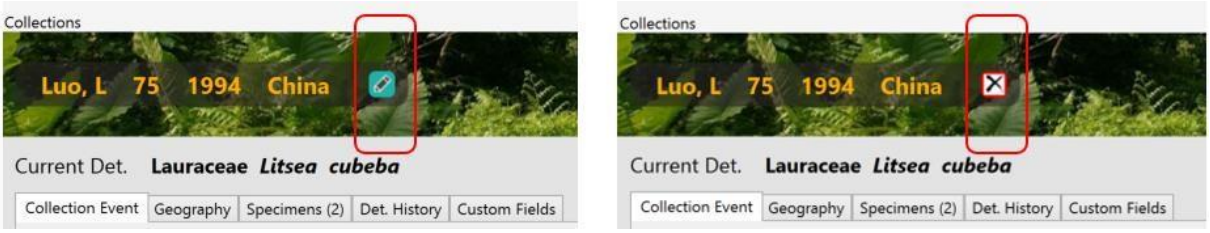
- Locate a record that you want to delete – it might be the record you have just added.
- Press the **DEL** key or click on the **X Delete** toolbar. Note that * is added to the DEL field and the record goes to strikeout font. All tables have a DEL field.
- The record is not yet deleted – it is only marked for deletion. You can reverse the above by removing the DEL field * manually, or by clicking again on **DEL** or the **X Delete** toobar option – when on the deleted record.
- To finally delete the record and indeed any other records that have the * in DEL, on the toolbar, on the toolbar, select **Delete > Remove records marked for deletion**.

If you delete a record that has children records – e.g. a species with linked collections, BRAHMS reports the consequences. For example, you may be warned that the species you want to delete has linked collections.

Task 15: Using forms for data entry and editing

Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#speciesformvideo

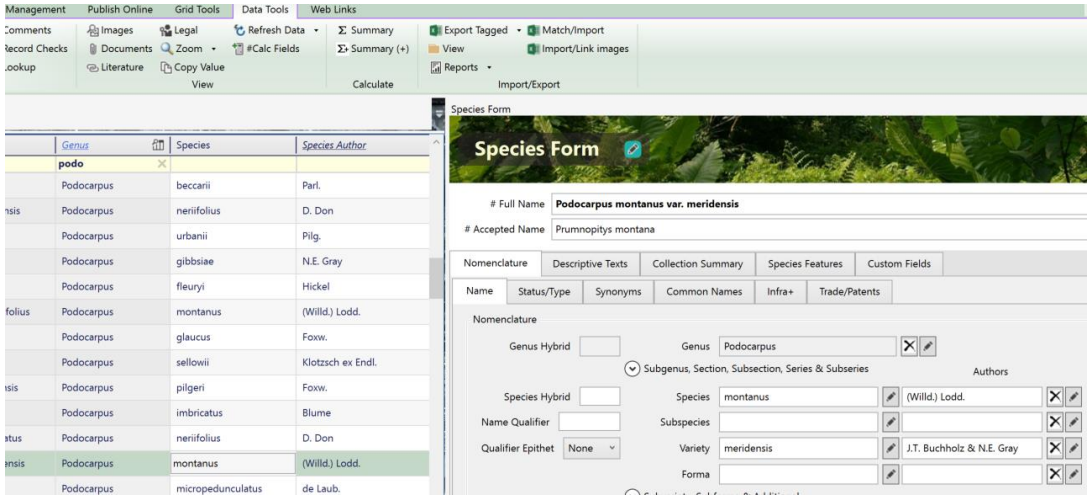
Forms are provided for most tables. They can be used for editing and often provide additional options to view and cross-reference data in other tables. Forms update as you move to new records. They can be undocked and re-sized. If you are not in **Edit mode**, data cannot be edited/saved.



The form icon indicates if you are in Edit mode or not.

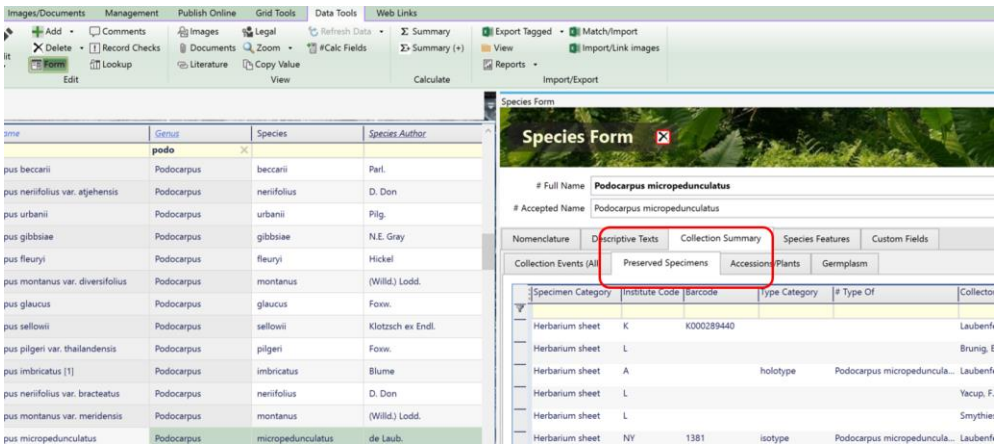
Most forms have the option to edit data and then **Save** or **Cancel** the edits made. Once any edits have been made, the form is given a red surround.

- Select **Taxa > Species** and then select the **Form** option on **Data Tools**.
- Review the various form tabs, moving through grid records to update the form data.



Data can be viewed and edited using grids or forms. Forms can be resized, docked or dragged to separate monitors.

- To hide unwanted fields on the species form, select **System > Options > Taxa > Species Form** and here you can choose to hide unwanted species epithets.



Summary of collections displayed from the main species form. Move to a new species in the grid to update the form.

Task 16: Using field lookups

When editing data, the challenge is to maximise efficiency. You can use function keys; some handy tools such as value merging; and using **Lookups**. Lookups minimise typing and help standardise your data.

There are two main categories of Lookup. Those that link to other main tables in BRAHMS such as species, place names and collection events. And those for all other fields such as habit, IUCN category and taxon status. These may be standard or custom fields.

Activating lookups

In this guide, you have already used a lookup when adding a new species record as this action opened the Genus Selector. You can activate the Genus Selector (and any other lookup in an appropriate field) by:

- Clicking on the Lookup option on the main toolbar.
- Pressing F9.
- Typing Ctrl+L.
- Selecting Lookup on the Right-Click context menu.

Using standard lookups

- Select **Taxa > Species** to open the main species table. Make sure you are in Edit Mode.
- On any record, click in the genus field and press F9 or use one of the other lookup options. This will open the Genus Selector allowing you to change the Genus name of the current species.

Another example:

- Select **Collections > Collection Events** to open that table. Make sure you are in **Edit Mode**.
- On any record, click in a geographic field such as Locality Name and use a lookup to select a place name.
- In the map field Latitude, use a lookup – this will open the Map Point Editor.

Registering lookup values in the central Lookup Fields table

Lookup values for all fields that have lookup capability (excluding those that link to other BRAHMS tables such as the genus name example above) can be registered manually or by importing from an Excel list. Lookup fields can be single or multi-value lookups. Here's an example with IUCN Red List categories:

Lookup for IUCN categories

If you are using the conifer demo database, the field IUCN is probably already registered as a lookup called IUCN. As a useful exercise, you can delete this lookup field and its values – and then re-add it.

- Select **Management > Lookup Fields**. Locate the field IUCN. If you press the option Show Field Lookup Values, you will see the list of IUCN categories listed.
- Assuming the field is present, mark this look entry for deletion and then delete the record. Refer to the general section on deleting records for help.
- Now select **Taxa > Species**. Locate the field IUCN Red List. If is not visible, switch it on using the **Column Manager** (F8). In the conifer database, Red List values (EN, VU, CR, etc.) are already added for most accepted names.
- In the species table, ensuring you have clicked in the IUCN field, select the main **Edit** toolbar dropdown and then select **Edit lookup values…** you will see how all of the existing values in the species table are listed on the left. You can use the options provided here to register some or all of the values as lookups. Once selected, close this form.
- If you now move to **Edit mode**, you will see the IUCN field is a dropdown where you select a value.
- If you now select **Management > Lookups Fields** again, you will see your newly registered IUCN lookup field.

Task 17: Create maps using the ArcGIS API

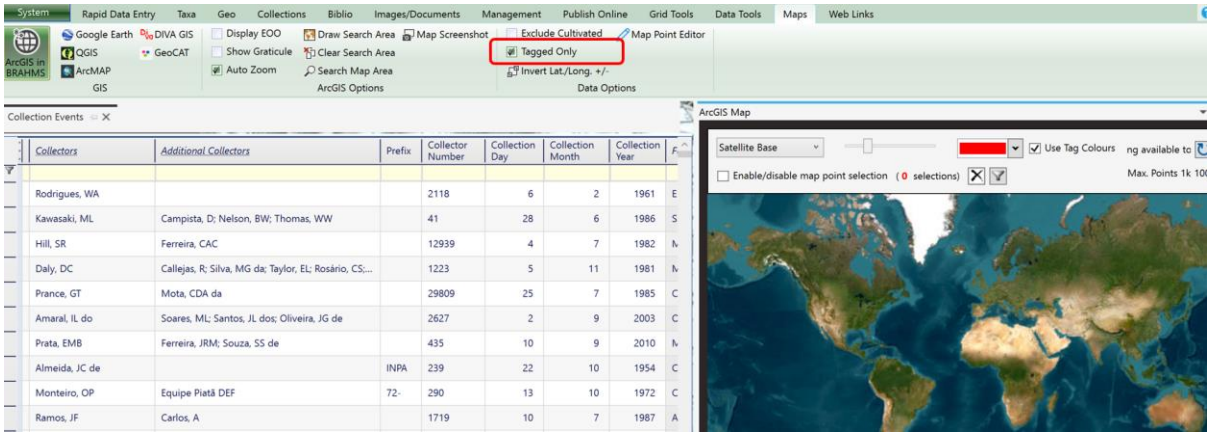
See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#mapping Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#mappingvideo

You can also map your data to ArcMAP, QGIS, DIVA, Google Earth and GeoCAT. These topics are explained in the manual. If you use QGIS, refer to the QGIS videos on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos.

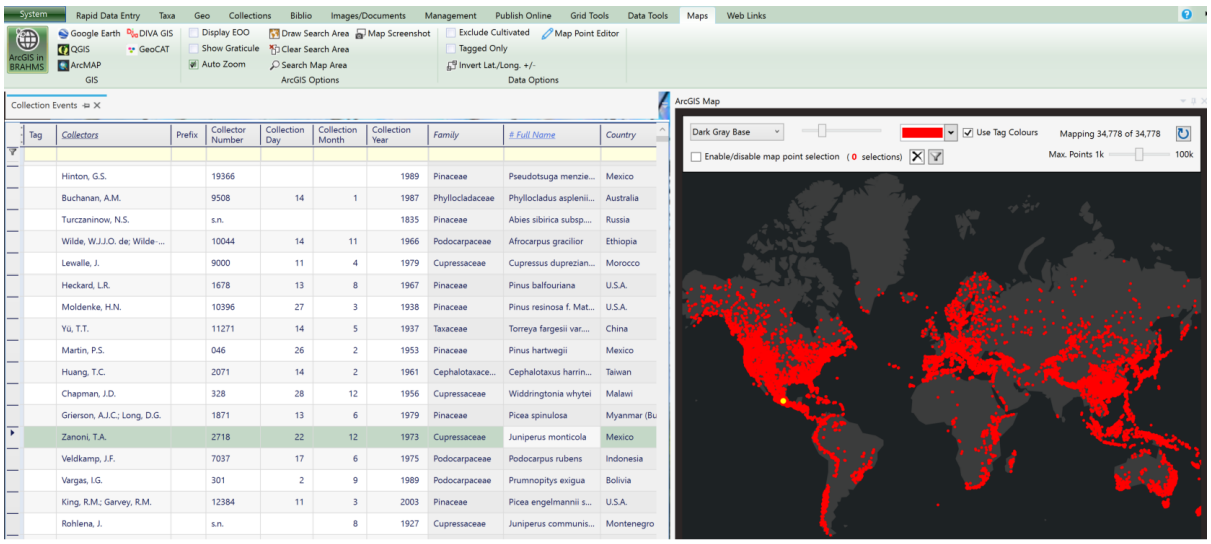
Internal mapper - advantages

The in-built ArcGIS API provides a wealth of handy mapping features which you can take advantage of without installing any GIS software. You do need to be online. Some advantages of the in-built ArcGIS tool: * No installation required; * data points are highlighted on the map as you browse through your data grid; * clicking on a map point locates the grid record, an excellent way to locate errors; * maps are auto-updated as you apply grid filters; * calculation of Extent of Occurrence (EOO); * selectable base map including world imagery; * map tagged only or map all; * exclude cultivated records; * search maps; * save map as a png file and import to a document.

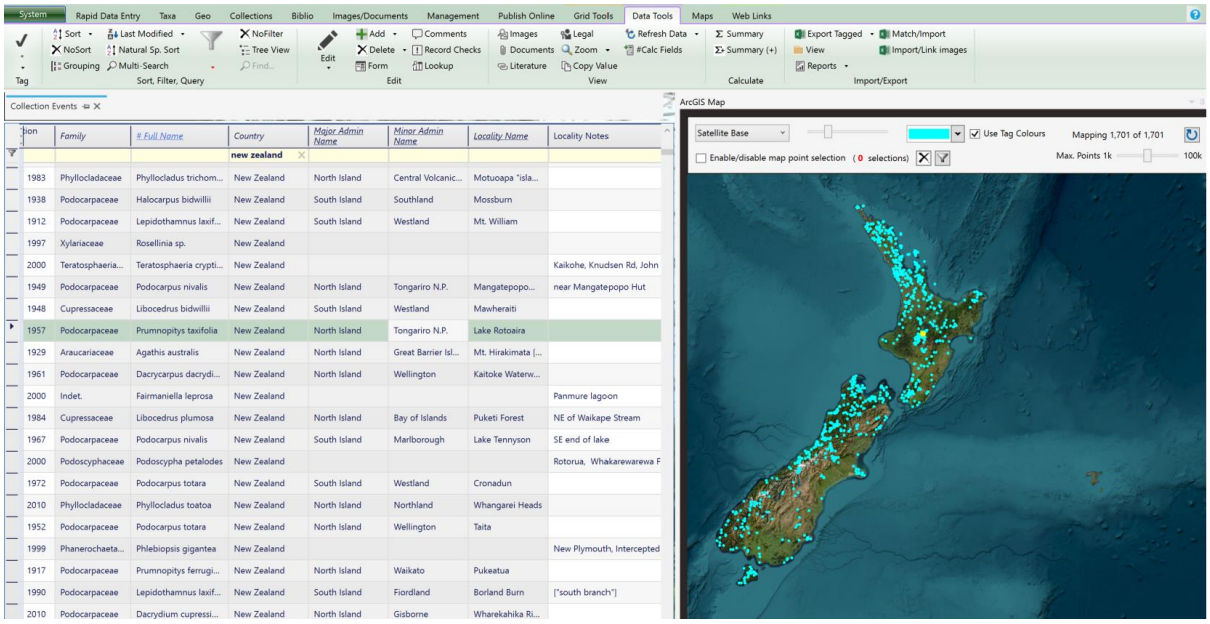
- Select **Collections > Collection events** then select **Maps** followed by **ArcGIS in BRAHMS**.
- Maps respect filters and, by default, will only plot tagged records.
- To plot records, tagged or not, adjust the **Tagged only** option.



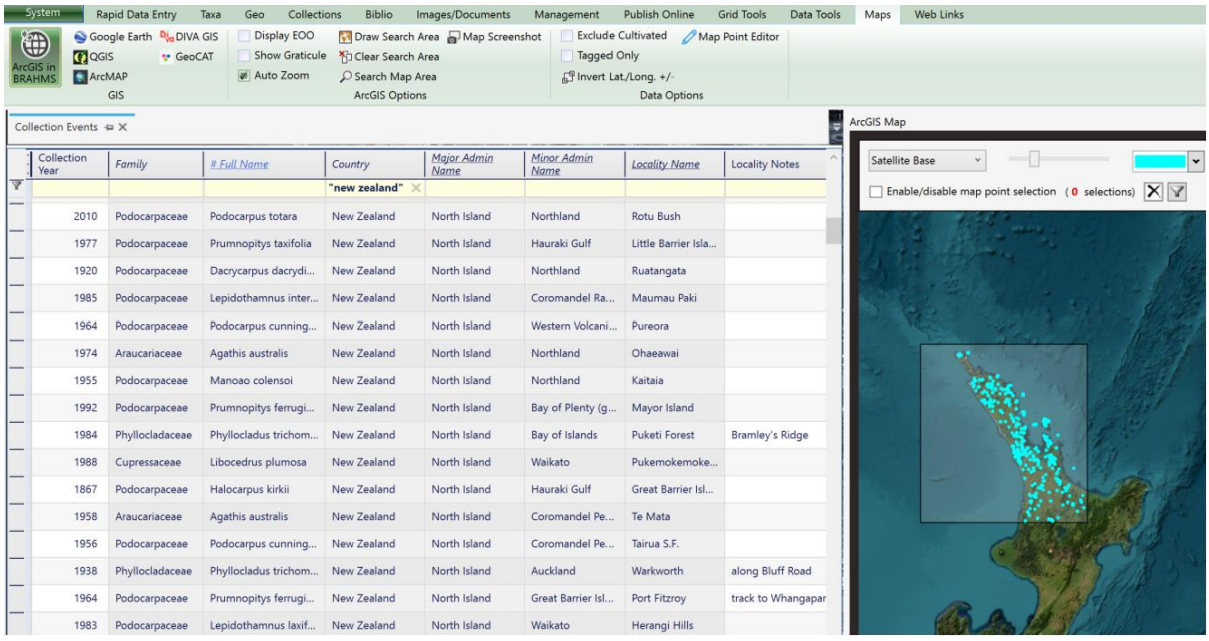
In the above example, nothing is mapped because there are no tagged records and the option "Tagged Only" is selected.



A map displaying all conifer collections. The setting here does not restrict to tagged records and a dark grey base map is selected. The current data grid record in Mexico is highlighted on the map with a yellow dot.



Here, a filter set on New Zealand with the base map set to World imagery. The point colour has been changed and the current grid record is highlighted.



Here the map toolbar options Draw Search Area and Search Map Area have been used. The records in the data grid have been filtered accordingly.

- To add a map image to a document, you can select **Map Screenshot** on the map toolbar. This creates a png file which you can easily import to your document.

Task 18: Images and Documents

See examples on https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8#images

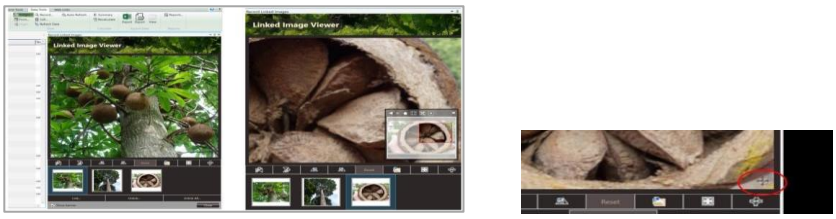
Images

Images can be linked to any record in BRAHMS. You can link multiple images to the same record. All images are listed in the central images table with their full pathname or web URL.

Images may be stored in any location including media libraries and on the cloud. Read more about managing images in BRAHMS. You can store links to images using a URL – no need to have a copy of the image file.

Images can be viewed from the main image file and/or wherever they are linked. As an example, you can link some images to a species:

- Select **Taxa > Species**. On Data Tools, select **Images…** to open the Image Viewer.
- You need to make sure you are in **Edit mode**.
- Now, you can either use the **Link …** button or drag images to the Image Viewer.

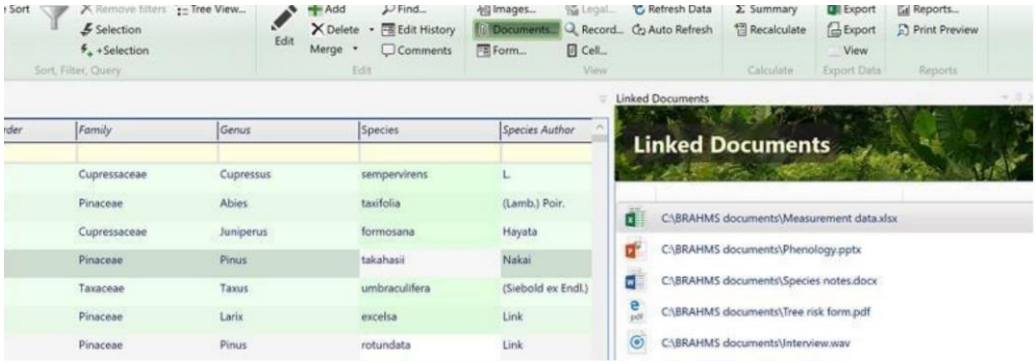


The Image Viewer has several handy toolbar options (Rotate, Zoom, etc.). You can also use F keys and your mouse to control the viewer, for example Shift + mouse wheel = zoom in/out around central point.

Images can be transferred from Excel files to RDE and also from RDE to BRAHMS.

Documents

Multiple documents of any type can be linked to records in BRAHMS. This could be a Material Transfer Agreement; a collection permit for a specimen; a protologue description linked to a species; a sound file linked to an animal entry; or perhaps a video or slideshow linked to a botanic garden location.



Linking pdf, docx, wav, pptx and xlsx documents to a species record. Media and documents can be opened using the Open option or double-clicking on the linked entry.

- Select **Taxa > Species** and go to **Edit mode.**
- To link a document, select the **Documents** toolbar option.
- You can now link one or more documents to the current species record.

Task 19: Merging values and records, using Find/Replace

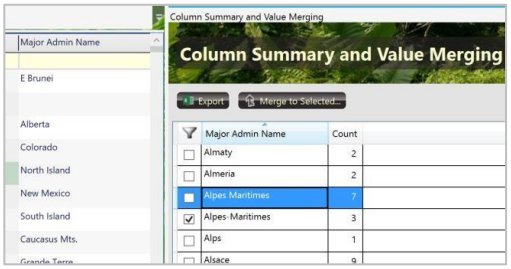
Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#mergevalues

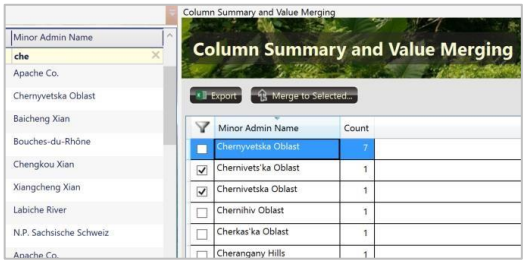
The tasks here demonstrate Value Merging and Record Merging.

Value merging

The Column Summary tool, as well as listing and giving a count for each different value in the selected column, can be used to quickly **clean up data errors** in non-relational, non-read-only fields. Value merging standardises different spellings of the same value in a column – and is a fast way to find and clean these errors. You can use value merging in any table – as long as the field is not read-only.

- In the conifer demo database, select **Geo > Gazetteer** and select the Major Admin Name and/or Minor Admin Name columns.
- Select the **Summary** tool on the **Data Tools** toolbar. Sort the summary record by values by click on the value header.
- Tag the value(s) to be merged - then select the correct value by click on that record (no need to tag). Use **Merge to Selected** to complete the task.

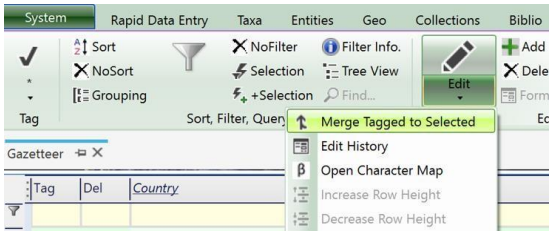




In the example on the left, either spelling of Alpes-Maritimes may be acceptable but clearly, it is better to be consistent. The right-side example is in the Minor Admin Name column where you will find plenty of other entries to correct. Note that a grid filter has been used with the Minor Admin example to narrow down the summary entries.

Record merging

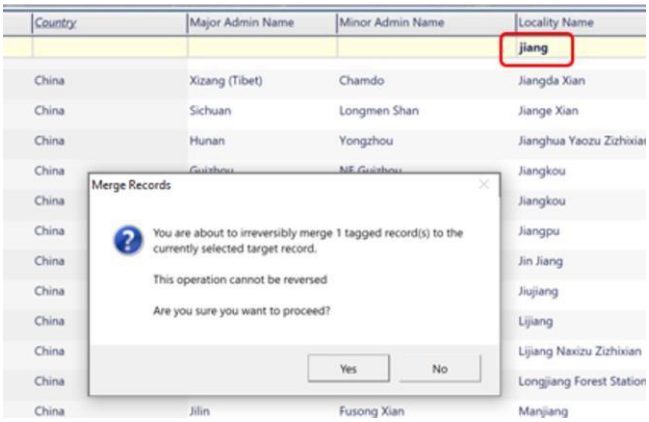
Record merging leads to 2 or more similar or identical records being merged into one record with a resulting deletion of the merged records. When record merging takes place, the system must ensure all child records are moved to the selected record. Record merging is used to clear up double (or more) entries of entire records – for example if you had two or more entries in the genus table for the same genus, both with linked species, you could not simply delete one, you would need to merge the records.



The Merge records tool is found on the Edit dropdown.

In this example, you can merge some gazetteer records.

- In the conifer demo database, select **Geo > Gazetteer** and enter 'jiang' in the grid filter bar for the field Locality Name. Click on the column header to sort by name. Locate the entries 'Nu Jiang - Qi Qu divide' which is entered twice, slightly differently.
- Tag the one you want to remove and then select the record to merge into. Then select the **Merge** option on the **Edit** dropdown on **Data Tools**.



In this example, the calculated field shows each of these Nu Jiang records has 1 linked collection event. These will be joined under the selected entry.

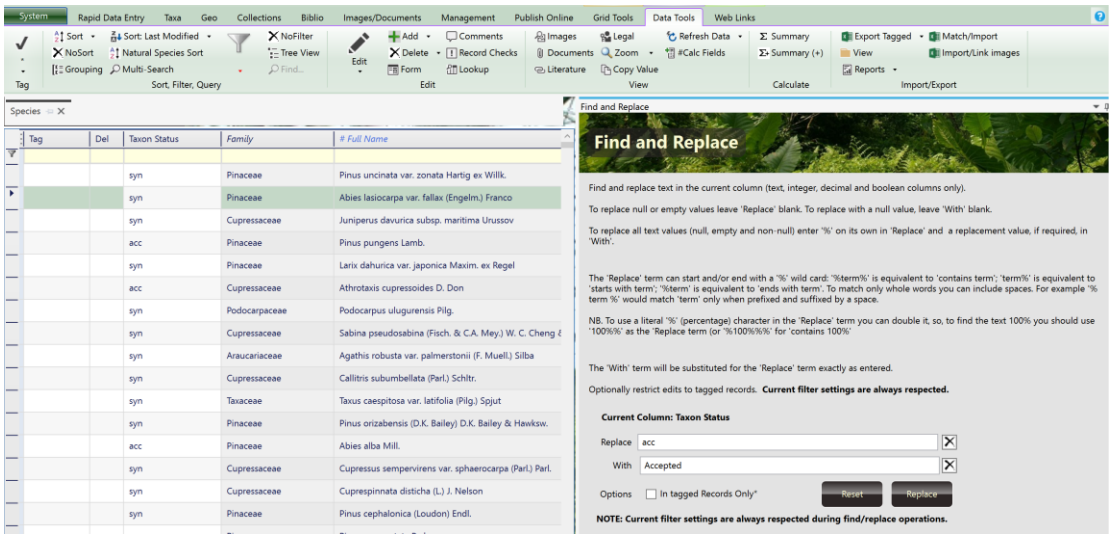
Find and Replace

On the **Data Tools > Edit** dropdown, you will find the **Toggle Find/Replace Tool.** Assuming that you have permission to use this, this tool provides an excellent way to tidy up and edit data in the active column. For example, in the conifer training database:

Select **Taxa > Species** and ensure the TaxStatus column is visible.

Click in that data column and then open the **Toggle Find/Replace Tool** on the Eidt dropdown.

The task here is to replace the text 'acc' with 'Accepted'



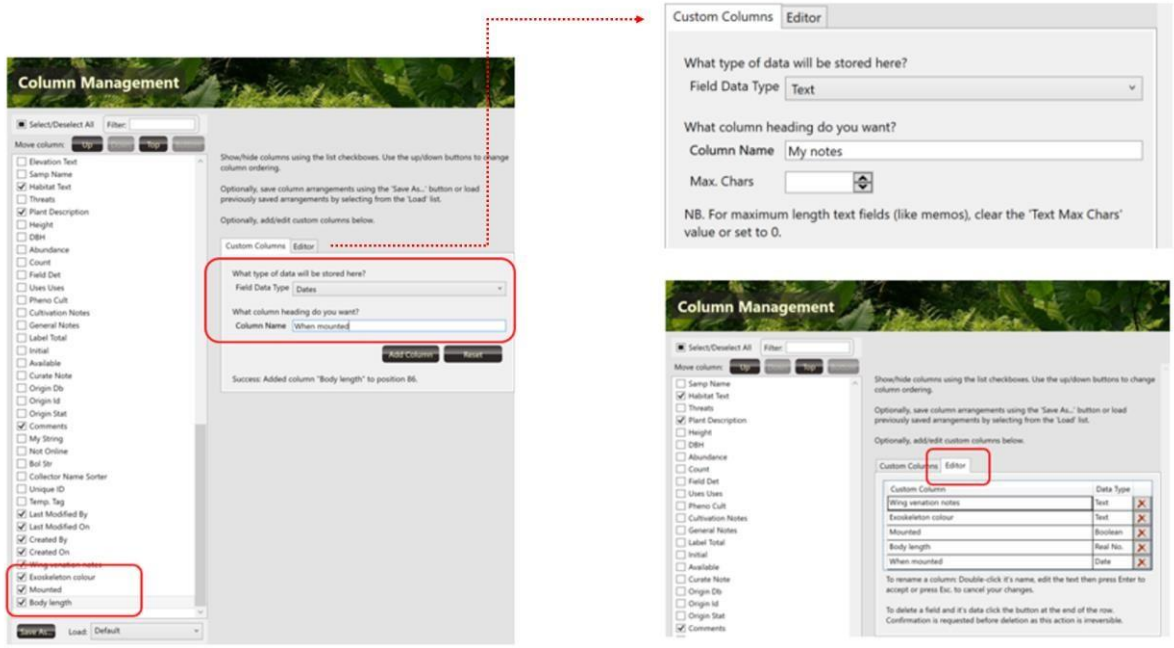
Fill in the Replace and With options. Optionally restrict the update to tagged records. Note that if you are replacing part of a string, you need to use % wildcards as described on the form help text.

Task 20: Adding custom fields to BRAHMS

BRAHMS databases and the tables they contain are provided with a defined structure. However, as well as defining the data columns that you choose to see in your data grids, you can add new data storage fields that are specific to your project.

You can choose the field name, type and size. These custom fields become a permanent part of your database unless you subsequently opt to delete them. This also applies to RDE files.

- Select **Collections > Collection events** - or another table if you prefer.
- Select **Grid Tools > Manage Columns**.
- Add one or more new columns using the **Custom Columns** tab. Field names can include spaces.



*The **Column Manager** form - options to add and edit custom columns are enlarged on the right side.*

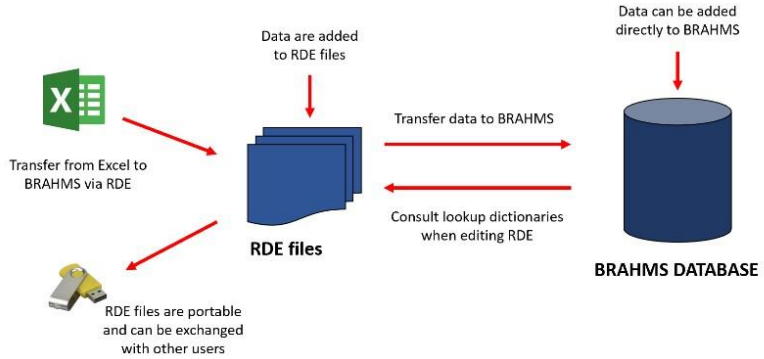
On this form, you have the option to add new fields. If the field is of type Text and you set Max. Chars to NULL or 0, this creates a text field equivalent to a v7 memo field. Using the **Editor** tab options, you can list and remove your custom fields. Field position can be modified using the buttons provided above the field list. You can also load existing field layouts, edit and save as a new layout.

Custom fields appear in your main data grids, assuming they are selected for inclusion in your data grid view. They have a different font to standard fields.

Task 21: Register and open a Rapid Data Entry file

Video: https://herbaria.plants.ox.ac.uk/bol/brahms/software/v8videos#labelstoppt

While data can be entered directly into BRAHMS, RDE is recommended for entering larger numbers of records and also as a first step when importing or transferring data from other software packages such as Excel.

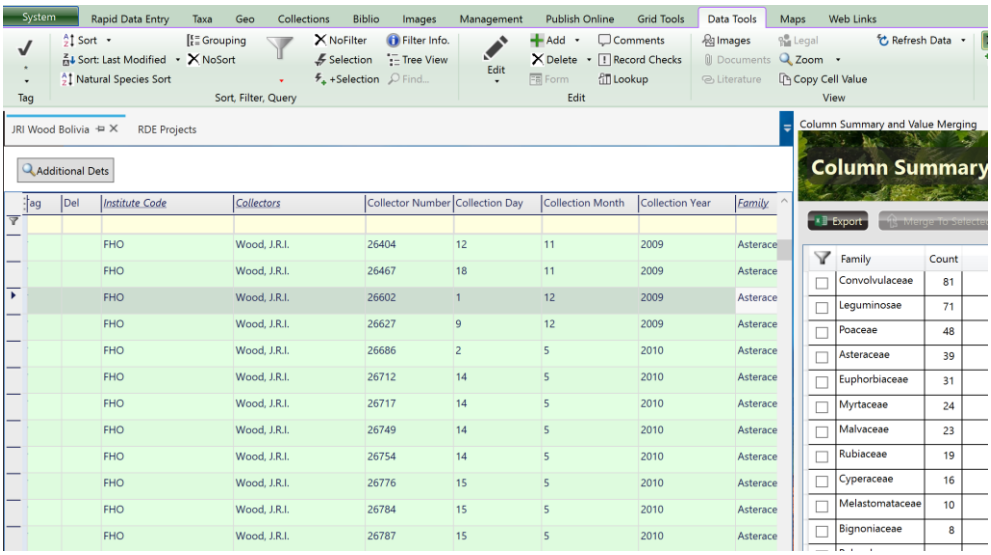


RDE files are entirely separate mini **SQLite databases** linked to your main BRAHMS database. They provide portability and flexibility – optimising data entry and cleaning.

You can store data in one or more RDE files and use these data to create summaries, maps, reports, manage images, and in general, use most of the BRAHMS tools and functions.

This example opens an RDE file of specimen data prepared by John Wood (Oxford based botanist) from his field work in Bolivia.

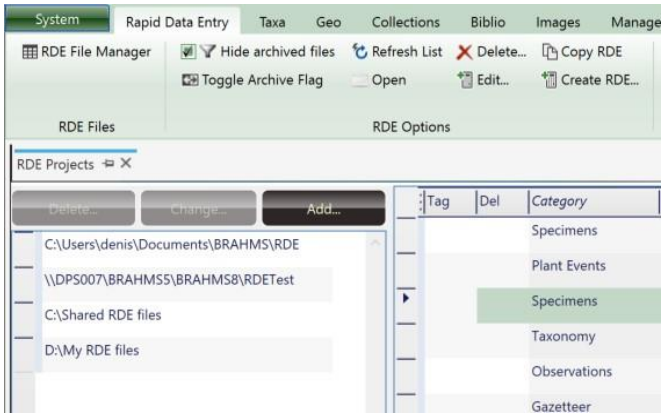
- First download the file RDE_Bolivia_JRIWood.zip and open the zip to the folder Documents/BRAHMS/RDE. This is the default location for RDE files. The zip file includes an RDE file of specimens and a report template sample for labels.
- Log into BRAHMS – choosing any project and select **Rapid Data Entry > RDE File Manager**. This will list any RDE files located in your registered RDE folders.
- To open the RDE file downloaded above, double-click on the RDE manager entry 'JRI Wood Bolivia'.
- Explore this RDE file using the **Summary** option on Data Tools.



An RDE opened with a column summary in the Family field. The summary shows the number of records per different family. Clicking in a different column will update the summary.

RDE folders

All users, regardless of their database role, have access to their default Documents\BRAHMS\RDE folder. Beyond this, non-admin and non-manager users need to be given access to folder(s) by the system administrator or database manager.



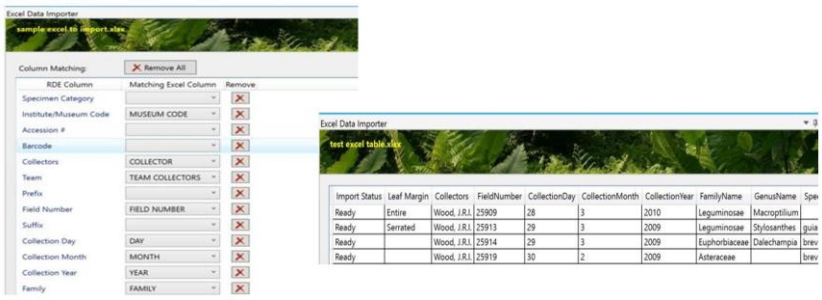
*RDE files can be stored in any registered folder. New folders are added using the **Add** option of the left panel. Administrators can register new RDE folders and assign access permissions to one or more non-admin level users.*

Task 22: Import from Excel to RDE

Data and images can be imported from .xlsx tables into RDE using the *Excel Data Import Wizard*. This allows you to match the columns in the Excel file to your RDE file. The matching between Excel and RDE columns can be adjusted as necessary to pull in as many fields as possible. This process also allows you to import data from custom fields – assuming the custom fields have been added to your RDE file. Fields in foreign languages can be mapped to the standard names. For example, your Excel table may store country names in a column with heading PAÍS or 国家 or PAYS. The task is to align this with the standard RDE field COUNTRY.

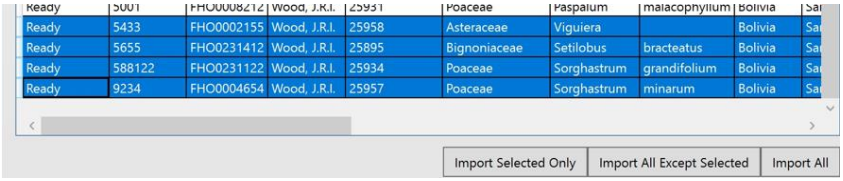
This example uses collection data (species x locality) taken from museum specimens. But you could work with other data, for example, just a list of taxon names. If you do not have your own data to experiment with, download the sample Excel: https://herbaria.plants.ox.ac.uk/bol/Content/Software/v8/SampleExcel_RDE_Import.xlsx.

- Select **Rapid Data Entry > RDE File Manager** then use the **Add** option on the **Data Tools** toolbar to create a new RDE file. Choose the Category '*Specimens*' – and provide a file title. Enter Next.
- If you want to add some custom columns to the RDE, use the options provided in the right-side panel. Knowing whether to add custom data fields requires some knowledge of what the default fields are.
- When you Finish, the new RDE will be created and registered in your RDE manager.
- Open the file by double-clicking on the record. Then choose **Rapid Data Entry > Import from Excel…**
- Follow the **Excel Data Importer** steps as prompted.



These screens show the matching process (left) and the data processed and ready to import to RDE. This may not be fully possible if the data are in the wrong format – but you will probably be able to get close. Data in different formats can be adjusted in Excel or processed after transfer to a custom field in RDE.

If your Excel file includes image references as physical file names (path + file name) or URLs, these can be imported to and viewed in the RDE file. If there is more than one image cited in the same field, the entries should be comma or semi-colon separated or on different lines.



Once the data have been processed by the Excel Wizard, you can then choose to transfer selected records or all the data into your new RDE file.

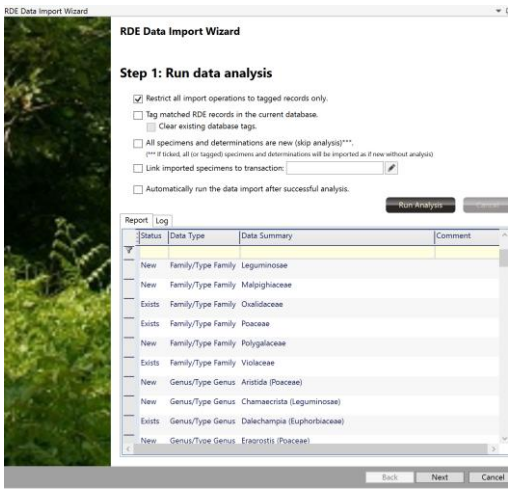
Task 23: Transfer RDE data to BRAHMS

Introduction

Data in RDE files can be easily transferred into BRAHMS. The transfer process starts with an analysis of the RDE data and will tell you about the new data you are about to import. Obvious errors will stop the process. The analysis phase does a lot of checking and in large files, it can take a while.

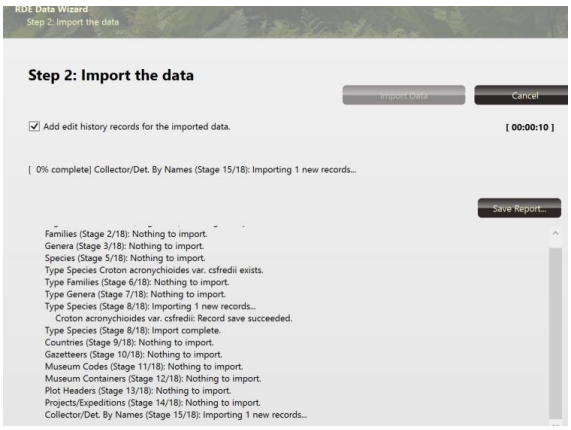
Transferring from RDE into BRAHMS

- On the main menu, select **Rapid Data Entry** and open the RDE table you wish to transfer to BRAHMS. You can optionally restrict the transfer to tagged records and if you wish to do that, tag the records to transfer. Otherwise, this is not necessary.
- Back on the **Rapid Data Entry** menu, select **Transfer RDE to BRAHMS….** and on the *'Step 1: Run data analysis'* page, you can restrict to tagged if necessary.
- Select **Run Analysis** – this will list the data that are new to BRAHMS and those that already exist. The report enables you to review the quality of the data.



A part of an analysis report.

- Now select **Next** to go to **Step 2: Import the Data** and select **Import Data**



The data transfer from RDE to BRAHMS adds new records to your database as needed.

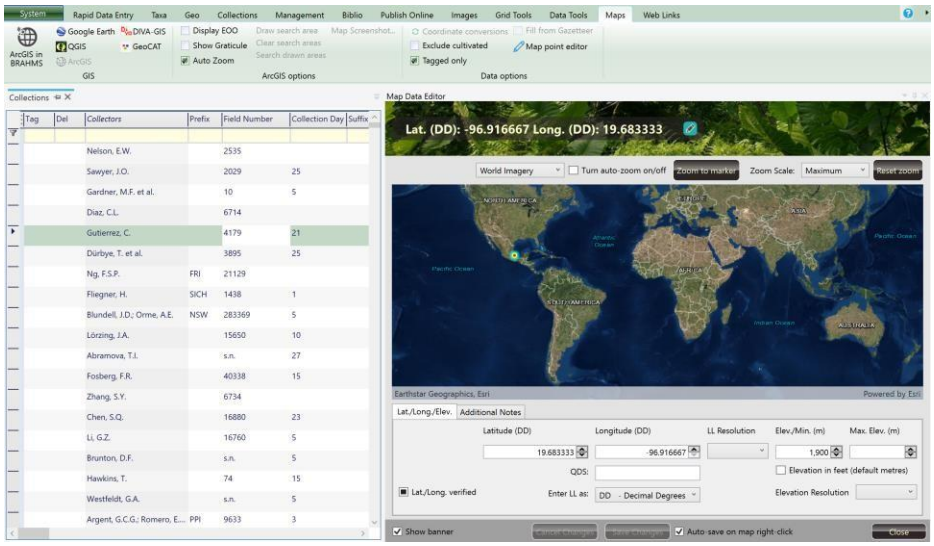
Task 24: Adding and editing map points

You need to be online to use this feature. The map location editor can be used in RDE and in the main tables for any table with map points. You can use the map location editor to add a new map point or edit an existing one. The editor opens a map form which updates as you move through the data grid. A **right-click** on the map resets the point position and either auto-saves this to the grid or awaits confirmation *via* the **Save** option.

Select **Collections > Collection events**.

- In the opened RDE file, select the **Map point editor** option on the map toolbar. In Edit mode, you can also use the standard F9 lookup from the latitude or longitude fields.

Once opened, the location editor can be used to edit points and altitude in your data grid.



The map location editor displaying the current point, set to Auto-save. In this mode, a right-click on the map will update the Latitude and Longitude values in the data grid without using the Save option. This example screen has no zoom and is displaying the entire globe.

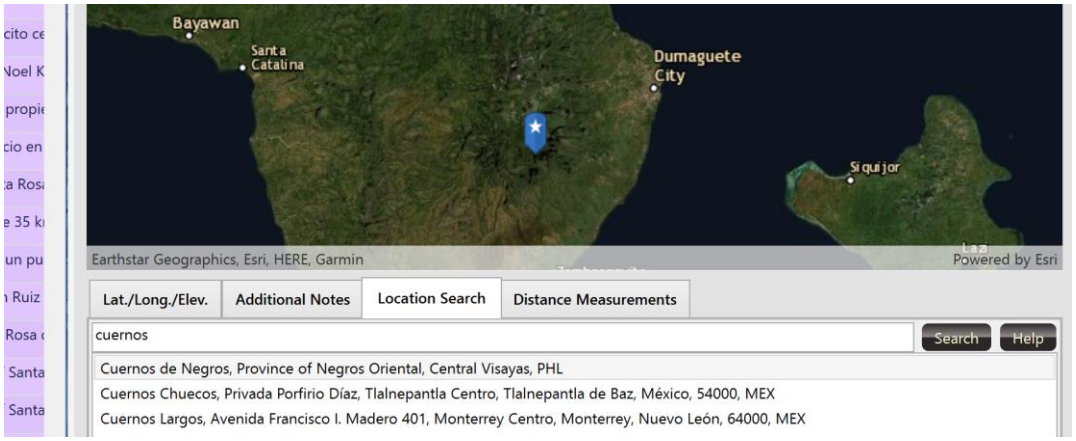
*The same point displayed at a very different zoom level. **Right-click** the map to edit point location.*

Location editor settings

Setting	Notes
Base map	Choose base map that best suits the editing task in hand.
Auto-zoom on/off	If selected, as you move to different records, the map zooms to the current point using your zoom scale setting.
Zoom to marker	Zoom to current point based on your Zoom Scale setting.
Zoom Scale	Choose the optimal zoom setting. Maximum shows a world map.
Reset Zoom	Reset the zoom, if adjusted, to your current setting.
Map units	Select the entry mode for manually editing data.
Lat Long checked	Mark a record as 'map checked'.
Auto-save	If selected, a right-click on the map will adjust the point and save the map point change.

Location searching

The internal Map Point Editor, dynamically connected to your data grids, has a location search tool. Localities can be searched for by name or part of a name, adding a region or country to help improve the results listed. Clicking on the suggested locations list adds a blue suggestion marker to the map. A **right-click** on the map adds the map reference to the data grid.



Using the location search option with the Map Editor.

Task 25: Reporting example

NB: Before running the report sample, be sure to run through the task on #Calc Fields as it uses a calculated field.

You can print reports directly from any table in BRAHMS – also from RDE files. Report design is covered in detail in the BRAHMS manual: https://herbaria.plants.ox.ac.uk/bol/content/software/v8/BRAHMS_Manual.pdf.

This report example, included with the demo conifer database, introduces a number of features. These may look complex but the template only took a minutes to prepare. These features are described in detail in the manual.

- Title band: printed once at the start. It includes a text box; a transparent image; the print date; and a line feature.
- A Group Header band: this has a data source Species.FamilyName with a text box for the family name; and a total count of species printed per family. Group headers automatically sort entries based on the data source.
- A Data Band: this has a data source set to the Species table and it has a text box for the species name (calculated HTML format); and the IUCN category. The IUCN category has conditional formatting to only print when non-null. This band has a Sort set on the species name.
- A Data Band: this has a data source set to the Species Texts and it has a text box for the text title and the actual text. This band is set as a Master Component band relating to species. It has a filter set to only print records where the text title is "Conservation".
- A Page Footer band: this has a text box entry and also includes page number/page total.
- A page Watermark with transparency set to 65%.

Sample report printed on 16/11/2023

This report lists tagged species together with their IUCN Red list status and conservation notes, if given. The Family grouping includes a count of the # of taxa per family as included in this report.

BRAHMS

Araucariaceae Taxa total: 38

Agathis atropurpurea B. Hyland **[NT]**

Conservation: Wherever logging is/was allowed exploitation has been heavy and subpopulations have declined as a result. The extent of the decline is not accurately recorded, if this were better quantified this species could meet criterion A1c,d under Vulnerable (IUCN Red List Categories and Criteria version 3.1, 2001). A large percentage of the remaining forest is now protected. Part of the population of A. atropurpurea is protected in Wurunuru National Park.

Agathis australis (D. Don) Lindl. **[NT]**

Conservation: Since the arrival of Europeans in New Zealand, the estimated 1,215,000 ha once covered by primeaval kauri forests have been reduced to ca. 7,500 ha. These remnants are now strictly protected; the largest reserve is the Waipoua Forest covering 9,105 ha (not all of it is dominated by A. australis) created in 1952. However, natural regeneration, where land use as mixed (semi-)natural forest has not changed, is abundant in many places because the species of course does not distinguish between natural and man-made disturbance events. This regeneration is possible, in ecologically suitable locations, within some 80,000 ha of existing forest reserves. The Department of Conservation in New Zealand has plans to establish a Kauri National Park in order to give full protection to these forests. If IUCN Red List criteria were strictly applied to this history of reduction of population size (A criterion), A. australis would fulfil the criteria for a listing as (at least) Endangered (EN), even though the causes of decline have now ceased, because the reduction amounts to more than 70% over the last three generations (of mature trees). Conservationists in New Zealand object to such a rating because to them it would appear to be a denial of their successful efforts to curb the destruction and save this iconic tree from extinction. On the other hand one could observe that most of the historical reduction will be permanent under human occupation and land use and that while the reduction has ceased (and is even being reversed) no one can guarantee what the priorities of future generations are going to be. Taken from another IUCN approach, this species can be assessed as NT for nearly meeting criterion B2a, b for EN whereby habitat degradation is threatened by the spread of a species of Phytophtora which affects Agathis.

Agathis borneensis Warb. **[EN]**

Conservation: This species has been very heavily over-exploited in many areas and as a result its total area of occupancy (AOO) is estimated to have at least been reduced by half and this is still ongoing. Stands covering an estimated total of 30,000 ha discovered in Kalimantan in the 1930s had effectively been logged out by the mid 1960s. Most stands outside the few well protected nature reserves (mostly situated in the Malay Peninsula and in Sabah) have been seriously depleted and it is doubted that regeneration will be sufficient to restore the losses. Habitat degradation has caused further reductions in recruitment of young trees to replace felled ones.

Agathis dammara (Lamb.) Rich. & A. Rich. **[VU]**

Conservation: Historically, this species has been seriously overexploited for both timber and resin. Some populations are now protected in several reserves, including major reserves, across the southern part of the country, but ongoing decline is projected to occur elsewhere.

Agathis lenticula de Laub. **[VU]**

Conservation: This species has been assessed as Vulnerable primarily on the basis of a limited distribution (area of occupancy less than 100 km² under IUCN 1994 criteria) because it is very difficult to estimate its decline due to exploitation. Most herbarium collections at K from the Crocker Range and lower spurs and slopes of Mt. Kinabalu in Sabah have been identified as A. lenticula, but A. borneensis does occur in the region and foresters do not distinguish them. Exploitation of both, being tall trees with long, free boles, must be similar outside protected areas. If we would know more about specific rates of exploitation in particular areas where A. lenticula has been found, it could well be that A. lenticula turns out to be more seriously threatened than the more widespread species A. borneensis.

Agathis macrophylla (Lindl.) Mast. **[EN]**

Conservation: Overall, this species was listed as Near Threatened (IUCN Redlist 1999). However, individual island populations may well be severely threatened, e.g. that on Utupua in the Santa Cruz Group. Doyle (in Farjon & Page, 1999) assessed the species separately for each of the island groups as follows: Fiji: VU - Vulnerable, IUCN 1994-criteria A2d (>20% reduction within next three generations based on current exploitation levels) and B2e (continuing decline in the number of mature individuals). Santa Cruz Islands: NE - not evaluated. Vanuatu: VU - Vulnerable, IUCN 1994-criteria A2d and B2e. Agathis macrophylla is now quite rare outside plantations in the Santa Cruz Group, though an unlogged population apparently survives on the upper Lawrence River on Vanikoro. A re-assessment using version 3.1 of the IUCN criteria (IUCN, 2000) in 2011 concluded that the entire known population is seriously threatened.

Agathis microstachya J.F. Bailey & C. T. White **[NT]**

Conservation: Before 1985 the population of A. microstachya had nearly been halved by logging but 70% of the forests are now protected. The remaining population is estimated to consist of fewer than 10,000 mature trees. Under IUCN Red List criteria (version 3.1, 2001) this species would therefore qualify for the status VU, but due to cessation of large-scale logging and effective protection in a National Park and other protected areas, its threat with extinction has been greatly reduced. Logging continues in unprotected areas, but the decline appears to have been halted.

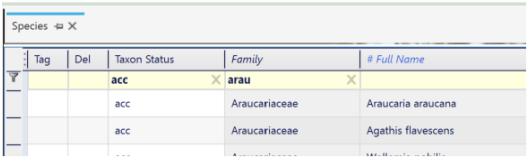
Agathis montana de Laub. **[CR]**

Conservation: Population decline (die back) among monitored trees was observed to be 5% between October 2012 and February 2014 and is projected to amount to 80% within the next 21 years. The activities of feral pigs causing erosion of thin topsoil and root damage combined with an introduced species of Phytophtora with affinities to a species causing die back in New Zealand kairi (A. australis) are among the suspected causes of this recent decline of mature trees on Mt. Panie. The AOO is likely to be between 1200 ha (main population) and 5000 ha (outliers) based on ecology and range modelling. The total population may be ca. 100,000 mature trees. Decline was not apparent before 2009 but may have commenced some years earlier.

Agathis moorei (Lindl.) Mast. **[VU]**

Conservation: This species has been heavily exploited for its timber in the past and consequently it has disappeared or become very scarce in many parts of the forest, especially in more accessible localities. Even in pre-European times its wood was preferred for the making of outrigger canoes. Substantial decline has occurred also within recent years and may continue because illegal logging is a particular concern (Waltt in Farjon & Page, 1999). However, the species still occurs over much of the island of Grande Terre and, given

- Select **Taxa > Species. Select Tag > Clear tags > from records in the current grid.**
- In the filter row, add "acc" to Taxon Status and "Arau" to family.



Species

Tag	Del	Taxon Status	Family	# Full Name
		acc	arau	
		acc	Araucariaceae	Araucaria araucana
		acc	Araucariaceae	Agathis flavescens

Setting filters in the main species table.

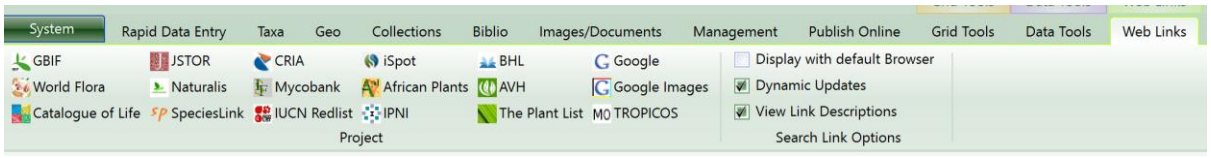
- Select **Tag > Tag All** to tag all accepted species in the Auracariaceae.
- Select **Reports**. Highlight the report "Species list with conservation data" and then choose **Run**.
- To view or edit the report template, select **Reports > Edit Template**.

As the report is "Shared", other users logged into this database will also see this report template.

Task 26: Dynamic weblinks

Weblink toolbar

You can dynamically link your data records in any table to external websites as provided on the **WebLinks** toolbar. From BRAHMS v8.6 onwards, WebLink options are configurable, allowing you to add websites that you find most useful. As an ornithologist, mycologist, plant taxonomist or a researcher with another interest, you can select personal Web Link connections as well as use sites that are shared across your BRAHMS project.



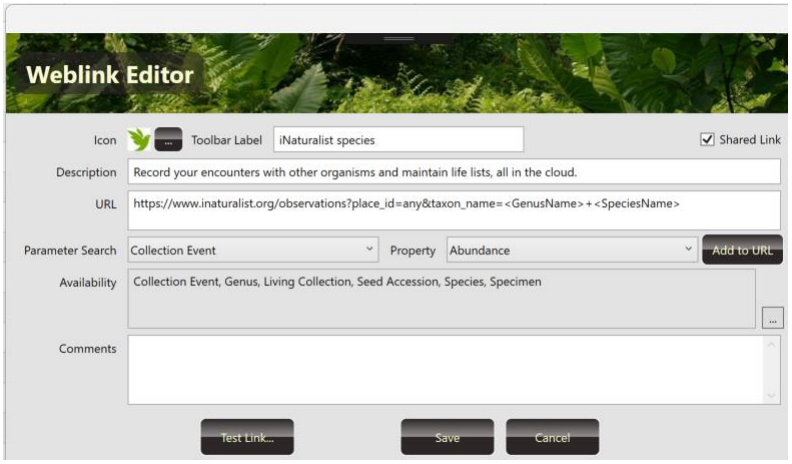
An example of the weblinks toolbar, edited to show the required website links.

Add your own weblinks

Web Links can be configured to include search parameters that enable dynamic searching as you move through your data grid records. The Web Links editor on the Management menu includes options to select icons and toolbar text; add the URL with the appropriate search parameters utilizing any BRAHMS data field from the relevant table; set whether the link is personal or shared; choose the BRAHMS tables your weblinks are associated with; and set the order in which they appear. The ability to edit Web Links is permission controlled.

In the following example, a dynamic link to INaturalist is added:

- Select **Management > Manage Weblinks** and then **New Link**.
- Enter the data as provided in the below screen.

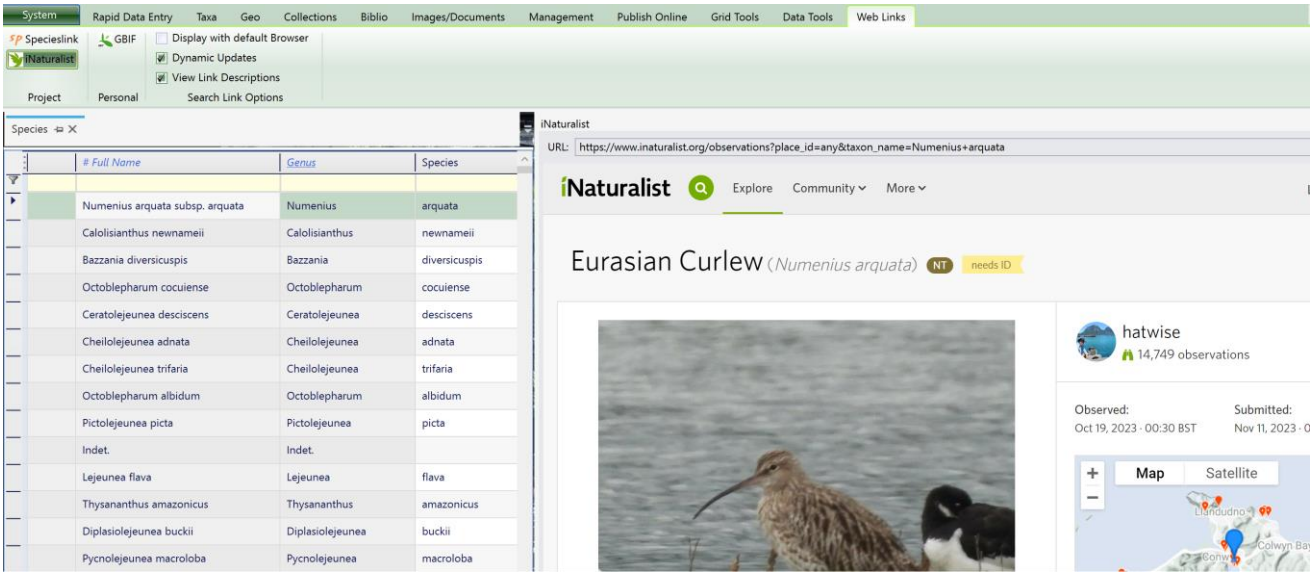


You can download the logo by searching for 'iNaturalist' logo. Then upload this to the Weblink Editor using the icon lookup. Keep the toolbar label as short as possible. The description is optional. The entry in the URL text field is:
https://www.inaturalist.org/observations?place_id=any&taxon_name=<GenusName>+<SpeciesName>
but you could also use e.g.
https://www.inaturalist.org/observations/<Int06> where <Int06> is a BRAHMS custom field name holding the iNaturalist ID code.

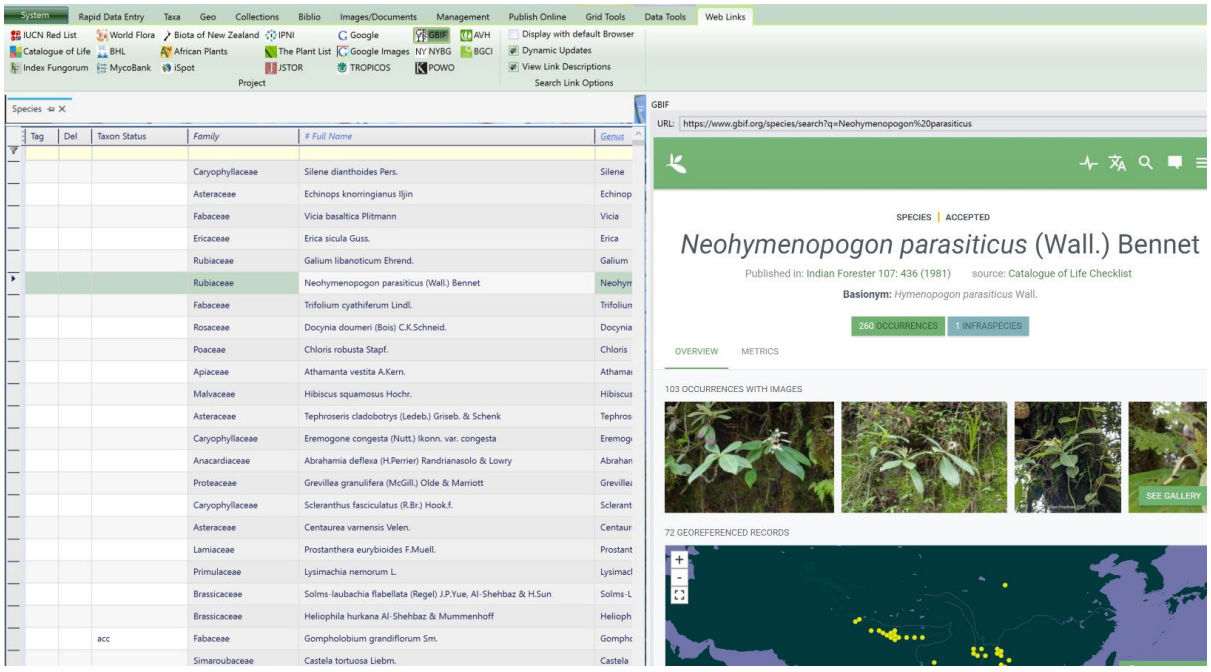
The field names inside <> are interpreted when you use the weblink, replacing these field names with the actual data values. You can ignore the Parameter Search and Property options as these are to help locate the correct search field names (which in this case we already have).

Setting the availability using the multi-value lookup button is important as this dictates which tables the weblink option will be available for. Thus, if you want this toolbar to appear in the species table, make sure "Species" is added to the availability list.

- Select **Taxa > Species** to open the main species table.
- Select **WebLinks** and choose your newly added weblink option.



An example using the above added WebLink

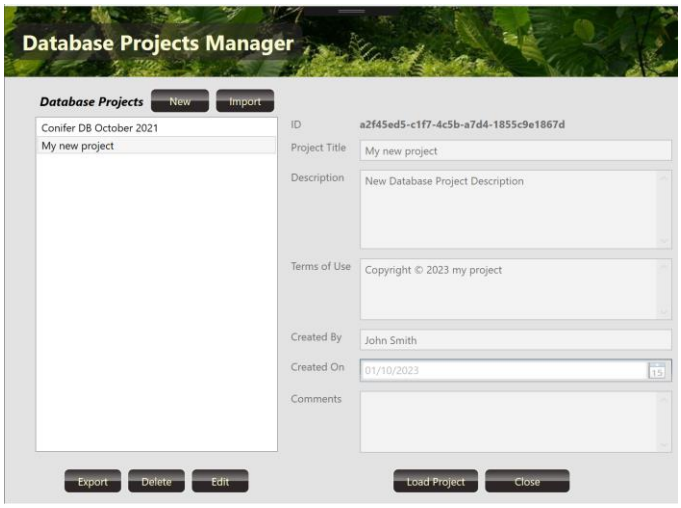


Another example using a dynamic link to GBIF.

Task 27: Creating your own database

You can create a new and separate database project in the same SQLite file that includes the conifer demo. This is done with a few simple steps. When you are logged into the conifer demo database:

- Select **System > Manage Database Projects > New**.
- Enter the Project Title and any other details as prompted on the Manager form.
- Select **Save**. Highlight your newly named project on the left and select **Load Project**. You will find that this project has no data.



Adding a new database project to the same store as the conifer database.

You can return to the Conifer demo database by selecting **System > Manage Database Projects** and then load the conifer project. Alternatively, you can select **System > Sign Out** and then log in again, selecting Conifers.

Moving up to MSSQL Server or PostgreSQL

In most cases, you will want to create an entirely separate data store which does not include the conifer demo database. As discussed below, for larger projects, especially multiple-user systems, you will use MSSQL Server or PostgreSQL as the data stores.

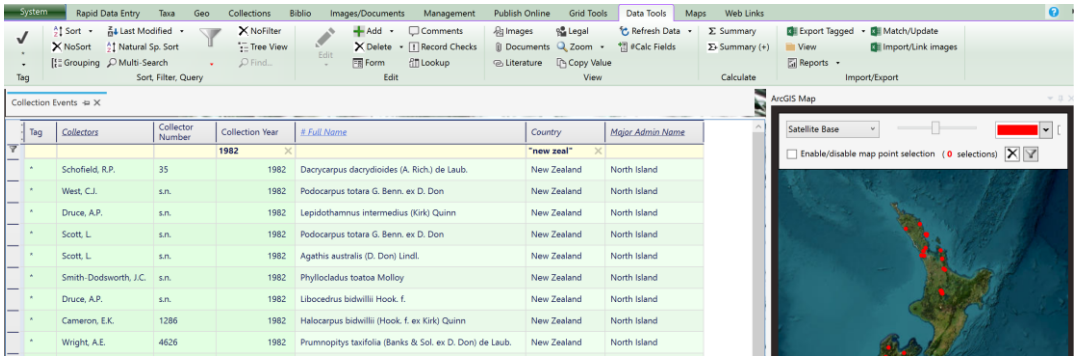
This guide cannot cover these steps in detail – however the procedures to create such data store are covered in the main guide: https://herbaria.plants.ox.ac.uk/bol/content/software/v8/BRAHMS_Manual.pdf

Please refer to the guide sections:

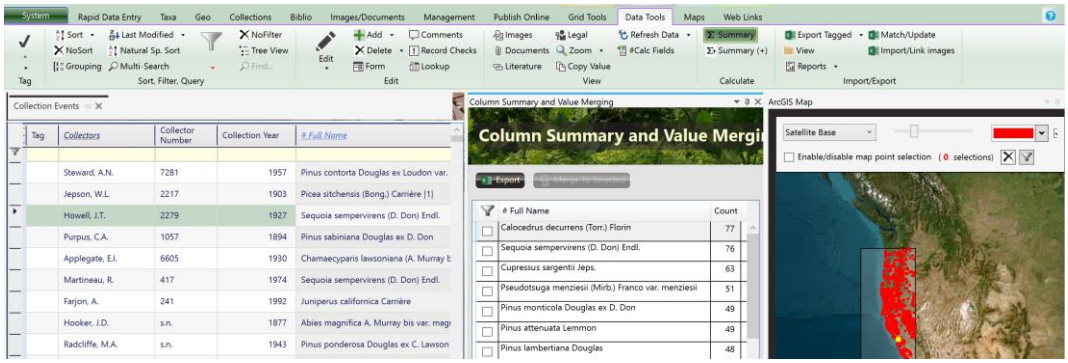
- Data stores and databases.
- Data Connections > Creating a PostgreSQL connection and database.
- Data Connections > Creating a MSSQL Server connection and database.

Task 28: Some challenges

1. Create a view in Collection Events to show the fields Tag, Collectors, Number, Collection Year, Full species name, Country and Major Area. Tag all collections from New Zealand that were collected in 1982. Map these using ArcGIS and export the collection data to Excel.



2. Using the ArcGIS mapper, from the Collection Events table, draw a map of all conifer collections. Use the **Draw Search Area** and then **Search Map Area** tools for any region in West coast USA. In the updated data grid, use the Summary Tool to check the # collections per species in your selected area. Dock the summary tool next to the Map window.



3. In the main species table, create a field view to show the fields as shown below. Set a filter to include taxa with IUCN status = CR OR VU. Tag these taxa and export to Excel.