Documenting Plant Translocations with Recorder 6:

A Practical Guide

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Table of Contents

Please note that only bold items in the table of contents are essential.

Introduction

According to the *ConservePlants* survey, over 300 plant translocations have been carried out in Luxembourg until 2022 and their number is increasing continuously. The Museum of natural history of Luxembourg (Musée national d'histoire naturelle Luxembourg - MNHNL) was an official partner of the *ConservePlants* COST action, represented by the plant population biology research team G. Colling, L. Daco and T. Walisch. *ConservePlants* experts define the term 'translocation' as encompassing three types of conservation actions:

1. the introduction of a population: the process of introducing plants from a site where they occur naturally to a new locality;
2. the reintroduction of a species: the controlled placement of plant material into an area in which it formerly occurred, but in which it is now extinct or believed to be extinct (sensu stricto);
3. the reinforcement: the addition of individuals to an existing population, with the aim of increasing population size or diversity and thereby improving its viability.

Translocation projects usually comprise multiple events beyond the translocation itself, such as assessing population size of natural populations and seed availability, collection of source material, cultivating plants, identifying suitable introduction sites, managing the sites as well as monitoring translocations. In Luxembourg translocations are often part of species action plans (PAE -plan d'action espèce) established under the national protection plan (PNPN - plan national de protection de la nature). In some cases, they are also carried out as compensation measures for urbanisation projects.

The *ConservePlants* team in Luxembourg aims to assemble a dynamic dataset of past, current and future translocation sites and projects on Luxembourg territory which could be published on the museum's dataportal (mdata.mnhn.lu) and via a map layer - webservice. Ministry of the environment, climate and biodiversity (MECB) officials, conservation agents and researchers have also expressed a need for such a dataset.

To produce ensure data quality and standardization, this guide provides recommendations for documenting translocations using the Recorder 6 software, a biodiversity database used by several stakeholders in Luxembourg translocation projects, including MNHNL and the SICONA (Station biologique de l'Ouest). This guide matches fields from the *ConservePlants* survey with Recorder 6 (R6) data fields. For information that does not fit specific Recorder 6 data fields, the R6 survey description field (e.g. funding, success evaluation), taxon_occurrence comment or specimen information fields (ex situ conservation actions and multiplication) can be used.

The guide uses screenshots and a real work example. For general guidance on data entry in R6, visit http://www.recorder6.info/ or contact the MNHNL's SIDPNAT data team at recorder@mnhn.lu. If you are not working directly with the Museum's Recorder instance and have your own Recorder instance installed, please export your entered data in standardized Recorder 6 export format (zipped access file) and send it to recorder@mnhn.lu for import into the Museum's instance, from where it will be published on the national biodiversity portal mdata.mnhn.lu and the international biodiversity platform gbif.org.

If you do not have access to Recorder, a template Excel sheet is available where you can fill in all translocation-relevant data: https://mnhn.public.lu/fr/collections/donnees-observations.html. After you have filled in the Excel sheet with relevant information on plant introductions and/or monitoring for your project, please send it to recorder@mnhn.lu for import into the Museum's Recorder instance, from where it will be published on the national biodiversity portal mdata.mnhn.lu and on the international biodiversity platform gbif.org.

Although this guideline has been elaborated for plant translocations, it also works for animal translocations with some additions to the term lists.

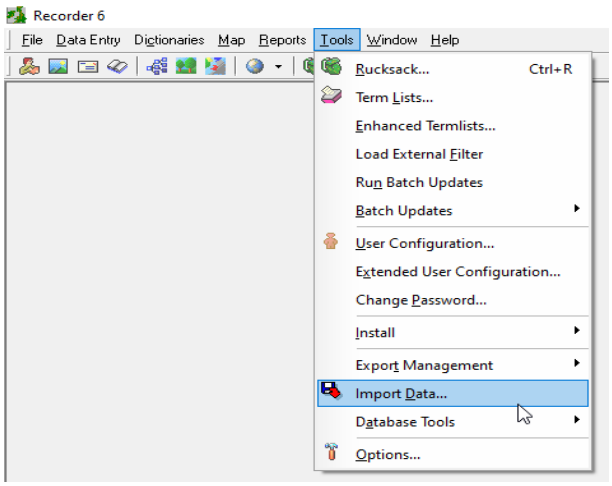
Please note that only the items in bold in the table of contents are essential. The non-bold items are optional and relate either to data on seed collection entered into BGBase or to additional information requested by the ConservePlants survey.

1 Prepare your Recorder instance by importing term lists

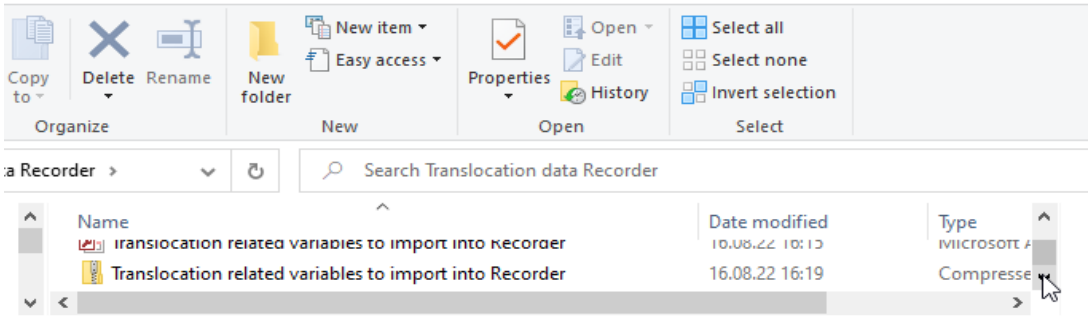
If you work with the MNHNL R6 instance you can skip this part!

If you are working on a Recorder instance that is not based at the Museum, I recommend importing the translocation-specific terms into your Recorder before entering any data. The file to import is called *Translocation terms Recorder 6* and is provided in a zipped Access format, ready for import into your Recorder instance. You can obtain the file by sending an email to tania.walisch@mnhn.lu or recorder@mnhn.lu. It is preferable to use the predefined terms from this file rather than adding your own, to ensure that terms are not duplicated in the MNHNL's Lux-Recorder database during data exchanges.

To import the terms go to:



and select the zip access file called *Translocation terms Recorder 6* for your import.

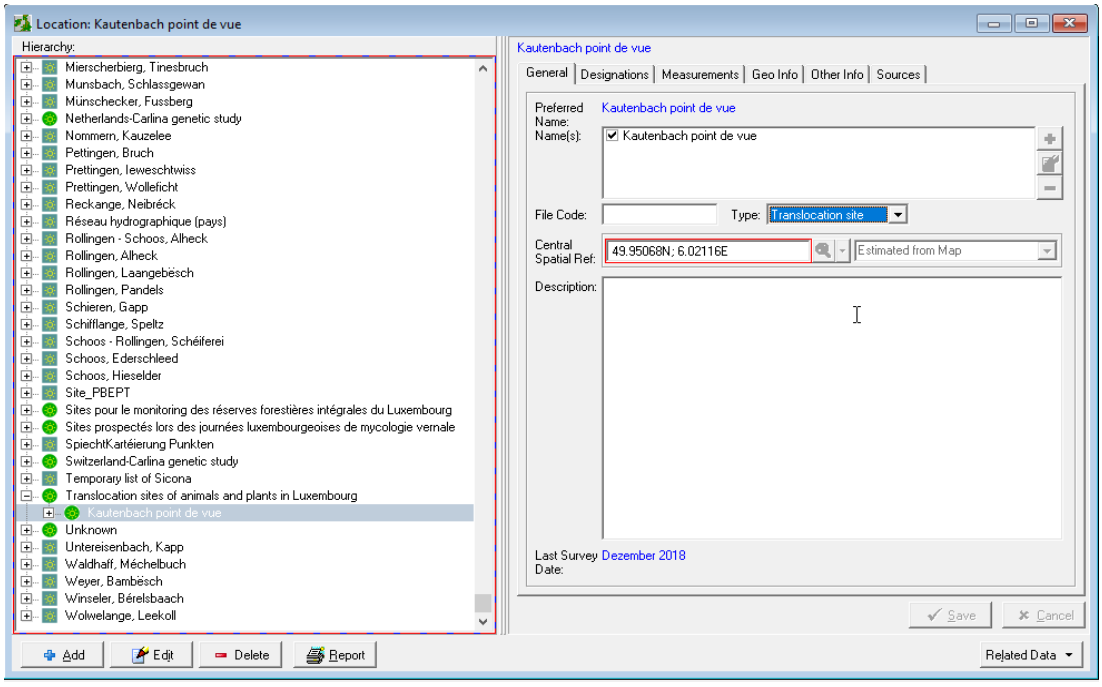


Note: The Translocation projects term list file can be extended as the project develops. For example, the community of conservation agents could aim to establish a common set of essential abundance qualifiers for monitoring (cf point 6 below).

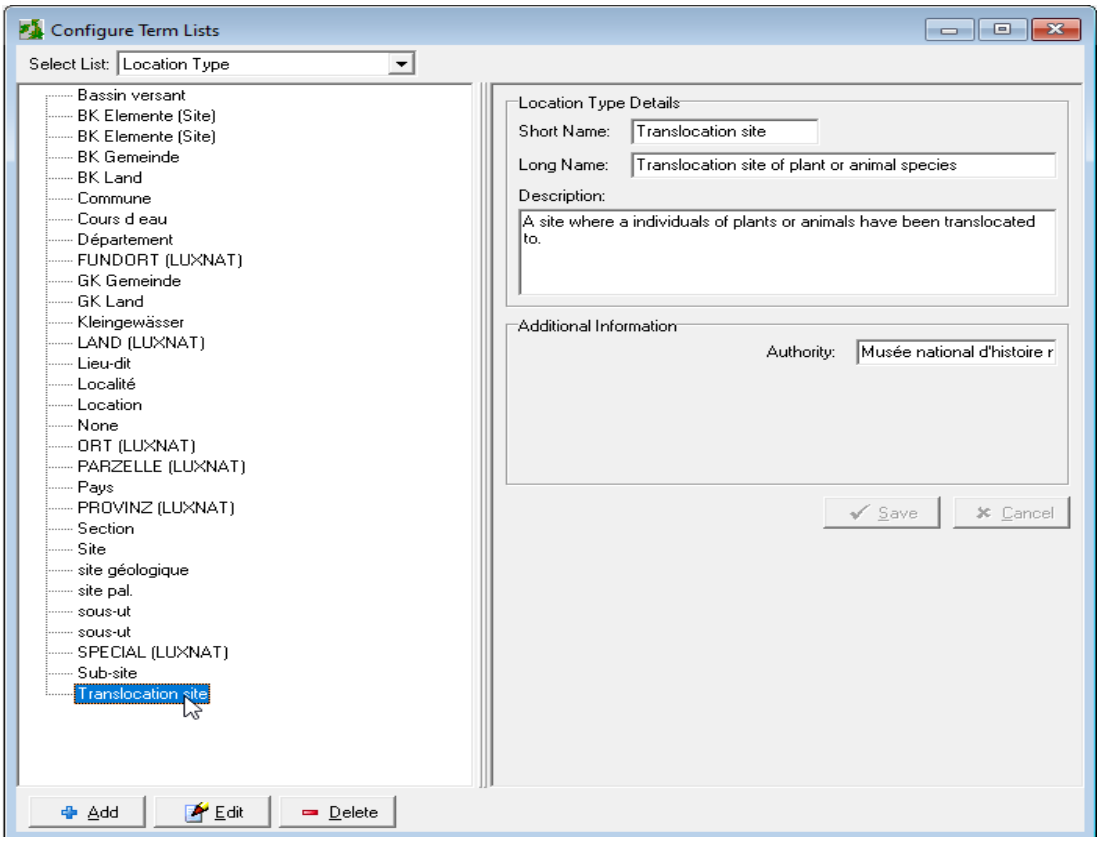
2 Add a new translocation site

I recommend adding a new location in Recorder for each site into which you introduce seeds or individuals. This allows you to enter site specific information only once and subsequently link all your translocation and monitoring events to the same site. It also contributes to building a national list of translocation sites, which can then be published as a webservice and is a very useful resource for people working in conservation and in research.

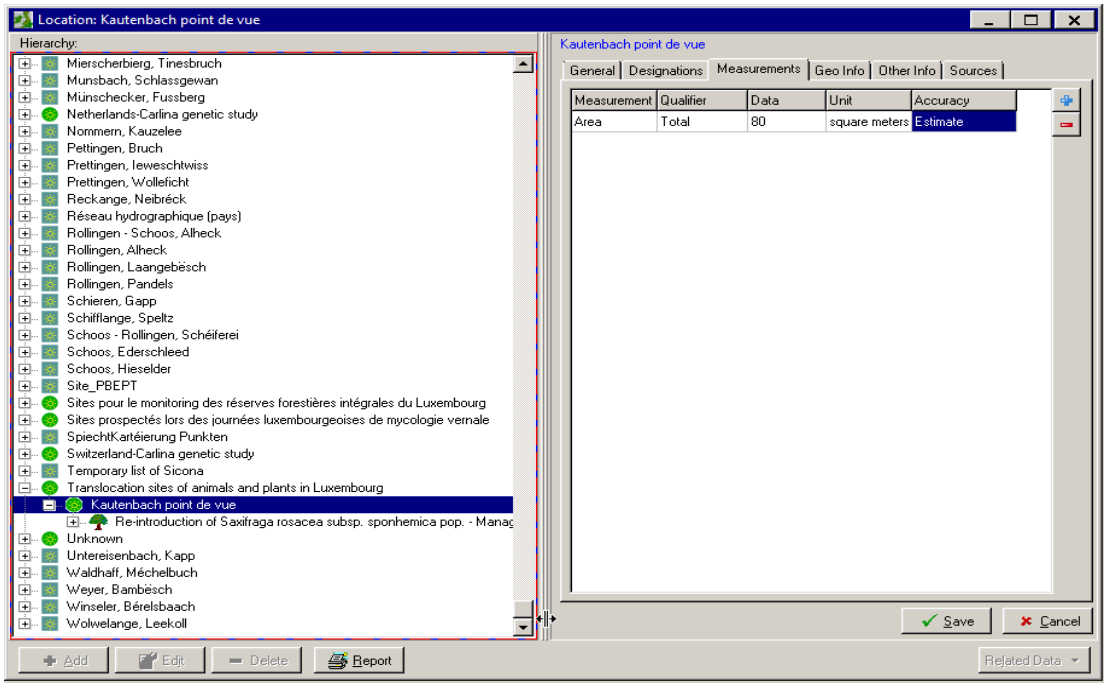
To add a new location, go to *Data entry*, choose *Locations* and add your translocation site under the metasite called 'Translocation sites of Luxembourg'.



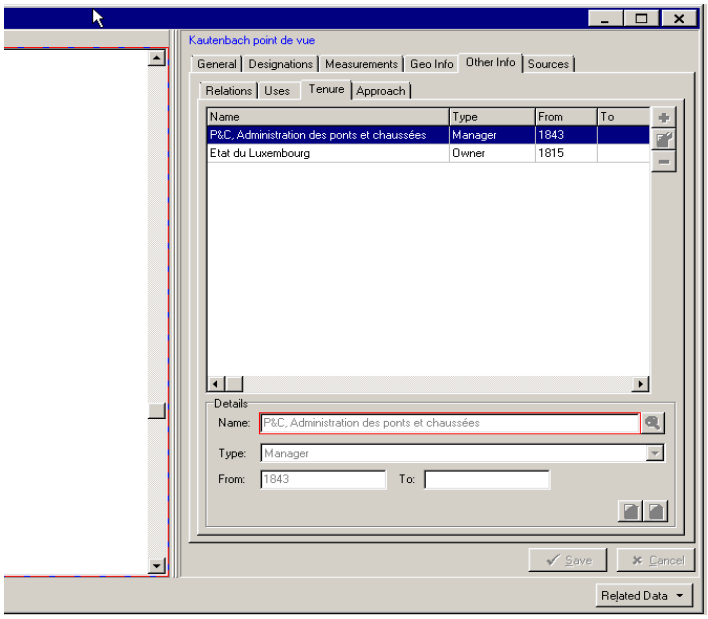
Choose the site type ‘Translocation site’. If it is missing from the drop down list, go to tools, term lists, select the Location type list and add ‘Translocation site’.



Add the approximate area of the translocation site into the ***Measurements*** **tab in the locations menu**



Also add information on the ***Tenure*** (who owns or who manages the site) or if not possible because of data protection reasons, then mark at least if it is publicly owned or privately owned in the general locations comment tab.

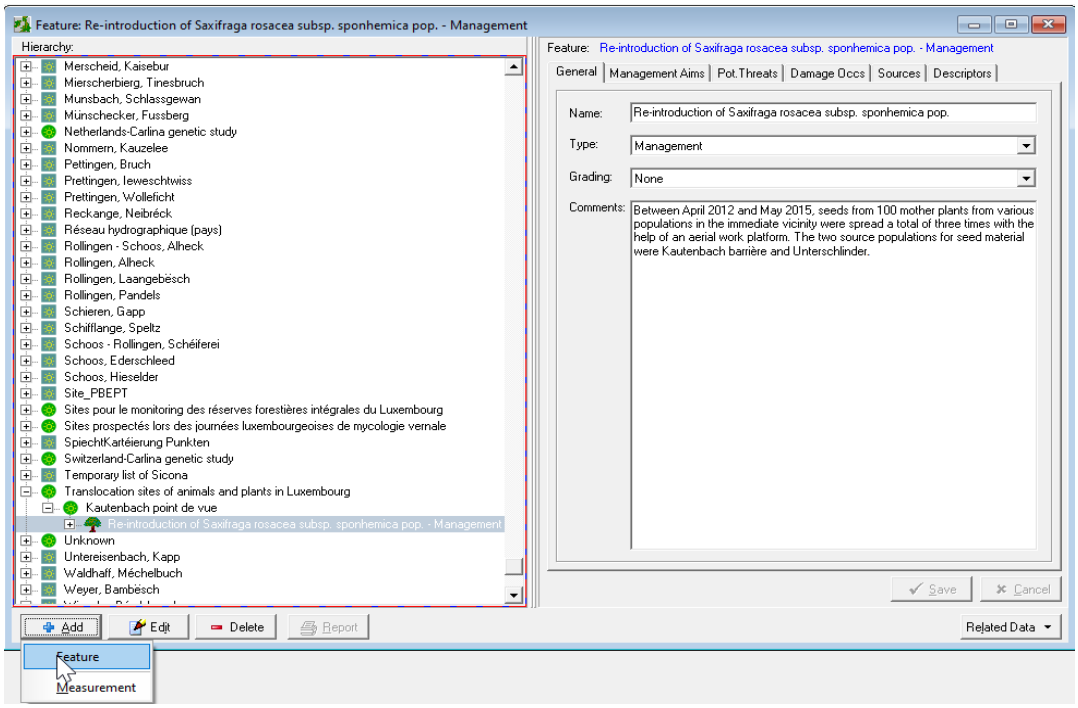


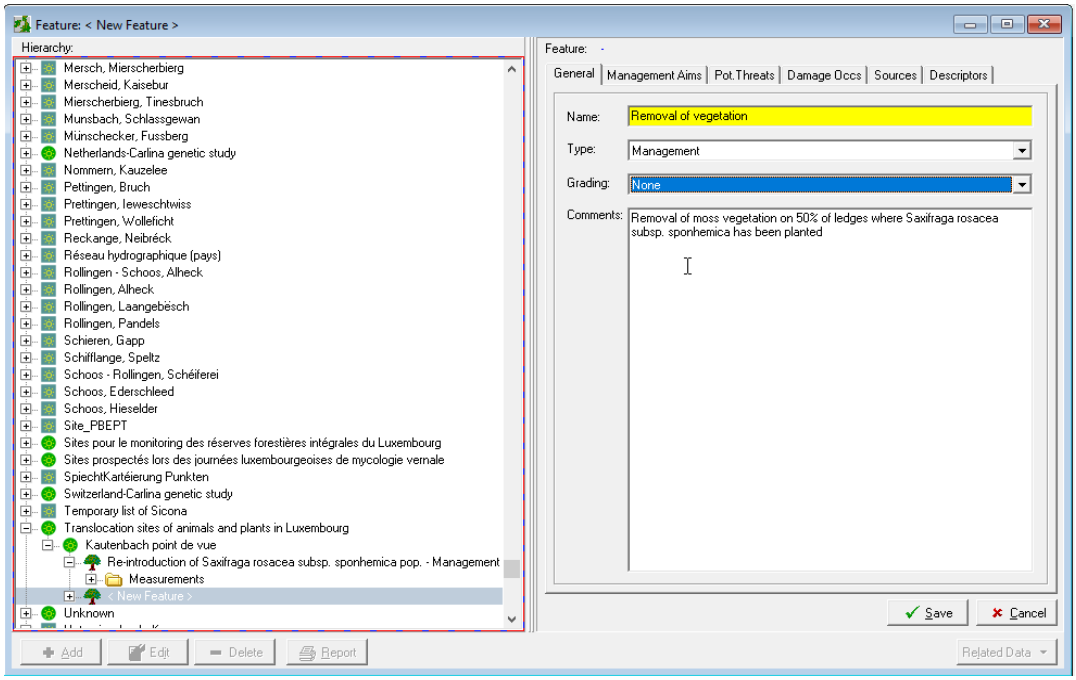
You have the possibility to add **further information** for your translocation site using the tabs on the right hand panel such as *Designations* of the site (i.e. national or international status), *Geographic information*, *Other info* - *Relation*s to other sites, *Uses, Approach* (how to get there) as well as *Sources* (for example References, Images or URL).

Note: I encourage you to also add a sub-site at the plot level you introduce the plants or seeds to. To do this repeat the same steps as for adding a new location, but create your new sub-location as a child of the location and add 'translocation plot' or 'sub-site' as a new location type.

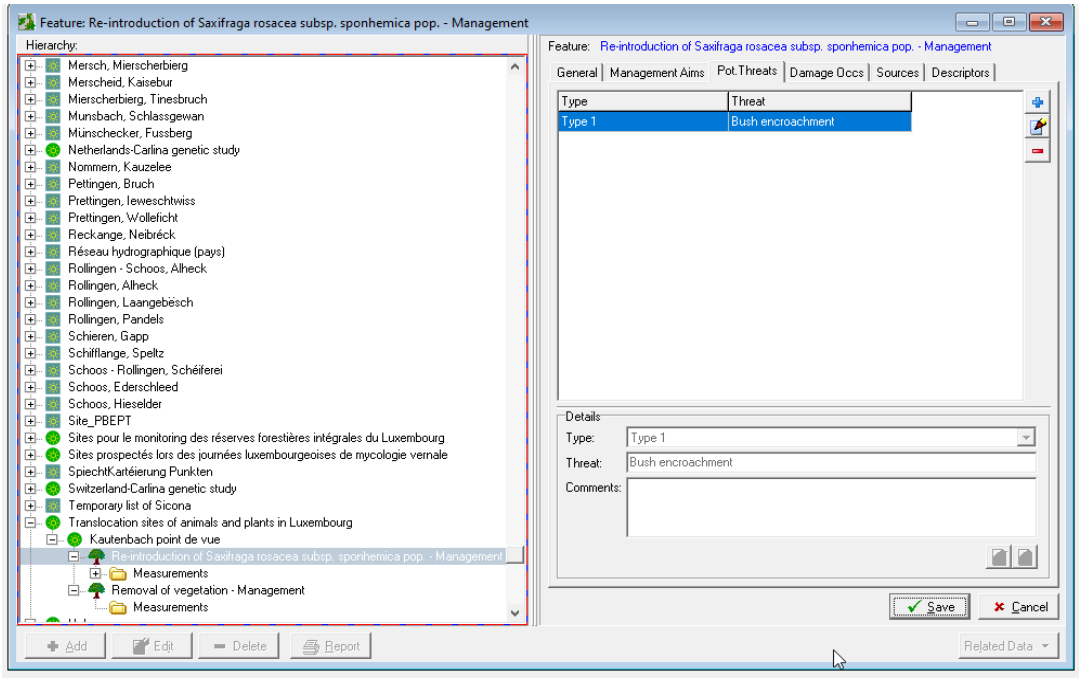
3 Add site specific management features

You may also add **location features** by clicking on the 'add' button at the bottom left of the location window. You may enter a **feature of the type 'Management'** with a description of your conservation action in the comments field.





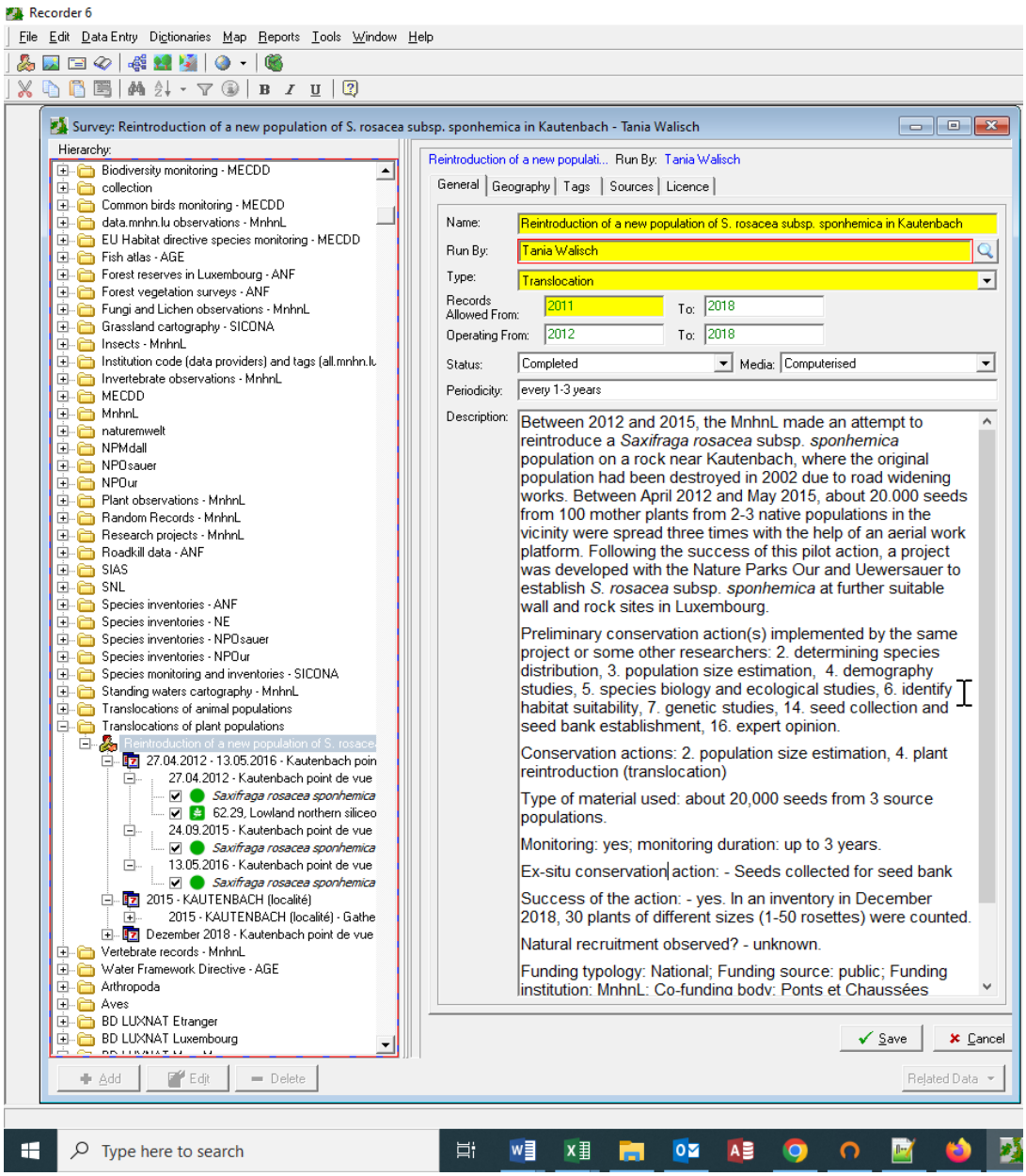
In the right hand panel of features, there are additional tabs where you may document the **management aim, potential threats and damage occurrences** if relevant.



Note: If you have the collections module installed, the **descriptors** tab is visible. This is the case for the MNHNL's Recorder 6 instance. I recommend not to use this unless you have to. When you add a descriptor, the descriptor parameter you enter will be saved to the thesaurus and usable for subsequent data entry. Note that the descriptor parameters can also be added or modified in the 'Descriptor parameters' concept group in the 'system term' domain of the Thesaurus.

4 Add a new translocation survey

After having created your translocation site(s) you are ready to enter your project (called survey in Recorder) and any events linked to that survey. Fill in the name of your project in *Survey Name*, the organization (or person) running the project in *Run By*, the start of the project in *Records Allowed From* and the status (completed, in progress, published) in the field *Status*.

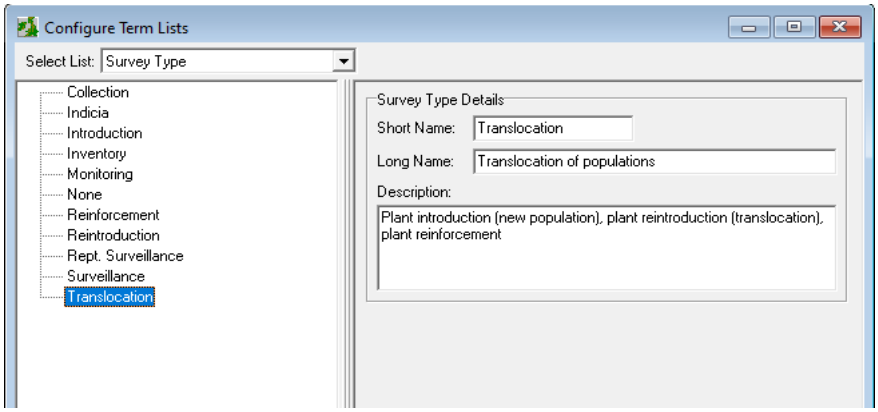


Add a **description** of your project in the *Description* field of the survey. If available, you may add the following information data fields from the ConservePlants survey:

1. **Funding Information:**
   - Funding typology: - National;- Regional;- International;- European Union.
   - Funding source: - public; - private; -both.
   - Name of the funding institution and of the co-funding body(ies) if there is more than one funder, percentage of cofounding (estimate).
   - Total amount of funding in Euros.Write the exact amount or pick adequate range. Range options: • < 10.000; • 10,000-24,999; • 25,000-49,999; • 50,000-74,999; • 75,000-99,999; • 100,000-124,999; • 125,000-149,999; • 150,000-174,999; • 175,000-199,999; • 200,000-499,999; • 500,000-999,999; • 1,000,000-1,499,999; • > 1,500,000; • Unavailable.
     If this is the complete amount for the whole project dealing with several plant species, please emphasize it in the notes.
   - Name of the funding program: If there is no special name of the program write "no name". If the name of the program is not available, write "unavailable".

2. **Conservation actions:**
   - Description of conservation actions: - in situ; - ex situ; -both.
   - Prior knowledge on species biology: - yes; - no.
   - Preliminary conservation action(s) implemented by the same project or some other researchers; in the case of several options, separate numbers by coma: 1. none, 2. determining species distribution, 3. population size estimation, 4. demography studies, 5. species biology and ecological studies, 6. identify habitat suitability, 7. genetic studies, 8. identification of populations under threat, 9. designing conservation and management plans, 10. removal of competing natural vegetation, 11. removal of competing indigenous species, 12. removal of competitor invasive species, 13. fence erection, 14. seed collection and seed bank establishment, 15. divulgation actions (conservation dissemination to the public), 16. expert opinion, 17. other (specify).
3. **In situ conservation actions:**
   - 1. none, 2. population size estimation, 3. plant introduction (new population), 4. plant reintroduction (translocation), 5. plant reinforcement, 6. removal of competing natural vegetation, 7. removal of competing indigenous species, 8. removal of competitive invasive species, 9. multispecies management, 10. habitat protection, 11. fence construction, 12. divulgation actions (conservation dissemination to the public), 13. other (specify).
   - Type of material used: - seeds; - rhizomes; - bulbs; - tubers; - cuttings; - juveniles; - established plants; - mature and already propagating plants; - NA (not applicable). Approximate number of transplantants per location.
4. **Monitoring Duration:** - up to 3 years; - up to 5 years; - more than 5 years; - no monitoring;- NA (not applicable).
5. **Ex-situ conservation actions:**
   - Seeds collected for seed bank /gene bank; other plant parts collected for ex-situ conservation: -whole plants; - cuttings; - embryo or tissue for cryopreservation, - none.
   - Number of mother plants per population from which plant material was collected.
   - Was a multiplication ex situ (e.g. in a botanic garden or a nursery) employed prior to translocation?
6. After completion of the project, add the **success of the actions**: - yes; - no; -unknown. Note if natural recruitment has been observed: - yes; - no; - unkown; - NA

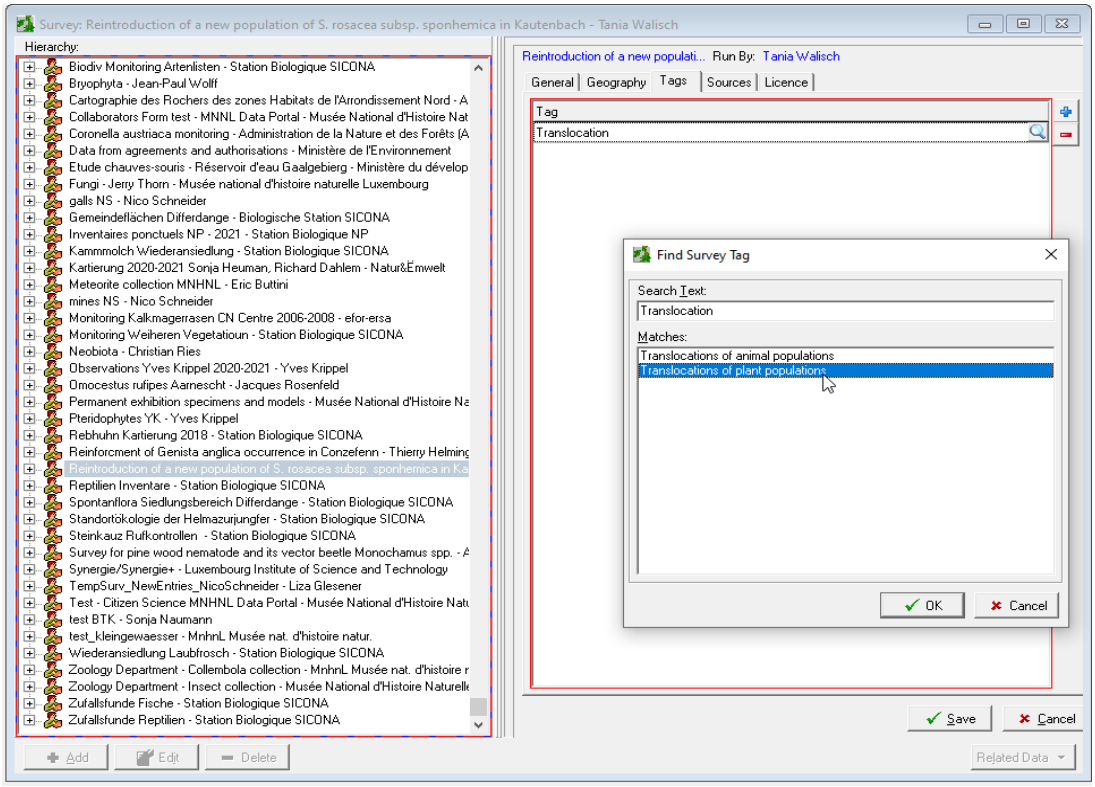
If you already filled in the *ConservePlants* Excel file, you may link it as a source to the survey. Copy your file to the Recorder 6 sources folder, go to the survey tab, in the external references field add the file path.



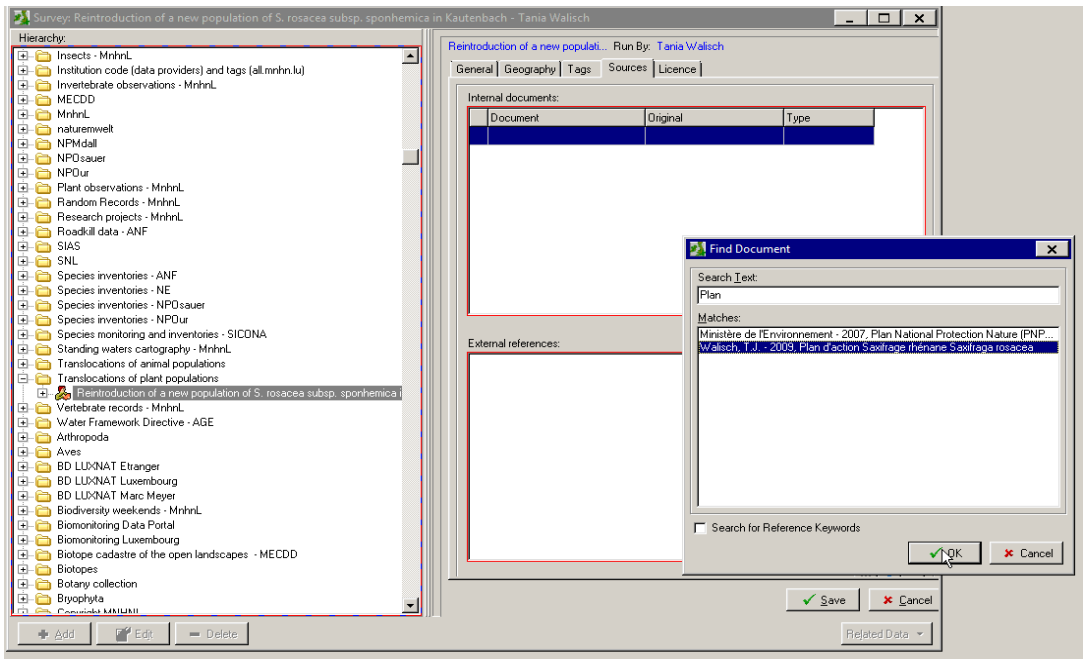
Add a survey tag to your survey if the survey tag functionality is enabled on your instance of Recorder (as is the case of the MNHNL's Recorder 6 instance)

Add the relevant **survey tag** if available:

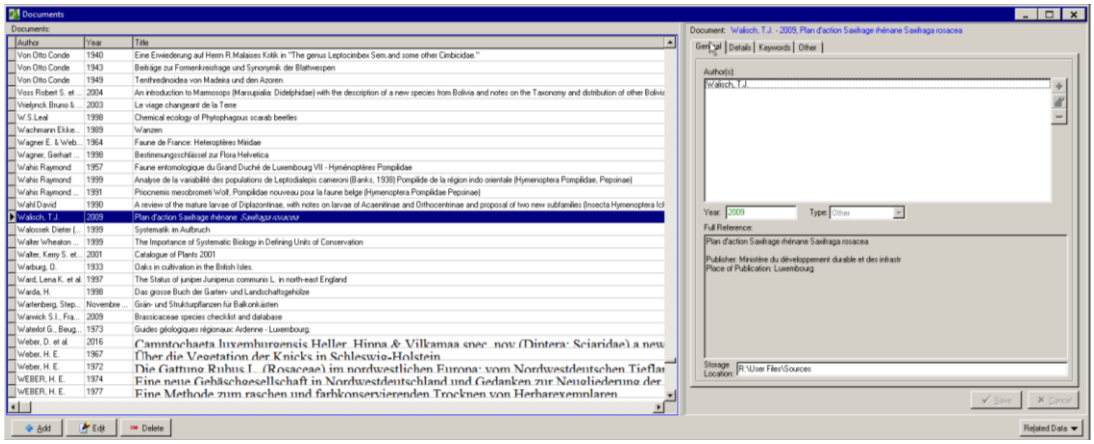
- Translocations of plant populations
- Translocations of animal populations



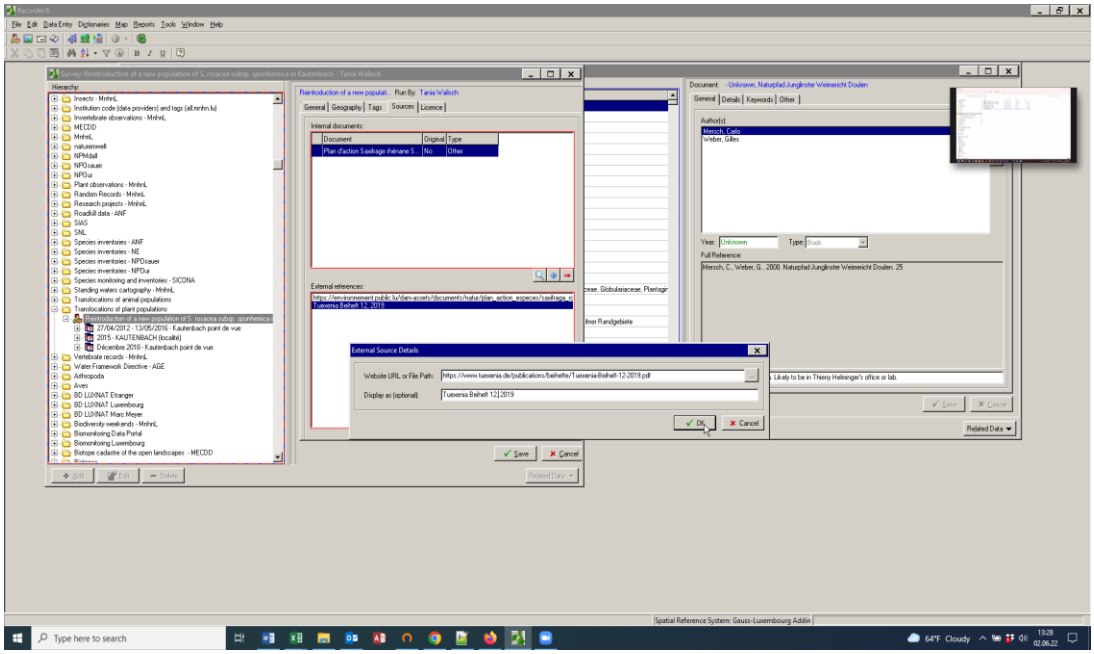
You have the possibility to add reference documents to your survey such as the Plan d'action espèce or a LIFE project description as well as any references to the results, publications or reports after completion of the project. Go to the *Sources* tab, add the reference of your document.



If you cannot find the reference of the document you are looking for, you need to add it as a new reference to the document browser first. Click on the magnifying glass icon. In the **document browser** click the add button at the bottom left and fill in Author field, year and type publication as well as the title in the *Details* tab.

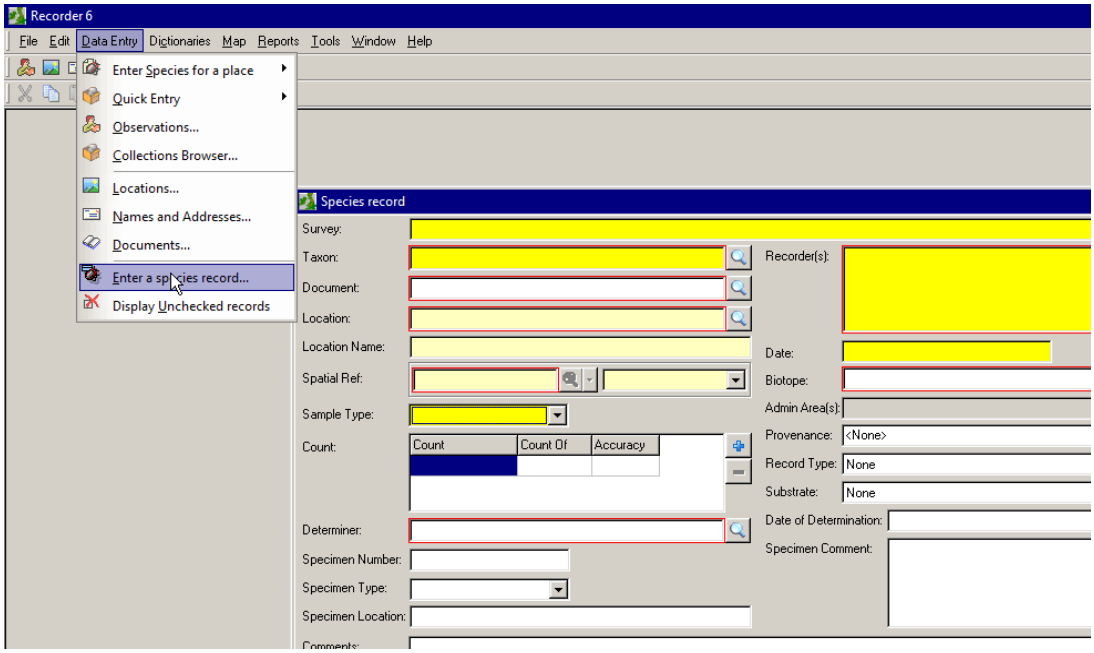


Instead of (or additionally to) adding an internal reference you may also add one or more **external references** to websites (URL).



5 Add the translocation events

5a. Add an event using the species record card



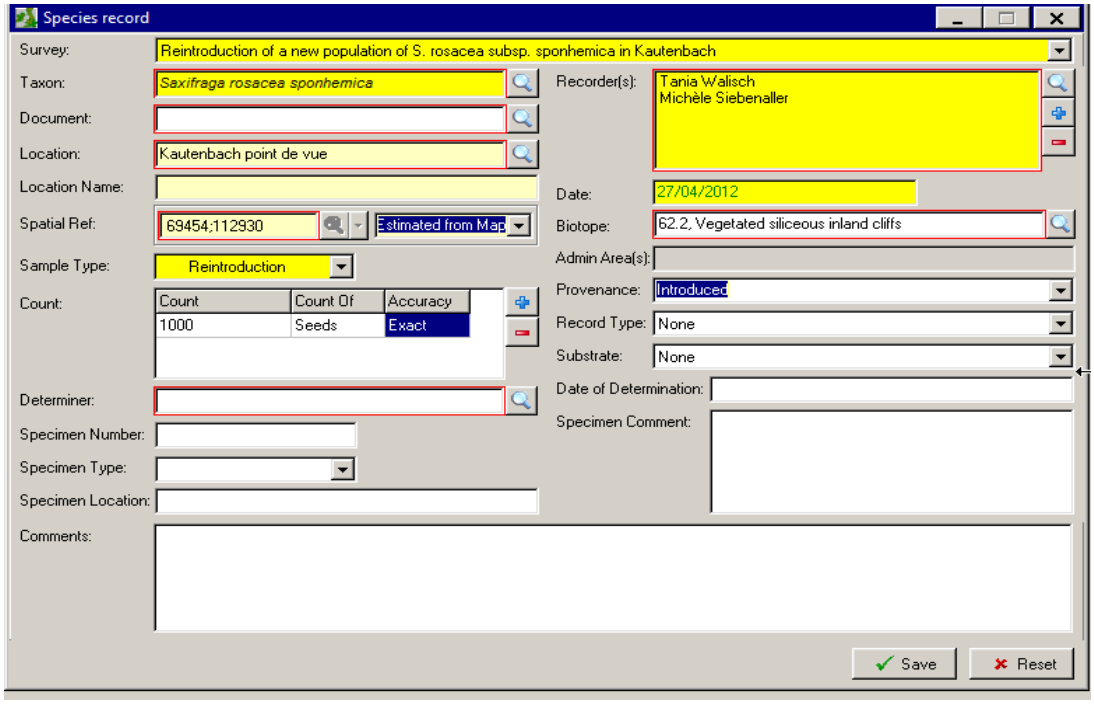
Fill in information about the event in the corresponding fields as shown in the two examples shown below.

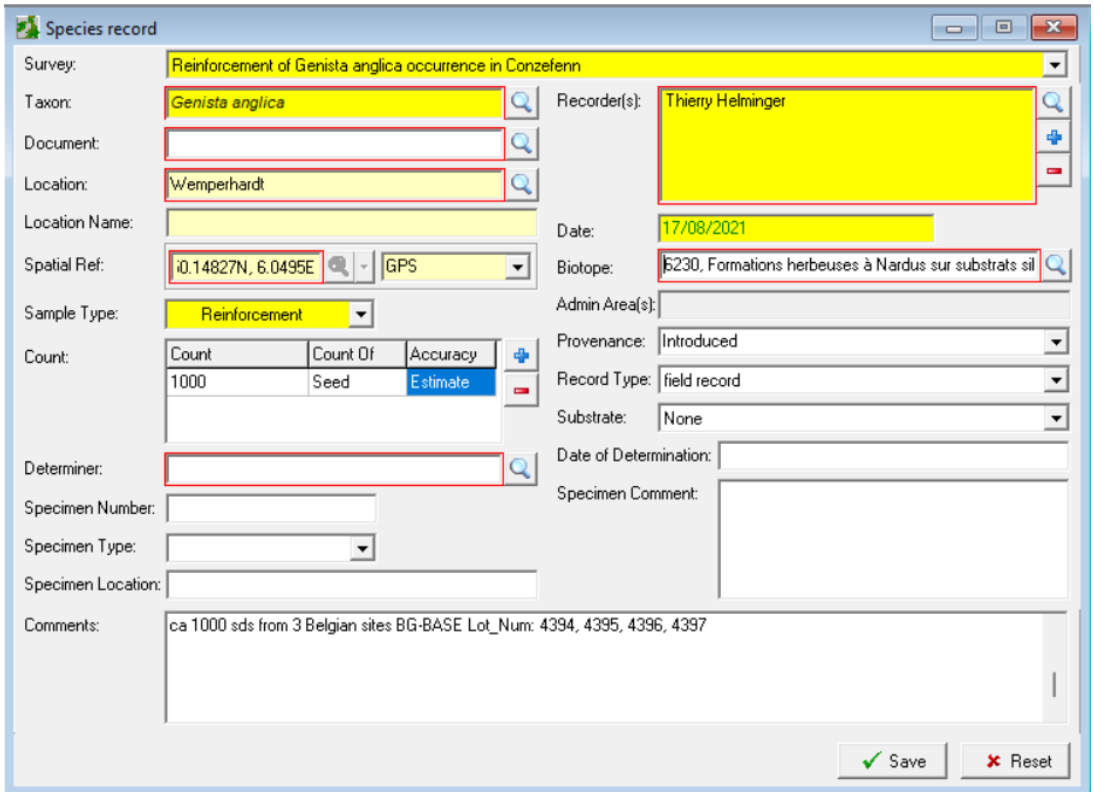
In the field *Sample type* choose ‘Reintroduction’ ‘Introduction’ or ‘Reinforcement’ from the drop down list (first letter); for the *Provenance type* select ‘Introduced’.

Add the origin of your source material in the comment field at the bottom left = Taxon_occurrence_comment (for example the seed batch number of the national seed bank at the MNHNL)

Note:

If the abundance qualifier you need is missing in the drop down list, go to the menu ‘Tools’, ‘term lists’ then choose ‘measurement types’ and add it under ‘abundance’.

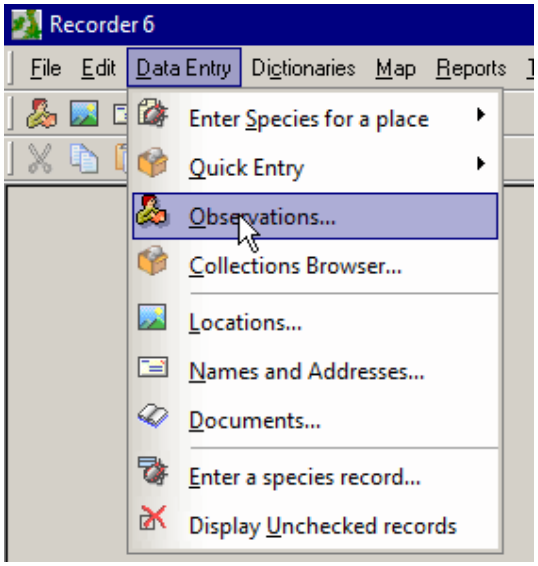




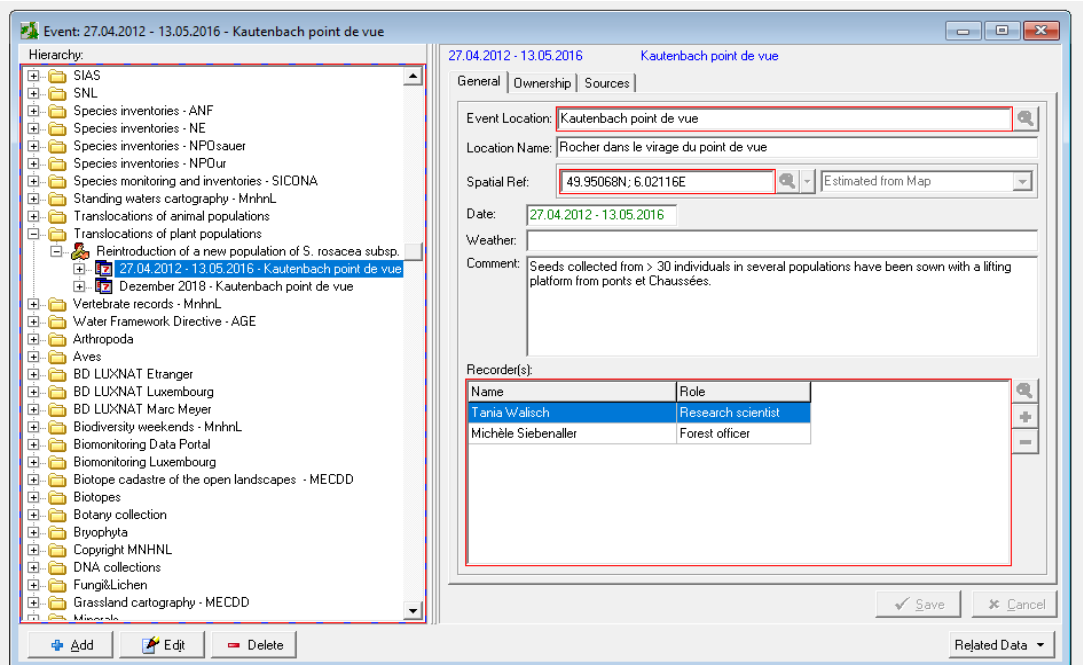
In the document field you may add any reference related to the translocation event (protocole, report …) (see 3b,c on how to add an external file or URL)

5b. Add additional information to the new survey event

Go to Data entry, Observations



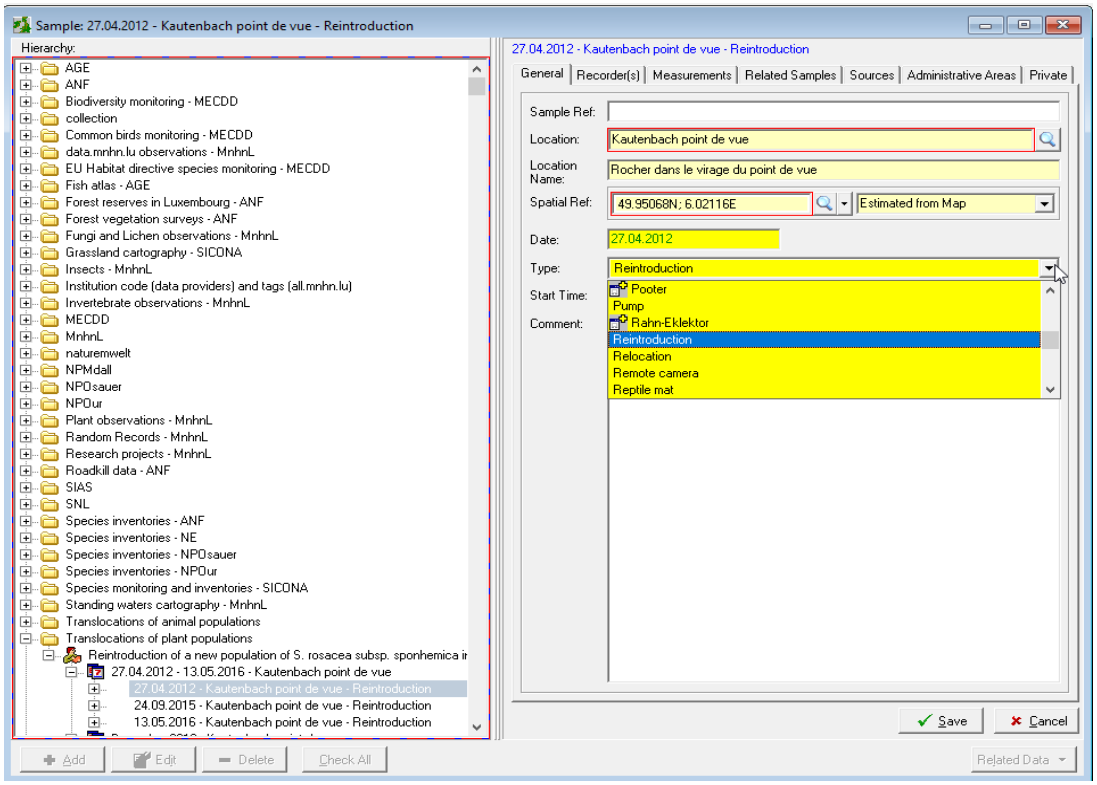
Look for your sample in the survey you created.



You can define people's roles — such as research scientist, forest agent, biologist, assistant, or volunteer — in the right-hand panel.

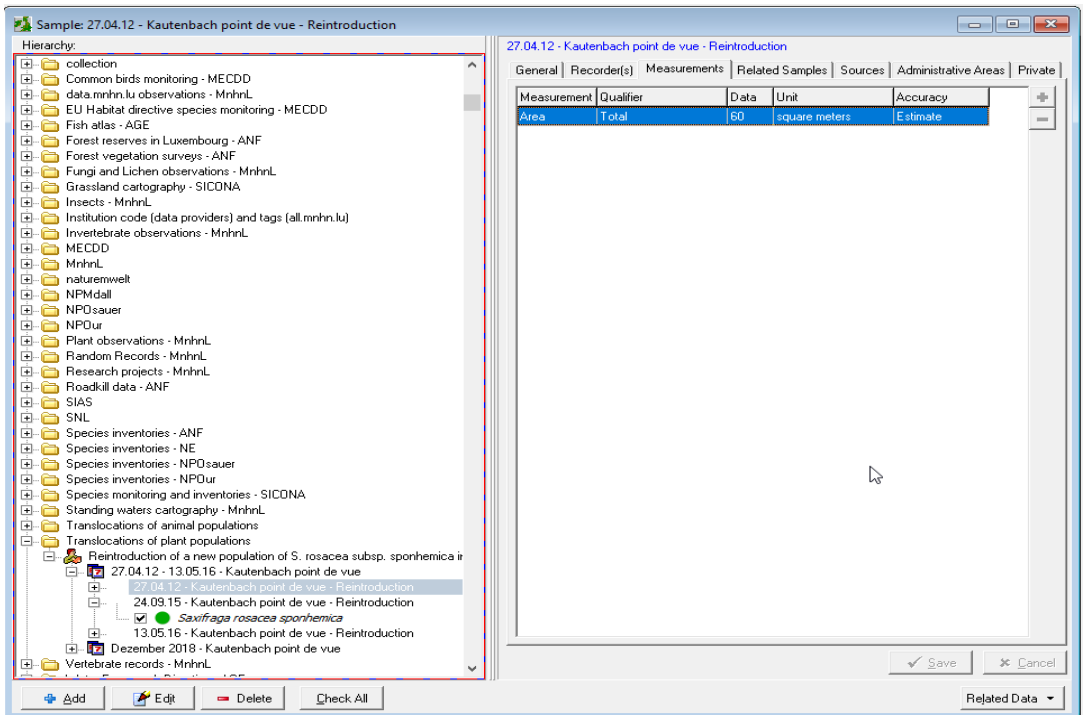
Note: **Survey_event date** = date or period of translocation(s).

5c. Check data in newly created sample



Note: You have the possibility to **link samples** in the related samples tab, for example source populations and translocation sites. As there is however no possibility to indicate the **type of relationship** between these samples, we don't consider linking samples as an essential piece of information.

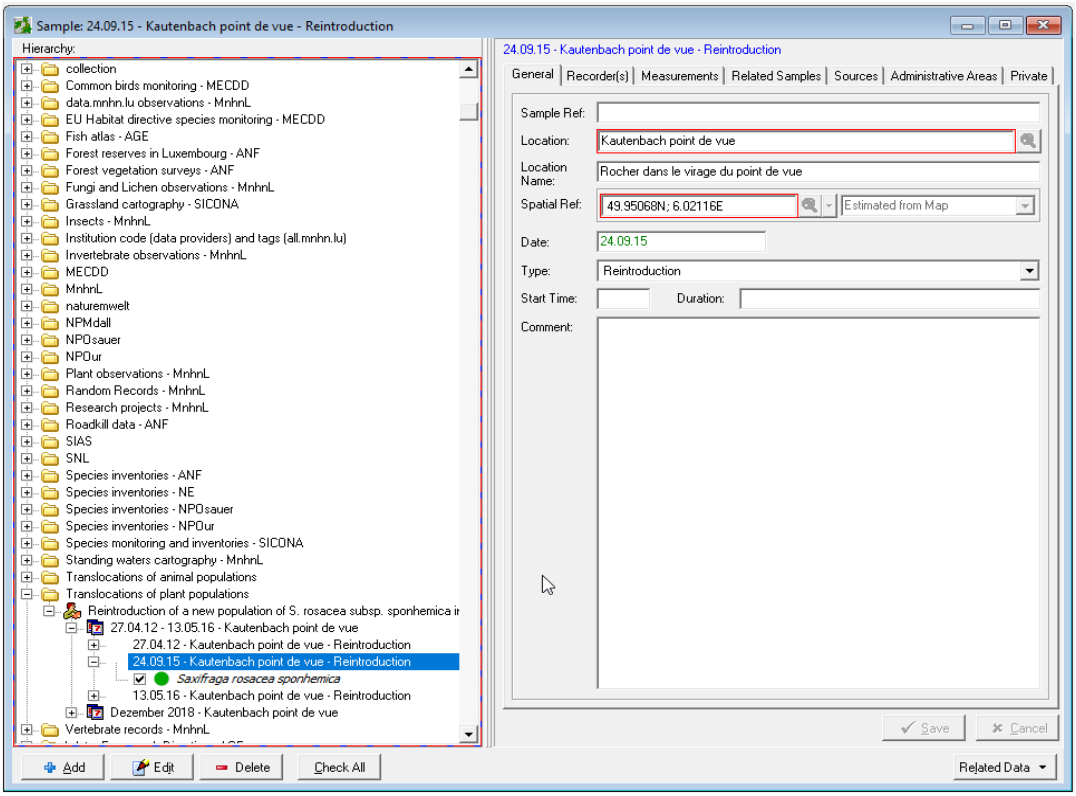
Enter the **spatial extent** of the population reintroduction as a sample measurement:



Add an external document file, data file or URL in the sources tab.

5d. Check data in taxon occurrence and add missing information

Go back to the taxon_occurrence window and click on your sample.



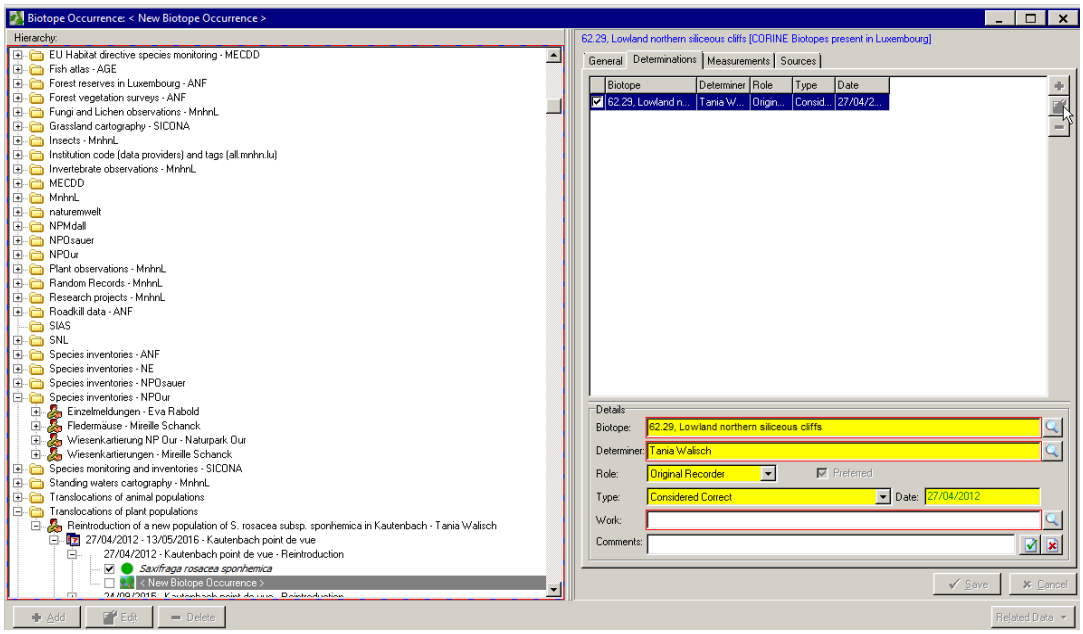
Go to the measurements tab on the right-hand side of the window. Add the abundance qualifier to the measurement.

Note: You may link any **external data files** such as Excel or csv files holding your precise measurements as external sources in the sources tab (see more about this under monitoring 4a.).

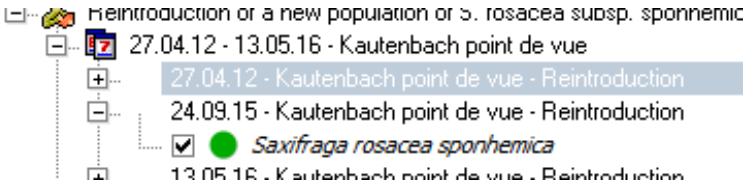
If everything is correct, tick the box at the left of the species name in the browser window.

5e. Check data in biotope occurrence

Set determination_type to ‘correct’.



If you verified that all the data you entered is correct, check the taxon occurrence tick box in front of the species name in the left hand panel of the observation browser:



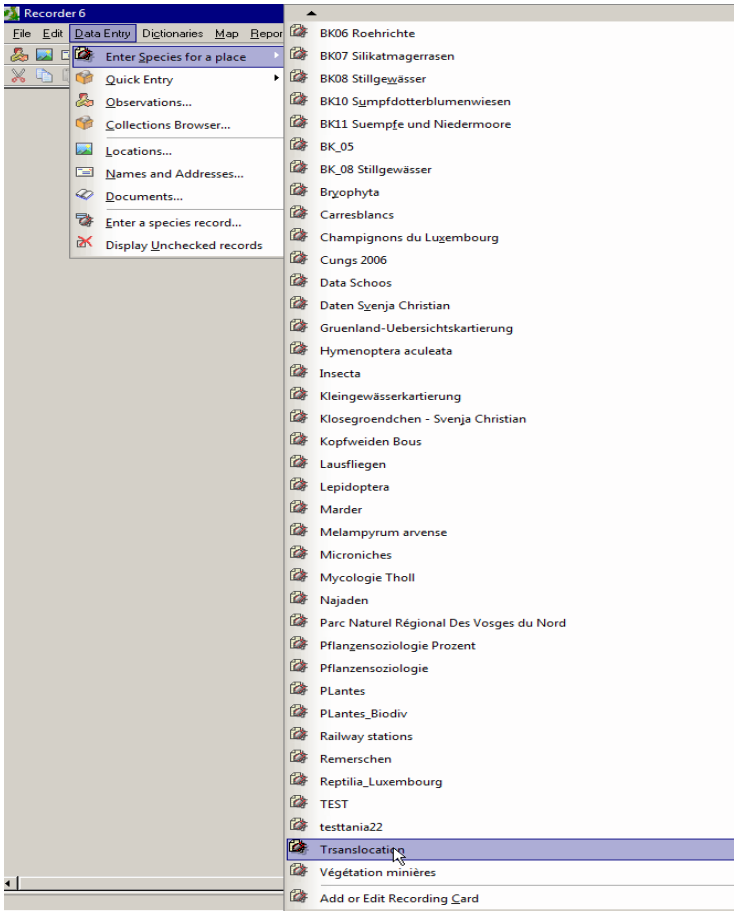
Preferably use biotope designations from the biotope term list in the cadastre of biotopes (Biotopkataster).

If everything is correct, tick the box at the left of the biotope name in the browser window.

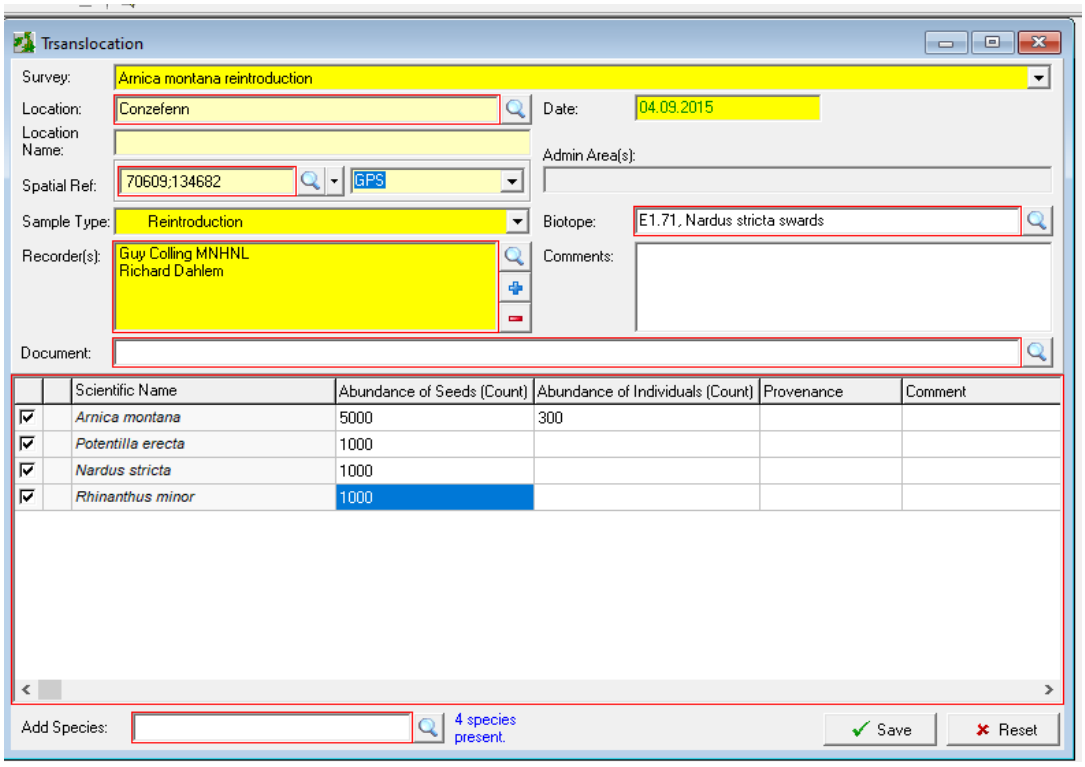
5f. Use the data entry form 'enter species for a place' if you translocated more than one species

This form is useful if you have introduced **more than one species in a site for the same event**.

Go to Data entry – 'Enter species for a place' and choose the recording card 'Translocation'

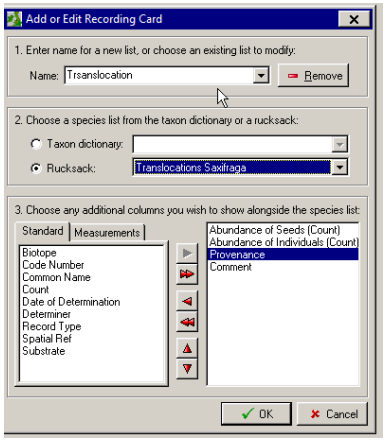


Enter data into the recording card and save



Fill in any missing information which cannot be entered via the data entry form, such as ownership or (funder) or recorder role and Provenance 'Introduced' and determination type 'correct', going to the observation browser as explained above.

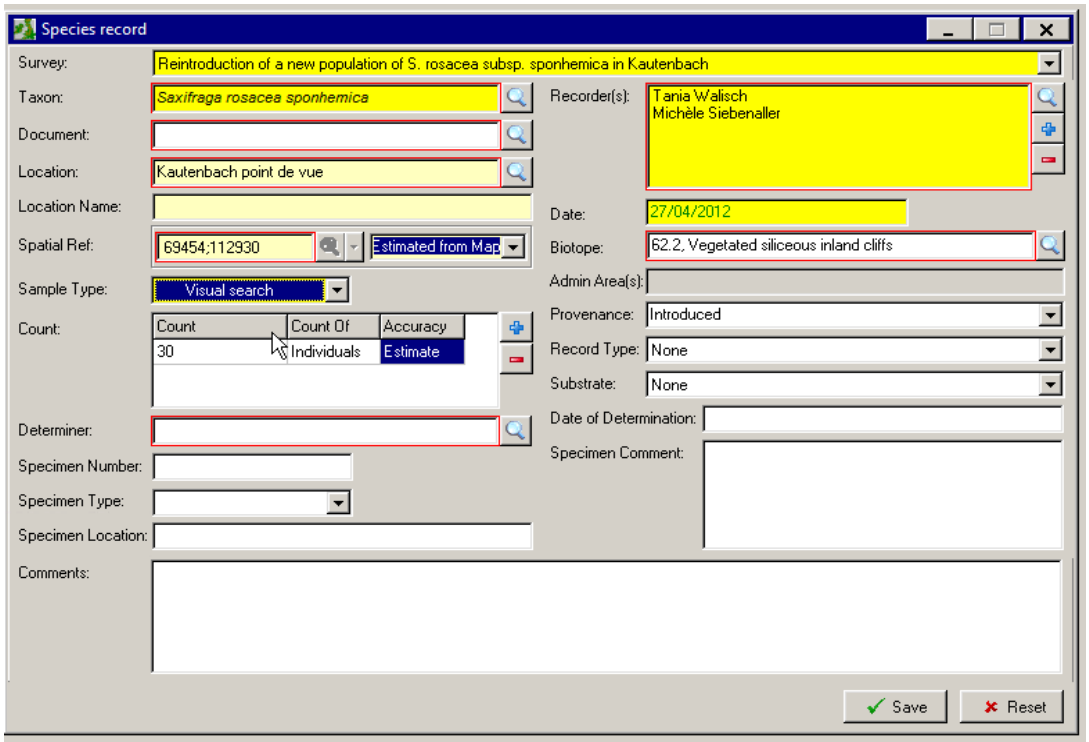
If the 'translocation' data entry form under *Enter species for a place* is not available, ask your data manager to create it for you or try yourself. Go to data entry, enter a species for a place, Add or edit a recording card. Then add the following fields:



6 Add a MONITORING event

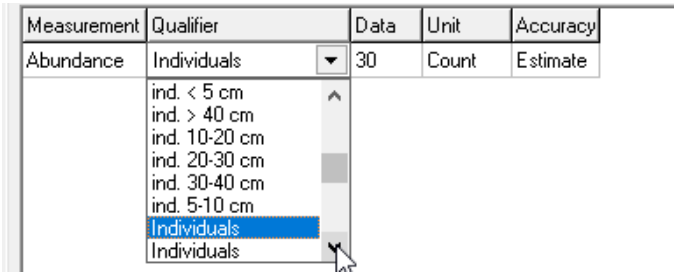
6a. Use the species record card

Go to data entry, species record



Choose ‘Visual search’, ‘Field observation’ for the sample type. Add the number of individuals, flowering individuals or juveniles counted on the site, and select the appropriate qualifier — ‘individuals’ or ‘flowering individuals’ or ‘juveniles’ — from the drop-down list.

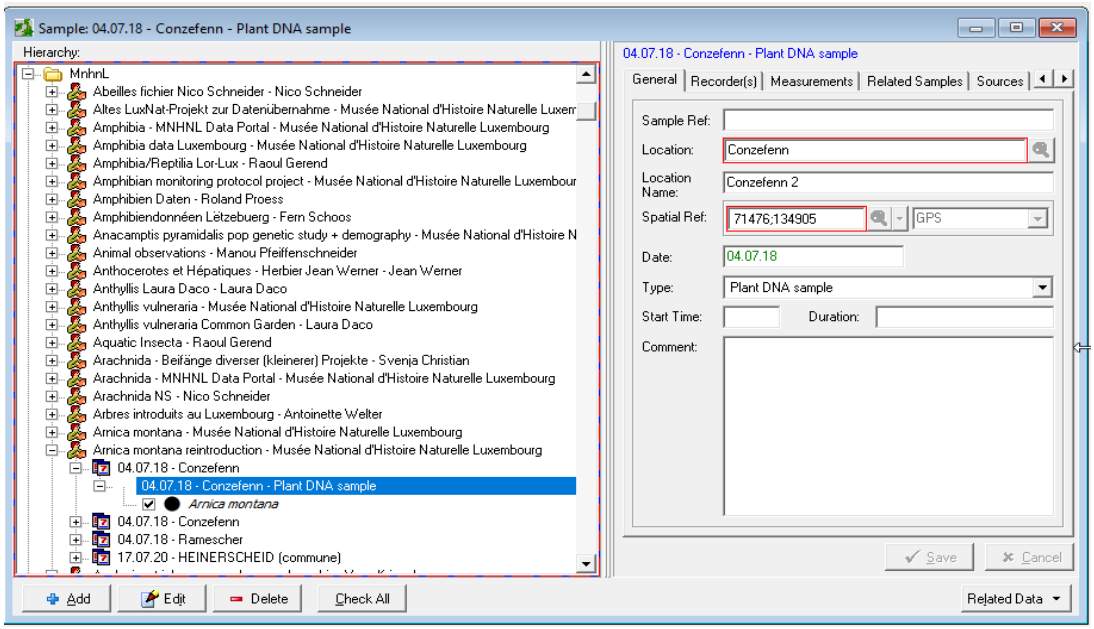
Note: Under Count, you can add more detailed measurements using qualifiers such as seedlings, juveniles, flowering, fruiting, recruited individuals, or other (please specify, for example, range sizes for the number of rosettes — useful in demographic studies). Alternatively, you can also add external data files containing more detailed measurements as a source (see below).



If your qualifier is missing in the drop down list, go to tools, term lists, select the *measurement type* list and add your term under *abundance.*

Note: Organisations using *Recorder* should aim to establish a common set of essential abundance qualifiers for monitoring to be integrated into the term lists file (cf point 1 above).

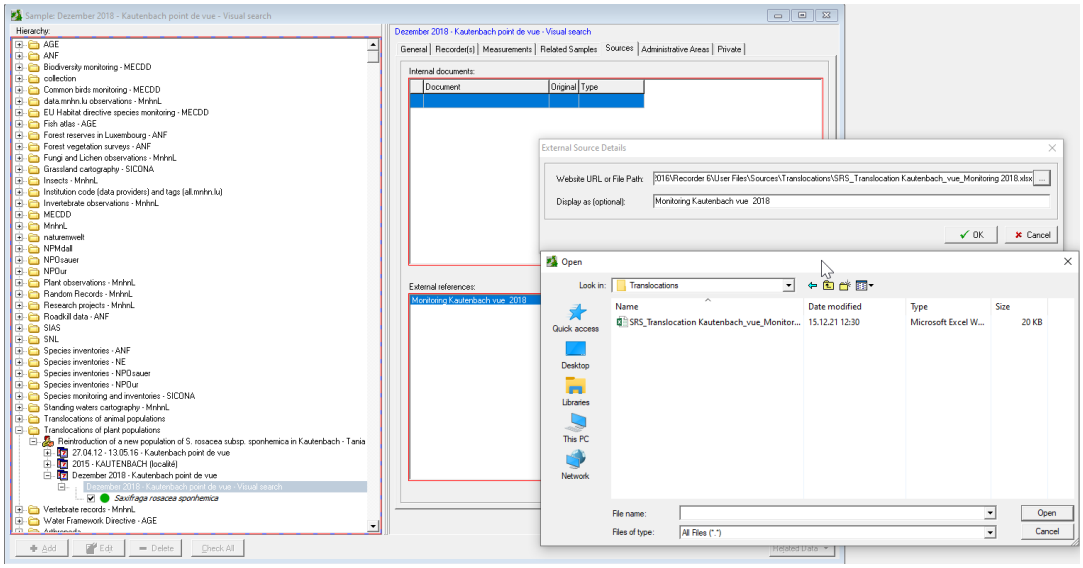
For genetic monitoring events where you gathered plant material for DNA analysis, add a sample with sample type *DNA sample*.



6b. Check the data after entry and complete or update if necessary

Check the data via the observation browser. Update *determination type* and *Recorder roles* as described above under 3.

You may store a copy of your **data files** with detailed monitoring data on abundances as well as environmental data (temperature and humidity dataloggers for example) in the 'external files' folder under R6 (...\User Files\External Files, create a translocation subfolder). Add the file path to your files in the sources tab. By doing this you can easily re-use or share your data files with others.



Alternatively you may also add the path or URL to an open source server holding your data files such as Dryad or Zenodo in the external references data field of R6.

6c. Add data using a specific data entry form

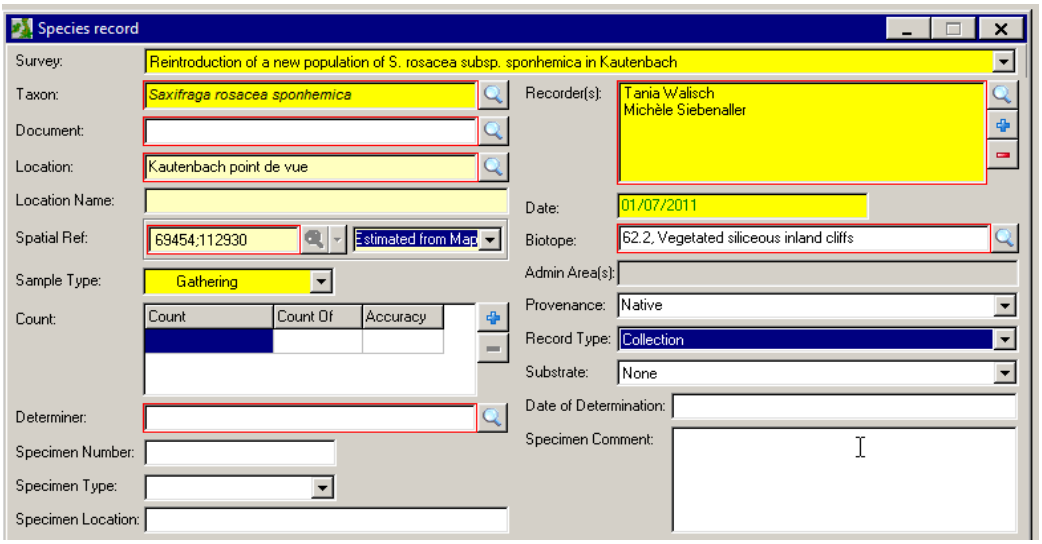
You may also use the data entry form defined under 5f to enter your data, as sample type choose 'Visual search' or 'Field observation'. Open the observation browser as explained in 3b and 3c to find your sample and fill in any missing information such as *Ownership* (funder), *Recorder role*, *Provenance* 'Introduced' or *determination type* 'correct'.

7 Add a GATHERING event (in a source population)

So far we have seen how you can enter your data for the translocations events and subsequent monitoring events. I encourage you to also enter data about the gathering event on which you collected propagules or individuals in source populations for direct sowing in the translocation site or for prior cultivation ex situ of plants (in case of seeds).

Note: In case of seed collection for longer term storage at the Museum's national seed bank or the Wëllplanzen.lu seed bank, this information ought to be added to BGBASE instead of Recorder.

7a. Add a new gathering event

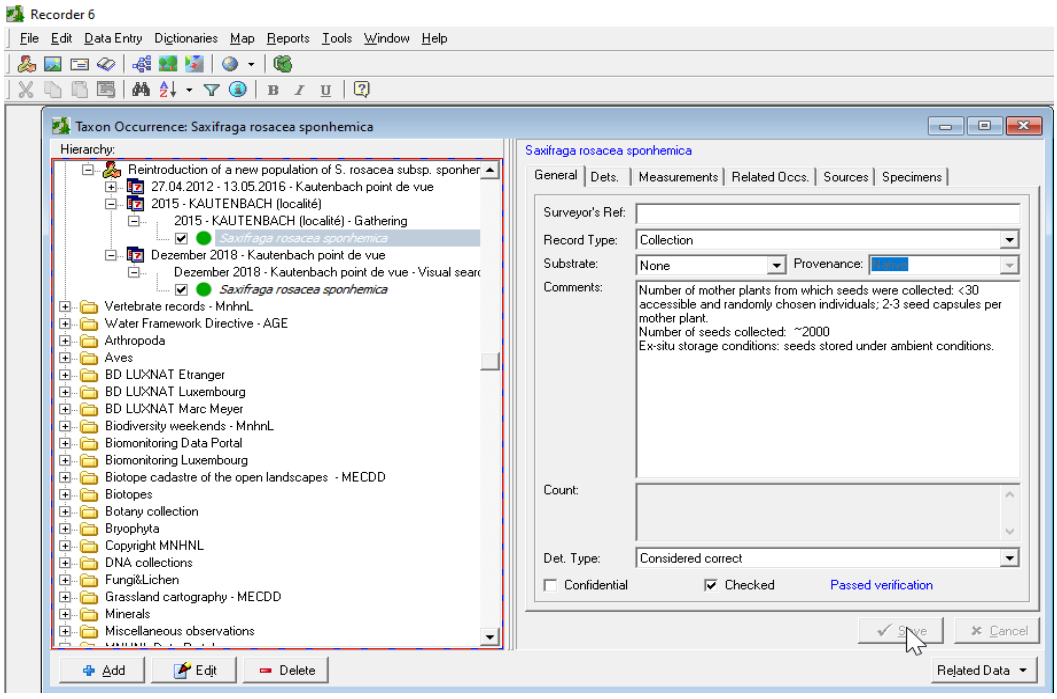


Open a new species record form. Choose *Sample type* 'gathering', and *Provenance* 'Native', *Record type* 'Collection'

Check your data in the observation browser and update *determination type* and *recorder roles* as described above under 3.

Add the number of individuals in the population if you counted them on that day. Save the data you entered via your data entry card.

Open the Observation browser, go to the sample you just entered, in the taxon_occurrence_comment field



You may enter the following information from the ConservePlants survey in the comment field:

- number of mother plants per population from which material was collected,
- the exact or approximate number of seeds collected,
- other plants or plant material collected for ex-situ conservation,
- ex situ storage conditions: - seeds stored under ambient conditions; - seeds stored in climate chambers; - plants kept in garden beds; - other (specify).
- Climate chamber conditions if applicable: - the exact temperature in °C, Humidity:- relative humidity in %, - very dry (silica gel),- unknown.
- Ex-situ cultivation prior to translocation: how many plants were approximately cultivated?: - < 50,- 50-199,- 200-499,- >500,- unknown,- NA (not applicable), if plants weren't cultivated.

Notes:

- If you entered your seed batch into the MNHNL's BGBASe instance, add the BGBASE key or reference code in the taxon_occurrence_comment and Surveyor's reference fields.
- You may also use the specimen tab to enter data on seeds or other living plant material you collected on site. For a description on the taxon_occurrence specimen tab in classic R6 instances look here: http://www.recorder6.info/WebHelpR6V625/Topics/Taxon_Occurrence_Specimens_Tab.htm

7b. Add data using a specific data entry form

You may also use the data entry form defined under 3e to enter your data if you gathered seeds from more species in the same site on the same day. As sample type choose 'gathering'. Fill in any missing information which cannot be entered via the data entry form, such as *ownership* (funder), *Recorder role*, *Provenance* 'Introduced' or *determination type* 'correct', using the observation browser as explained in 3b, 3c.

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