Guide to BGCI's PlantSearch

About PlantSearch

BGCI's PlantSearch is a globally unique tool for sharing and accessing information about living botanical collections maintained by botanic gardens and similar organisations. PlantSearch connects collections directly to conservationists, educators, horticulturists, researchers, policy makers and many others who are working to save and understand plant diversity.

PlantSearch, which functions in combination with BGCI's GardenSearch, can be used to locate plants in botanic garden collections around the world and connect to staff who maintain those collections.

Search by scientific name, country of *ex situ* collection, conservation status, or other parameters including threat, crop wild relative, exceptional species, and tree statuses.

Contents

Background

Suggested Citation

BGCI. [YEAR ACCESSED]. PlantSearch. Botanic Gardens Conservation International. Richmond, U.K. Available at https://plantsearch.bgci.org/ Accessed on DD/MM/YYYY.

BGCI PlantSearch Data

Note that PlantSearch uses and aligns with these datasets:

- **Family** information is based on the APG IV system in the Angiosperm Phylogeny Website which was last updated in July 2023. These data align taxa reported to PlantSearch within plant families. Changes to APG IV family assignments are updated periodically in PlantSearch.
- **Name Status** is based on static copies of the World Flora Online (WFO) (last updated in March 2023), the World Checklist of Vascular Plants (WCVP) (last update in May 2020), and/or the International Plant Names Index (IPNI) (last updated in October 2020). These data indicate if a taxon listed in PlantSearch is an accepted name, a synonym, or unchecked according to the name reference data source(s), and is assigned in PlantSearch through consensus matching when possible. Name status is intended as guidance, PlantSearch will not dictate a particular taxonomy. Changes to name status assignments in each of these data sources are updated periodically in PlantSearch.
    - Name references are also based on these data sources. These data indicate the authorship of a taxon listed in PlantSearch, and is assigned in PlantSearch through consensus matching when possible. Changes to authorities in each of these data sources are updated periodically in PlantSearch.
- **ThreatSearch Status** is based on a live link to the BGCI ThreatSearch. These data identify whether a taxon listed in PlantSearch is considered threatened or not, based on the most recent global or regional assessment for a taxon.
- **IUCN Red List Status** is based on a live link to the IUCN Red List of Threatened Species. These data identify an assessment rank for taxa listed in Plantsearch if they have are listed in the IUCN Red List.
- **CITES Appendix** data are taken from Species+ and was last updated in July 2023. These data identify taxa listed in one of the three CITES appendices, to indicate CITES restrictions in international transfer of material.
- **Crop Wild Relative** data are taken from the USDA, Agricultural Research Service, National Plant Germplasm System and identify wild relatives of major crops around the world. These data were last updated in July 2023.
- **Exceptional Species Status** is taken from Global Working List of Exceptional Plants. These data identify whether a taxon is known to survive seed banking (non-exceptional) or not (exceptional). Exceptional species status data were last updated in February 2022.
- **Tree** data are based on a live link to the BGCI GlobalTreeSearch. These data indicate if a taxon listed in PlantSearch is considered a tree.

Data User and Provider Agreement

PlantSearch data download, use, and provision is guided by the terms and conditions of the BGCI Data User and Provider Agreements.

PlantSearch Data Requests

BGCI will make summary data available and provide request capabilities via PlantSearch in future releases.

Much of the data BGCI stores and curates are available through BGCI's online Data Tools, however, if you require information which is not available through the online downloads, please fill out this Data Request Form. The information required in the form enables BGCI to provide advice and determine what data will be most useful to you and your work. Once submitted, a member of BGCI will review a request and follow up via email.

Additional Resources

1. PlantSearch overview of quick search and filtering VIDEO LINK
2. How to upload taxa onto PlantSearch VIDEO LINK
3. How to manage your taxa list VIDEO LINK

Acknowledgements

The development of this version of BGCI's PlantSearch was made possible with the support of the following organisations:

CHICAGO BOTANIC GARDEN
DARWIN INITIATIVE
INSTITUTE of Museum and Library SERVICES
The Morton Arboretum
THE CHAMPION of TREES
UNITED STATES BOTANIC GARDEN

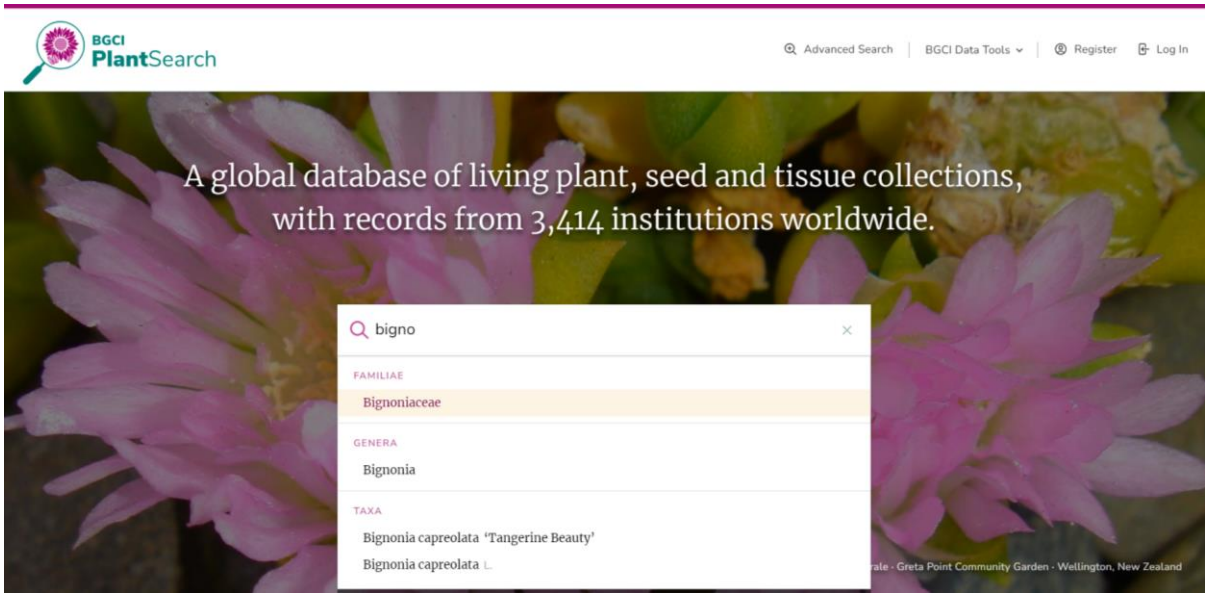
We acknowledge support from IMLS grants: MG-60-19-0064-19 and MG-245575-OMS-20

Data in BGCI's PlantSearch is made possible by valuable data contributions by thousands of botanic garden staff around the world. BGCI is also grateful to Keith Damiani for designing and building the PlantSearch system and web app.

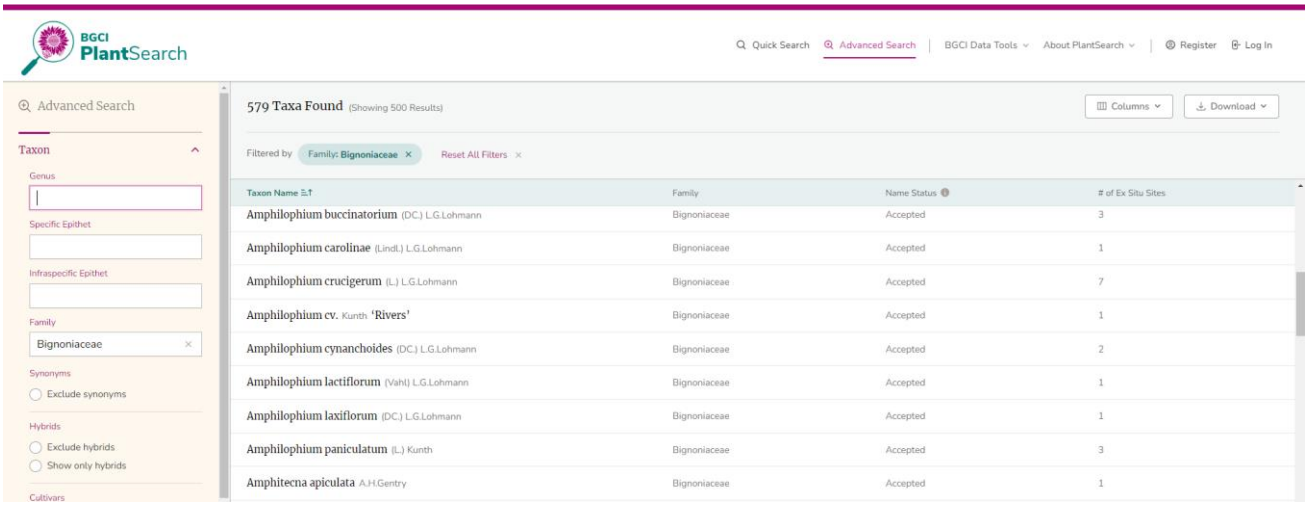
Quick Search

Help video

To perform a quick search, enter a taxon name (family, genus, species, etc.) in the search box (e.g., Bignoniaceae).



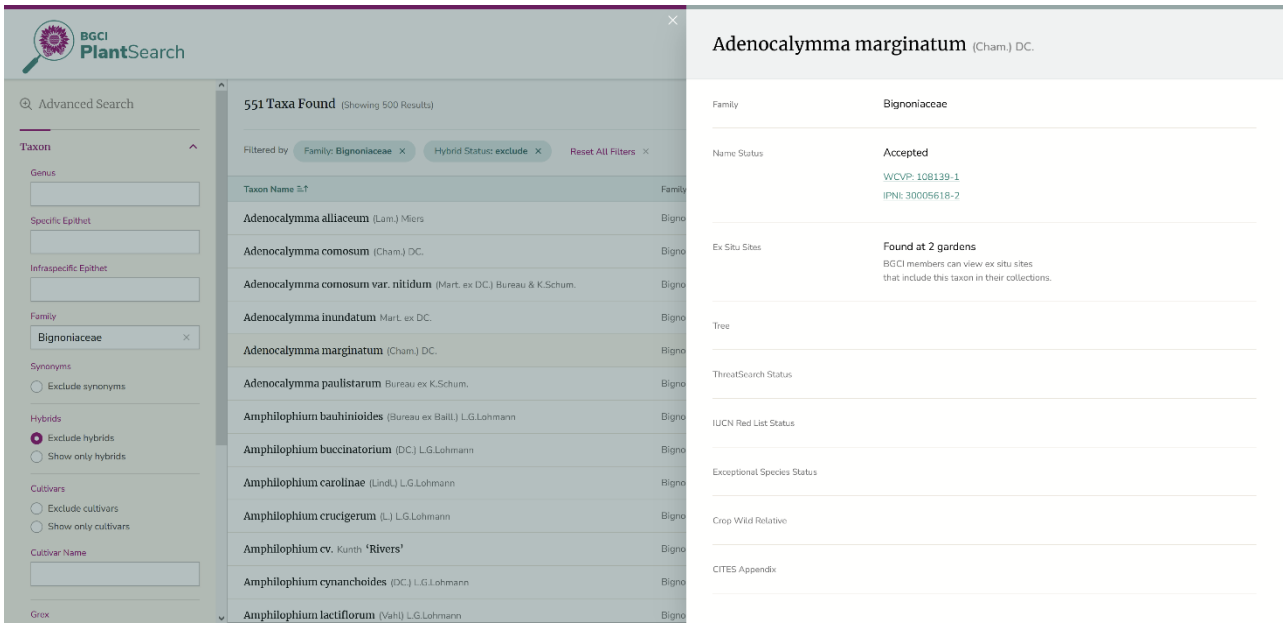
Search results will include all relevant taxa based on the search criteria entered, along with family name, nomenclatural status, and the number of botanic gardens (ex situ sites) which report each taxon in their collections.



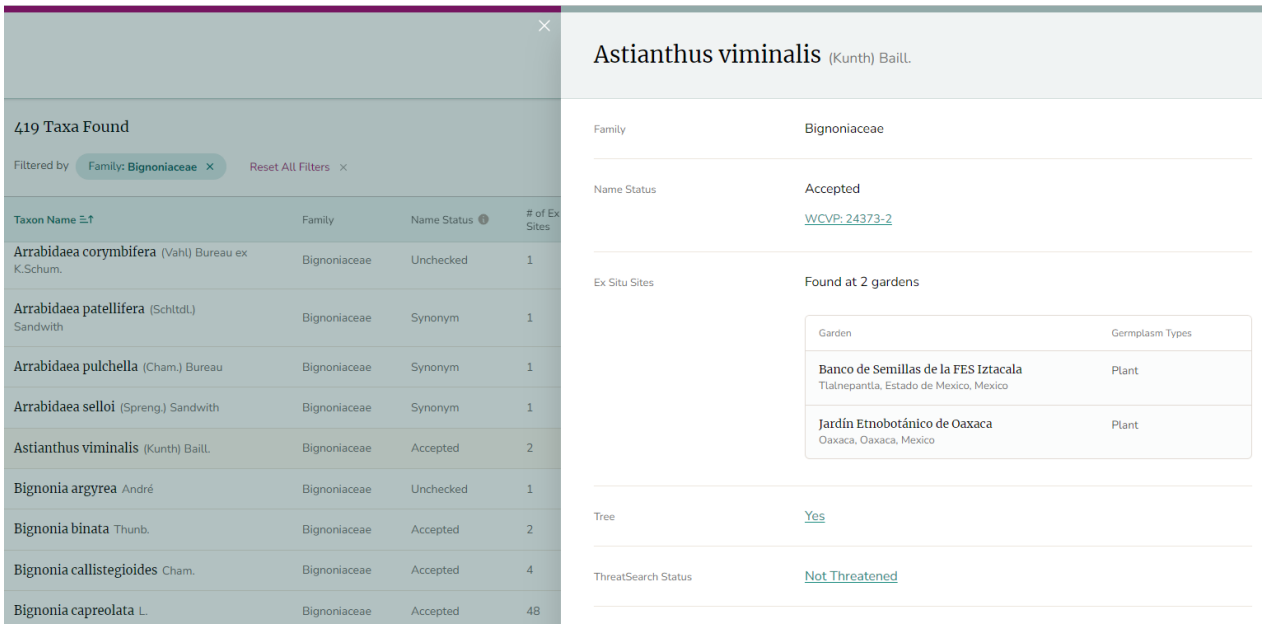
Use the search results page to:

- sort search results by each column
- use the advanced search features and filters on the left to refine search results
- login to view additional data columns and/or download search results

Click on any row in the search results to view summary information for a single taxon, with onward links to Name Status data sources. BGCI Members can login to also view the names and locations of botanic gardens which report each taxon.



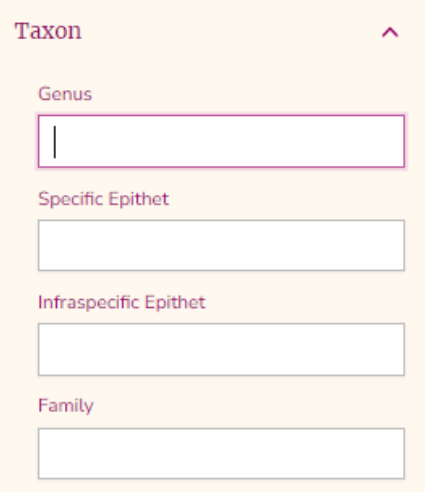
Non-member view of individual taxon



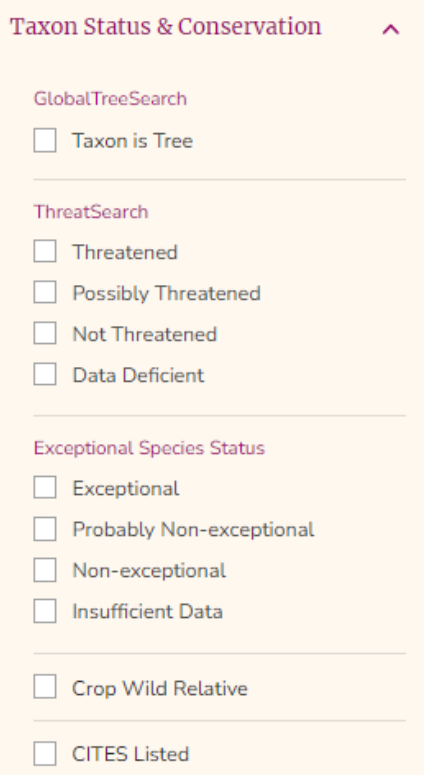
Member view of individual taxon

Advanced Search

The top column headings and advanced search filters in the left panel can be used to sort and refine search results.



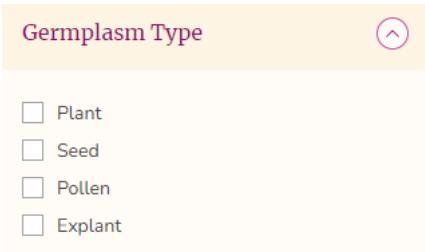
The ***Taxon*** filters refine search results further by genus, specific and infraspecific epithets, family, cultivar name, and/or grex. Synonyms can be excluded from search results; and hybrids and cultivars can be excluded or included as well.



The ***Taxon Status and Conservation*** filters identify if a taxon is:

- **Considered a tree** according to GlobalTreeSearch.
- **Threatened** according to ThreatSearch.
- **Considered an exceptional taxon** (taxa that cannot be stored long term in a conventional seed bank) according to Global Working List of Exceptional Plants.
- **Considered a Crop Wild relative** according to USDA, Agricultural Research Service, National Plant Germplasm System.
- **Listed in an CITES Appendix** according to Species+.

The ***Garden Location*** filter refines search results by Continent or Country of botanic garden (*ex situ*) locations. The continent and country delimitation and names are as per United Nations convention.



The ***Germplasm Type*** filter can refine search results by germplasm type:

- **Plant**: plants growing in a living collection (whole plants)
- **Seed**: seeds stored in a long-term seed bank
- **Pollen**: pollen stored in a long-term pollen bank
- **Explant**: tissues stored in tissue culture or cryopreserved collection (parts of plants)

Data Downloads

Search results can be downloaded by logging into PlantSearch. Columns can be added or hidden for the download file.

After logging in and agreeing to BGCI's Privacy and Data User Terms & Conditions:

1. Logged in (non-BGCI member) can view up to 500 records and download up to 100 records. Download does not include *ex situ* locations.
2. Logged in (BGCI member linked to a GardenSearch garden) can view and download up to 1,000 records.
    a. By logging in and clicking on a single taxon record, BGCI members can also view the *ex situ* collection name(s) and location(s) which report each taxon. Download does not yet include a listing of botanic garden (*ex situ)* locations (planned for future release).

Users can also fill out a Data Request Form to request bulk datasets over the maximum allowed for download. BGCI will respond via email to these requests.

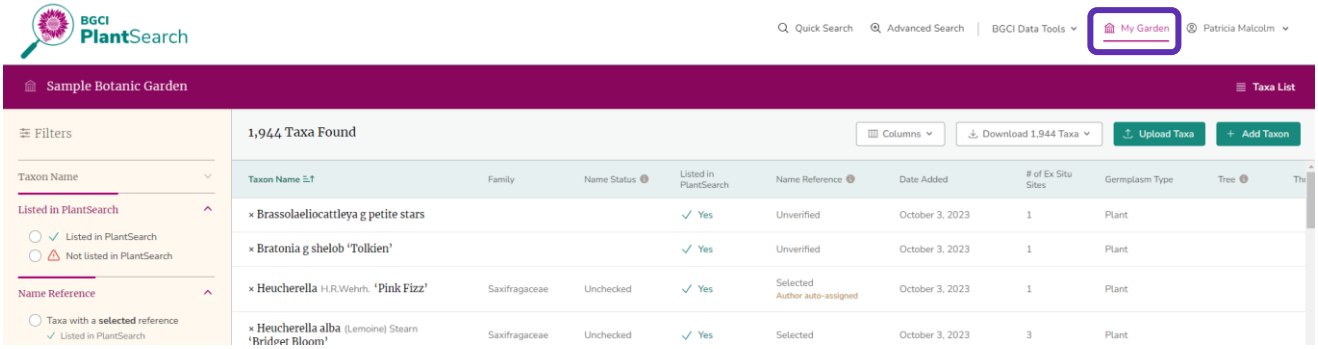
Data Contributions

To contribute data to PlantSearch, the following steps are required:

1. **GardenSearch profile**: A garden first needs to be listed in GardenSearch. See the GardenSearch Instructions & FAQ for details on adding and managing garden profiles.
2. **Editor registration**: Any number of users at a single organisation can register an account (SheepApp). Please use the same (preferably work or non-personal) email address to access all BGCI tools and services.
3. **Link to GardenSearch profile**: Users need to be linked to their organisation in GardenSearch.
4. **PlantSearch data contribution**: Upon login, users can manage and upload a taxa list or contribute other data on behalf of their garden.

Preparing Data Contributions

Click on the 'Log In' button in the top right and use your SheepApp credentials to login. Then, click 'My Garden' to view your garden's current PlantSearch data.



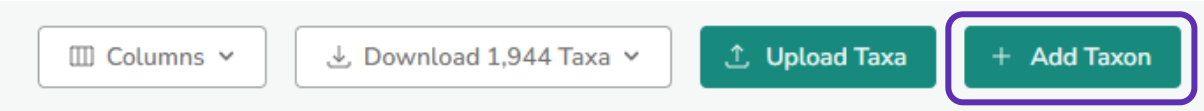
If previously submitted, any recorded taxa can be viewed using the column headings and toggles, and filters in the left panel. More detailed information can be viewed by clicking on each taxon record.

Important notes as you prepare your data contributions:

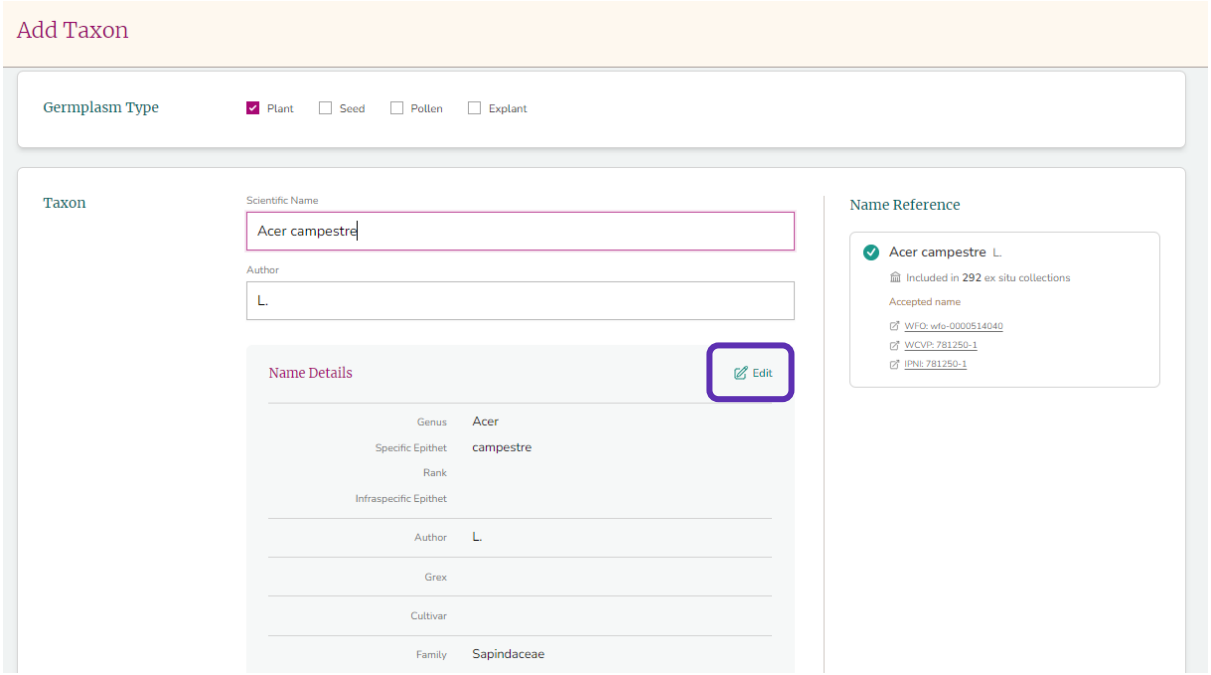
- All users which are linked to the same garden have the same permissions and can manage and contribute data. Please **coordinate with your colleagues** on data contributions to PlantSearch.
- PlantSearch accommodates multiple germplasm types (e.g., plants, seeds, pollen, etc.) per organisational profile, though **each germplasm type needs to be uploaded separately**, as germplasm type is assigned at the upload file level. Please coordinate with collection managers at your garden to ensure all viable germplasm types (plants, seeds, pollen, explants) are reported to PlantSearch. And use caution when overwriting data to **replace or add to only the germplasm type relevant to the list being uploaded**.
- PlantSearch specifies authorities for plant names when possible, based on consensus matching among the name reference data sources described in the Background section above. For greatest accuracy, please **include authors** when submitting taxa.
- Past data contributions were migrated from the legacy PlantSearch system to the newly launched PlantSearch in 2023. Please see the Legacy Data section for more details.

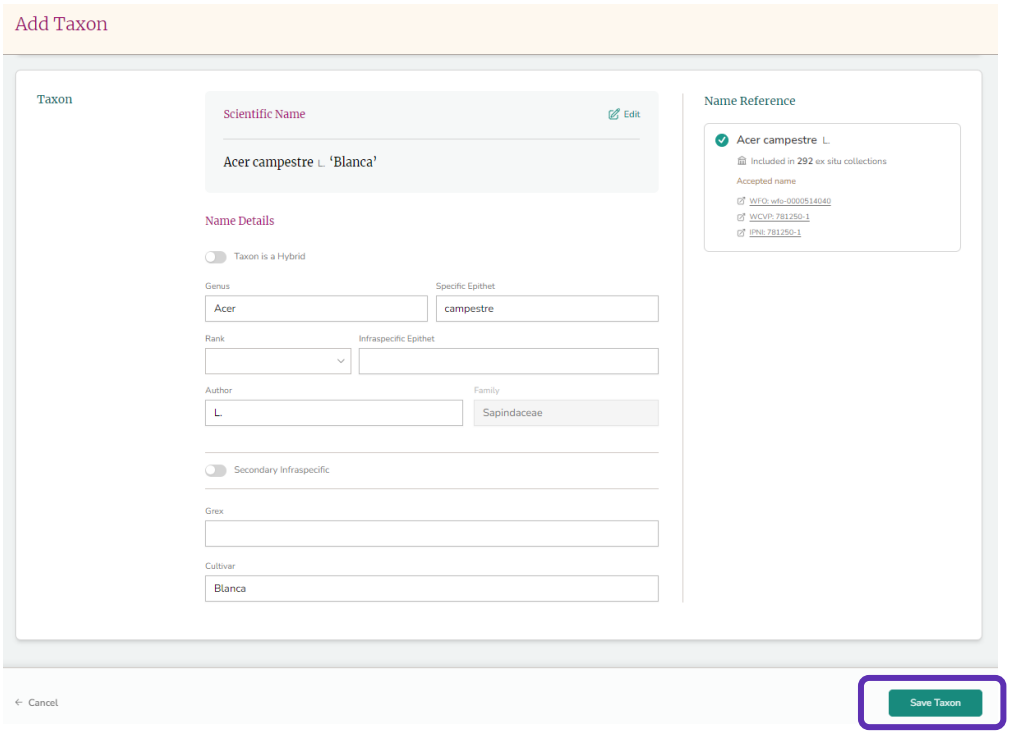
Add or Delete a single Taxon

To add an individual taxon to a garden's taxa list recorded in PlantSearch, click the green 'Add Taxon' button.



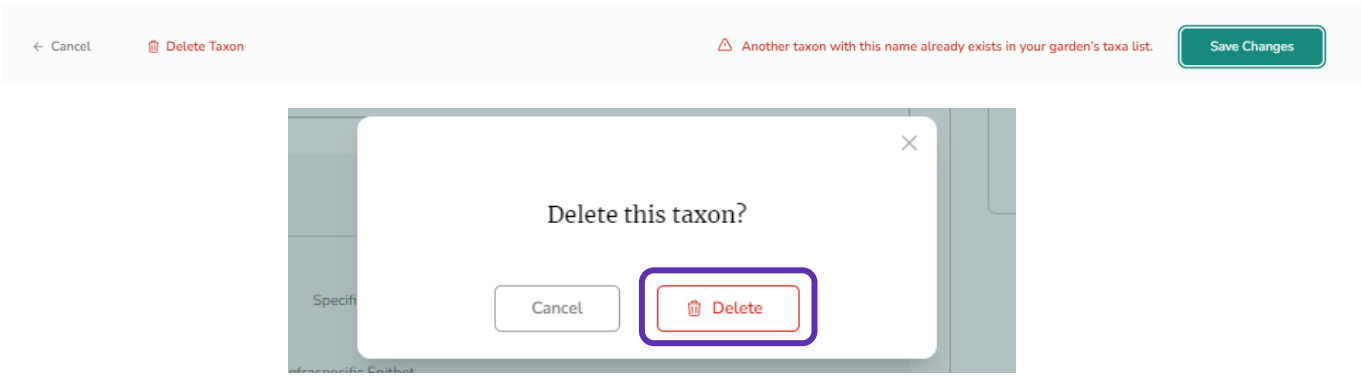
As the scientific name of the taxon is typed, any matching name references will appear on the right. Click the 'Edit' button in Name Details to specify if the taxon includes a hybrid, cultivar, grex, and/or infraspecific epithets.





Fill out the taxon name and select the appropriate germplasm type and name reference, and click 'Save Taxon'.

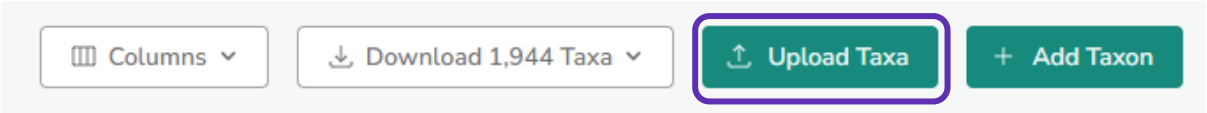
A taxon name can be edited or deleted at any time by clicking a single taxon record. If a proposed name change duplicates a taxon already in a garden's list, a warning will appear and the likely solution is to delete this now-duplicate taxon.



Help video

Upload a Taxa List

To upload more than one taxon at a time via file upload, click on 'Upload Taxa' in the upper right corner of the screen.

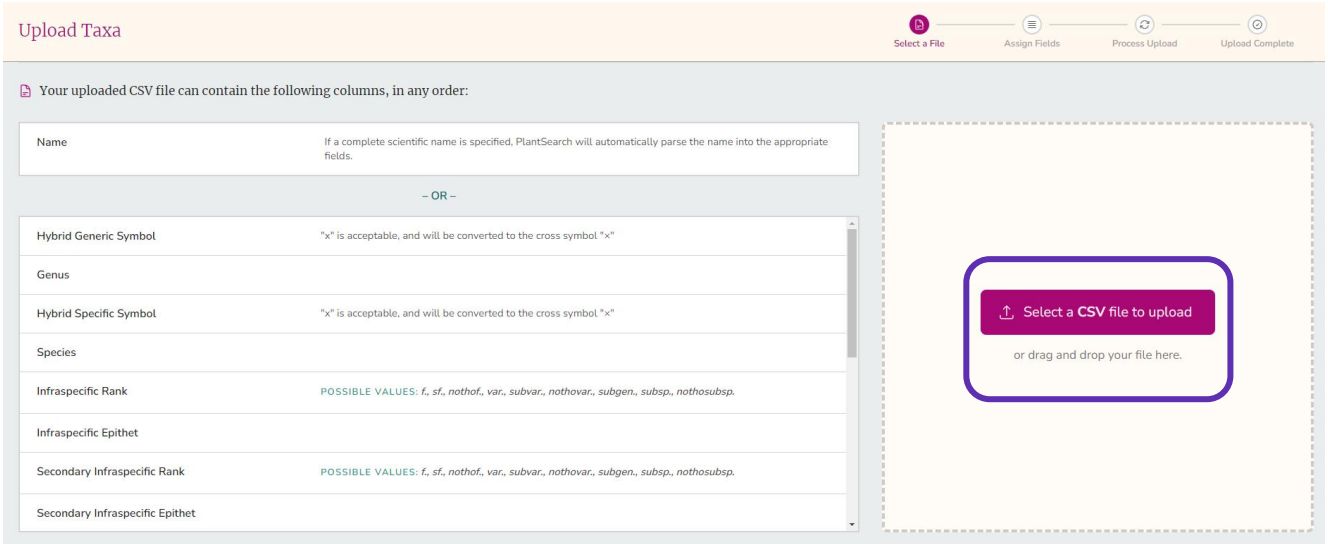


The list of possible components for plant names in PlantSearch is shown on the left. PlantSearch will accept taxa names split into separate columns, but it will also allow a combination of fields in a single column. The use of column headings is recommended. Acceptable file formats include Comma Separated Value (CSV) files.

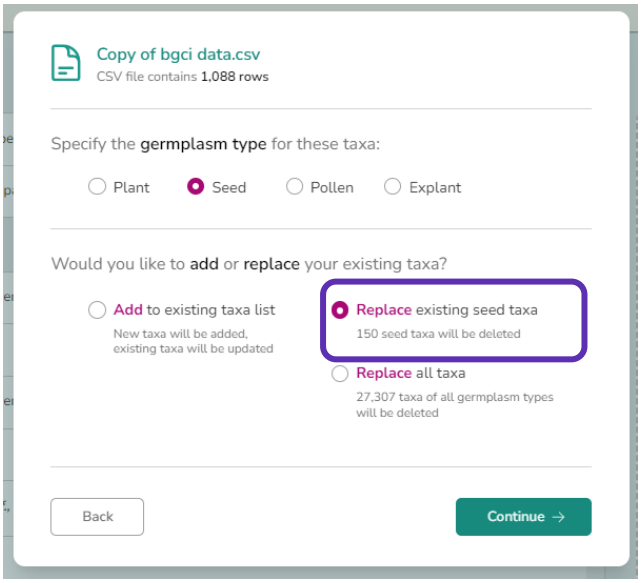
Important notes as taxa lists are prepared:

- All users which are linked to the same garden have the same permissions and can manage and contribute data. Please **coordinate with your colleagues** on data contributions to PlantSearch.
- PlantSearch accommodates multiple germplasm types (e.g., plants, seeds, pollen, etc.) per organisational profile, though **each germplasm type needs to be uploaded separately**, as germplasm type is assigned at the list level. Please coordinate with collection managers at your garden to ensure all viable germplasm types (plants, seeds, pollen, explants) are reported to PlantSearch. And use caution when overwriting data to **replace or add to only the germplasm type relevant to the list being uploaded**.
- PlantSearch specifies authorities for plant names when possible, based on consensus matching among the name reference data sources described in the Background section. For greatest accuracy, please **include authors** when submitting taxa.
- Past data contributions were migrated from the legacy PlantSearch system to the newly launched PlantSearch in 2023. Please see the Legacy Data section for more details.

Once prepared, select or drag and drop the upload file in the box on the right, and the file will begin processing.

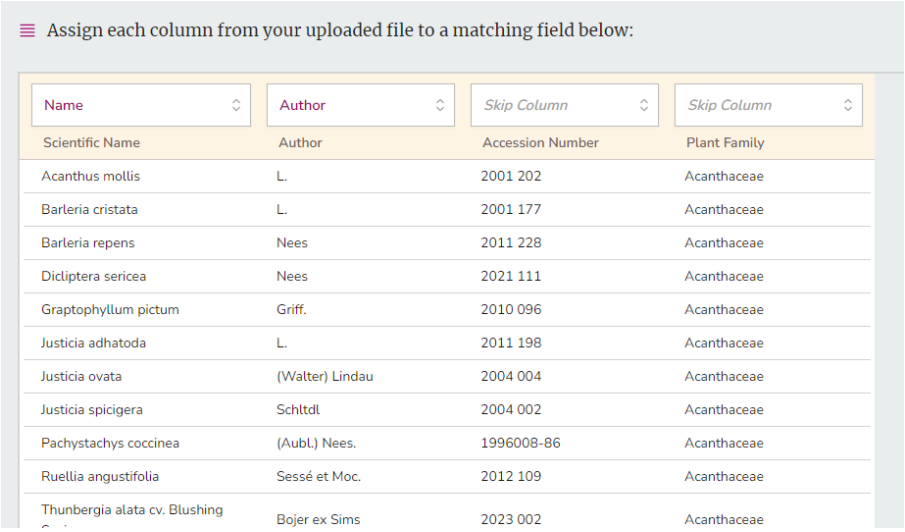


To complete the upload process:



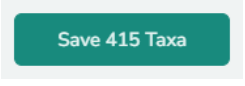
1. Select the germplasm type for the taxa list being uploaded (plant, seed, pollen, explant). Note, if a taxon is uploaded as more than one germplasm type, it will be recorded as such.
2. Choose how the data will be treated in relation to existing data recorded for your garden (see below).
3. Select 'Continue' to proceed to the next step in the Upload process.

(RECOMMENDED) Select **Replace existing (plant, seed, etc.) taxa** to replace only the records relevant to the germplasm type being uploaded. This is recommended if you are submitting a full taxa list of a specific collection type (e.g., plants) and would like to reflect all changes to this collection since the last upload.	Select **Add to existing taxa list** to combine an upload file with a list of taxa already recorded for the garden. New taxa will be added that have not already been uploaded, and duplicate records will be ignored. This option can be useful for submitting new taxa that have been recently added to a collection.	Select **Replace all taxa to** overwrite the whole taxon list for your garden with this new dataset, including ALL germplasm types. This option should be used with caution.

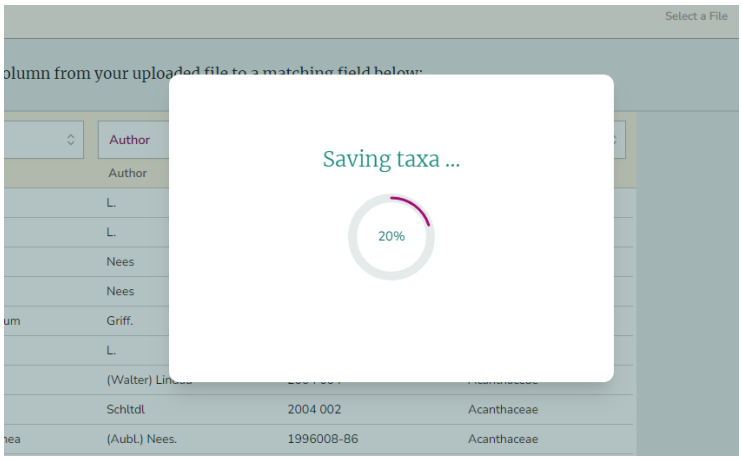


The data being uploaded will display on the next screen to confirm the column headings and data types.

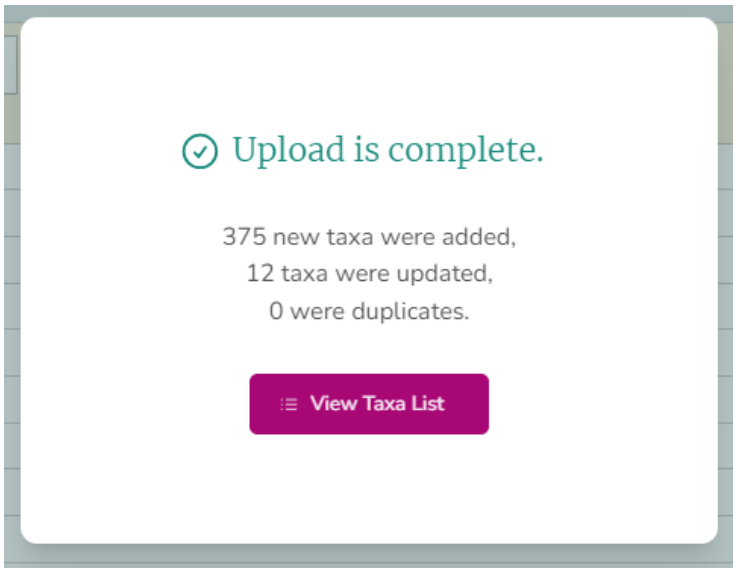
PlantSearch will assign column headings based on the data and column headings submitted in the upload file. Adjust column headings to match the type of data being uploaded in each column to ensure a taxa list is processed as accurately as possible.



Click 'Save Taxa' when the columns have been assigned appropriately.



The upload process will check taxa against the name reference data sources (see 'Background' for details on name references), and it will omit duplicate records in the upload file.



Once the upload checks are complete, a summary of results will appear:

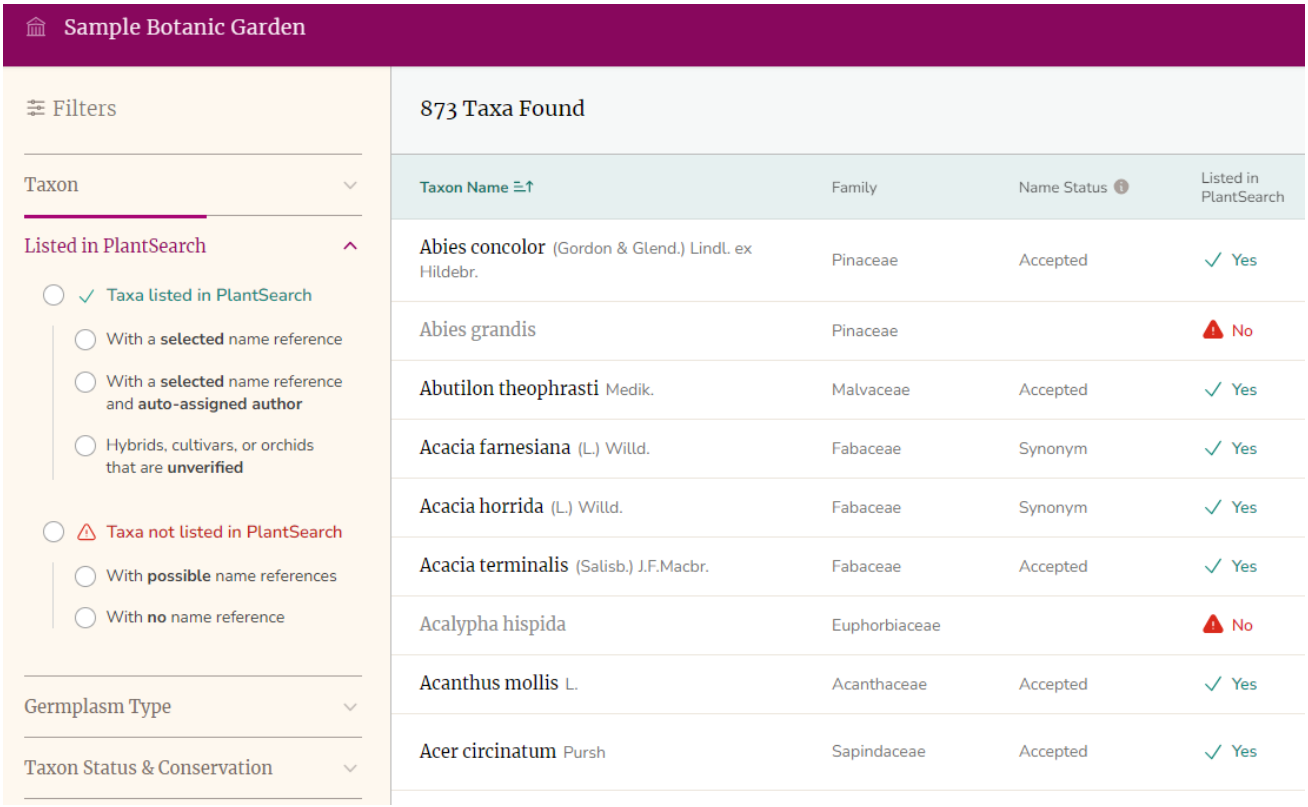
- the number of taxa that have been added to your garden's taxa list;
- the number of taxa in your list that were updated with data from the name reference data sources (i.e., author information); and
- The number of duplicate records that were found in the uploaded list.

Help video

Manage a Taxa List

Once the upload process is complete, use the column headings and filters in the left panel to review and manage your garden's taxa list in the following recommended ways:

- Filter by 'Taxa listed in PlantSearch' to review and manage all taxa that were successfully assigned a name status and name reference using consensus matching. Authors can be reassigned manually as desired.
- Filter by 'Taxa not listed in PlantSearch' to review and resolve taxa that were not successfully assigned a name status or author. Update your garden's records as appropriate.
- Use the 'Germplasm Type' filter to review results of a recently uploaded taxa list for a specific collection type.
- Filter by 'Taxon' or 'Taxon Status & Conservation' to review other groups of taxa.



A garden's taxa list can be downloaded at any time, which includes useful data aligned with a taxa list, including threat, crop wild relative, exceptional species, and tree statuses.

Taxa listed in PlantSearch – Examples

Taxa that are successfully added to PlantSearch during the upload process include:

- **Exact name match**: the taxon epithets and author(s) provided match exactly to the name reference data sources used in PlantSearch, or there is only one name reference to select for that taxon.

Example: *Allium commutatum* Guss. was successfully added to PlantSearch and the name status and reference were assigned during the upload process. This means the name matches completely to the epithets and author(s) provided, or no author(s) were provided and there is only one name status and reference option for that taxon.

Taxon Name	Family	Name Status	Listed in PlantSearch	Name Reference
Allium commutatum Guss.	Amaryllidaceae	Accepted	✓ Yes	Selected

- **Auto-assigned name match**: the taxon epithet and author(s) were assigned with confidence based on consensus matching, or there was only one name reference option for that taxon.

Example: *Acer tataricum* L. was successfully added to PlantSearch and the name status and reference(s) were auto-assigned during the upload process. This is most commonly because author(s) were not provided in the upload file and there is only one name status and reference option for that taxon.

Taxon Name	Family	Name Status	Listed in PlantSearch	Name Reference
Acer tataricum L.	Sapindaceae	Accepted	✓ Yes	Selected Author auto-assigned

- **Hybrid name**: The name status is left blank and name reference is 'Unverified'. Hybrid taxa do not require matching during the upload process, but are matched when possible in PlantSearch.

Example: *Spiraea* x *bumalda* was successfully added to PlantSearch but the name status is blank and the name reference is listed as Unverified because hybrid taxa do not require matches but are matched when possible in PlantSearch.

Taxon Name	Family	Name Status	Listed in PlantSearch	Name Reference
Spiraea × bumalda	Rosaceae		✓ Yes	Unverified

- **Cultivar name**: The name status and name reference could be matched or unmatched based on the epithets provided. Cultivar epithets are excluded from matching, and do not require matches to be listed in PlantSearch.

Example: *Arctostaphylos auriculata* Eastw. 'Knobcone Point' was successfully added to PlantSearch, and the binomial was checked with the author auto-assigned, but the cultivar portion of the name was not checked against references.

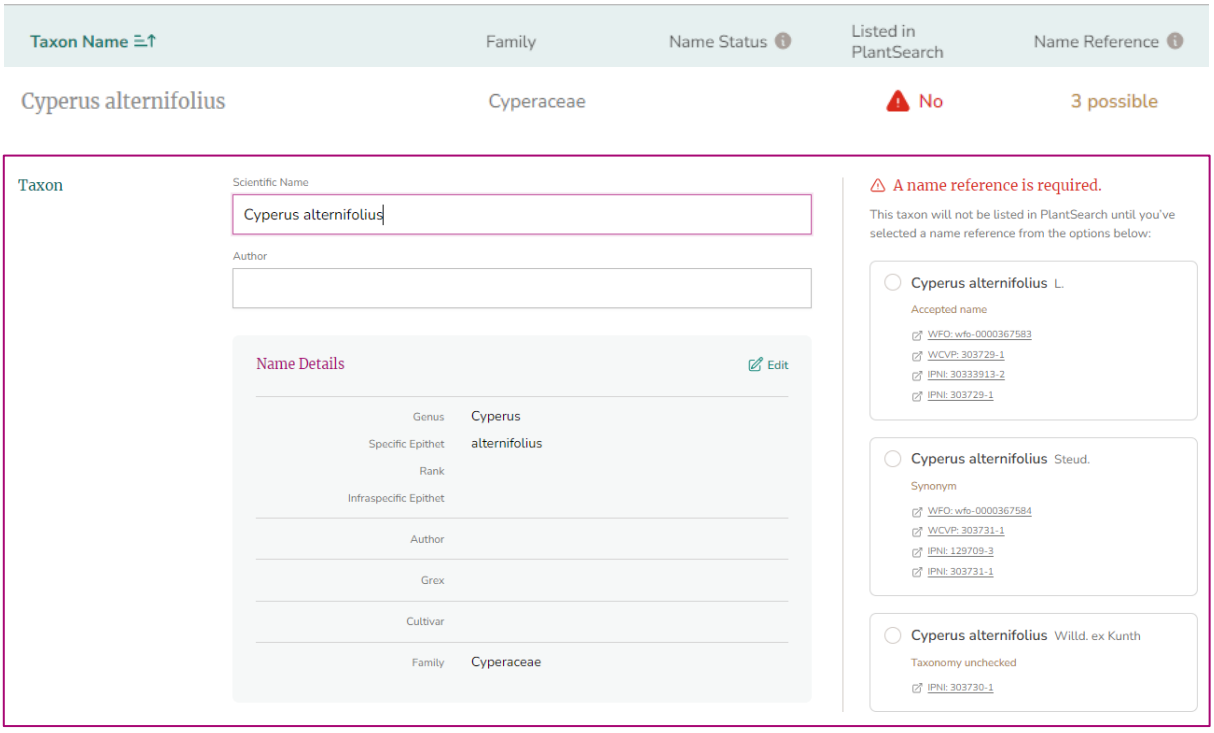
Taxon Name	Family	Name Status	Listed in PlantSearch	Name Reference
Arctostaphylos auriculata Eastw. 'Knobcone Point'	Ericaceae	Accepted	✓ Yes	Selected Author auto-assigned

Taxa not listed in PlantSearch – Examples

Taxa that are not listed in PlantSearch during the upload process include:

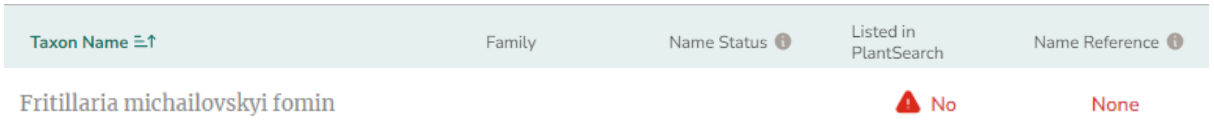
- **Multiple matched name references**: the upload process matched a taxon with multiple name references that are deemed distinct, and a single reference needs to be chosen. Click on a taxon record to review and select which name reference matches your taxon. Click 'Save Taxon' and it will be listed in PlantSearch on behalf of your garden.

Example: *Cyperrus alternifolius* matched with three possible name references so is NOT listed in PlantSearch until a single name reference is chosen.



No matched name reference: the upload process did not find a name reference match for the taxon.

Example: *Fritillaria michailovckyi* is NOT listed in PlantSearch and there are no possible name references that the system is providing you with. This can be due to an upload error such as misaligned data (as in this case), the taxon name is new or not yet recorded by the name references used in PlantSearch, or the taxon name is erroneous. Click on the taxon and try to fix the name provided. Make sure the epithets are in the appropriate fields, and double-check the taxon name in your plant records.



Legacy Data

If you have contributed data in the past to PlantSearch, we have migrated these data to the new system. You will need to review your data or replace with a new list and then review, as some of your collection might not have passed the new PlantSearch checks.

Two options for past data contributors:

1. (RECOMMENDED) Upload an updated taxa list and replace your legacy data:
    a. Include authors for each taxon for greatest accuracy.
    b. Upload different germplasm types separately and replace only the taxa relevant to the germplasm type being uploaded (see Data Contributions section for details).
2. Review your garden's migrated data from legacy PlantSearch, review and fix names that are not marked as 'Listed in PlantSearch'. For gardens that have uploaded multiple germplasm types in the past (ex: plants and seeds), we have migrated all lists associated with your garden.

Future PlantSearch

- Messaging system: Users will be able to login to send requests to collection managers about taxa of interest.
- Ex situ location download: BGCI Members will be able to login to download data including botanic garden (*ex situ)* locations per taxon.
- Pedigree data: Users will be able to share and access accession- and plant-level data about taxa in their collections, to support gap analysis and metacollection management.