VocBench v2.0
User Manual

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Based on VocBench v2.0

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Executive summary

This manual provides instructions on how to use VocBench version 2.0 (VB 2.0) − a web-based vocabulary management tool providing full multilingual support and enabling a formalized workflow.

It covers editorial operations typically performed by VB Editors, Validators and Publishers. It also covers functionalities for Administrators, but only limited to the management of projects (i.e. not including global system configuration/administration).

The manual first explains how to create a user account (Sec. 2. Registration & login), specify your user and interface settings (Sec. 4. Administration and 5. Preferences) and interpret the user interface (Sec. 3. User interface). This is followed by sections on how to search VB (Sec. 6. Search) and on the various roles a user may play in the workflow (Sec.7. Editorial workflow). Subsequently each module is covered in a separate section in the following order: Recent changes, Concepts, Relationships, Schemes, Validation, Load data, Export module, Statistics and SPARQL.

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Legend

What	How	Examples
GUI elements: button, field, module, form, box names	Bold	Click on **Add** Click on the **[+]** sign Go to the **Select language** box
VB message	" "	[..] the message "Concept already exists" […] "Activation of your account on VocBench"
Status of approval of VB elements	Capitalized	Proposed Deprecated
Roles in workflow	Capitalized	Validator Term Editor
Concepts, terms, relations, attributes*	Bold & italic	***genetically modified organisms*** ***produces*** ***HasTermType***
*__Note__ that all examples are taken from the AGROVOC concept scheme.		

1. Introduction

VocBench[1] (VB) is a web-based multilingual vocabulary management tool developed and hosted by a collaboration between the Food and Agriculture Organization[2] (FAO) of the United Nations, the University of Rome - Tor Vergata[3] and the Malaysian research centre MIMOS Berhad[4].

VB supports the maintenance of SKOS/RDF resources, providing support for workflow and editorial processes such as user rights/roles, validation and versioning that are associated with the development and management of vocabularies.

VB is adopted by a growing number of user communities, including FAO's multilingual agricultural thesaurus AGROVOC[5], FAO's Fisheries and Aquaculture Department and the data.fao.org project, the European Commission Publications Office, the European Environment Agency, the Italian Senate and others.

This manual refers to version 2.0, released in November 2013, and is the result of a joint effort between FAO and the ART (Artificial Intelligence Research) group of Tor Vergata. In its 2.0 version VB met the objective of enabling a quicker, dataset independent, setup and providing a collaborative platform for the management of SKOS-XL thesauri. Some new functionalities for the end users are:

- Multi scheme management to develop several skos:ConceptSchemes for the same dataset, providing different views on the data.
- Statistics module to provide statistical information about the loaded data.
- Export module to export the whole or a part of the content of a project.
- Load data module to load bulk data serialized in some RDF serialization standard.

[1] http://aims.fao.org/tools/vocbench-2 ; http://vocbench.uniroma2.it/

[2] http://www.fao.org/home/en/

[3] http://art.uniroma2.it/

[4] http://www.mimos.my/

[5] http://aims.fao.org/standards/agrovoc/about

- SPARQL module to query/update content directly through the SPARQL query language for RDF.
- Ontology Import Management to owl:import ontologies to be used as property vocabularies for the modelled thesauri.
- New tabs under the concept view for covering extensively the SKOS-XL standard (note, notations).

VocBench has been successfully tested[6] on the following browsers: Safari, Google Chrome, Mozilla Firefox and Internet Explorer.

[6] VocBench has been tested on all the recent versions of the reported browsers and seems to work seamlessly.

2. Registration & login

To access VocBench, you first need to register as a user: Go to the **User login** area on the VB entry page (Figure 1) and click on **Create an account** (Figure 2).

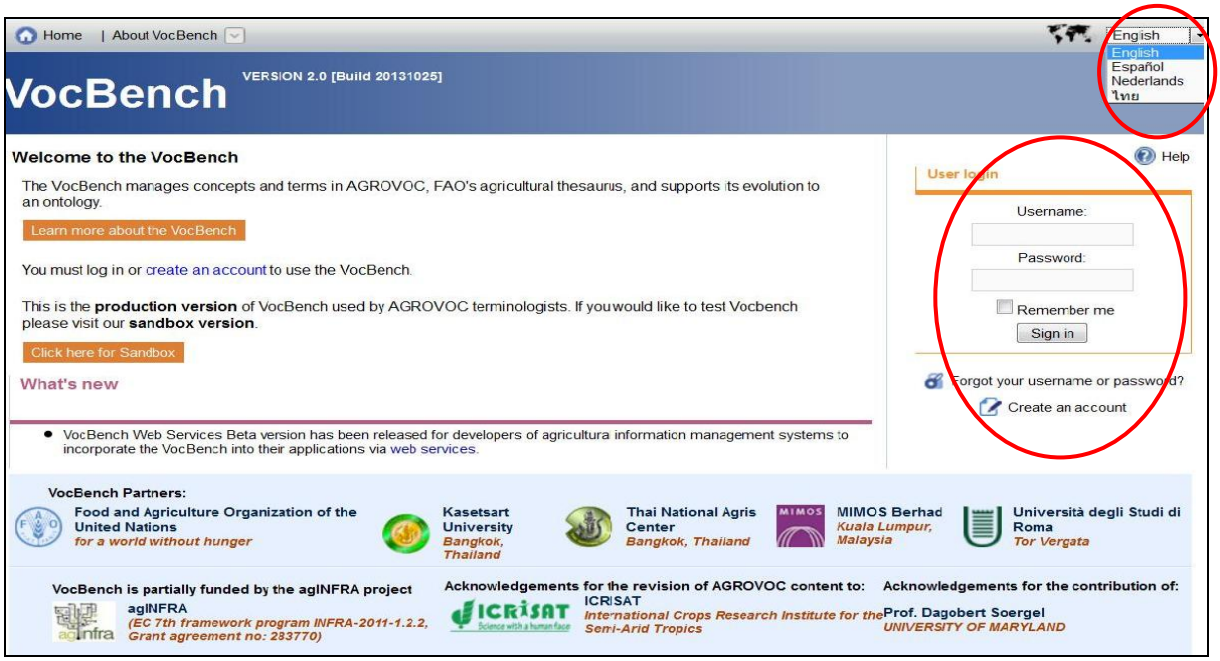


Figure 1. VB entry page

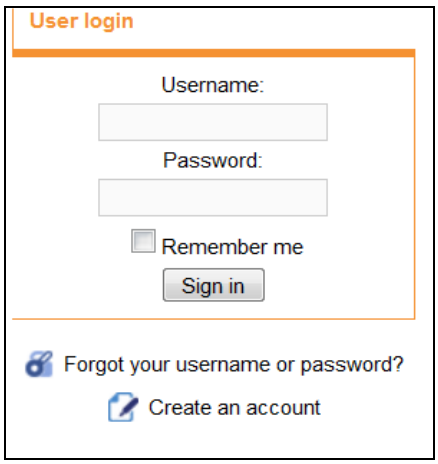


Figure 2. User login

2.1 Register

Once you have clicked on **Create an account**, the system will take you to the **User Registration** form (Figure 3. User registration form).

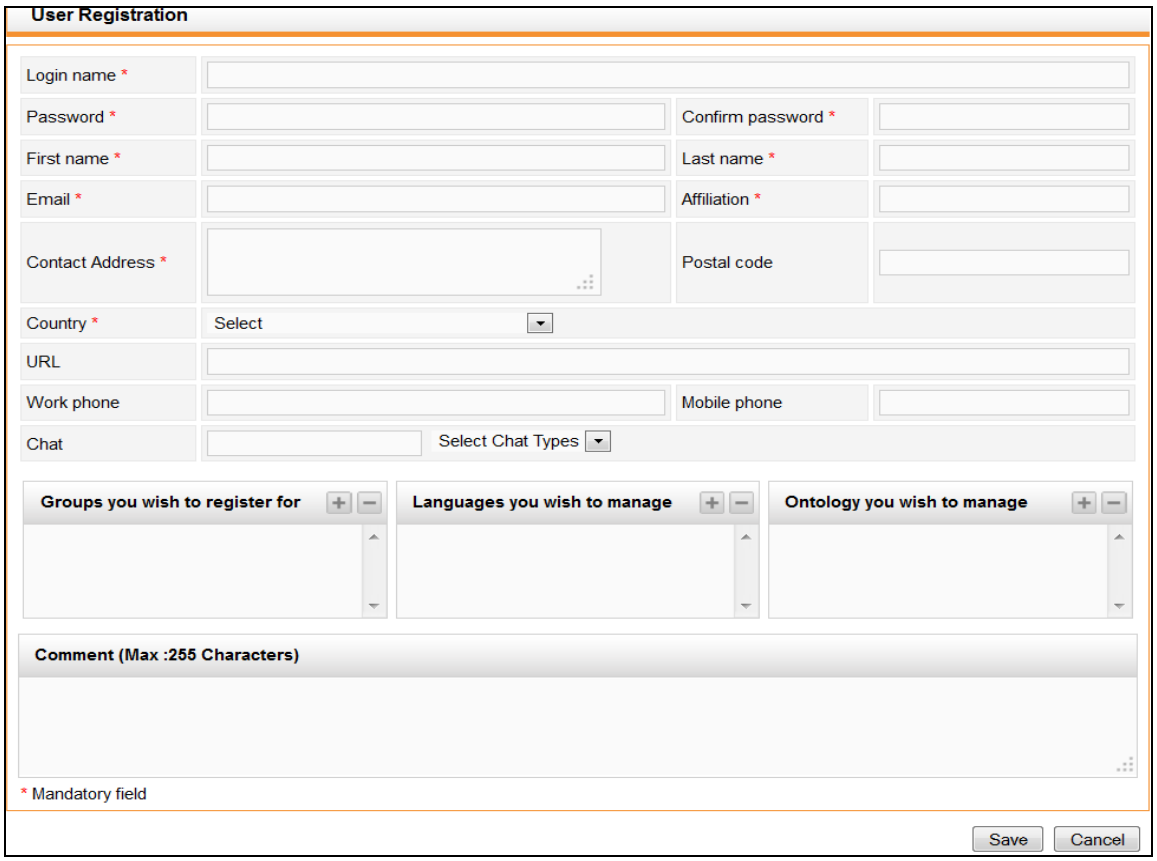


Figure 3. User registration form

1. Fill in the fields.

   Note: The fields marked with an asterisk (*) are mandatory.

2. Select the groups you wish to register for and the languages and ontologies you wish to manage or contribute to.

   - **Select group** box: Click on the **[+]** sign and select from the dropdown list the appropriate group(s), then click on **Add** (Figure 4).

     Note: To select more than one group, keep the Ctrl key pressed whilst you click on the groups of your choice.

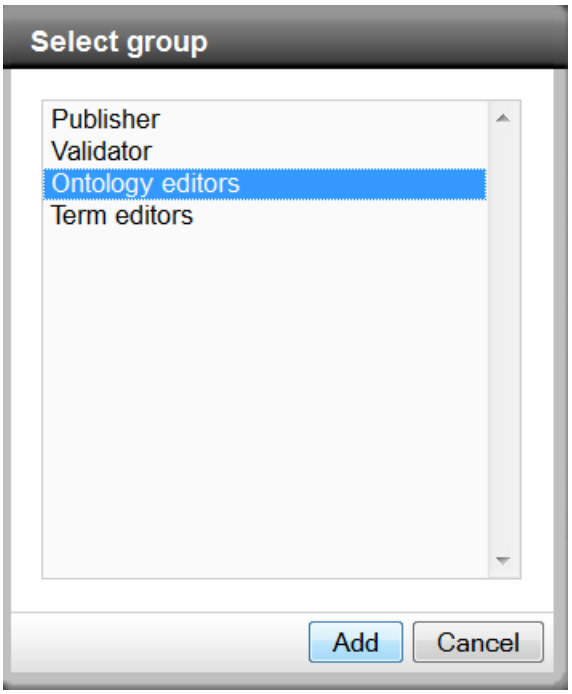


Figure 4. Select user group

- **Select language** box: Click on the **[+]** sign, select from the dropdown list the language(s) in which you wish to edit data, then click on **Add** (Figure 5).

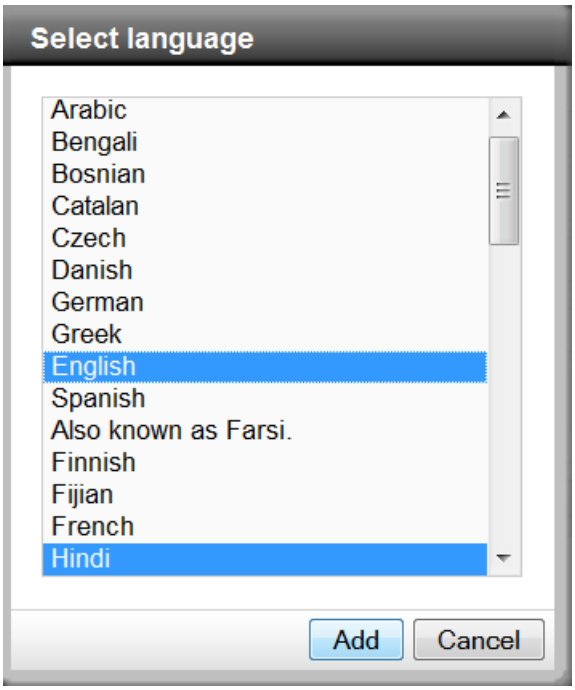


Figure 5. Select language

Note: It is important to make a distinction between settings that determine the languages you want to use for concept search and visualization and settings that determine in which languages you want to edit concepts.

The languages you select in the registration form are the ones which you would like to use for editing. To use other languages to search for concepts, click in the top right corner of the VB user interface on the orange box **Content language** (Figure 11 [C]) and select the language/s which you would like to use for concept search and visualization (see Sec. 3.1.4 Concept navigation history & Content language)

- **Select ontology** box: Click on the **[+]** sign, select from the drop down list the ontology/ies you wish to manage or contribute to, and click on **Add** (Figure 6).

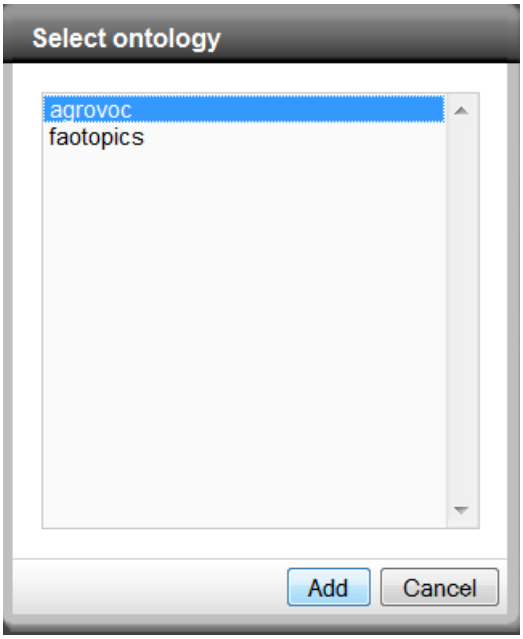


Figure 6. Select ontology

3. At the bottom of the form, there is space for comments.
4. After clicking the **Save** button a message appears confirming your registration (Figure 7).

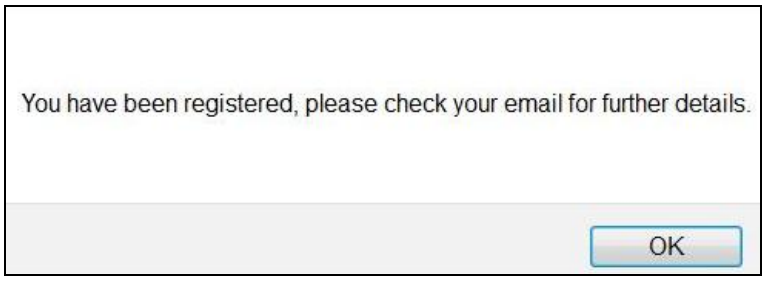


Figure 7. Registration confirmation

5. You will receive an email confirming that your request was sent to the VB 2.0 Administrators, i.e. the people performing the role of Administrator for the concept scheme(s) you are interested in.
6. You may start using VB once the Administrator approves your registration and after you receive a second email with the Subject title "Activation of your account on VocBench" containing your registration details.

2.2 Login

Once you have created an account you may access VB by entering your username and password in the **User login** area on the VB entry page (Figure 2). After clicking on **Sign in** a window pops up. Select the editorial role (**User group**) you wish to play during the current session and the **Ontology** you want to work with (Figure 8).

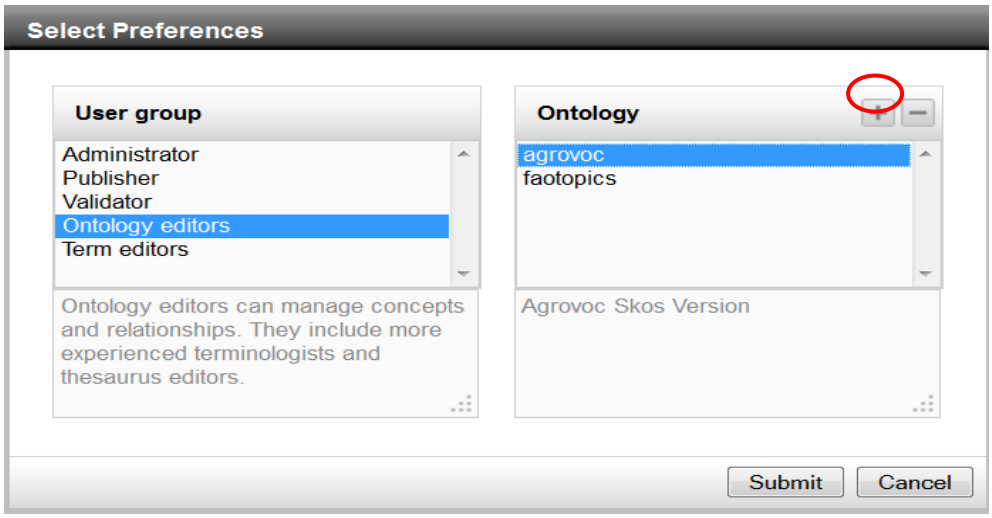


Figure 8. Login: Select preferences

Note: If necessary you may add a new existing ontology by clicking on the **[+]** sign (Figure 8). In the pop-up window fill in the project (ontology) name, a brief description, the Base URI, the Semantic Turkey Server URL (Figure 9) and click on **Add**.

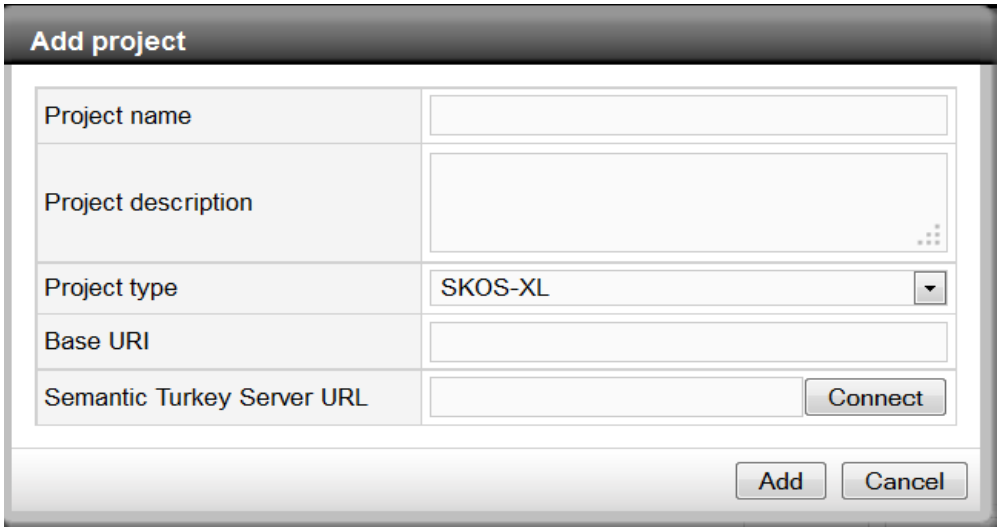


Figure 9. Login: Add ontology (project)

It is also possible to remove an ontology from the list: select the ontology you wish to delete and click on the **[-]** sign.

3. User interface

The language of the user interface for VB is currently available in English (default), Spanish, Dutch and Thai.

Note: You have to decide the language of the user interface on the VB entry page, i.e. the page where you login to access the VB user interface. It is a small drop down box at the top right corner of the VB entry page (Figure 1).

The VB user interface is organized into two different areas (Figure 10):

1. The menu area (Figure 10 [I: Menu])

   This area is organized into three horizontal menu bars:

   - General settings (top menu bar), Figure 10 [A]
   - Search (central menu bar), Figure 10 [B]
   - Access to different modules (bottom menu bar), Figure 10 [C]

2. The content area (Figure 10 [II: Content]) displays the module you selected.

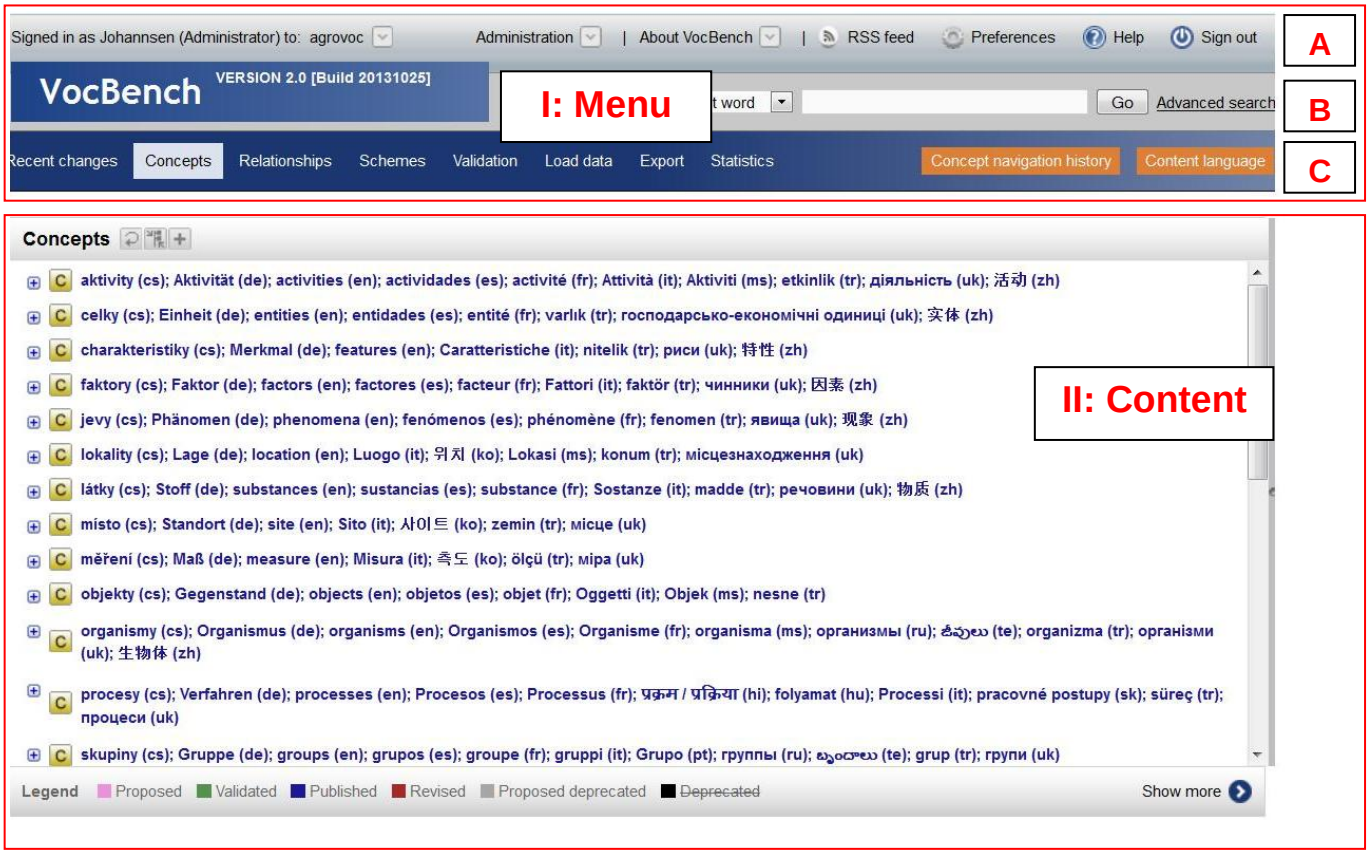


Figure 10. VB user interface. Concepts module: menu (I) and content area (II)

3.1 Menu area

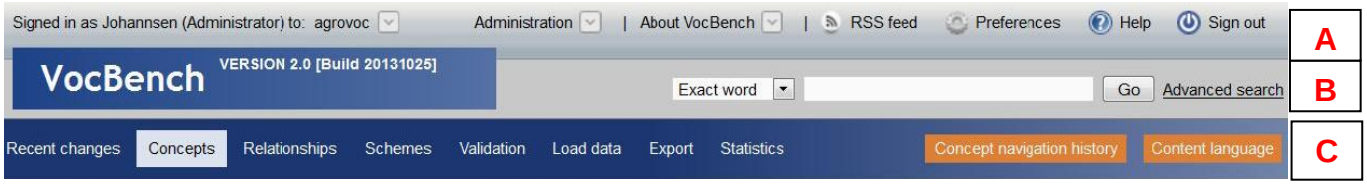


Figure 11. VB user interface: Menu area

3.1.1 General settings

The top bar in the menu area, (marked [A] in Figure 11) is dedicated to the following general settings:

- User name (Figure 12, [1])

  Signed in as: Shows the account name you used for login.

- Role (Figure 12, [2])

Shows the role (in brackets) you selected when you logged in, e.g. Term Editor (see Sec. 7.2 User roles).

- Dataset (Figure 12, [3])

  Shows the dataset currently in use (e.g. AGROVOC). To change to another dataset, click on the arrow and select the desired one from the dropdown box.

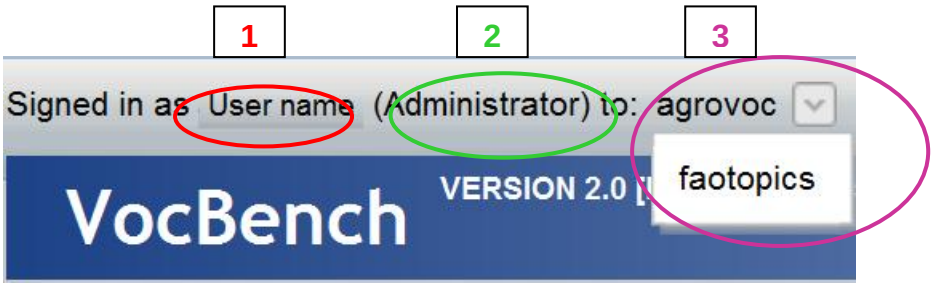


Figure 12. General settings: User name [1], User role [2], Dataset [3]

- **Administration** (Figure 13, [4])

Gives access to user management such as registered users, new user requests (**Users**), group management of user groups (**Groups**), ontology management (**Ontology**), **Configuration** of VB.

Note: **Users** and **Groups** are available to both Publishers and Administrators. **Ontology** and **Configuration** are only available to Administrators (see Sec. 7. Editorial workflow).

- **About VocBench** (Figure 13, [5])

Gives access to information about:

  - **Partners**: List of partners collaborating in the development of VB.
  - **Contact us**: Opens a web form to contact the VB team by email. **Note**: The form takes you to the Agricultural Information Management Standards (AIMS)[7] website which contains a section on VB.

[7] http://aims.fao.org/

- **RSS feed** (Figure 13, [6])

Allows you to subscribe to an RSS feed to be constantly informed about the changes made in a specific dataset (i.e., create/edit/delete concept/terms/relationships), user accounts and groups (new user registrations, change of rights). By clicking on **RSS feed** you open the page where you may subscribe for the VB RSS feed; simply click on **Subscribe Now**.

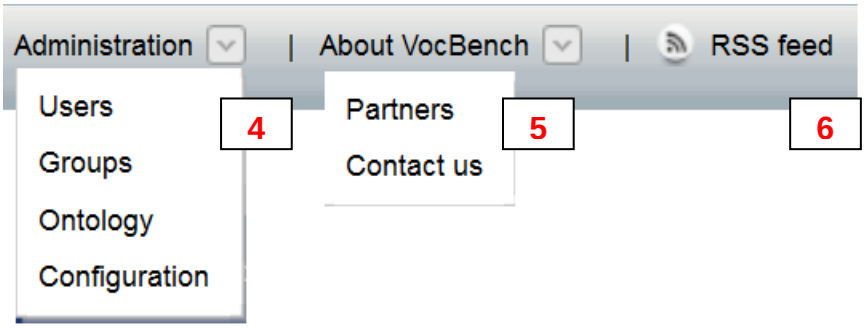


Figure 13. General settings: Administration [4], About VB [5], RSS feed [6]

- **Preferences** (Figure 14 [7])

Allows you to manage your account information, preferences regarding the user interface and the languages in which you want to edit data (see Sec. 5. Preferences). **Note**: You may also change your password in this section.

- **Help** (Figure 14 [8])

Links to this document, the VB v. 2.0 user manual, published on the AIMS and VB project websites.

- **Sign out** (Figure 14 [9])

To sign out of VocBench.

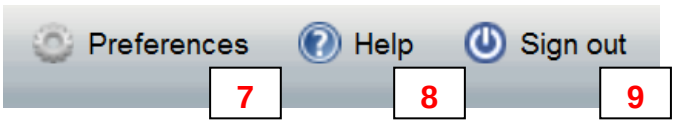


Figure 14. General settings: Preferences [7], Help [8], Sign out [9]

3.1.2 Search

The search bar is always available to all users.

- Simple search (Figure 15)

  Type in the term or phrase you are looking for, choosing one of the options from the dropdown list and click **GO**. For a detailed description see Sec. 6.1 Simple search.

Figure 15. Menu area [B]: Simple search

- **Advanced search**

  Opens an advanced search interface that allows you to use more specific search criteria. For a detailed description, see Sec. 6.2 Advanced search.

3.1.3 Access to content: Module bar

The module bar is shown in the bottom menu bar (marked [C] in Figure 11). Each module is briefly described, indicating the user group which is allowed to access it.

Note: Another simple way to find out if a module is accessible to your user role is to check the colors of the module names in the module bar: white names are accessible, grey ones are not.

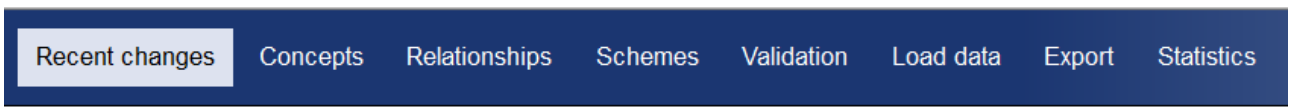


Figure 16. Menu area [C]: Access to content: Module bar

- **Recent changes** – All roles.

Lists recent changes applied to VB such as modifications applied to terms and concepts, user registrations etc. (see Sec. 8. Recent changes module)

- **Concepts** – All roles.
  This module is divided into two panels: The left side of the screen shows the browsable concept hierarchy of the concept scheme/ontology you selected when you logged in or you selected in the module **Schemes** (see Sec. 11. Schemes module); the right side visualizes the concept you selected, including its terms, relationships etc.
  This module is used to add, edit, delete concepts, terms, relationships etc. (see Sec. 9. Concepts module).

- **Schemes** – Administrator.
  To add or remove concept schemes. **Note**: The scheme selected here is the one displayed in the **Concepts** module (see Sec. 11. Schemes module).

- **Relationships** – Administrator & Publisher.
  Shows all the relations available for use in the ontology together with their definitions.
  This module is used to manage relations. The actual instances of relationships are visualized in the **Concepts** module (see Sec. 9. Concepts module).

- **Validation** – Administrator, Publisher & Validator.
  Shows all proposed changes applied to the concept scheme to be validated (see Sec. 12. Validation module).

- **Load Data** – Administrator
  This module is used to import RDF data by providing the base URI and RDF file (see Sec. Load data module).

- **Export** – All roles
  To export a concept schema in SKOS-XL format or to export a concept in SKOS-XL format, with the option to include its children (see Sec. 14. Export module).

- **Statistics** – Administrator, Publisher, Validator & Ontology Editor

  To search for statistics referring to the content contained by VB, from the workflow to concepts, terms, relationships etc (see Sec. 15. Statistics).

- **SPARQL** – Administrator

  To query/update all content through the SPARQL query/update language for RDF (see Sec. 16. SPARQL module).

3.1.4 Concept navigation history & Content language

Two more buttons, **Concept navigation history** and **Content language**, are available in the bottom menu bar [C] of the menu area (see Figure 15 and Figure 17):

Figure 17. Menu area [C]: Concept navigation history & content language

- **Concept navigation history** – All roles

  The navigation history shows the list of concepts navigated during your current session (see Sec 6.3 Concept navigation history).

- **Content language** – All roles

  To select the languages in which you want to search and visualize concepts.

  Note: The languages you select here are only related to searching and visualizing and only for the current session. In **Preferences** you may set the languages in which you would like to edit concepts (see Sec. 5.2 User languages & ontologies).

4. Administration

Administration is available from the top menu bar (Figure 18). After clicking on it you have four options:

- **Users**
- **Groups**
- **Ontology**
- **Configuration**

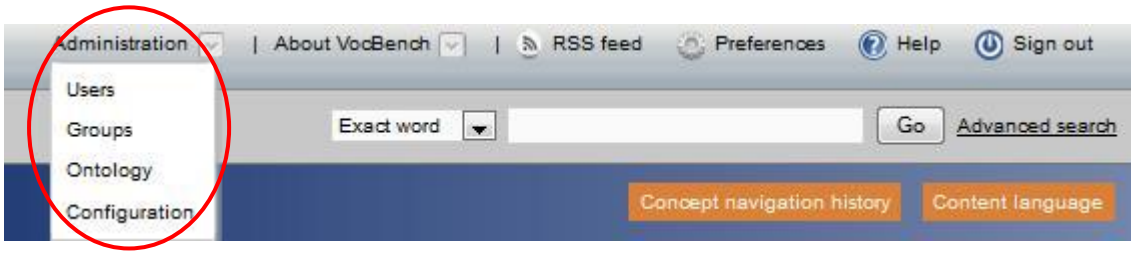


Figure 18. Top menu bar: Administration

Ontology and **Configuration** are only available to Administrators, **Users** and **Groups** are available to both Publishers and Administrators.

- **Users**

  This option shows the users using the same VB installation as you. For each user, user details, user group(s), language(s) and ontolog(ies) are indicated. (Figure 19).

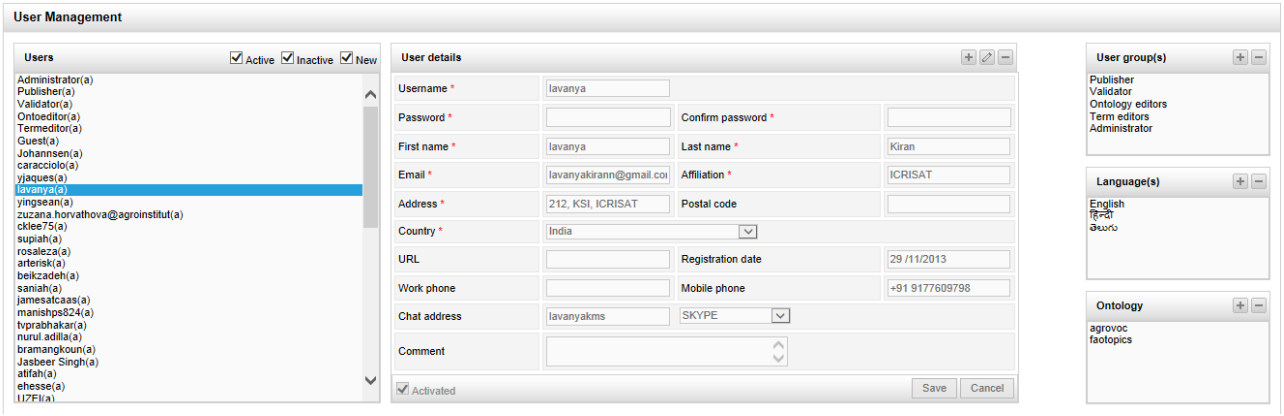


Figure 19. Administration: Users

- **Groups**

  This option is used to manage user roles, the associated permissions and the associations between users and roles (Figure 20).

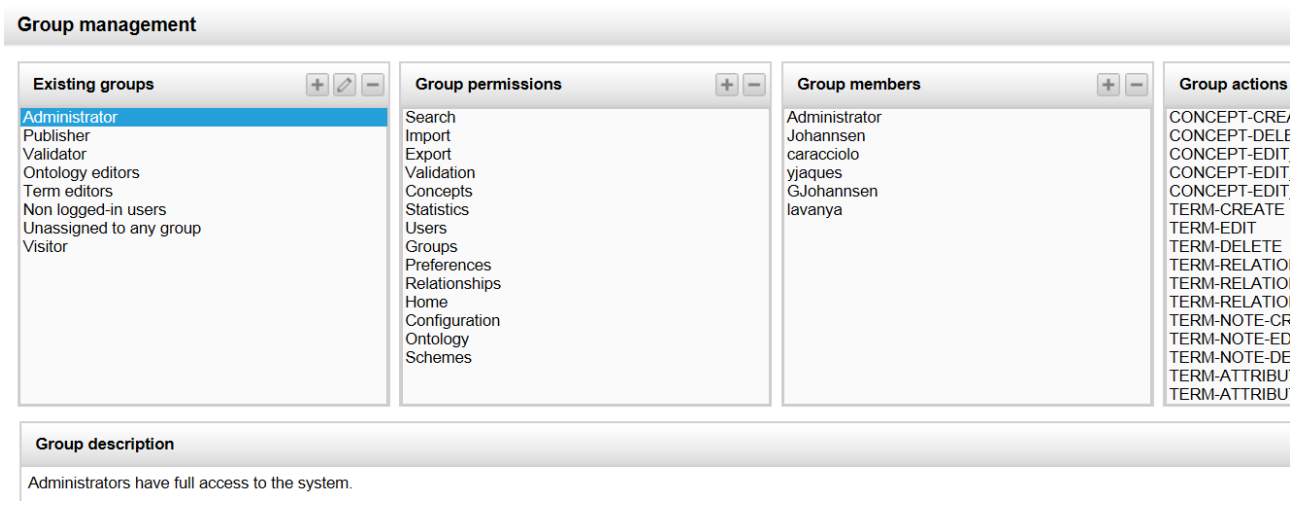


Figure 20. Administration: Groups

- **Ontology**

  This option displays the base URI and namespace of the loaded scheme (**Default configuration**) and the vocabularies used in it (**Namespace management**). From the Imports box, you may import vocabularies for use within the current concept scheme. (Figure 21).

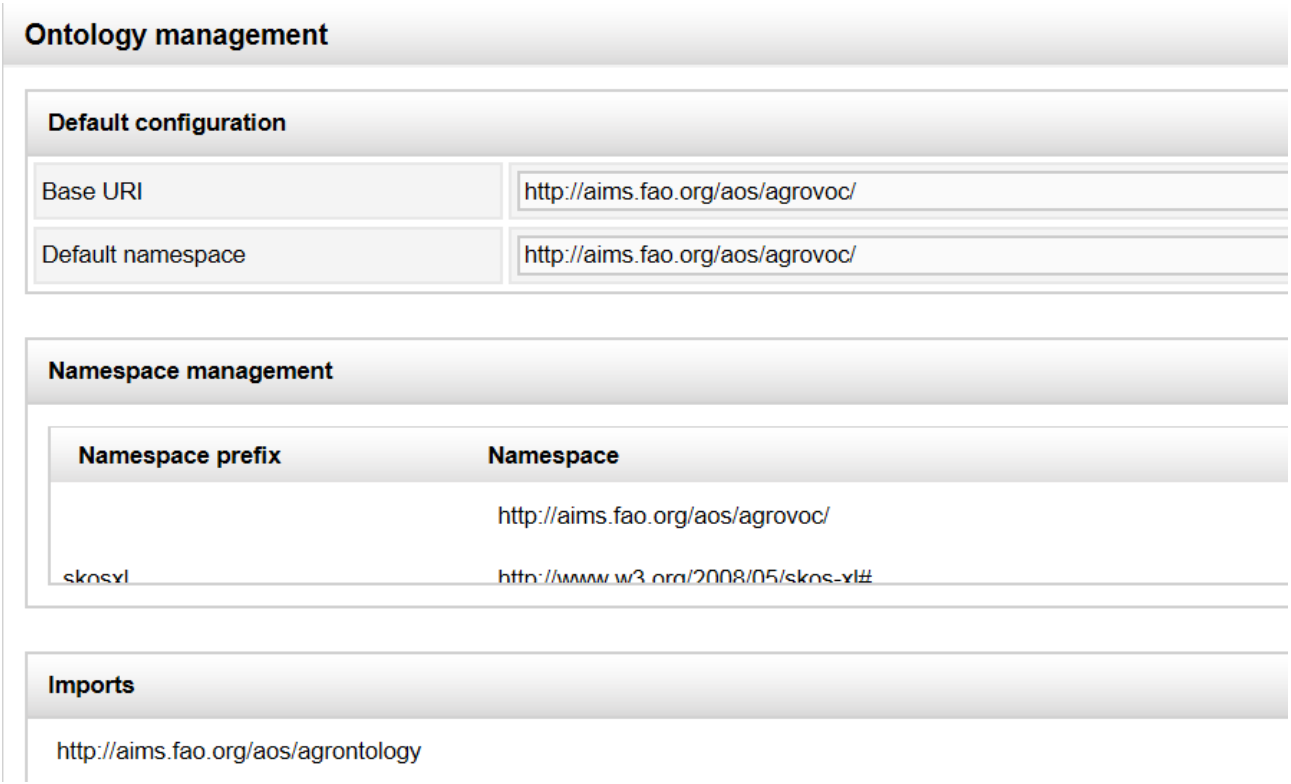


Figure 21. Administration: Ontology

- **Configuration**

  This option is used to manage the configuration of the present installation (Figure 22).

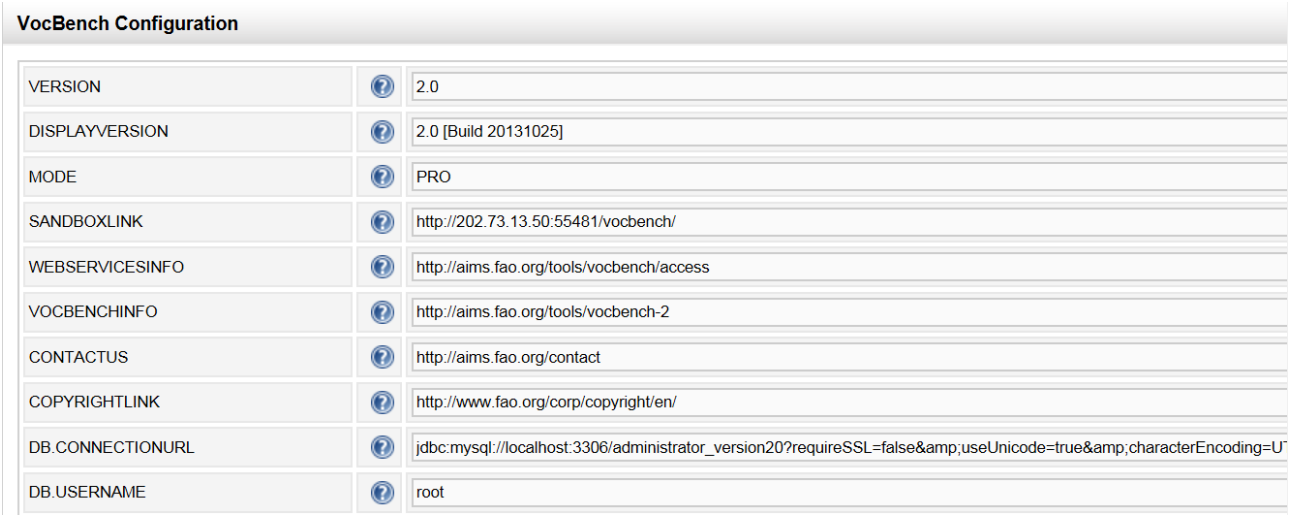


Figure 22. Administration: Configuration

5. Preferences

The **Preferences** button is available from the top menu bar. It is used to manage the preferences associated to your user account (Figure 23). In particular:

- **Details** of your user account
- **User language** to edit data in
- **Pending language request**
- **User ontology**
- **Pending ontology request**

Note: Your preferences will be saved and will apply to the current and future sessions. If you change any preference details you will need to sign out and login again to see the changes.

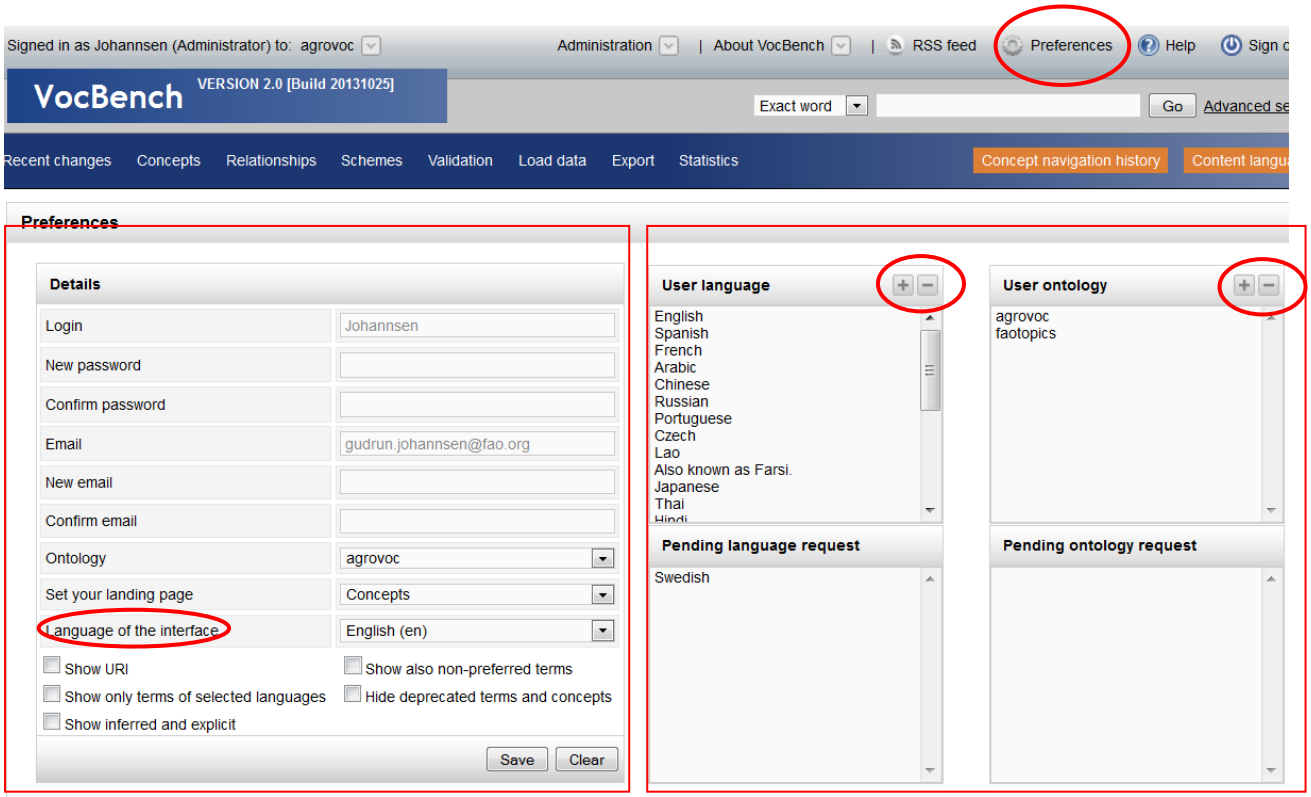


Figure 23. Personal preferences in VB

5.1 Details of your user account

The details of your user account are displayed in the panel on the left (Figure 23). Here you may control your personal information:

- **Login**

  User name. **Note**: The user name cannot be changed!

- **New password / Confirm password**

  You may change and confirm your password in this field.

- **Email**

  Shows your current email address.

- **New email**

  You may change your email in this field (confirm it in the next field).

- **Ontology**

  In case you are an editor of more than one ontology, you may state here which ontology you would like to be loaded by default.

- **Set your landing Page**

  To set the VB module you want to visualize after logging in.

- **Language of the interface**

  From the drop down list you may select the language in which you would like to visualize the VB interface.
  Note: Currently the user interface is available in English (default), Spanish, Dutch, and Thai.

- **Show URI**

  By default the URIs of concepts are not displayed. This check box corresponds to the check box **Show URI** in the **Concepts** module – valid for the current session only.

- **Show also non-preferred terms**

  By default only the preferred terms are displayed. To see also the non-preferred terms check this box.

Note: The box corresponds to the check box **Show also non-preferred terms** available in the **Concepts** module.

- **Show only terms of selected languages**

  The terms you see displayed in the concept box under the **Terms** tab are by default shown in all available languages. If you check this box only terms in the selected languages are shown (see 5.2).

- **Hide deprecated terms and concepts**

  By selecting this option the concept hierarchy will show only concepts and terms with the following status: Proposed, Validated, Published, Revised. For detailed information about statuses in VB, see Sec. 7.2 User roles.

- **Show inferred and explicit**

  By default VB shows only explicit information. Checking this option reasoned and "inferred" relationships are constructed based on OWL reasoning using information already explicitly provided by editors and publishers. The inferred information will be shown in light grey, and will not be editable (to make changes one should change the explicit information from which they are derived).

5.2 User languages & ontologies

- **User Language**

  This box lists the languages in which you are allowed to edit the data you have access to (Figure 23).

  In case you want to remove any language(s), select the appropriate language(s), and click on the **[-]** button.

  If you want to request editing rights to a new language for editing concepts/terms click on the **[+]** icon, select from the dropdown list the language, and click on **Add**.

  After this step, the selected language will be added to **Pending language request** box. The VB Administrator will receive an email about your language request. After approval, you will be notified by email.

Note: These language settings refer to editing rights. To define the languages in which you would like search and visualize concepts/terms use the orange **Content language** button, available in the bottom right corner of the menu area.

Note: The **Show only terms of selected languages** check box in the left panel refers only to the terms.

- **Pending language request**

  This box lists the languages you requested access to (Figure 23) to edit data in these languages.

- **User ontology**

  This box lists the ontologies (or datasets) you already have access to (Figure 23).

  If you want to remove an ontology, select the appropriate ontology and click the **[-]** button.

  If you want to request managerial rights over a new ontology, click on the **[+]** icon, select the available ontology, and click on **Add**. The selected ontology will then be added to **Pending ontology requests**. The VB Administrator will receive an email about the ontology request. After approval, you will be notified by email.

- **Pending ontology requests**

  This box shows the ontologies you requested access to.

6. Search

Search functionalities are always available to all users. VB allows you to perform a simple search and an advanced search. Both are case insensitive.

Note: The search results are based on your language settings. In **Preferences** you may set the languages in which you would like to edit concepts (see Sec. 5.2 User languages & ontologies), these same languages are then by default used to search and visualize concepts. To use other languages to search for concepts, click in the top right corner of the VB user interface on the orange box **Content language** (Figure 11 [C]) and select the language/s which you would like to use for concept search and visualization (see Sec. 3.1.4 Concept navigation history & Content language), only valid during your current session.

Note: **Last Results** (make reference) displays the results of your last search.

Note: All examples are coming from the AGROVOC scheme.

6.1 Simple search

You may choose one of the following search options (Figure 24):

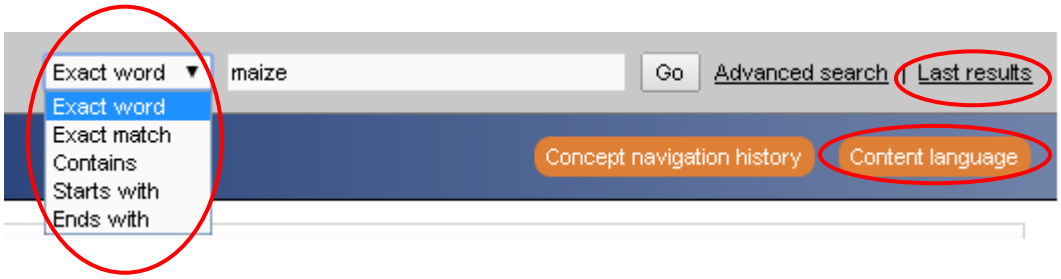


Figure 24. Search options

- **Exact word** (default)

  With this option you will retrieve the concepts labelled by terms (in the languages you selected) matching exactly the word typed in.

Example: Figure 25 shows the results of a search for ***Solanum*** (in this example English is the only language selected).

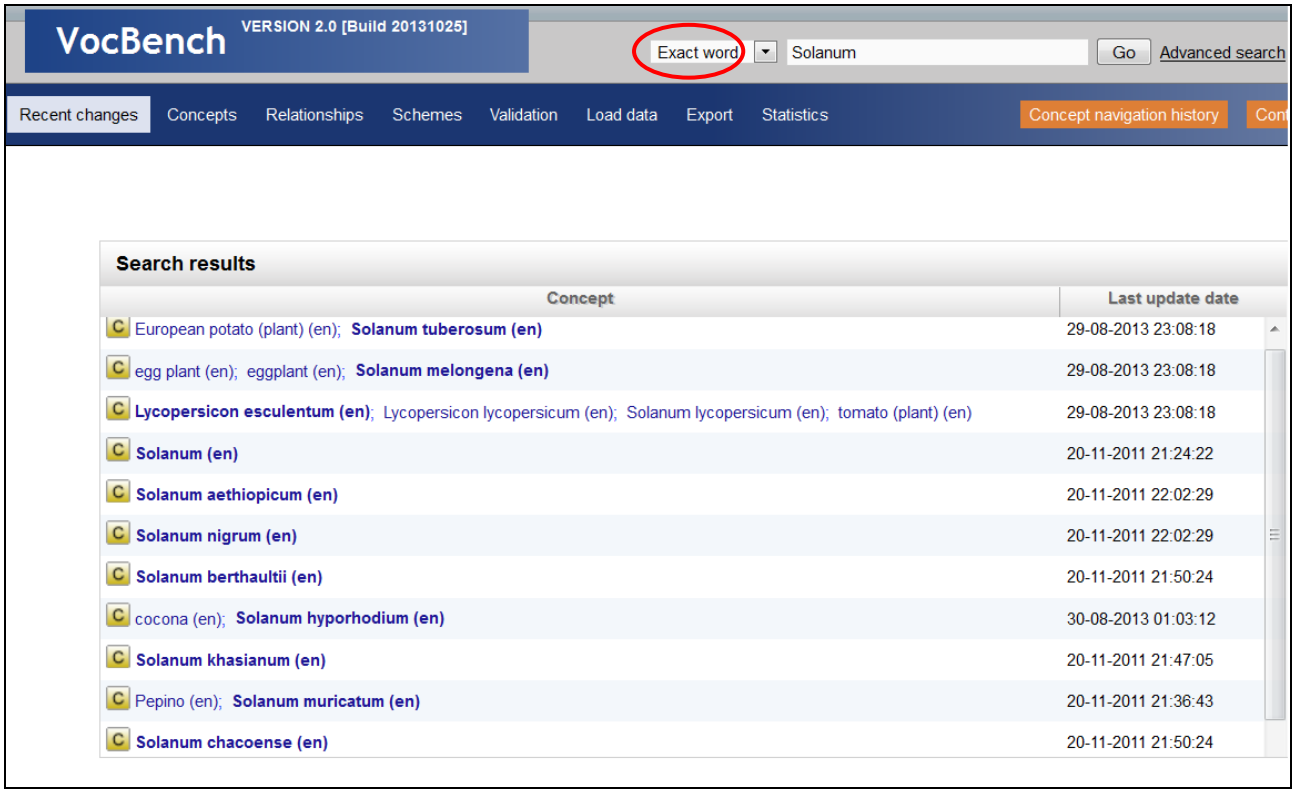


Figure 25. Search result with search option 'Exact word'

- **Exact match**

  With this option you will retrieve the concepts labelled by terms (in the languages you selected) matching the **exact term** typed in.

  Example: A search for ***Solanum*** will in this case only return one result, i.e., the exact term ***Solanum*** (Figure 26).

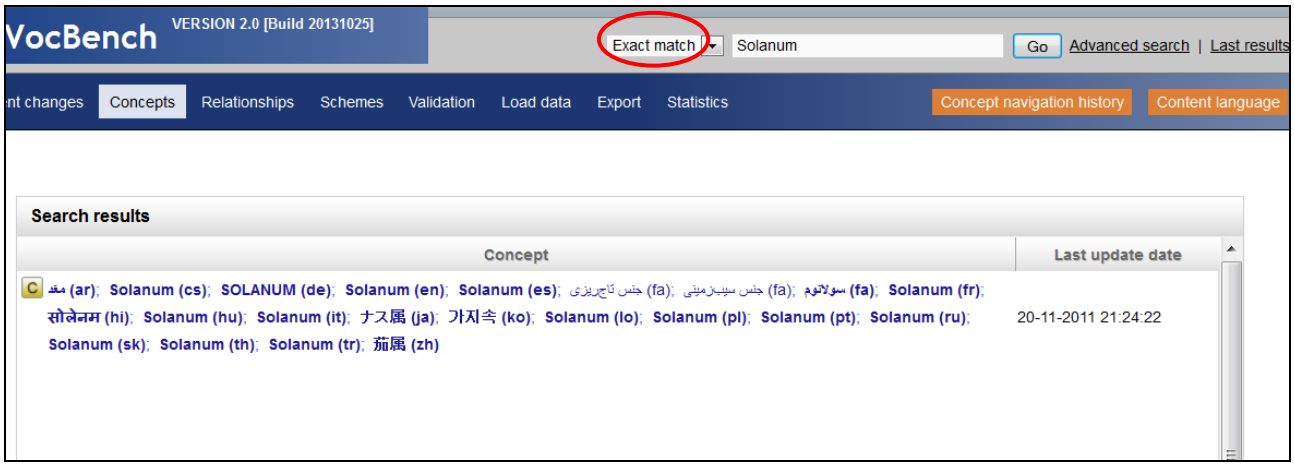


Figure 26. Search result with search option 'Exact match'

- **Contains**

  With this option you will retrieve the concepts labelled by terms (in the languages you selected) that contain the word (or string) typed in.

  Example: A search for ***palm*** returns also the terms ***Acer palmatum***, ***oil palms***, ***ascorbyl palmitate***.

- **Starts with**

  With this option you will retrieve the concepts labelled by terms (in the languages you selected) that start with the search string typed in. This search also retrieves composed terms that contain words starting with the string typed in.

  Example: In Figure 27 you can see the results of a search for ***tomato***.

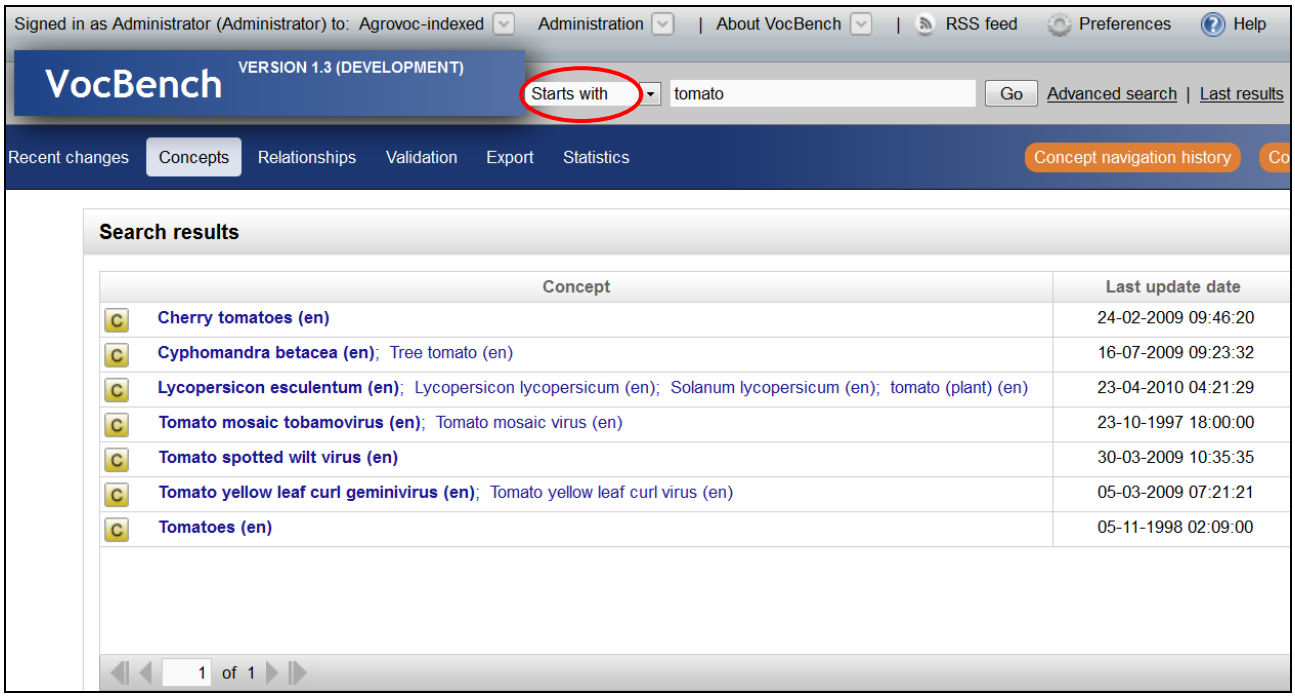


Figure 27. Search result with search option 'Starts with'

- **Ends with**

  With this option you will retrieve the concepts labelled by terms (in the languages you selected) that end with the word typed in.

6.2 Advanced search

When you click on **Advanced search**, a detailed search form displays (Figure 28).

In the **Search in these language(s)** box you may select languages in which you would like to search during your current session. By default it lists the languages you set in **Preferences**, i.e. the languages you have editing rights in (see Sec. 5.2 User languages & ontologies). To add a search language click on the **[+]** , to remove one on the **[-]** icon.

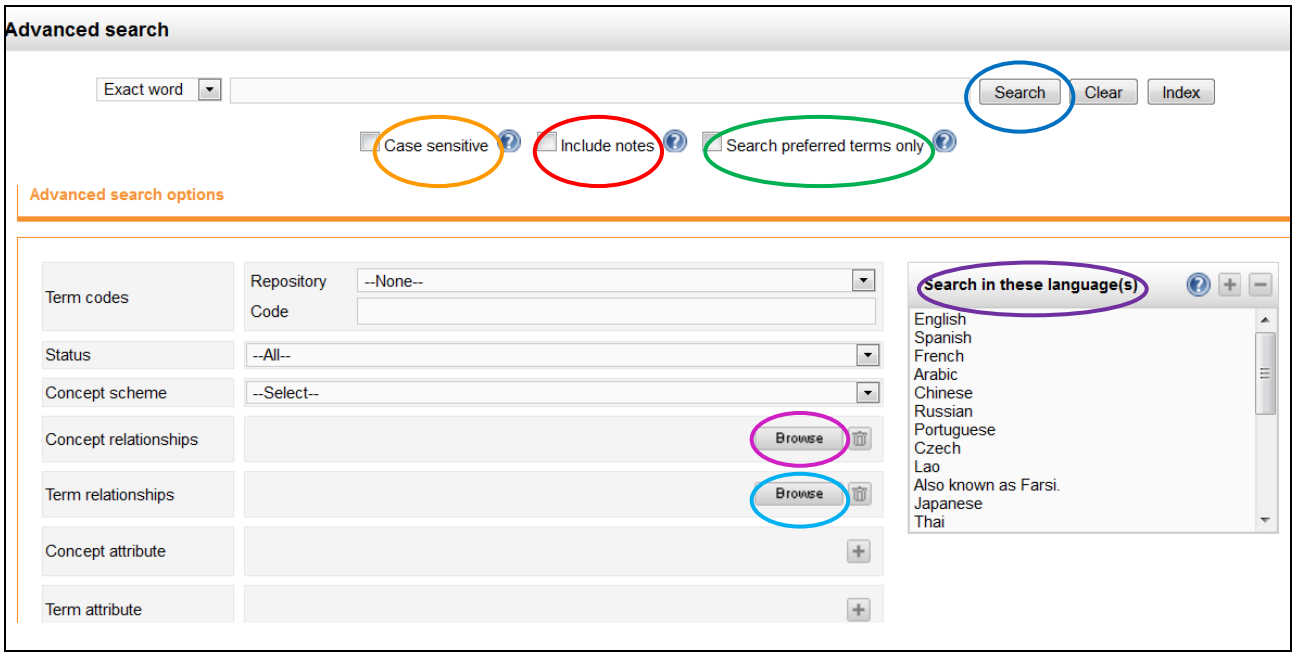


Figure 28. Advanced search interface

An advanced search may be performed by using the same search options described in Sec. 6. Search for simple search. Moreover, three more search options are available:

1. **Case sensitive**: Enables a case sensitive search is enabled.
2. **Include notes**: Includes also content of editorial notes, scope notes, and definitions in the search.
3. **Search preferred terms only**: Restricts the search to terms marked as ‘preferred term’.

In the **Advanced search** options area, the following constraints down below to the search criteria may be applied.

6.2.1 Search for relationships between concepts

To search for relationships between concepts click on the **Browse** button (Figure 28) in the **Concept Relationships** field, open the **Relationship browser**, select the relation you want to search for, and click on **Submit.** To perform the search click on the **Search** button.

In Figure 29, the relation ***Produces*** was selected in the **Relationship browser**. The search result consists of all pairs of concepts being linked by that relation (Figure 30).

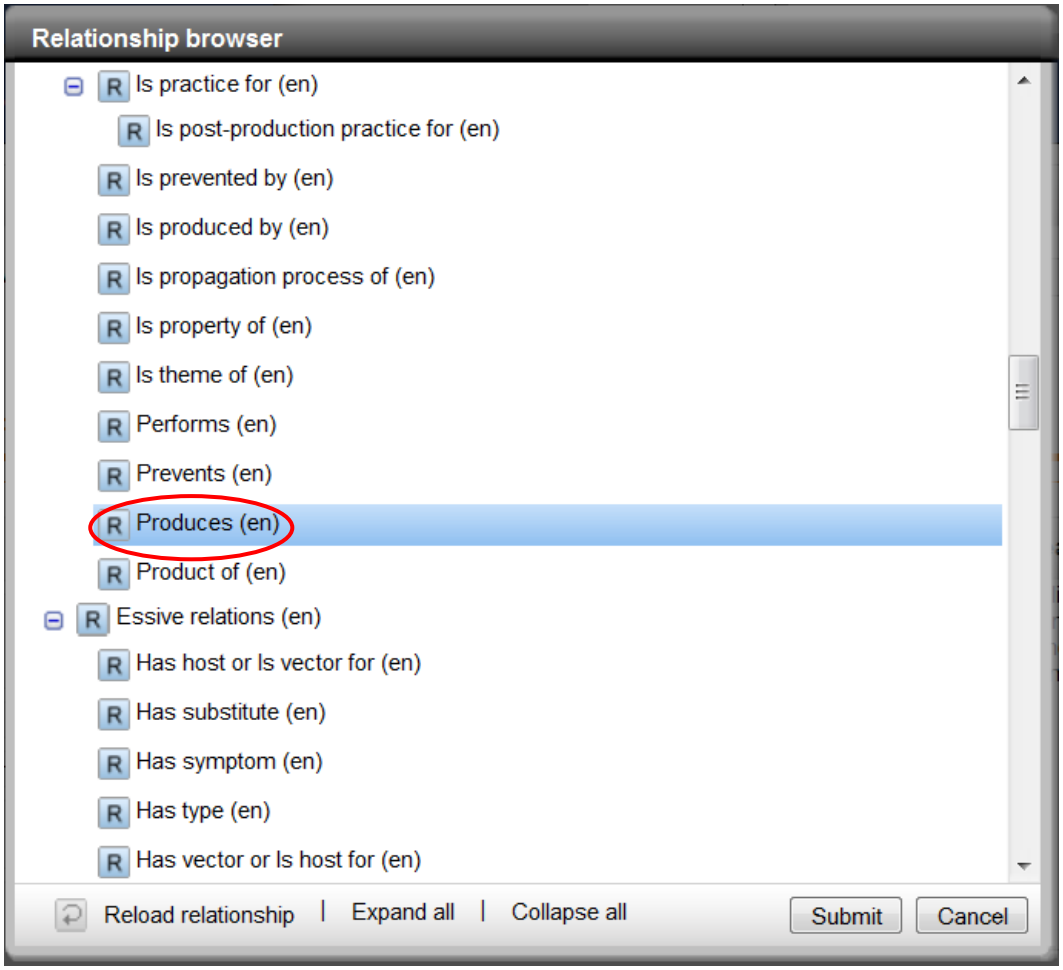


Figure 29. Advanced search: Search by relation

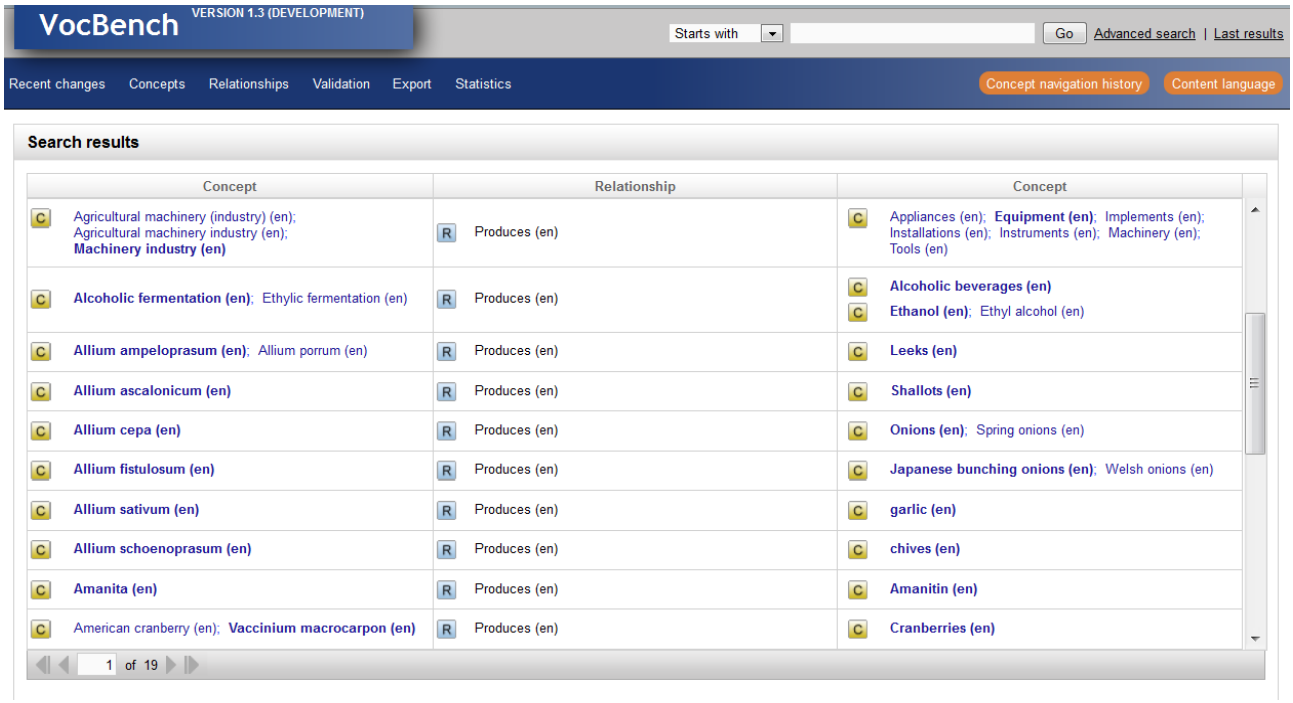


Figure 30. Results of Advanced search: Search by relation

6.2.2 Search by both relation AND concept

Type in the search box the word you want to search for, select in the **Relationship browser** the relation you are interested in as described above, and click on the **Search** button.

Figure 31 shows a search for preferred terms only, by word ***virus*** AND by relation ***Causes***. The results are displayed in Figure 32.

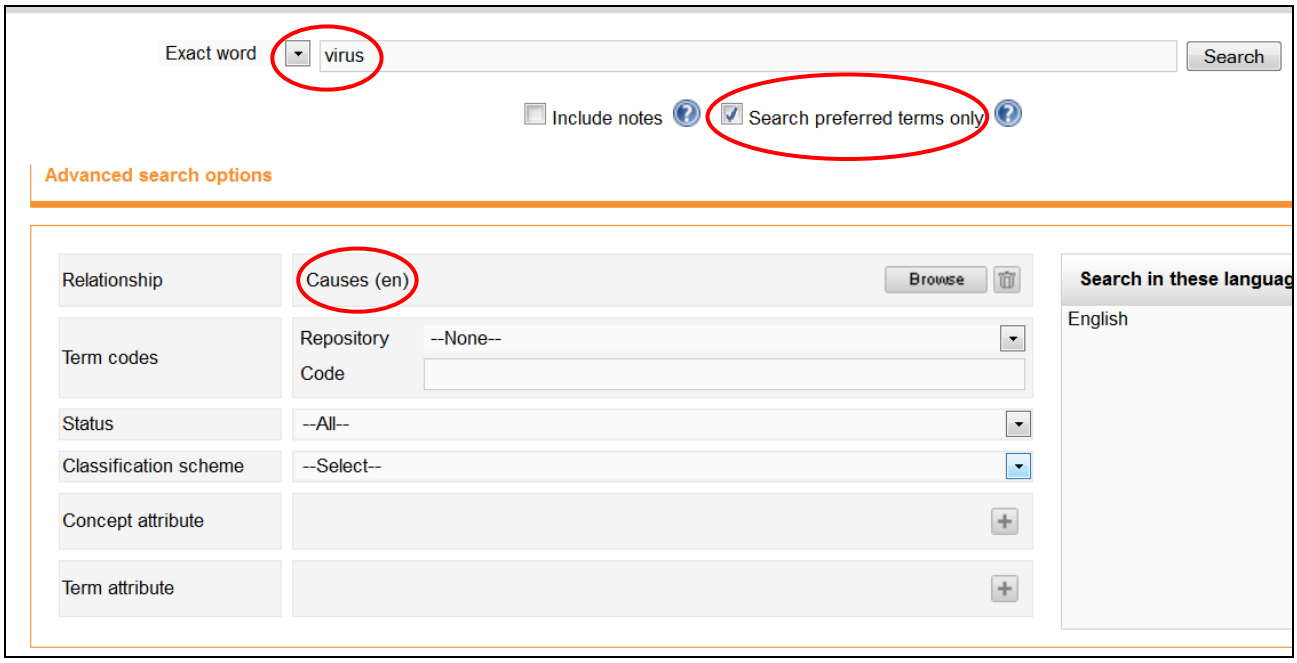


Figure 31. Advanced search: Search (preferred terms only) by Relation AND Word

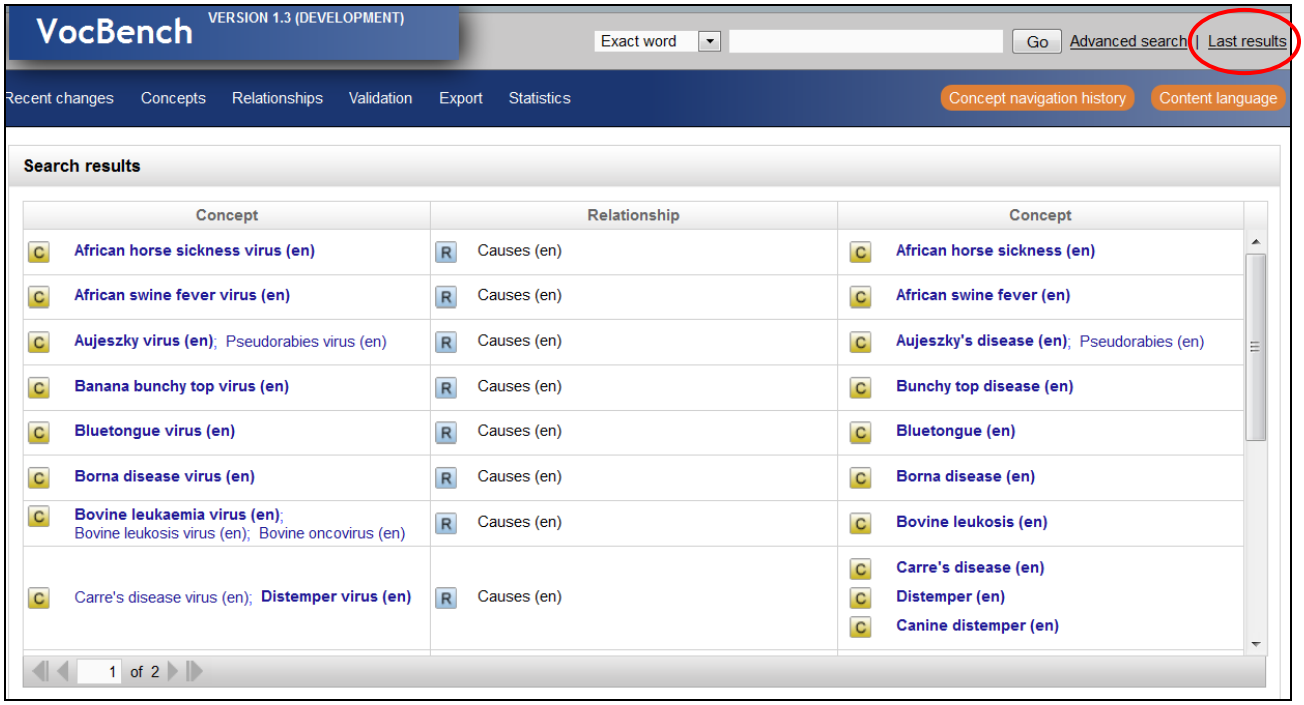


Figure 32. Results of Advanced Search: Search by Concept AND Relation

Note: You may search for relationships between terms in the same ways as described for concepts, using the **Browse** button of the **Term relationships** field.

6.2.3 Search for term codes

Terms have codes which are shown in the **Notation** tab of the **Term** box. If you know the code of a term, you may use the **Term codes** field to search for the concept to which the term is related. In Figure 33 you can see the term codes currently available in AGROVOC.

In order to search for a concept with a given term code, select the **Repository**, e.g. **skos: notation** (Figure 33), enter the code in the **Code** search box, e.g. ***7698*** (Figure 34), and click on **Search**.

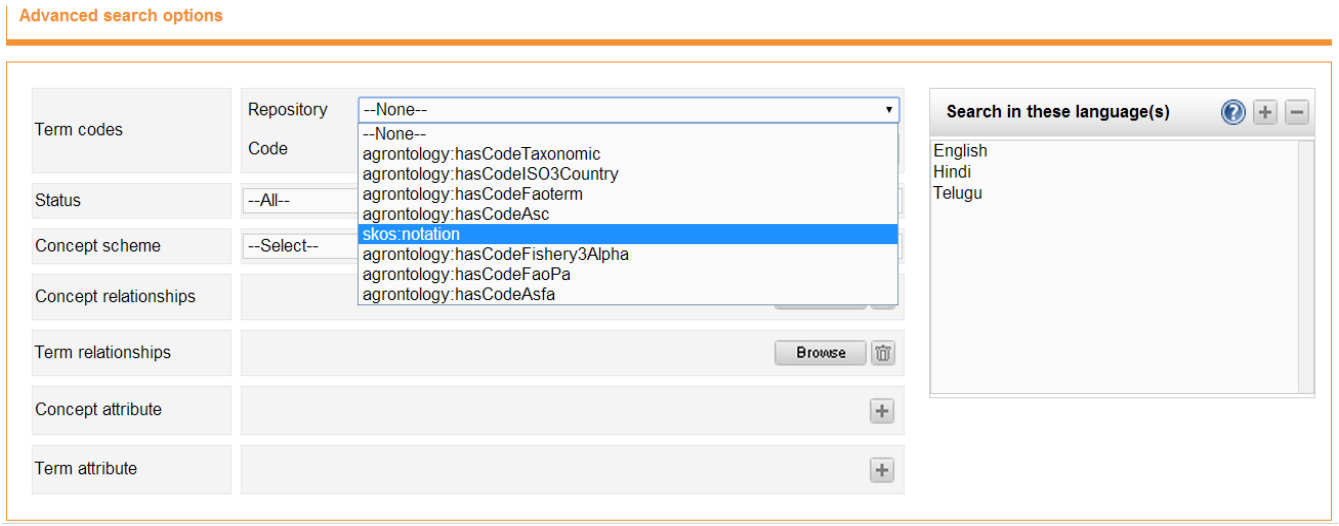


Figure 33. Advanced search. Search for term codes: Select repository

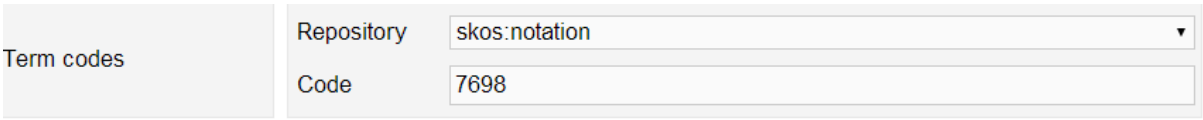


Figure 34. Advanced search: Search for term code

6.2.4 Search for status

This option allows you to retrieve all terms/concepts having the selected status (see Sec. 7.1 Status of terms and concepts). In order to use this search option select the term/concept status from the drop down list, e.g. ***Proposed*** or ***Deprecated***, (Figure 35) and click on the **Search** button.

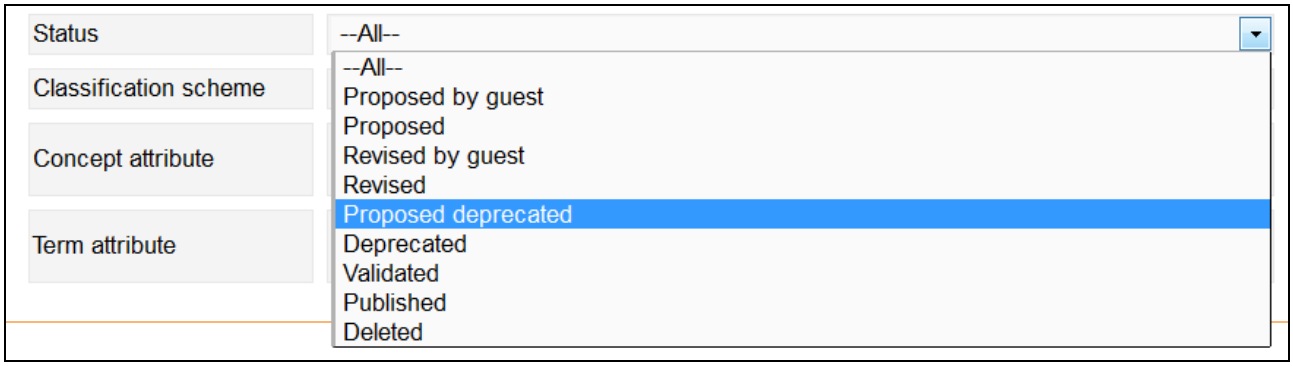


Figure 35. Advanced search: Search for status "Proposed deprecated"

6.2.5 Search for concept scheme

Use this option to select the scheme you want to search in.

6.2.6 Search for concept attribute

Use this search option to find for example concepts belonging to a specific subvocabulary of concepts (Figure 36). Click on the **[+]** icon to open the list and select the desired concept attribute e.g. ***Is part of subvocabulary***.

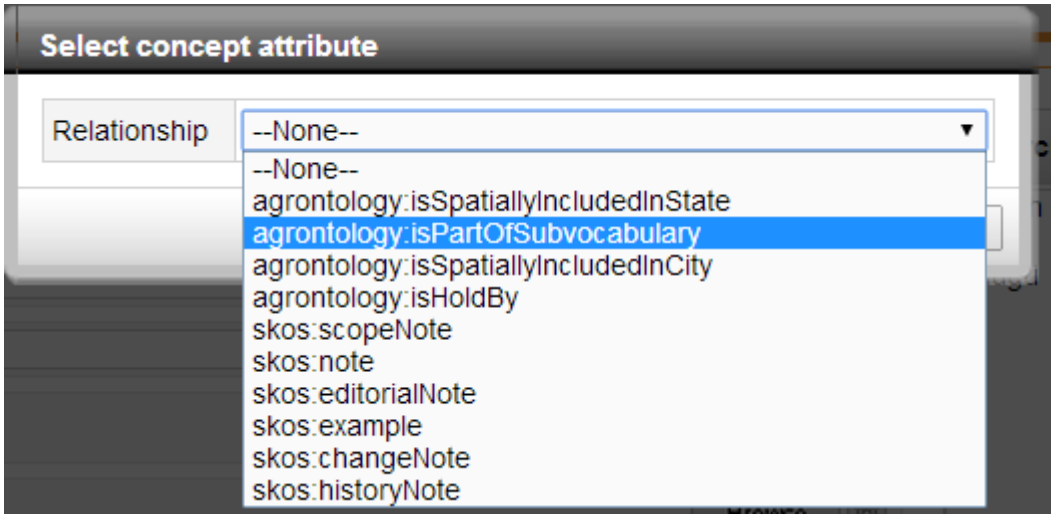


Figure 36. Advanced search: Search for concept attribute

Example: Search for a fishery related term (Figure 37): After selecting ***Is part of subvocabulary*** from the drop down list a new window opens in which you may select ***Fishery related term***.

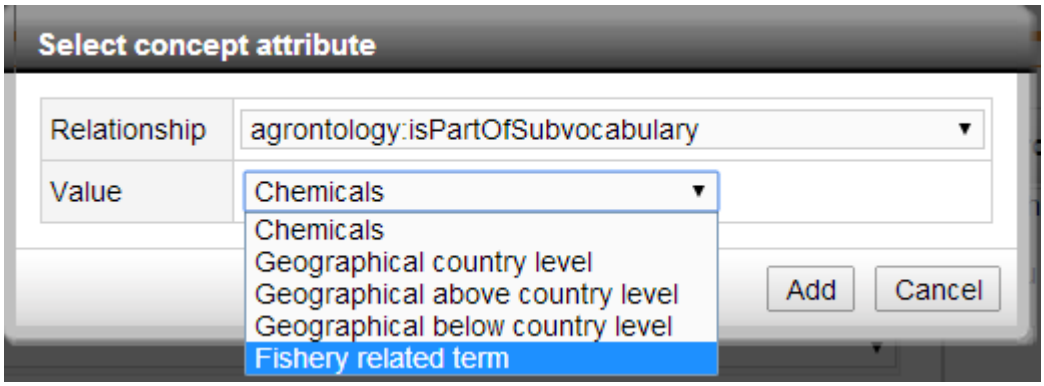


Figure 37. Advanced search: Search for 'Fishery related term'

6.2.7 Search for term attribute

Terms may be specified by attributes. For example Figure 38 shows the list of attributes currently available for AGROVOC terms.

Click on the **[+]** icon in the **Term attribute** field to open the list and select the desired term attribute, e.g. use ***HasTermType*** to find concepts whose terms belong to a specific subvocabulary

of terms.

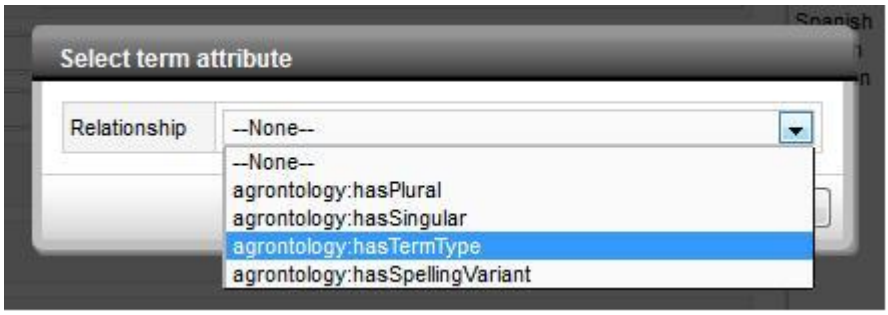


Figure 38. Advanced Search: Search for term attribute

A new field **Value** is added, select here the subvocabulary you want to search in, e.g. ***Common name for plants*** (Figure 39) and click on **Add.**

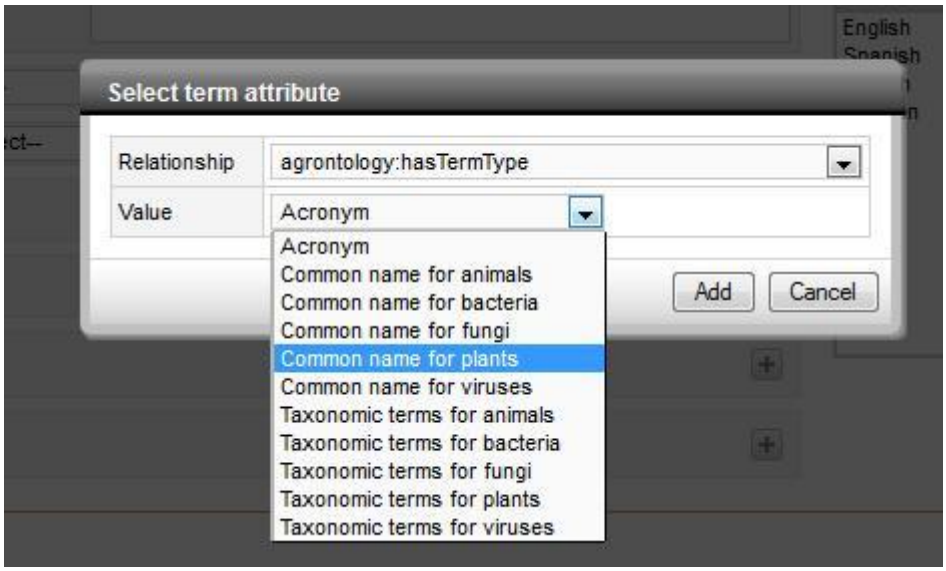


Figure 39. Advanced Search: Search for 'Common name for plants'

6.3 Concept navigation history

The orange button **Concept navigation history** in the bottom of the search area (Figure 40) gives you a chronological overview of the concepts navigated during your current session, indicating date and time (Figure 41).

Figure 40. Search area: Concept navigation history

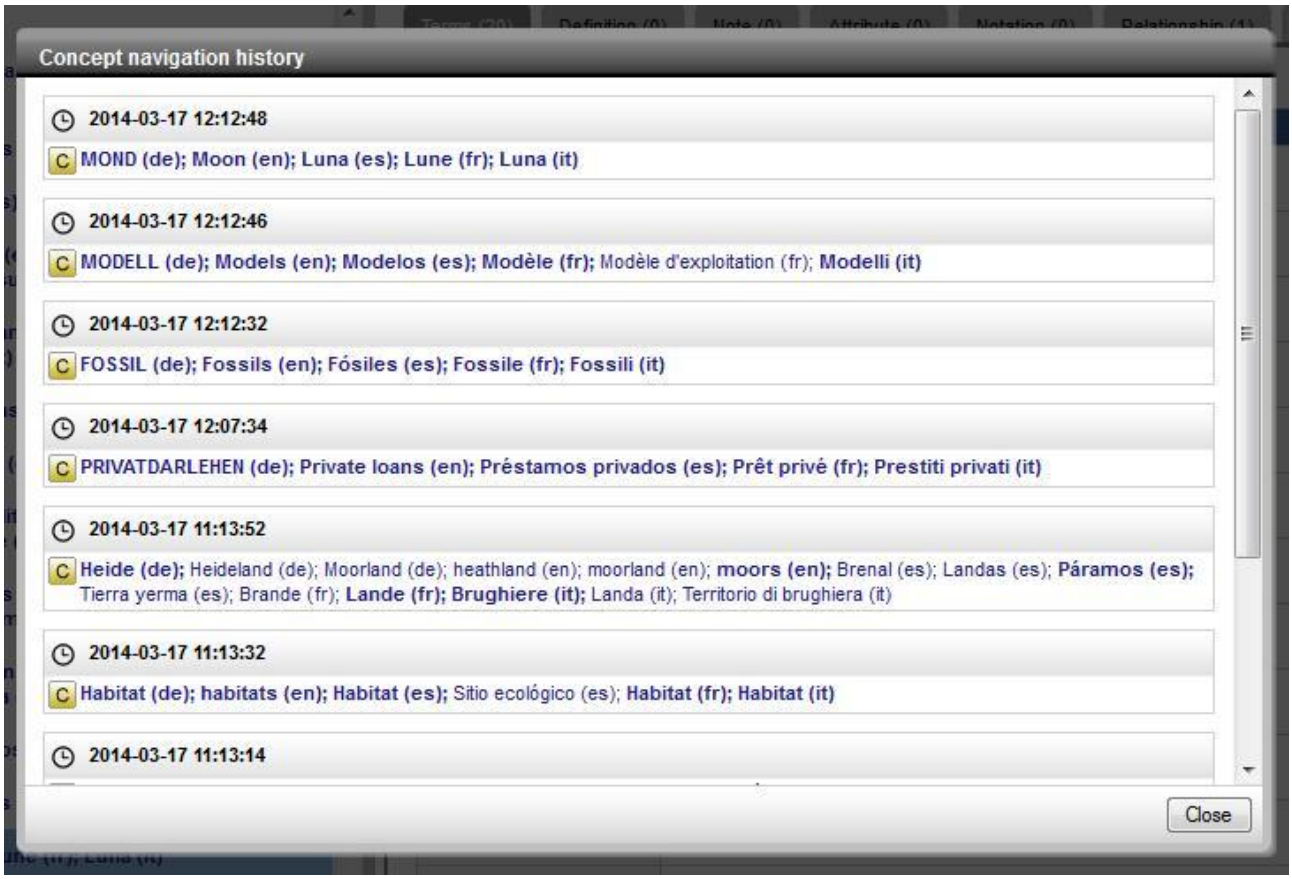


Figure 41. Concept navigation history

6.4 Content language

The orange button **Content language** in the bottom of the search area (Figure 40) gives the option to select the languages you would like to search and visualize concepts in. The languages you select here are only related to searching and visualizing and only for the current session. In **Preferences** you may set the languages in which you would like to edit concepts (see Sec. 5.2 User languages & ontologies).

Note: To visualize the terms of a concept in all languages the check box **Show only terms of selected languages** should be unchecked. If on the other hand you check this box you will only be able to view the terms in the languages you selected.

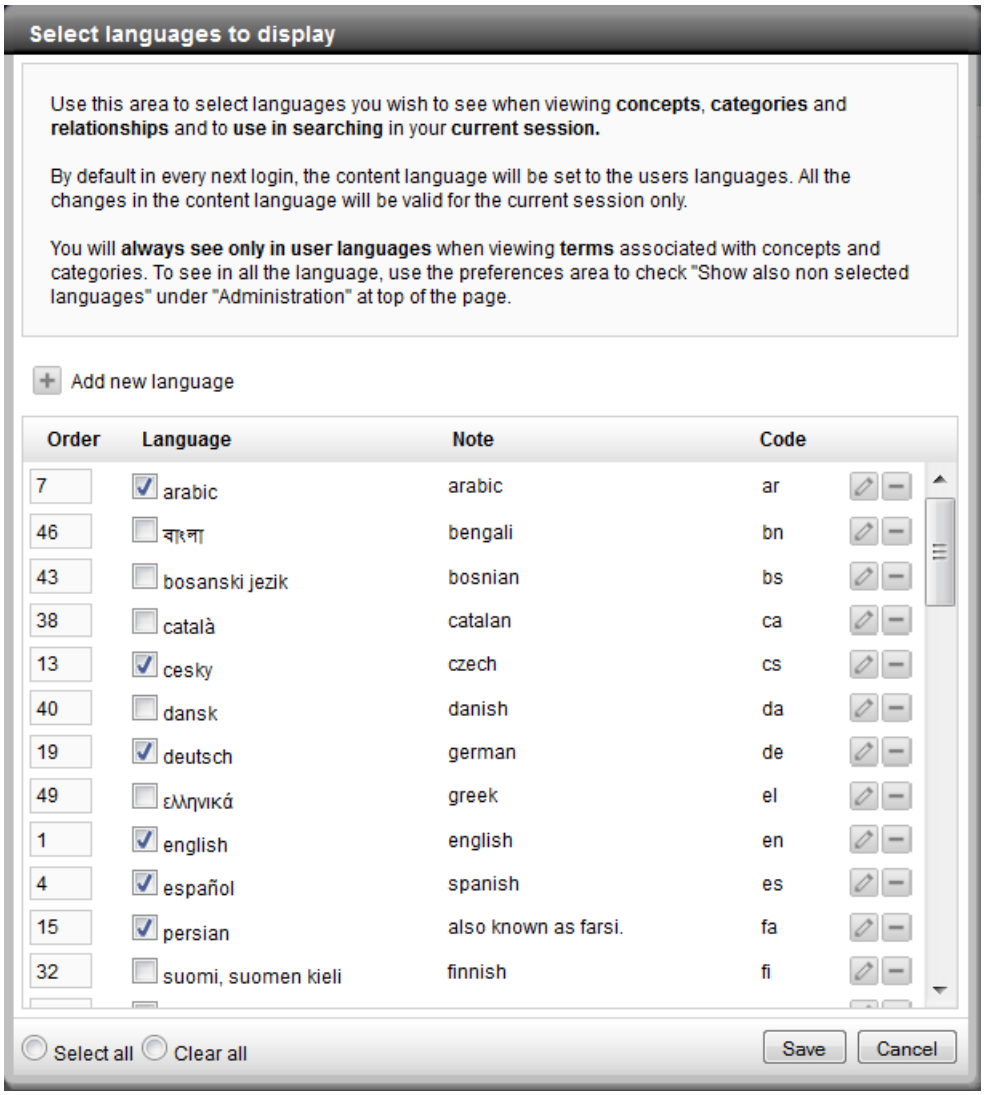


Figure 42. Content language

7. Editorial workflow

VB is a web-based, multilingual editing tool which implements a formalized workflow to allow for contributions by distributed editors. The workflow supported by VB is based on two notions: the fact that ontology elements have statuses, and that users have editing roles. Users may have more than one role assigned, but they can play only one role at a time.

7.1 Status of terms and concepts

When a user creates or edits a term or concept the system assigns it a status of approval in the workflow.
Possible statuses are:

Proposed. A user has proposed a new concept/term. The term/concept is drafted and has not yet been approved.

Revised. A user has revised an already existing term/concept. The revision has not yet been approved.

Validated. A proposed/revised term/concept has been approved by a Validator. Only after it has been reviewed by a Publisher will it get published.

Published. A validated term/concept has been approved and confirmed by a Publisher. Only published terms and concepts are included in the public version of the schema.

Proposed Deprecated. A user proposes to remove a term/concept. This needs to be approved by a Validator or Publisher.

Deprecated. A proposed deprecation of a term/concept has been approved by a Validator or Publisher. The term/concept is considered as outdated.

Note: The legend for the status of concepts and terms is always visible at the bottom of the **Concepts** and **Relationships** modules (Figure 43).

Figure 43. Legend

7.2 User roles

Possible roles in the workflow are:

1. Term Editor
2. Ontology Editor
3. Validator
4. Publisher
5. Administrator

Note: The rights for each role are restricted to the user languages the user selected during the registration process (Sec. 2.1 Register) or in **Preferences** in the menu bar (Sec. 5.2 User languages & ontologies).

7.2.1 Term Editors

Term Editors are the users of VB with the most restricted editing rights. They are usually terminologists by background.

Term Editors may access to the following modules:

- Recent changes
- Concepts
- Export

In the **Concepts** module, Term Editors may perform the following actions:

- Add, edit and delete terms.
- Add, edit and delete relations between terms and any other piece of information for terms.
- Add, edit and delete concepts.
- Add, edit and delete relations between concepts and any other piece of information for concepts.

All actions performed by a Term Editor get either the status Revised or Proposed, depending of the action undertaken, and need to be approved by a Validator.

7.2.2 Ontology Editors

Ontology Editors are more experienced terminologists and thesaurus editors, and have all the rights of Term Editors.

Ontology Editors have access to the following VB modules:

- Recent changes
- Concepts
- Export
- Statistics

In the **Concepts** module, Ontology Editors may perform the following:

- Add, edit and delete terms.
- Add, edit and delete relations between terms and any other piece of information for terms.
- Add, edit, delete concepts.
- Add, edit, and delete relations between concepts and any other piece of information for concepts.

All actions performed by an Ontology Editor get either the status Revised or Proposed, depending of the action undertaken, and need to be approved by a Validator.

7.2.3 Validators

Validators are experts that can check and validate the work done by Term Editors and Ontology Editors. Validators have all the rights of Term Editors and Ontology Editors.

Validators may access the following modules of VB:

- Recent changes
- Concepts
- Validation
- Export
- Statistics

In the **Concepts** module, Validators may perform all actions also allowed to Term Editors and Ontology Editors.

In the **Validation** module, Validators may accept or reject any action that has been proposed or by Term and Ontology Editors. Those items then get the status Validated or Deprecated (in the case of the status Proposed deprecated).

7.2.4 Publishers

Publishers are those who have the total control of the concept schema and are responsible for publishing the validated entities.

Publishers have all the rights of Term Editors, Ontology Editors and Validators. The following describes publishers' roles and privileges.

Publishers have access to the following modules:

- Recent changes
- Concepts
- Relationships
- Validation

- Export
- Statistics

In the **Concepts** module, Publishers may perform all actions allowed to Term Editors, Ontology Editors and Validators, plus the following ones:

- Move, link and unlink concepts.

In the **Validation** module, they may perform the same actions as Validators.

- Permission on terms and concepts.
- Validate changes applied by Editors, and confirm changes applied by Validators.

In the **Relationships** module, they may create new relations between terms and concepts.

They ultimately approve a validated entry by a Validator, and change its status to Published.

- They can still reject validated entries and thus remove them again from the model (in case of new proposals) or reset them to their previous status (in the case of Proposed Deprecated).

Finally, Publishers have access to the link **Administration** in the menu area, from where the **Users** and **Groups** menus are available.

7.2.5 Administrators

Administrators have access to all VB modules and have overall rights!

8. Recent changes module

This module gives an overview of all changes applied to a given scheme since its loading in VB. By default the list of changes is presented in reverse chronological order, i.e., latest first (**Error! Reference source not found.**). A change is split in 6 aspects (columns) of which each provides a different type of information about the change.

1. **Concept/Term/Relationship/Users**:
   Shows the concept when the change belonged to the concept, e.g. the creation of new concept, a new term, a new concept to concept relationship.
   Shows the term when you add any term-term relationship.
   Shows the relationship, when you make any changes in the relations in the **Relationship** module.
2. **Change**: shows the actual new value, e.g. the new term.
3. **Old value**: shows the value before the change took place.
4. **Action**: indicates which action was taken, e.g. term-create.
5. **User**: shows the name of the user who performed the action.
6. **Date**: indicates the date and time of the action.

Other ways to be informed about changes:

- Subscribe to the **RSS feed** available in the top menu bar (Figure 44).

Figure 44. RSS feed

- Select a concept in the **Concepts** module and open for concepts the **History** tab in the concept box and for terms the **History** tab in the term box (see Sec. 9. Concepts module). The information shown in this tab is automatically collected by VB. For each concept/term, the creation date, last update and status is displayed.

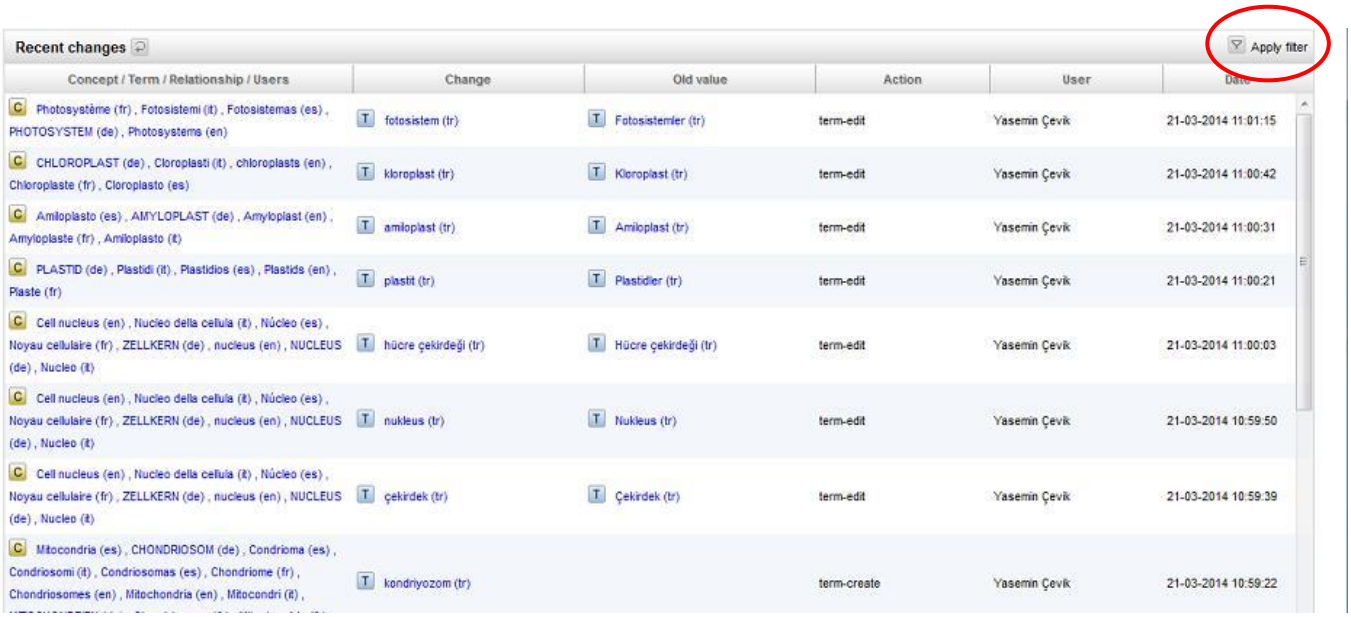


Figure 45. VB module: Recent Changes

8.1 Apply filter options

Filters may be used to reduce the number of actions shown: Click the **Apply filter** option in the top right corner of the **Recent changes** module (**Error! Reference source not found.**).

The following specific filter options (Figure 46) facilitate the search for recent changes:

- **Filter by user**: By default all registered users are unselected. To view changes by specific users, simply check the check box in front of their name. To select all users check the **All** box (at the bottom of the list); to uncheck all users check the **All** box again.
  Note: These settings will be saved also for next sessions.
- **Filter by action**: By default all possible actions are unselected. To select actions simply check the appropriate check boxes.
  Note: These settings will be saved also for next sessions.

- **Filter by date**: By default all changes are shown since the set-up of the VB installation you are looking at. You may narrow the time span down by using the options in the **Filter by date** box.

To apply the filter, click on **Submit**.

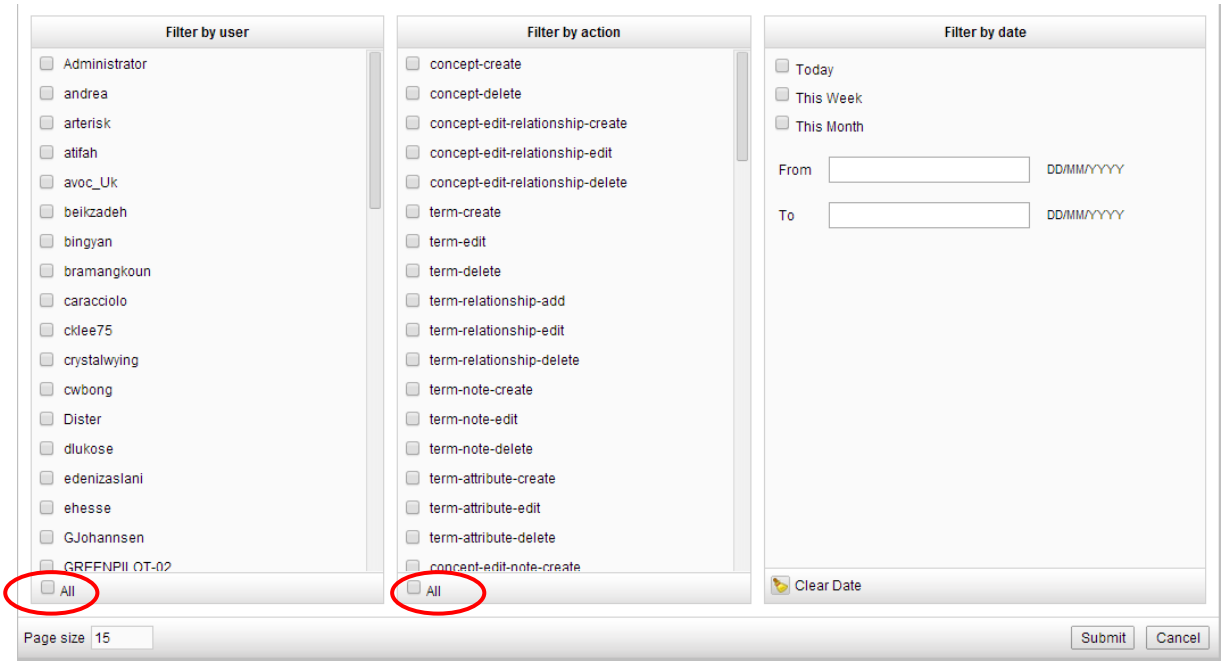


Figure 46. Recent changes filter

9. Concepts module

The **Concepts** module is available to all roles. It is used to:

- Browse and navigate the hierarchy of concepts.
- View the information attached to the individual concepts and terms.
- Add/edit/delete concepts and terms.

This section is divided into two parts: the first part is dedicated to operations on concepts, the second one to operations on terms.

9.1 Operations on concepts

A concept is anything that is relevant in a given domain. A concept is represented by all terms, preferred and non-preferred, and in all languages to which it is associated. The entire representation of a concept often includes many terms (Figure 47). Both concepts and terms participate in relationships with other concepts and terms.

Figure 47. Representation of a concept

9.1.1 User interface

The **Concepts** module displays the top concepts of the concept scheme you selected when you logged in. In Figure 48, the top concepts are those of AGROVOC in English.

Figure 48. Concepts module: Visualizing the top concepts of AGROVOC

If you click on any of the concepts in the concept hierarchy the screen divides into two parts as shown in Figure 49. The entire hierarchy is shown in the left side [A] (Concept hierarchy area), while the information relevant to the selected concept, i.e. its terms, information about the terms, definitions, relationships etc., is shown in the right side [B] (Concept/term area).

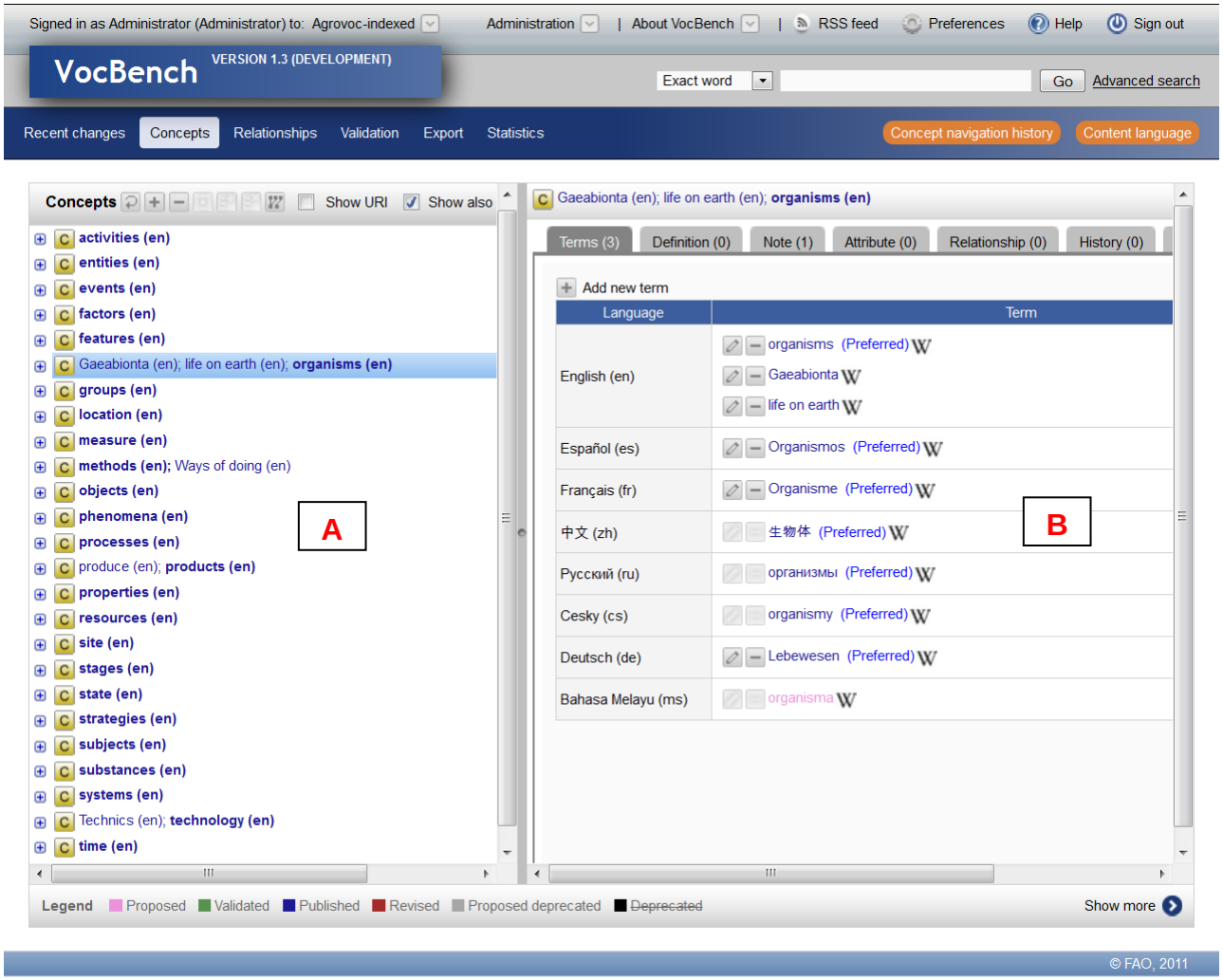


Figure 49. Concept hierarchy area [A] and Concept/term area [B]

Concept hierarchy area [A]

Starting from the left, there are a number of buttons with the following functionalities (Figure 50):

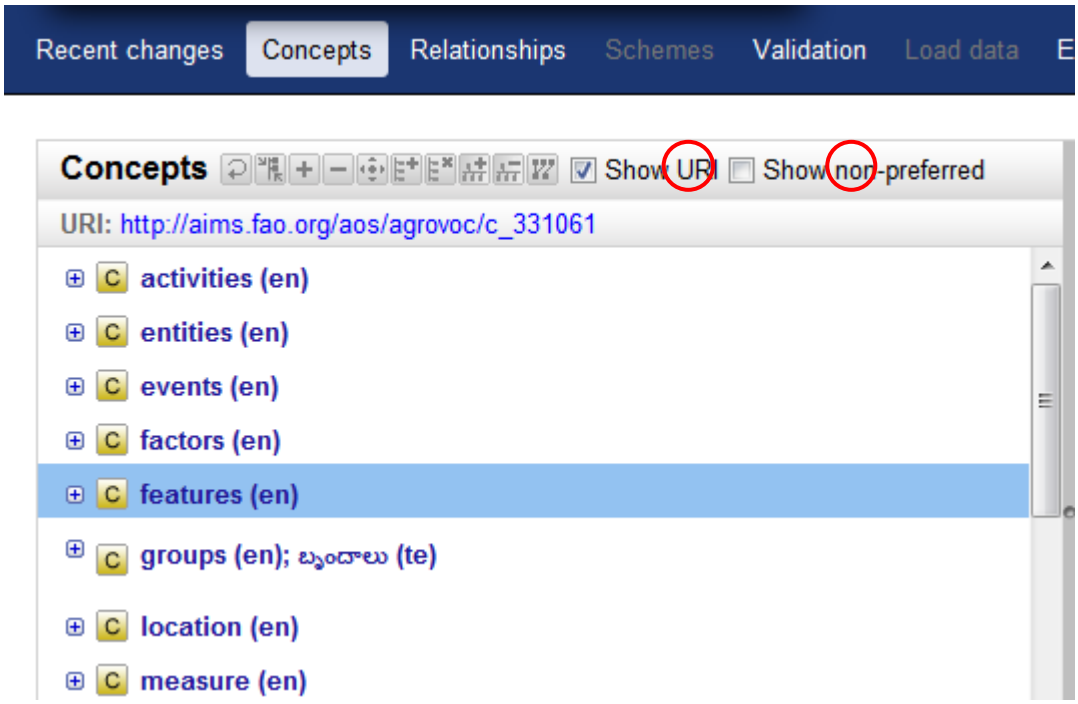


Figure 50. Buttons on concept hierarchy area

- **Reload concept**

  Refreshes the screen and reloads the selected concept or the entire hierarchy if no concept is selected.

- **Collapse all**

  This tab collapses the concept or all the concepts when its hierarchy is being expanded.

- **Add new concept**

  To add a new concept to the hierarchy.

- **Delete concept**

  To delete the selected concept.

- **Move concept**

  To move the selected concept.

- **Link concept**

  To link the selected concept to a new child concept.

- **Unlink concept**

  To unlink the selected concept from the hierarchy.

- **Add concept to scheme**

  VB supports the management of multiple schemes[8] inside the same project[9]. This functionality allows you to make the concept also belong to another scheme within the same project.

- **Remove concept from scheme**

  The opposite of the above, allows you to detach a concept from a given scheme.

- **View graph**

  Opens a new window or tab with a graphical representation of the selected concept and its relations with other concepts (Figure 51).

8 http://www.w3.org/TR/skos-reference/#schemes

9 For now, up to a limited extent. Works perfectly when schemes are meant have no concept overlap. There is limited support for having concepts belong to more schemes

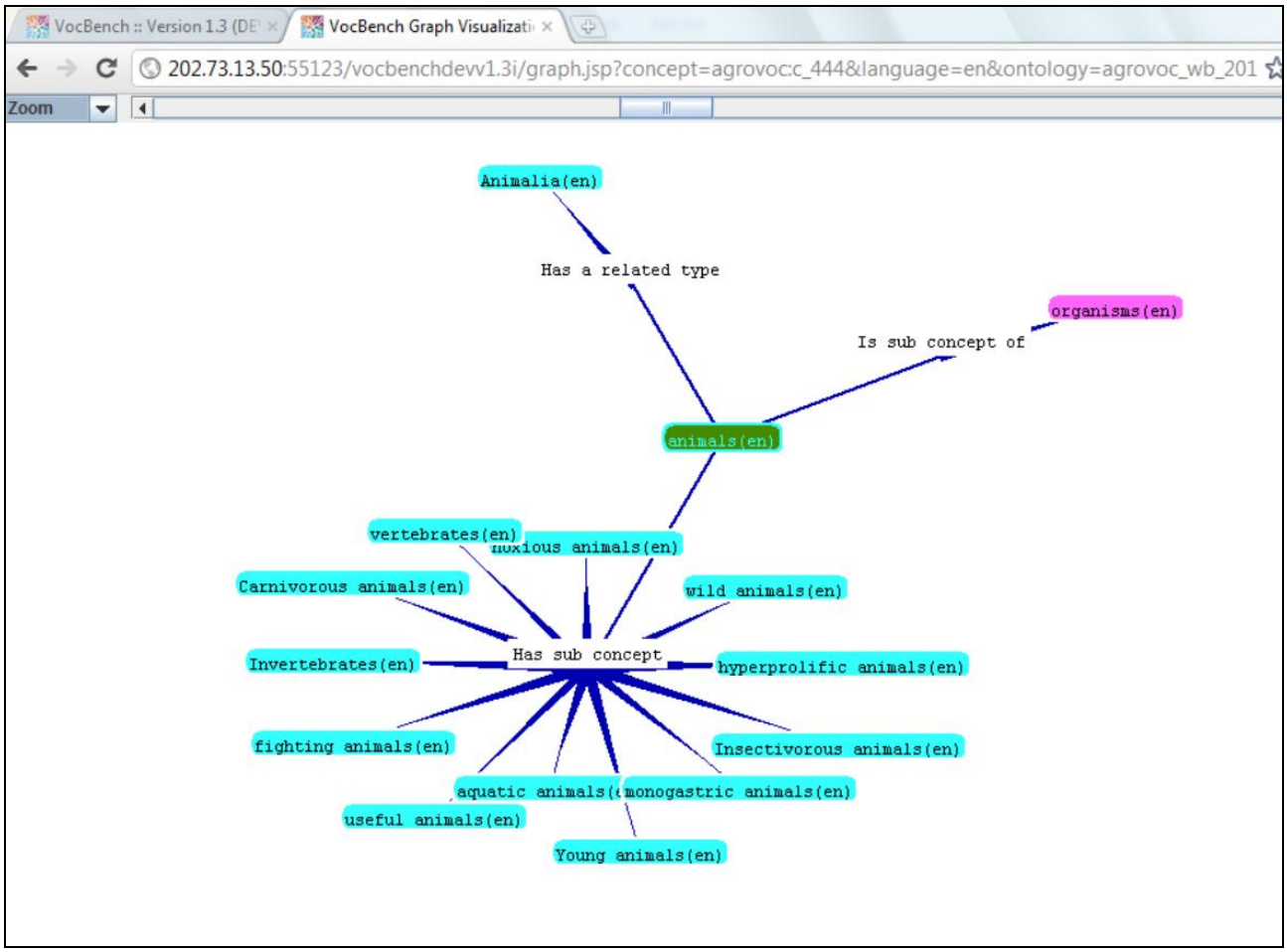


Figure 51. Graph visualization of a concept

Next to these buttons there are two check boxes to select what to show in the concept hierarchy (Figure 50):

- **Show URI**

  Shows the URI of the selected concept.
- **Show also non-preferred terms**

  Preferred terms are displayed in bold and non-preferred terms are shown next to them.

Concept/term area [B]

The concept/term area [B] (Figure 52) is organized in tabs. Each tab provides access to a different piece of information about the selected concept.

For example Figure 52 shows the tab **Terms** for the concept ***genetically modified organisms*** (content language: English).

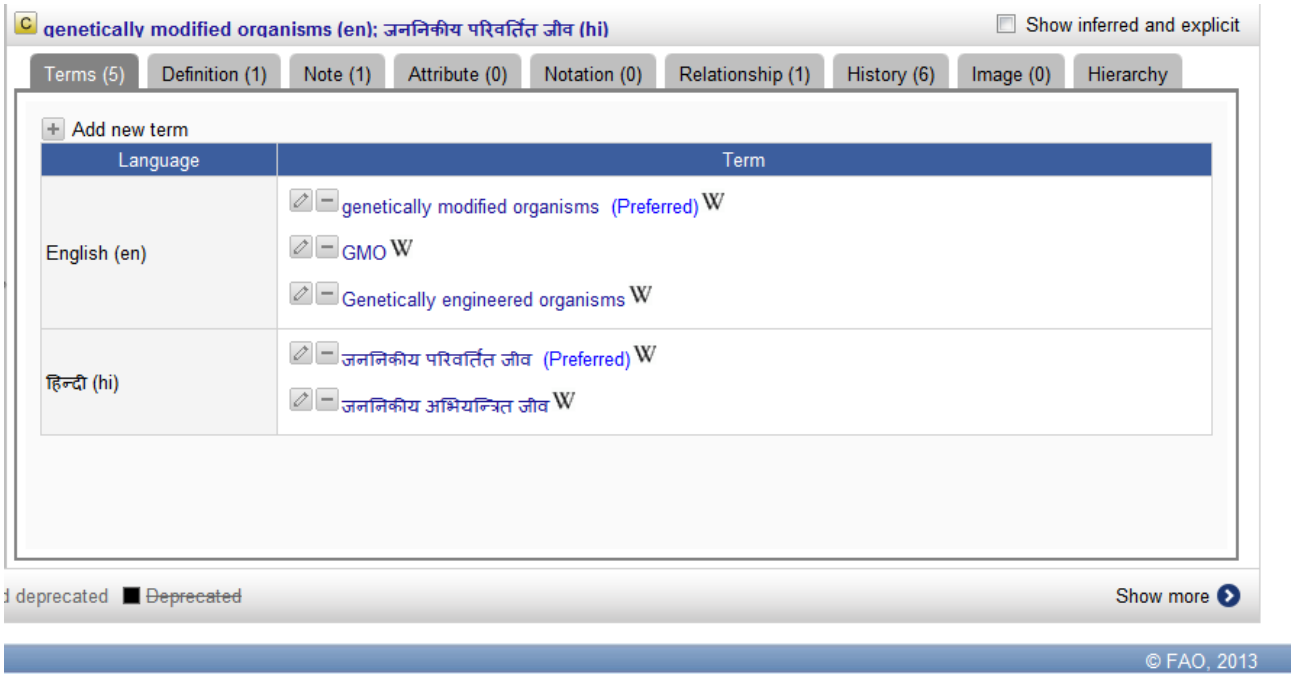


Figure 52. Concept/term area: Information tabs

The following tabs are available:

- **Terms**

  Shows all terms associated to the selected concept, in the selected languages.

  Note: To see all available terms in all languages, make sure the option **Show only terms of selected languages** under **Preferences** (see Sec. 5.2 User languages & ontologies) is unchecked.

- **Definition**

  Shows the definitions available for the selected concept.

- **Note**

  Shows available editorial and scope notes (Figure 53).

Figure 53. Concept/term area: Note

- **Attribute**

  Shows the available attributes for the selected concept (Figure 54).

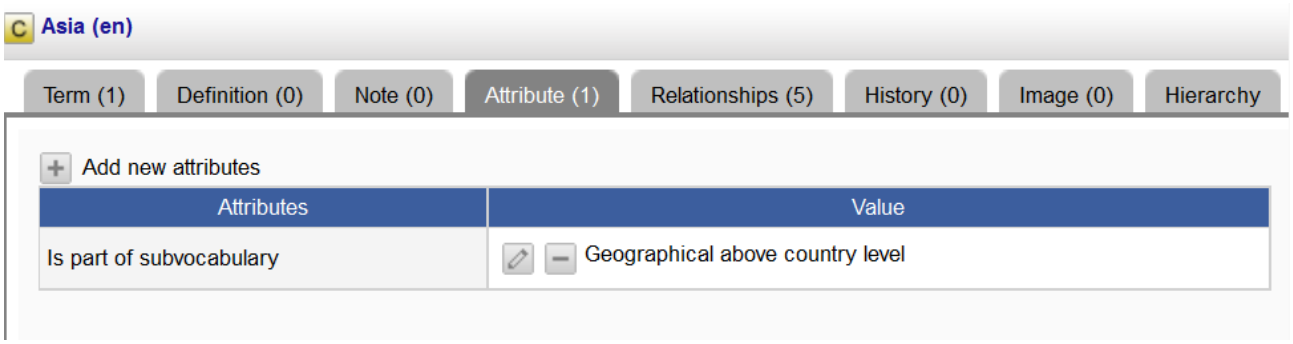


Figure 54. Concept/term area: Attribute

- **Relationship**

  Shows the relations between the selected concept and other concepts (Figure 55).

Figure 55. Concept/term area: Relationship

- **History**

Shows the history of the selected concept (Figure 56):

- Creation date of concept
- Date of last update
- Term status
- Detailed information on term changes

Note: This information is automatically generated.

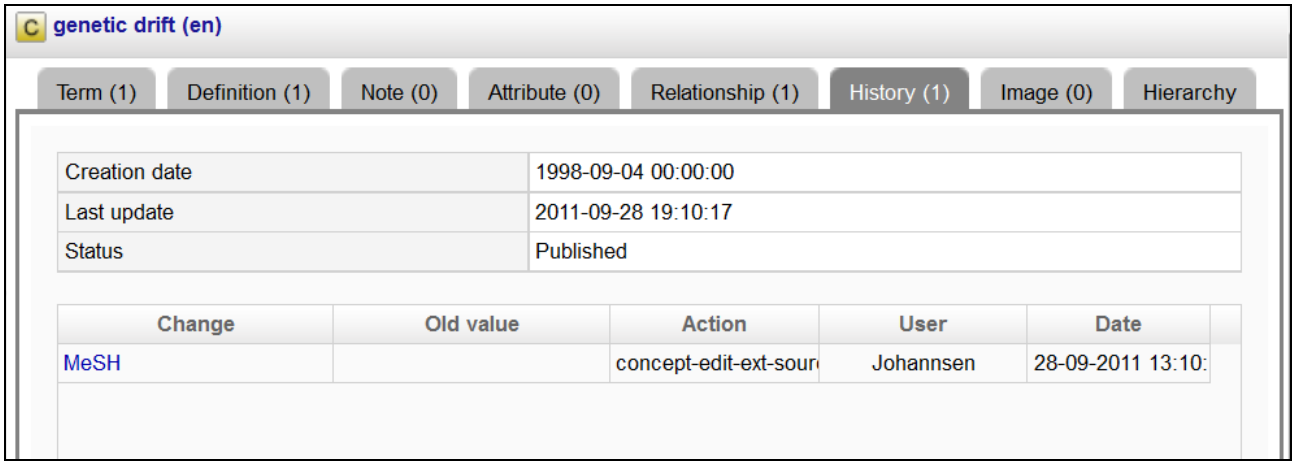


Figure 56. Concept/term area: History

- **Image**

  Shows an image of the concept.

- **Hierarchy**

  Presents in a compact way the hierarchy line from the selected concept to its top term (Figure 57).

Figure 57. Concept/term area: Hierarchy

In the following, we highlight some crucial operations that can be performed on concepts.

9.1.2 Add a new concept

This action may be performed by all roles.

To add a new concept, take the following steps:

1. Choose where in the hierarchy to add the new concept.
2. Click on the **[+]** icon in the bar above the concept hierarchy (Figure 50), a window opens with the title **Create a new concept**.
3. In the window, add the following pieces of information (Figure 58):
    a) **Term** for the concept.
    b) Select **Language** from the drop down list
    c) Click on the **Create** button.

Figure 58. Create a new concept: Add term and language

4. The system checks if the suggested term is already present in VB**.**

    If the label already exists you receive the message “Concept already exists” (Figure 59) and a short link to the existing concept is provided. In that case, enter a new term, and click on **Check availability**, then follow steps 4 to 7.

    Note: Take Care! The fact that you receive a message informing you that the term already exists does not stop you to create the term anyway.

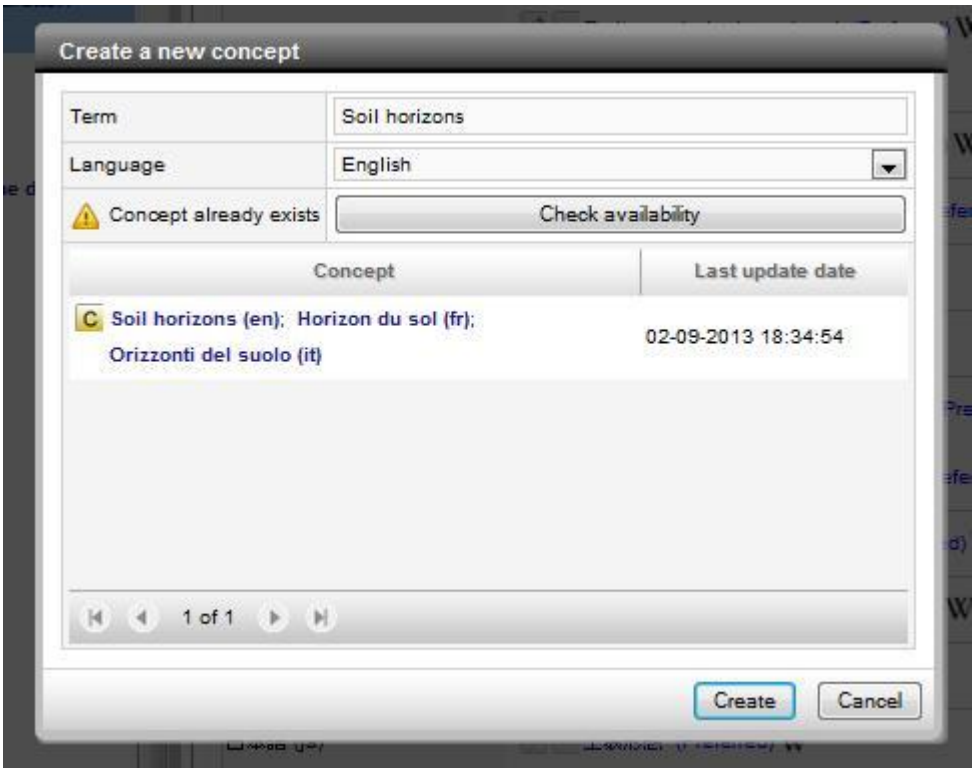


Figure 59. Create new concept: "Concept already exists"

If the label does not exist a new window opens. Here you choose (Figure 60):

a) The position in the hierarchy where the concept should be added. The following possibilities are available:

   i. **Child of the selected concept**

   ii. **Same level as the selected concept**

   iii. **Top level concept**

b) If the new term will be a preferred term by checking the box or not.

Note: Currently the box **Preferred** is checked by default (Figure 60) when a concept is new, but if you add more labels it is unchecked.

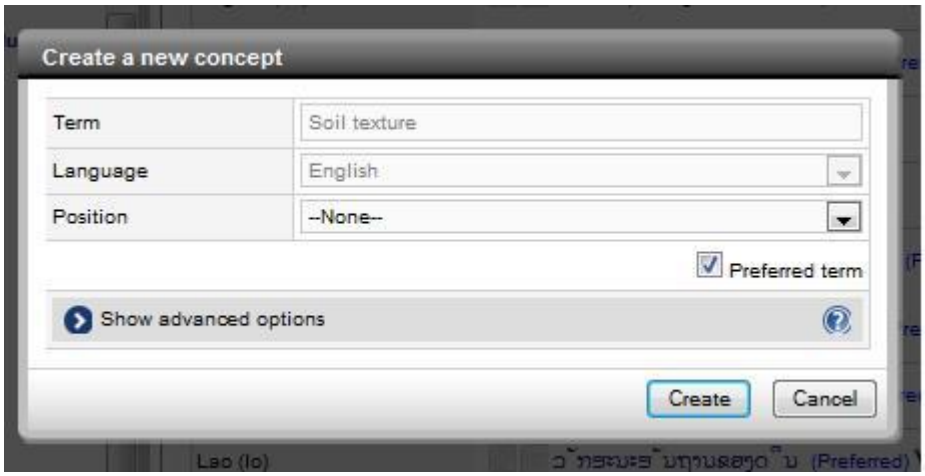


Figure 60. Create a new concept: Select 'Preferred term'

5. Then, click **Add** or **Add and repeat** (if you want to create another term) or **Cancel** to abandon.
6. After clicking **Add**, the system takes you to the newly created concept area where you may create other preferred or non preferred terms in other languages by clicking on **+ Add new term** (see Sec. 9.2.1 Add a new term).

9.1.3 Delete a concept

This action may be performed by Editors, Validators, Publishers and Administrators.

1. Select the concept in the concept hierarchy.
2. Click on the **[-]** icon in the bar above the concept hierarchy.
3. A warning message is visualized (Figure 61).
4. Follow the instruction; when ready, click **Delete**.

Figure 61. Delete concept: Warning message

Note: When you delete a concept its status becomes Proposed Deprecated, meaning it only becomes deprecated after it has been approved by a Validator or Publisher (see Sec. 7.2 User roles). In the meantime its terms in all languages do not change status!

9.1.4 Edit the information attached to a concept

This action may be performed by Term Editors, Ontology Editors, Validators, Publishers and Administrators.

To edit any of the pieces of information attached to a concept:

1. Select the concept in the concept hierarchy.
2. Click on the appropriate tab.

In the following the most relevant actions on concepts are singled out and explained in detail.

- **Add a definition to a concept**

  To provide a definition for a concept follow these steps:

  1. Click on **[+] Add definition**.
  2. A window opens (Figure 62) in which the following pieces of information should be added:

     - **Definition**

- **Language**: select language from drop down list.
- **Source** for the definition. Possible sources are, e.g. Wikipedia.
- **URL** for the source.

3. Click **Create** or **Cancel.**

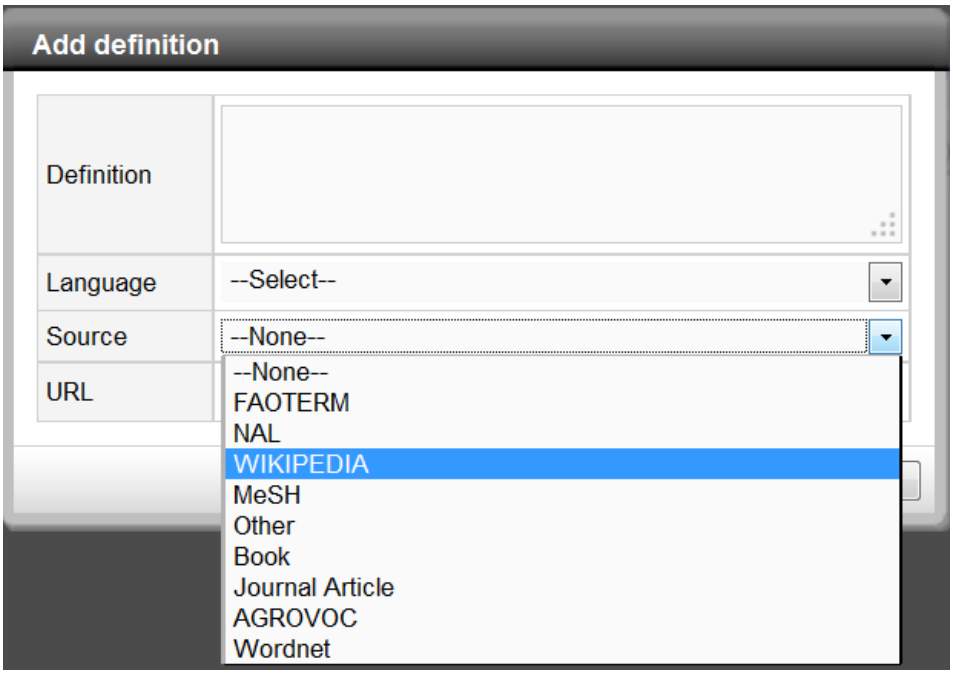


Figure 62. Add definition

- **Edit a definition of a concept**

  It is possible to edit the entire definition or the source.

1. Click on the Edit icon of the item you want to edit .
2. Revise definition and submit your changes.

- **Delete a definition of a concept**

1. Click on the **[-]** Delete icon next to the item you wish to delete.
2. Delete and confirm.

- **Add a relationship to a concept**

  To **create** a relation between two concepts follow these steps:

1. Select the first concept (by browsing or searching).
2. Click on the **Relationship** tab (Figure 63).
3. Click on **[+] Add new relationship**. A popup window will appear where you can specify the relation to use, and select the other concept in the relation (Figure 64).
4. To select a relation, click on the **Browse** button and the **Relationship browser** will open (Figure 65). To view the complete list of relation types, click on **Expand all** at the bottom of the window and select from the list the appropriate new relation.
5. To select the second concept in the relationship click on the **Browse** button. The **Concept browser** will open where you can search and browse for the desired concept (Figure 66). Once the concept is identified, click **Submit** (or **Cancel**).
6. Click the **Create** button to confirm the new relationship (Figure 67).
7. The new relationship is now visible in the Concept/Term Area (Figure 68).

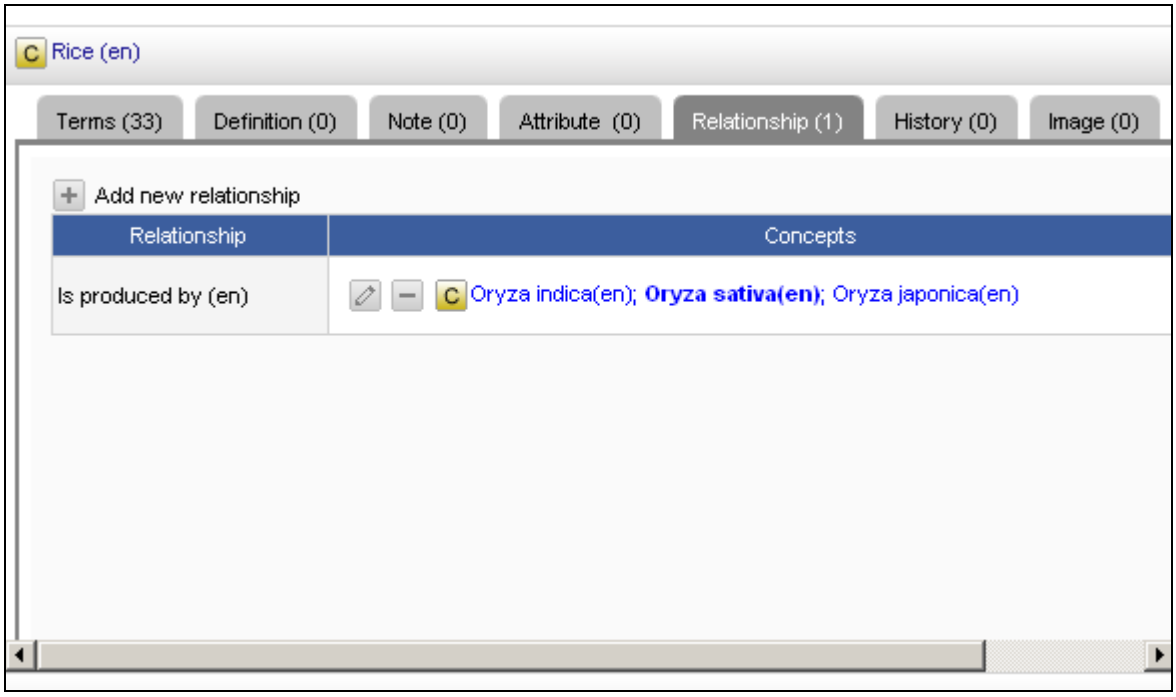


Figure 63. Create relation between concepts: Select Relationship tab

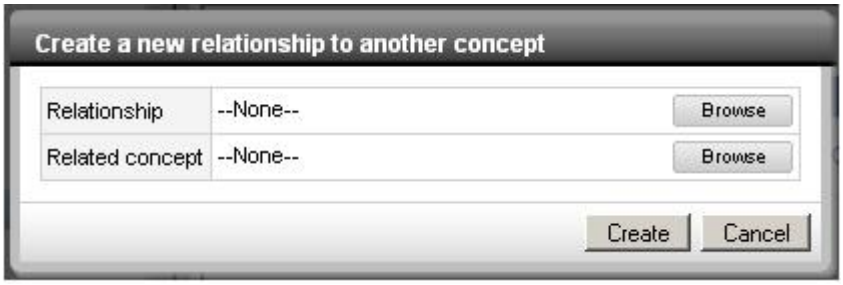


Figure 64. Create new relation between concepts

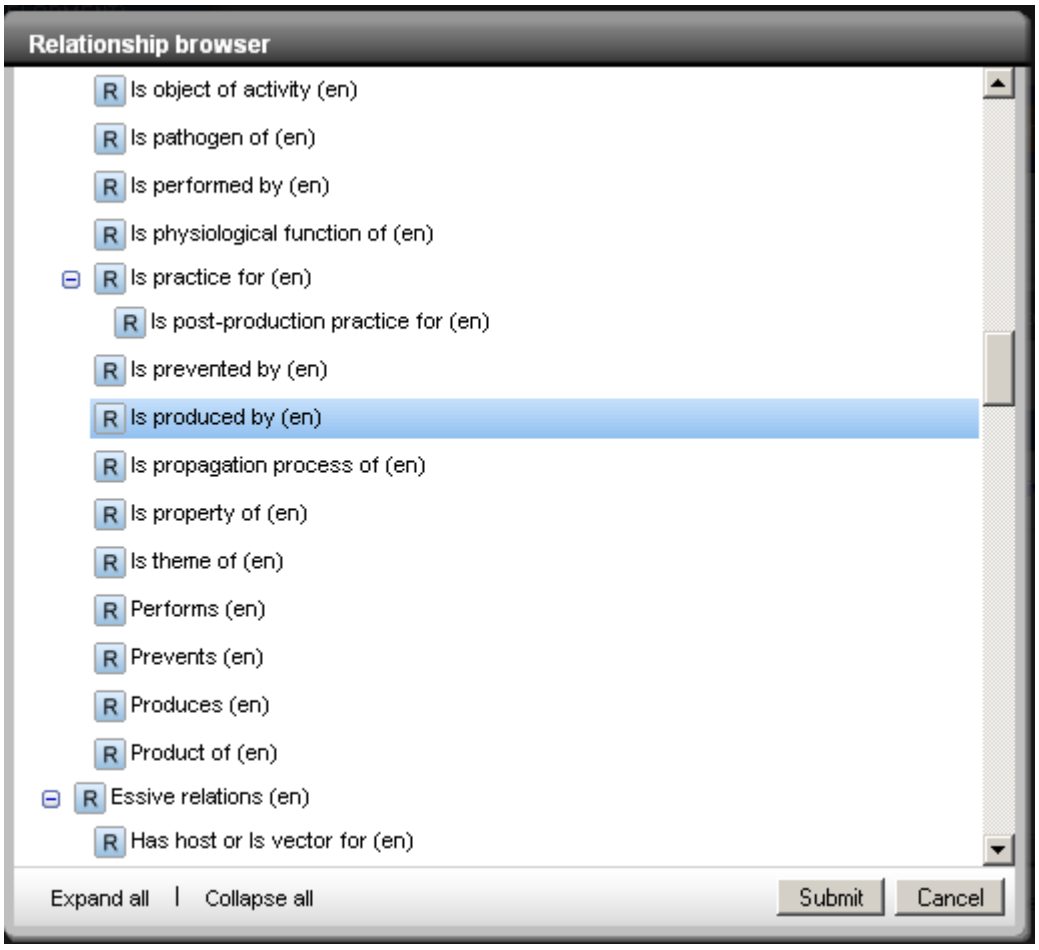


Figure 65. Relationship browser. Create new relation between concepts

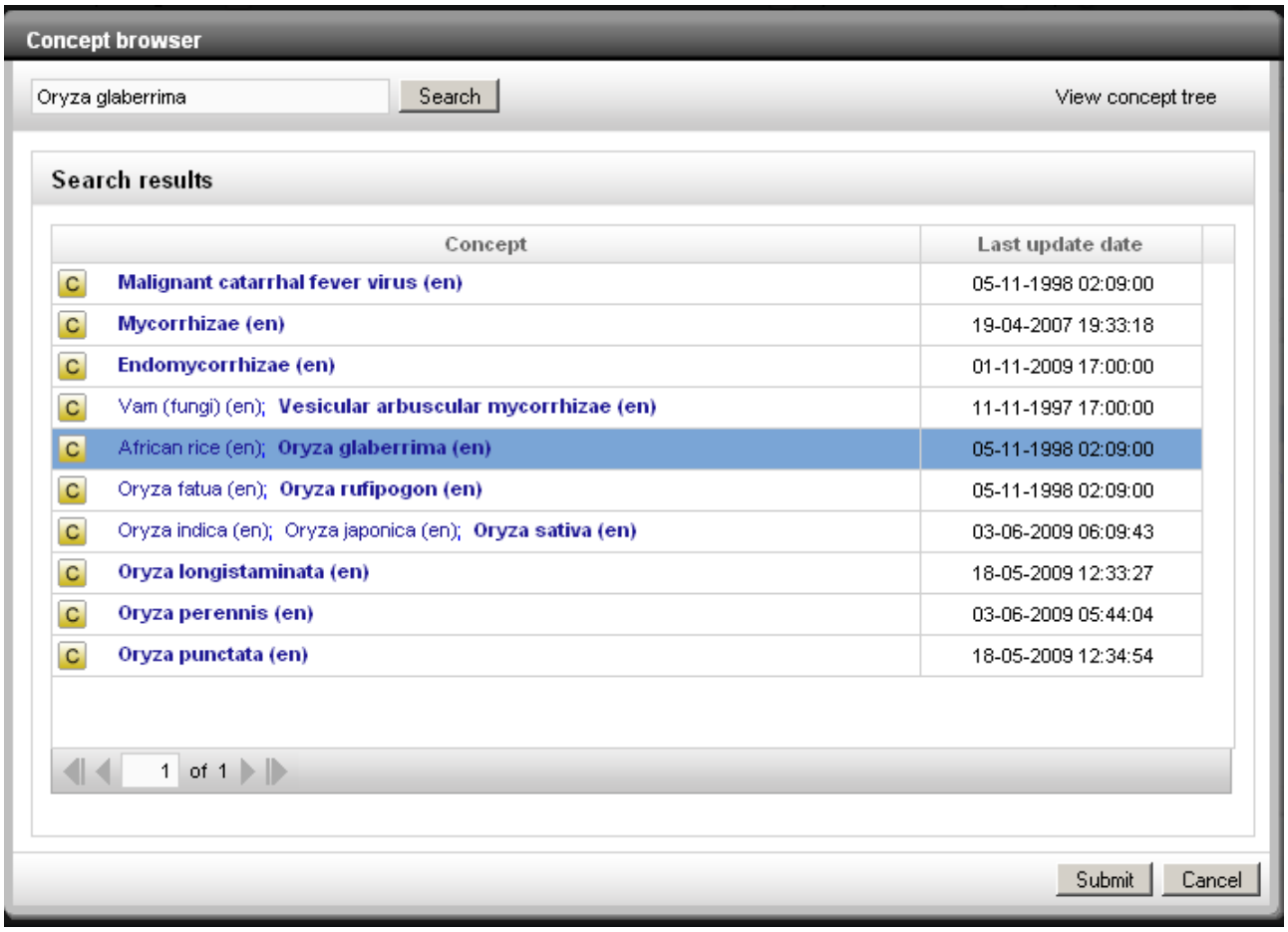


Figure 66. Concept browser. Search related concept

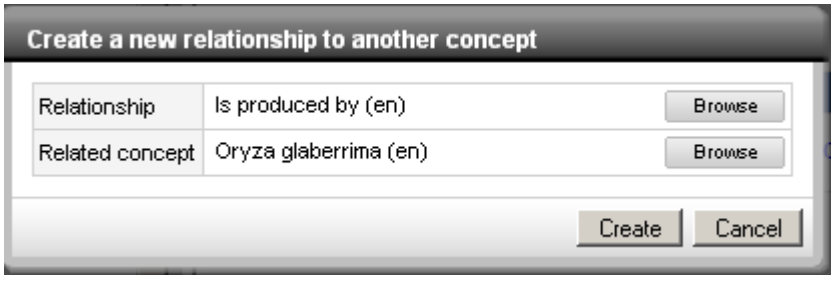


Figure 67. Create new relation between concepts: Information added

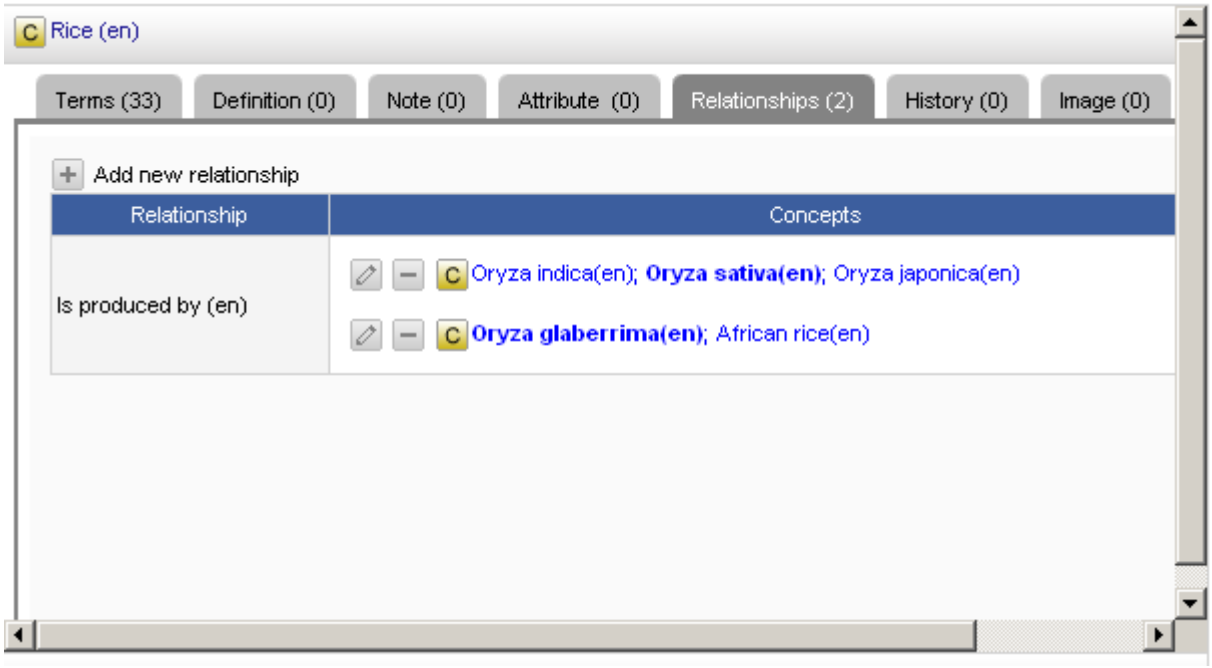


Figure 68. Create new relation between concepts: Completed

9.2 Operations on terms

Terms associated to concepts are displayed in the concept/term area of the **Concept** module (Figure 49).

9.2.1 Add a new term

1. To add a new term click on **[+] Add new term** (Figure 69) .
2. In the window that opens add the term, select the language from the drop down list, and decide if the new term is a **Preferred term** or not (Figure 70).
3. Click **Submit** or **Cancel**.

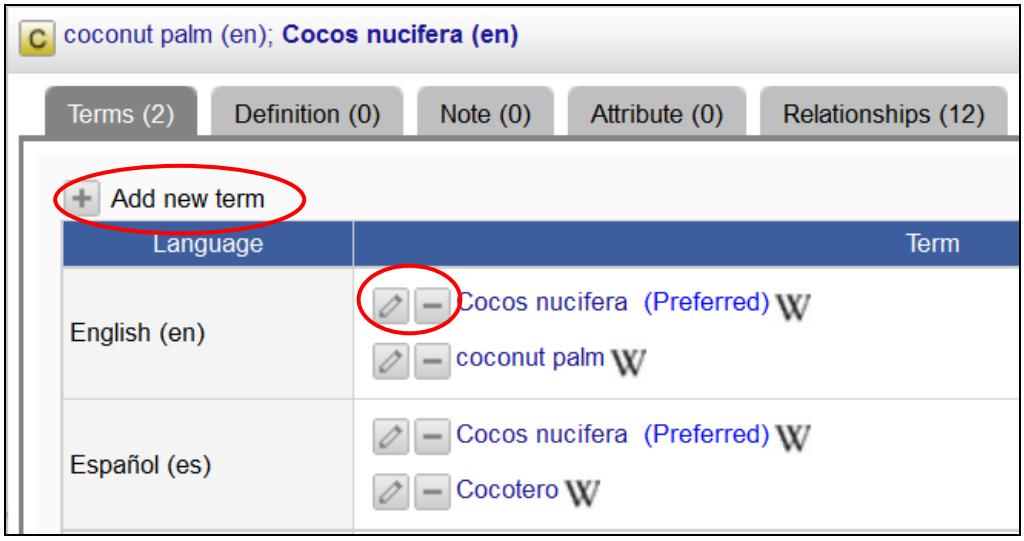


Figure 69. Add / Edit / Delete term

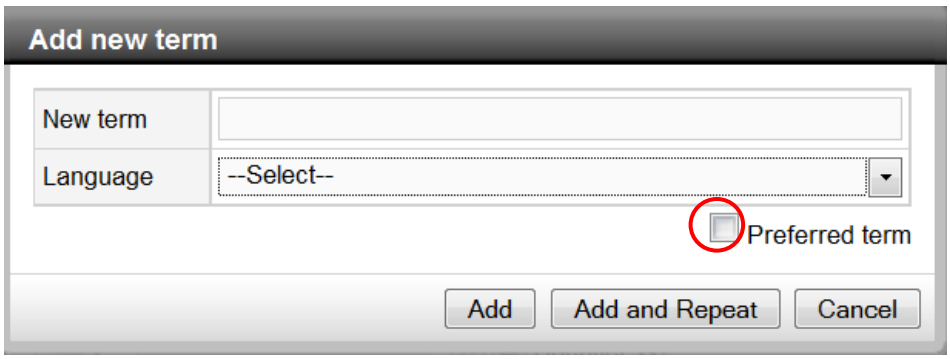


Figure 70. Add new term

9.2.2 Edit or delete a term

To **edit** a term:

1. Click on the edit icon next to the term (Figure 69):
2. In the window (Figure 71) that opens revise the term and click **Submit** (or **Cancel**).

Figure 71. Edit term

To **delete** a term:

1. Click on the **[-]** icon next to the term.
2. A window opens showing a warning message (Figure 72).
3. Click on **Delete** if you are sure to delete the term, or click **Cancel**.

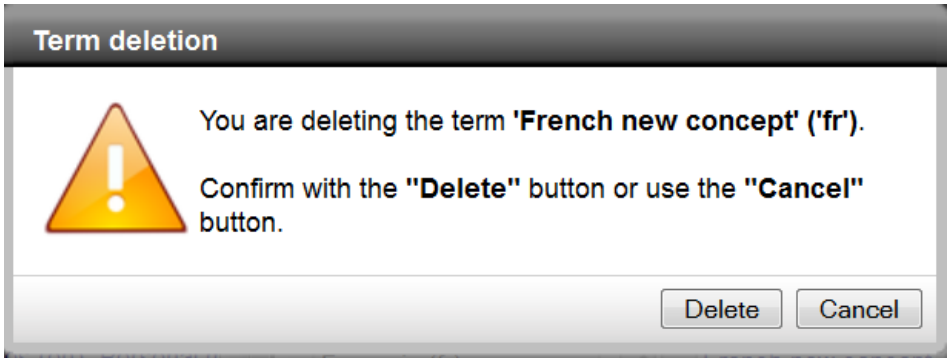


Figure 72. Delete term

9.2.3 Information about a term

When clicking on a term, a new window opens presenting three tabs containing the information associated to it:

- **History**

  Information shown in this tab (Figure 73) is automatically collected by VB. For each term, you can see the following pieces of information:

- **Creation date**
- **Last update**
- **Status**

Moreover, a table shows the sequence of changes applied to the term.

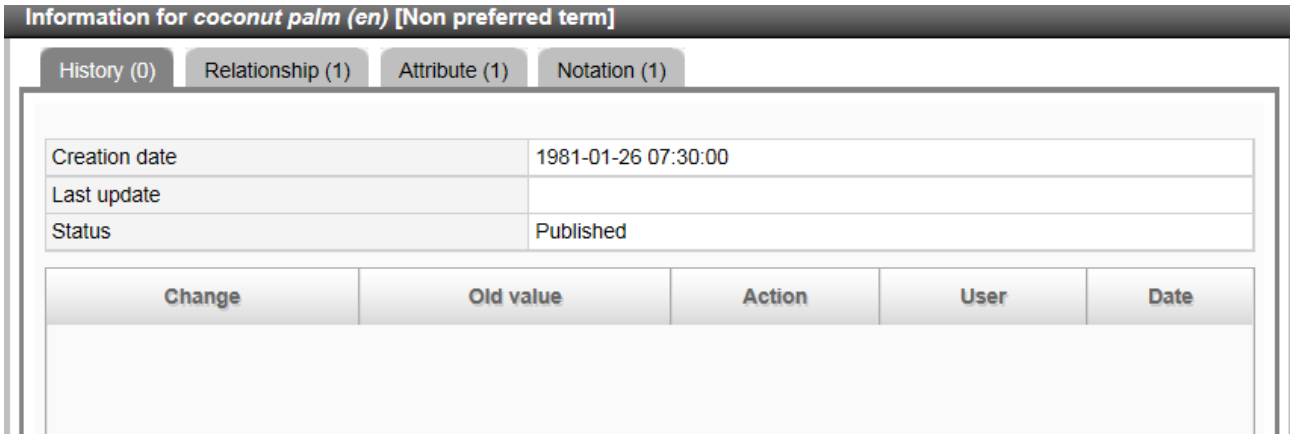


Figure 73. Information about a Term: Tab History

- **Relationship**

In this tab (Figure 74) you can visualize the term-to-term relations for the selected term.

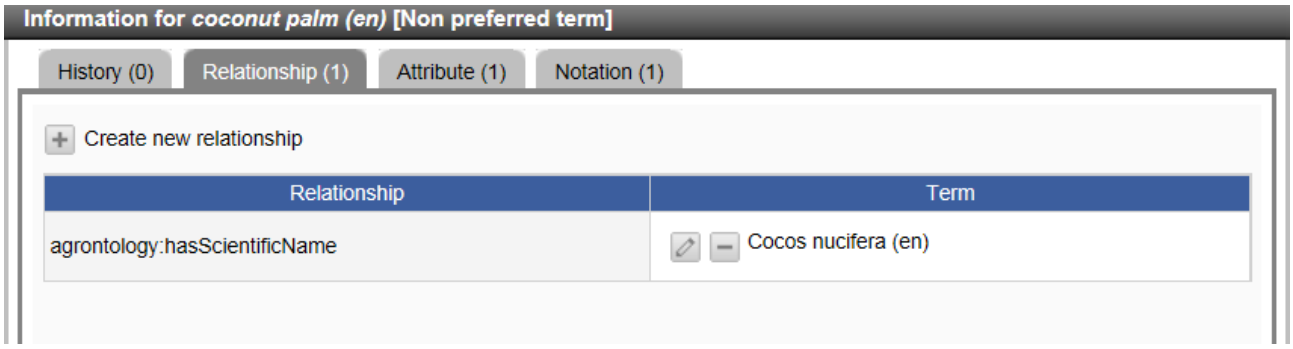


Figure 74. Information about a term: Tab Relationship

- **Attributes**

In this tab you may see the attributes assigned to the selected term. In Figure 75, attributes for a term in AGROVOC are shown.

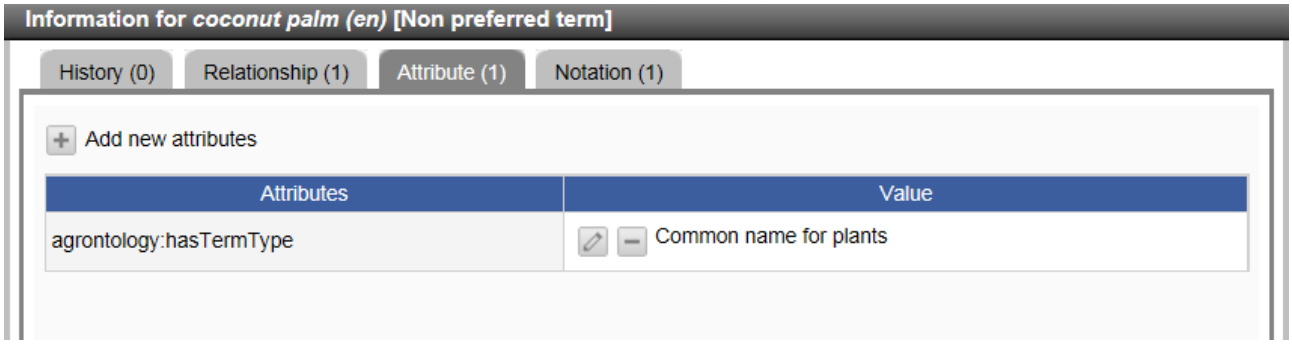


Figure 75. Information about a term: Tab Attribute

- **Notation**

  In this tab one may see the AGROVOC term code given to the selected term. In Figure 76, notation for a term in AGROVOC are shown.

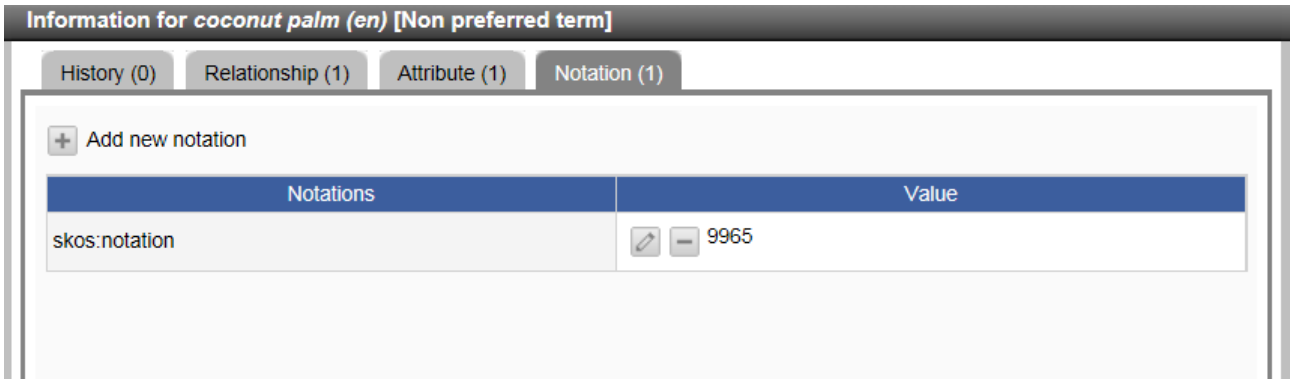


Figure 76. Information about a Term: Tab Attribute

9.2.4 Edit information about a term

1. Click on the term, a window opens with the three tabs shown in Figure 69.
2. Click on the tab **Relationship** or **Attributes**, to add, edit or delete information.

10. Relationships module

The **Relationships** module is available to Publishers and Administrators.
It is used to add relations. These relations are available in the **Concepts** module to create concept to concept and term to term relationships.

Click on the **Relationships** dropdown box to select the type of properties you are interested in (Figure 77).

Note: Imported relations are not editable, meaning that functionalities as **Add/Edit/Delete** a relationship label and **Edit the information attached to a relation** are not available for these relations.
Note: All examples are taken from the AGROVOC concept scheme.

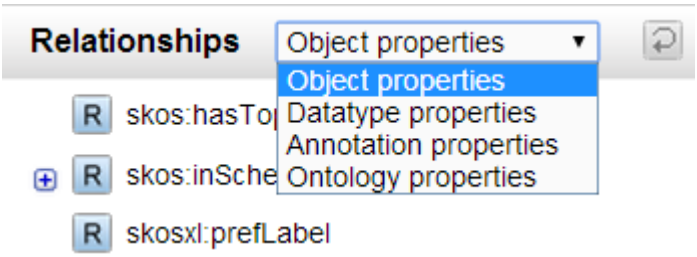


Figure 77. Relationships module: Select the required type of property

- **Object properties**

  Object properties relate objects to other objects. For object properties, one may define domain and range. Admissible entities in the range of an object property are resource represented with an URI (e.g. an skos:Concept)[10].
  For example in Figure 78 the object properties used for AGROVOC are listed.

[10] Steven J. Miller, Introduction to Ontology Concepts and Terminology. 2013. In International Conference on Dublin Core and Metadata Applications (DC-2013), Lisbon, Portugal, 2-6 September, 2013. [Tutorial]
OWL 2 Web Ontology Language (Second Edition): W3C Recommendation 11 December 2012

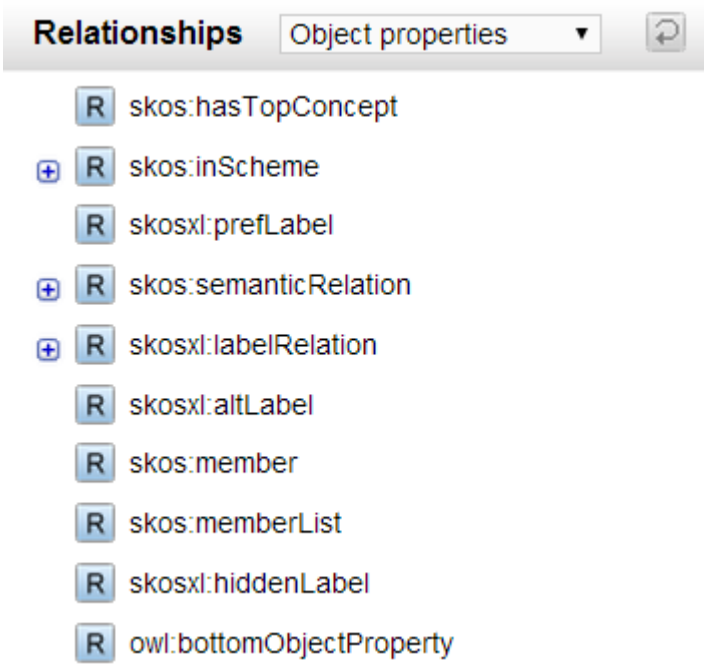


Figure 78. Example of object properties for AGROVOC

- **Datatype properties**

Data type properties relate objects to data type values, so that the value of the corresponding RDF triple is a literal value (e.g., a string)[11].

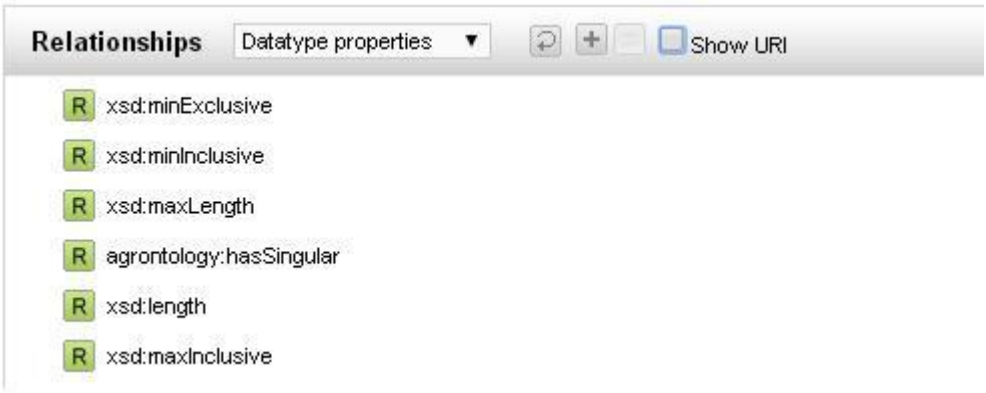


Figure 79. Example of Datatype properties for AGROVOC

- **Annotation properties**

[11] Steven J. Miller, Introduction to Ontology Concepts and Terminology

Annotation properties may be used to annotate any entity (e.g., owl:versionInfo, rdfs:label, rdfs:comment). No range is defined for these properties.

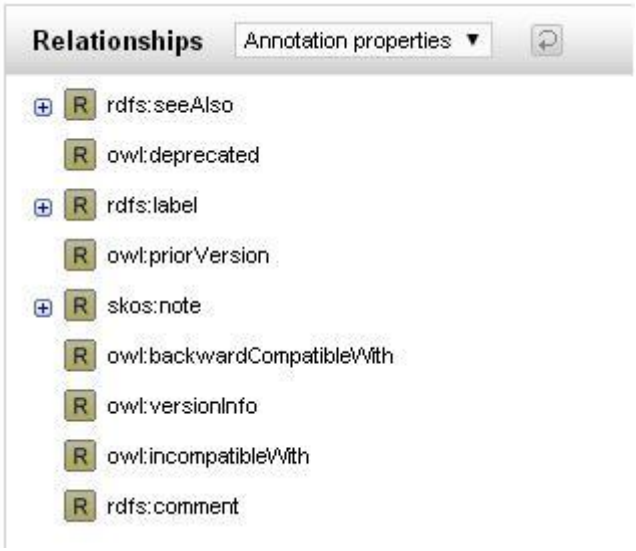


Figure 80. Example of Annotation properties for AGROVOC

- **Ontology properties**

  Ontology properties relate two ontologies (their domain and range must be an owl:Ontology).

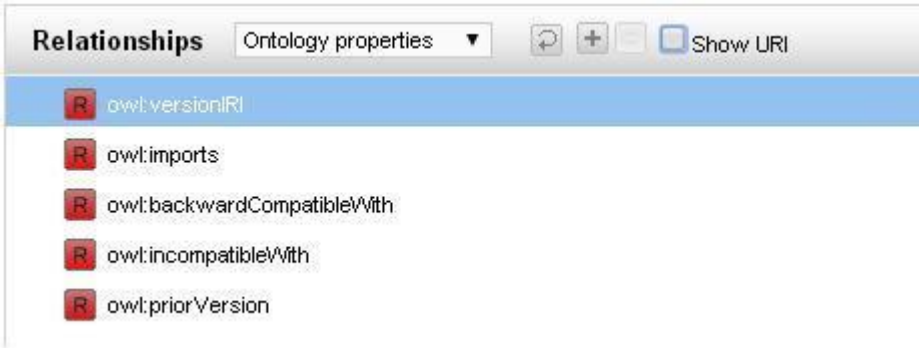


Figure 81. Example of Ontology properties for AGROVOC

10.1 User interface

The **Relationships** module displays the relations of the type selected in the dropdown box (i.e., object, datatype, annotation, ontology properties). If present, the hierarchy of relations is shown.

When clicking on a relation in the hierarchy, a right panel opens (same behavior as module Concepts), see Figure 82. The hierarchy/list is shown on the left side, while the information relevant to the selected relation is shown on the right side.

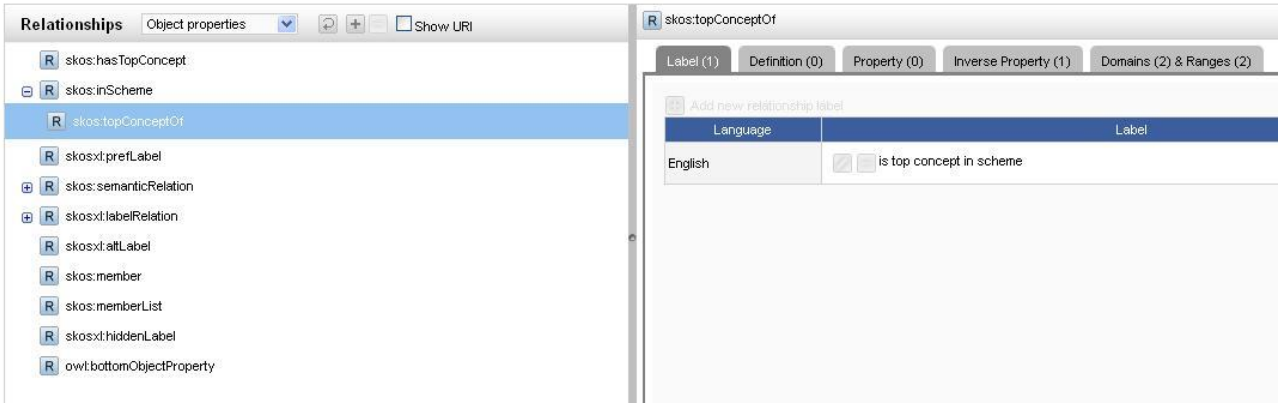


Figure 82. Relationships user interface

10.1.1 Relation hierarchy/list

Starting from the left, there are a number of buttons with the following functionalities:

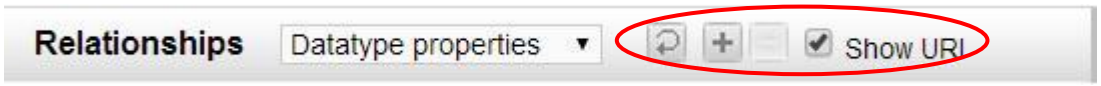


Figure 83. Relationships buttons

- **Reload relations**

  Refreshes the screen and reloads the selected relations or the entire hierarchy/list if no relation is selected.

- **Add new relationship**

  To add a new relation to the hierarchy/list.

Next to these buttons there is the check box **Show URI** to show the URI of the selected relation.

10.1.2 Relation area

The relation area is organized in tabs (Figure 84). Each tab provides access to a different piece of information about the selected relation.

For example Figure 84 shows the **Label** tab for the relation ***has narrower***.

Figure 84. Relationships area: Tabs

The following other tabs are available:

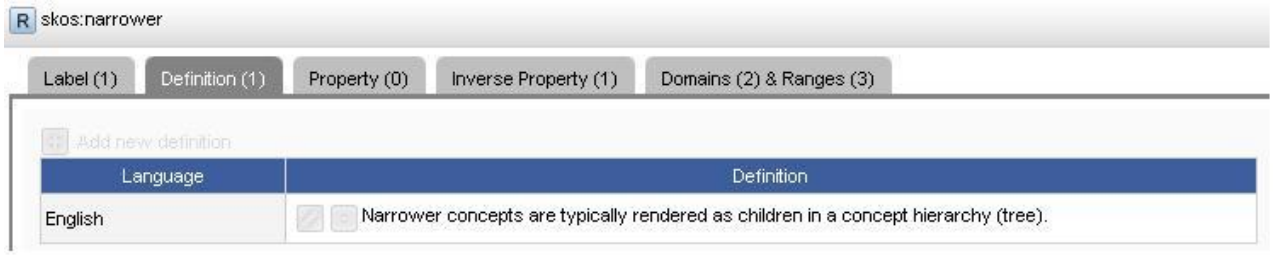


Figure 85. Relationships area: Definition tab

Figure 86. Relationship area: Property tab

Figure 87. Relationship area: Inverse property

Figure 88. Relationships area: Domains & ranges tab

Note: Functionalities as **Add/Edit/Delete** a relationship label and **Edit the information attached to a relation**, are not available for imported relations.

10.2 Operations on relations

10.2.1 Add a new relation

This action may be performed by Publishers and Administrators. To add a new relation, take the following steps:

1. Choose where in the hierarchy to add the new relation.

2. Click on the **[+]** icon in the bar above the relation hierarchy (Figure 83) a window opens with the title **Create new relationship**.

Figure 89. Create new relation

In the window, add the following pieces of information:

a) Label

b) Select **Language** from the drop down list

c) Click on the **Submit** button.

10.2.2 Delete a relation

This action may be performed by Publishers and Administrators.

Note: This functionality is not available for imported relations.

1. Select the relation.
2. Click on the **[-]** icon in the bar above the relation hierarchy.
3. A warning message is visualized.

Figure 90. Delete relation

4. Click **Delete** or **Cancel**.

11. Schemes module

The **Schemes** module is only accessible to Administrators.

The module lists (Figure 91) the SKOS concept schemes managed by the VB and offers the possibility to add new schemes.

Figure 91. Schemes module: Scheme management

Note: Only one scheme at a time may be displayed in the **Concepts** module: Check in the **Schemes** module the box of the scheme you want to work with/search in (Figure 92).

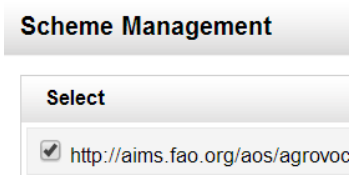


Figure 92. Schemes Module: checked scheme

This module contains three buttons with the following functionalities (Figure 93):

- Reload schemes

  To refresh the screen.

- Add a new concept scheme

- Delete a concept scheme

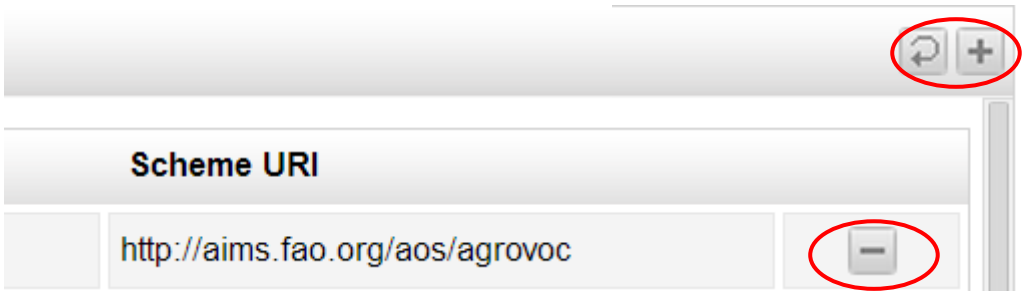


Figure 93. Schemes module: Functionalities

11.1 Add a new concept scheme

1. To add a new concept scheme click on **[+]** in the top right corner of the screen (Figure 93).
2. Add the **Scheme URI**, the **Scheme Label** and select the **Scheme language** from the dropdown box (Figure 94).

   Note: Labels may be added only in the languages for which you have editing rights.
3. Click **Submit** or **Cancel.**

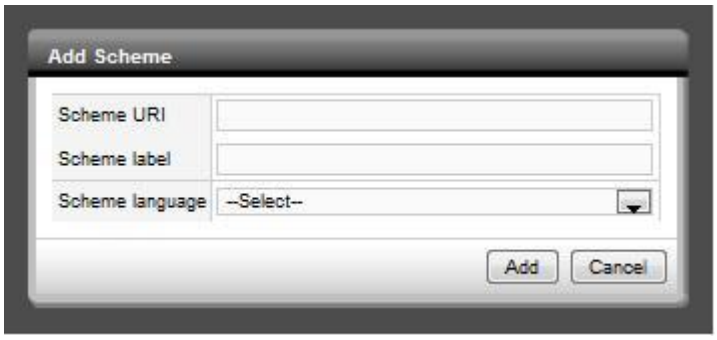
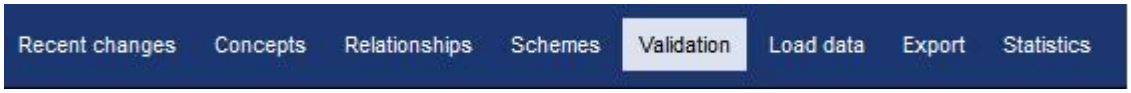


Figure 94. Add scheme

Once you created the new scheme it is added to the list of available schemes.

12. Validation module

The **Validation** module is available to Validators, Publishers and Administrators only. The module visualizes all the recent changes that have taken place in VB and need to be validated.



When entering the **Validation** module (Figure 95), you will see, in ascending chronological order, the list of all actions to be validated.

Figure 95. Validation module

The validation table contains the following information/options in eleven columns:

1. **Concept / Term / Relationship / Users**:

Shows the concept when the change belonged to the concept, e.g. the creation of new concept, a new term, a new concept to concept relationship.
Shows the term when you add any term-term relationship.

2. **Change**: shows the current value of the element.
3. **Old value**: shows the previous value of the element.
4. **Action**: indicates the action applied to the element.
5. **Owner**: shows the owner of the element.
6. **Modifier**: indicates by whom the change was performed.
7. **Creation date**: shows when the element was created.
8. **Modified date**: indicates when the change was applied.
9. **Status**: shows the current status of the element.
10. **Validate**: option to accept or reject the modification.
11. **Note**: Here you may enter a comment regarding the validation. The comment is automatically sent to the modifier.

12.1 Validation filter

You may filter the list of validation actions presented in the **Validation** table. There is an **Apply filter** option at the top right of the **Validation** module (Figure 95)**.** The filter functionality is very useful when there is a long list of issues to be validated.

Clicking on **Apply filter** a window opens showing the following specific filter options to facilitate the selection for validation (Figure 96):

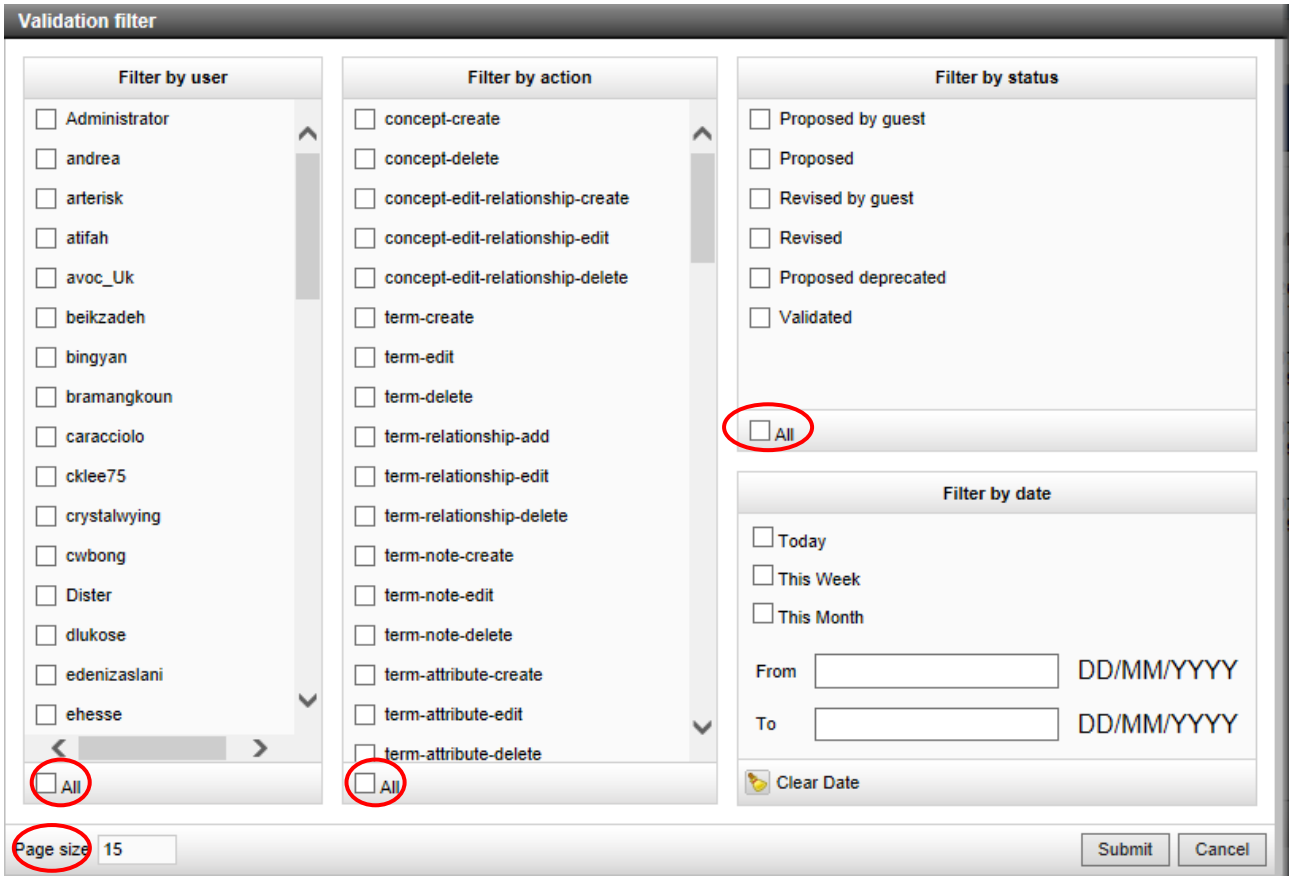


Figure 96. Validation filter

1. **Filter by user**: By default all registered users are unselected. To validate changes by specific users, simply check the check box in front of their name. To select all users, check the **All** box (at the bottom of the list), to unselect all users, click the **All** box again.

   Note: These settings will be saved also for your next sessions.

2. **Filter by action**: By default all possible actions are unselected. To select actions, simply check the appropriate check boxes.

   Note: These settings will be saved also for your next sessions.

3. **Filter by status**: By default all term statuses are unselected. To modify the selection, simply check the appropriate check boxes.

   Note: These settings will be saved also for your next sessions.

4. **Filter by date**: You may narrow the time span down by using the options in the **Filter by date** box.

5. **Page size** (Figure 96, bottom left corner): It allows to enter the number of entries you would like to see displayed per page.

To apply the filter, click on **Submit**.

12.2 Validate a change

The following steps are to be followed in the validation process:

1. To validate the changes one by one navigate to the **Validate** column (10th column of table) and select from the dropdown box either **Accept** or **Reject**. Alternatively, check at the bottom of the **Validation** module the checkbox **Accept all** or **Reject all**.

   In the **Note** field (last column of table) the Validator may enter a comment, for example explaining why a change was rejected.

2. After accepting or rejecting the issues click on **Validate** in the bottom right corner.

3. After validation by a Validator, the element becomes red if it was a revision and green if it was newly created. The status of the element is changed to Validated.
   After validation by a Publisher, the element becomes blue and its status Published.

4. The Modifier will be informed by email that his/her changes were accepted or rejected by the Validator.

Note: After each validation you should refresh the validation list by clicking on the refresh button at the top left of the **Validation** module (Figure 95 and Figure 97), in order for the system to load the new statuses of the elements.

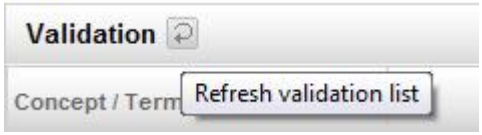


Figure 97. Refresh validation list

13. Load data module

The **Load data** module is only accessible to Administrators. It is used to bulk load RDF data to the current project. This data will be merged with the data currently available in VB. This functionality is intended for low-level operations carried out by Administrators.

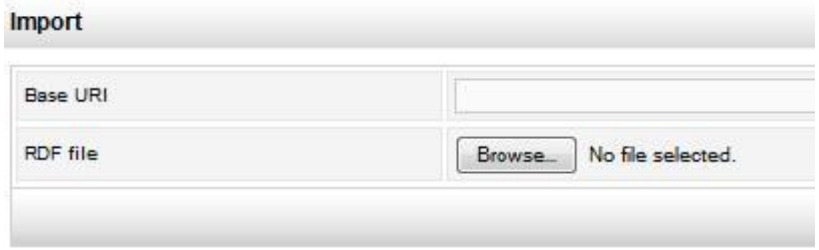


Figure 98. Load data module

Provide the base URI of your data in the **Base URI** field and upload the **RDF file** by using the **Browse** button.

Upon clicking the **Import** button in the bottom right corner, your data will be uploaded in VB.

Note: The data you loaded will be visible only if it is compliant with that in the project. For example, the base uri of the loaded data should be the same as the one of the project into which it is being loaded.

14. Export module

The **Export** module is available to all users. It is used to export either an entire concept scheme or a single concept from a concept scheme (with or without its children). The format of export is SKOS-XL format.

Upon entering the **Export** module, you may specify your export using the following three fields (Figure 99):

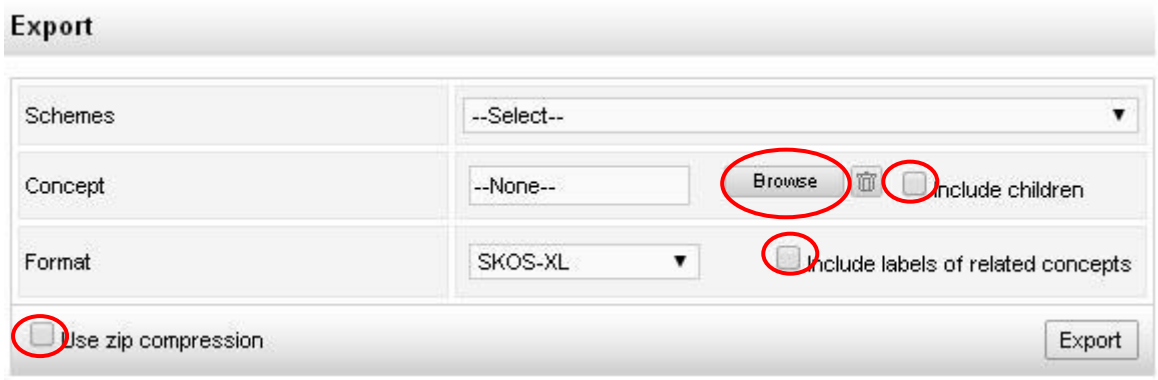


Figure 99. Export module

- **Schemes**: Click on the dropdown box and select the scheme to export. If you want to export only one or few concepts from that scheme specify that in the **Concept** field below.
- **Concept**: To select the concept to export click on **Browse**. A window opens containing the top concepts of the scheme (Figure 100) you selected in the **Schemes** field. Here you have the possibility to include or exclude (for faster export) the children of the selected concept by checking the **children** checkbox (Figure 99).

- **Format**: By default SKOS-XL[12]. You can decide to include or exclude (for faster export) the labels of related concepts.

  Note: In the bottom left corner you may want to check the **Use zip compression** to save time and space.

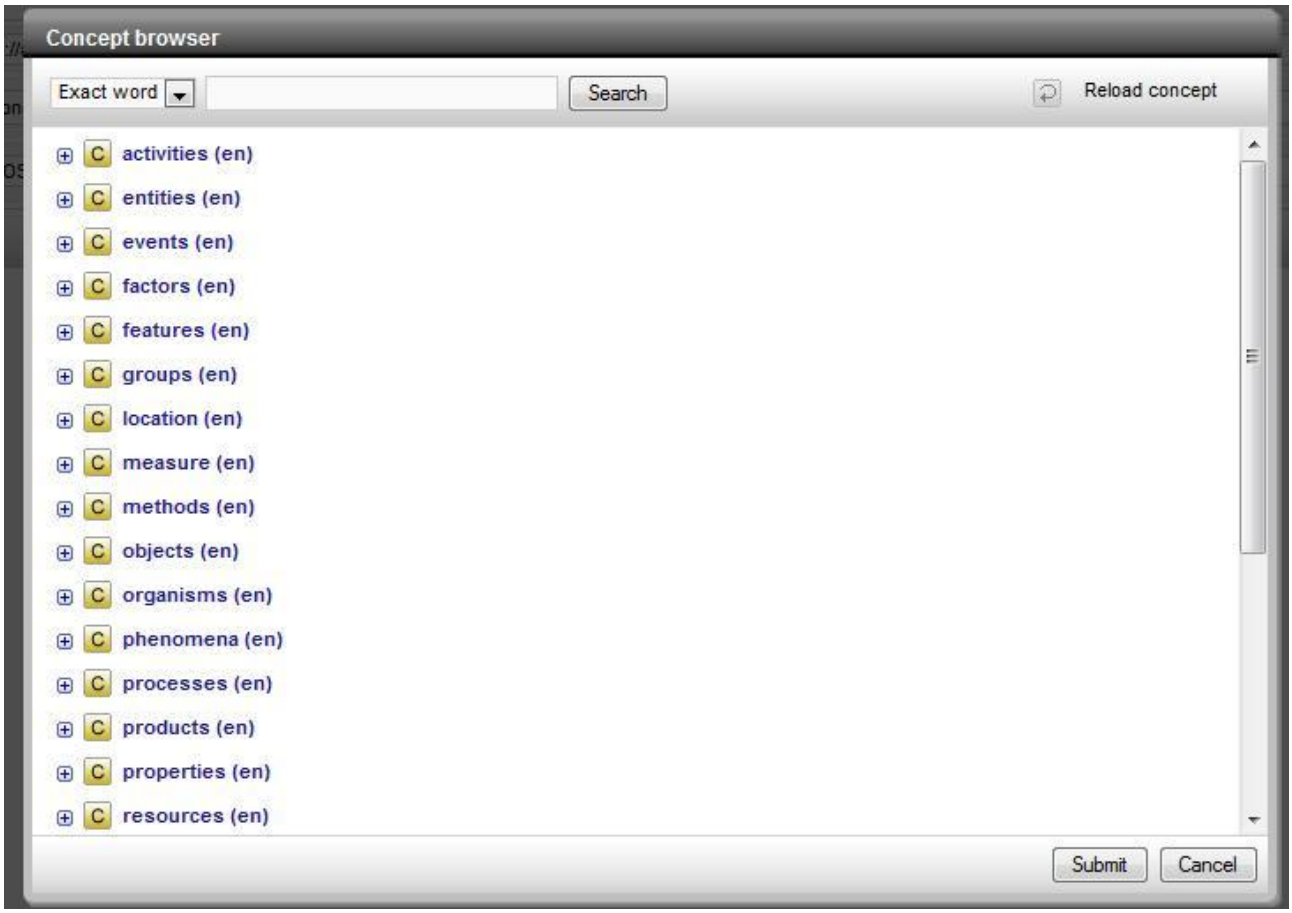


Figure 100. Export module: Top concepts of selected scheme

To start the export, click **Export** in the bottom right corner (Figure 99).

[12] Limited to SKOS-XL. Will be extended to cover traditional SKOS core syntax for labels in future versions.

15. Statistics

The **Statistics** module is accessible to Ontology Editors, Validators, Publishers and Administrators. It gives you the ability to search for specific facts and numbers of a scheme and its editorial status. Click on the **Statistics** dropdown box to select the group of statistical data you are interested in (Figure 101).

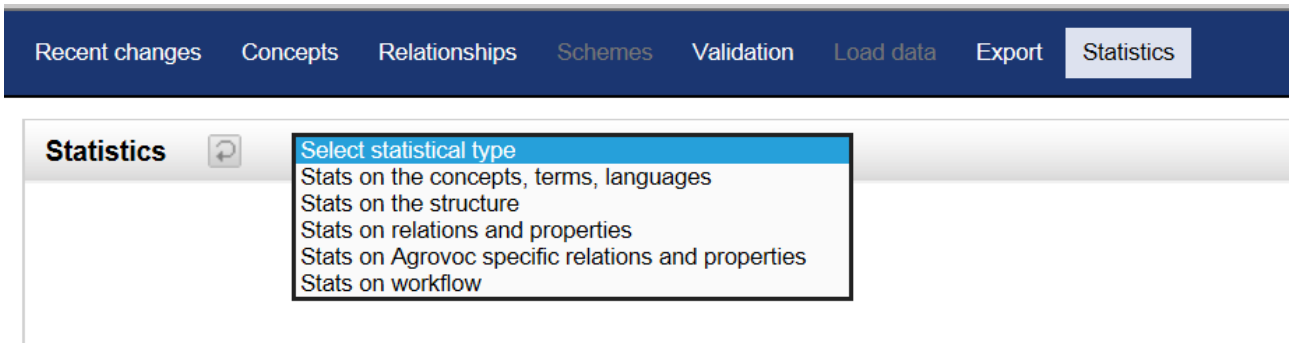


Figure 101. Statistics module: Select the required group

- Select the group **Stats on concepts, terms, languages** (Figure 102) to be informed about:
  - total number of concepts.
  - total number of terms (preferred and non preferred).
  - total number of top concepts.
  - total number of languages in which the scheme is available,
  - total number of available terms by language,

  for the scheme you are looking at.

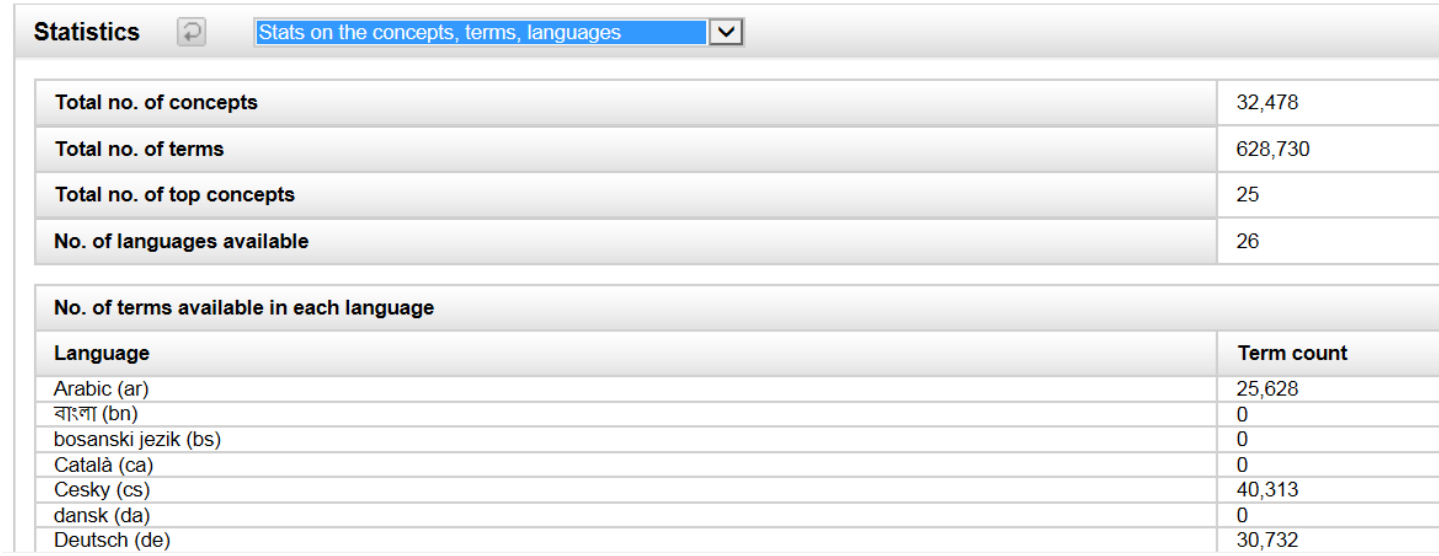


Figure 102. Search option 'Stats on concepts, terms, languages'

- Select the group **Stats on the structure** to view the following information about the hierarchical structure (Figure 103):
    - number of concepts under each top concept (only up to first level),
    - number of concepts under each top concept (counting all levels below each top concept),
    - depth of branches (number of levels underneath each top concept),
    - average depth of hierarchy,
    - minimum depth of hierarchy,
    - maximum depth of hierarchy,
    - number of concepts with multiple parentage,
    - number of concepts at bottom level (leaves of the graph),

  for the scheme you are looking at.

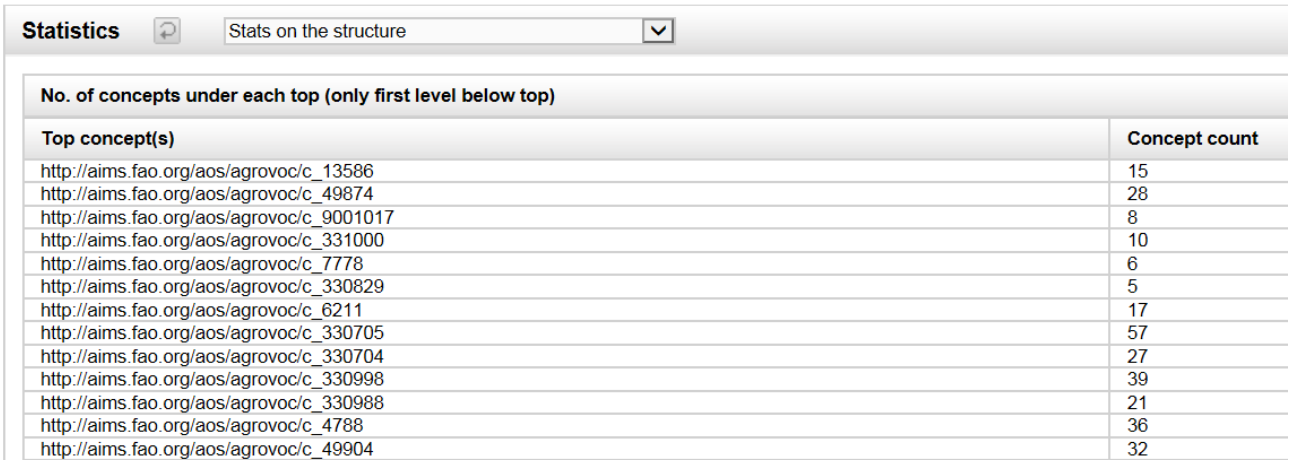


Figure 103. Search option 'Stats on the structure'

- Select the group **Stats on relations and properties** (Figure 104) to view the following information:
    - number of concept to concept relations,
    - number of term to term relations,
    - number of attributes of concepts,
    - number of attributes of terms,

  for the scheme you are looking at.

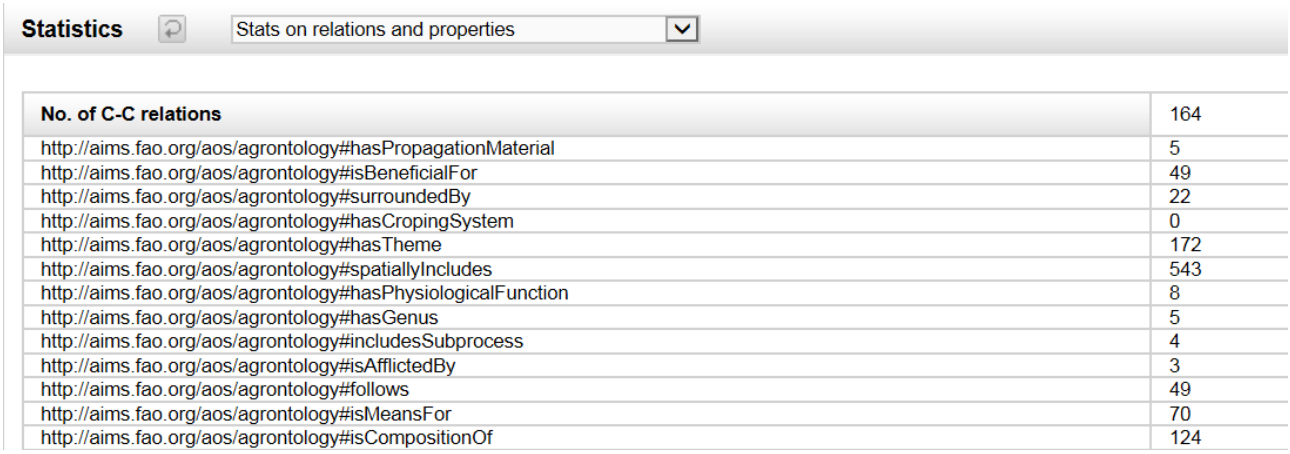
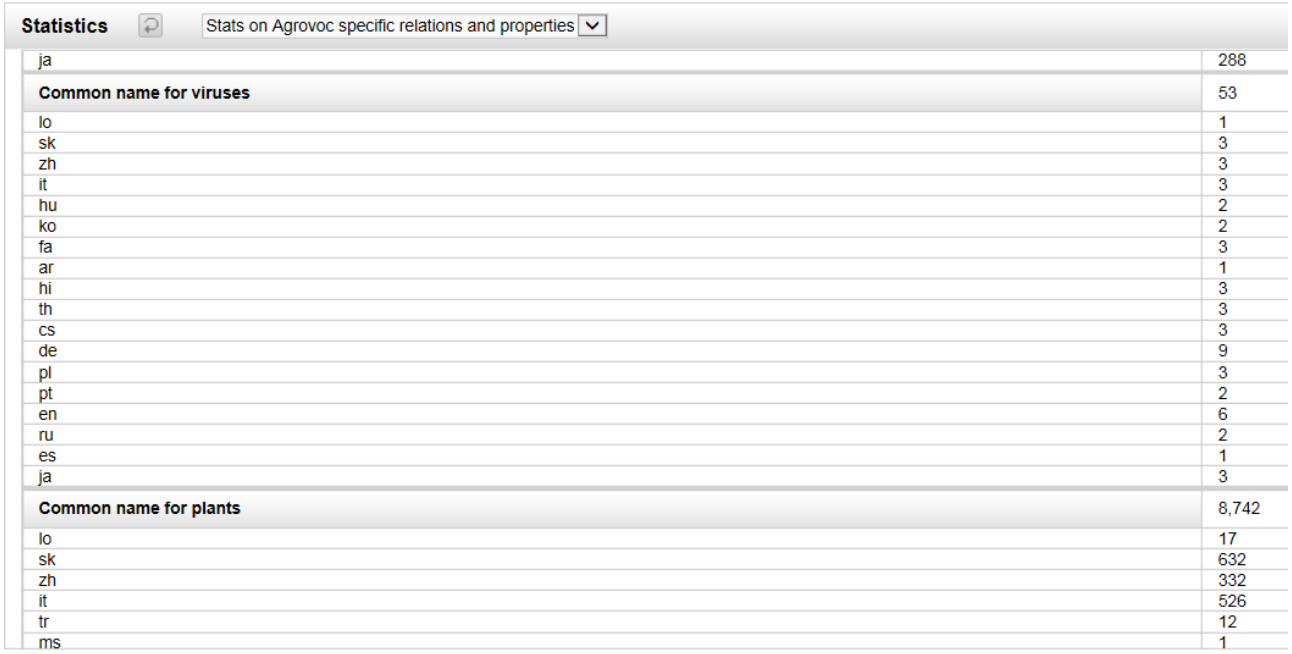


Figure 104. Search option 'Stats on relations and properties'

- Select the group **Stats on Agrovoc specific relations and properties** (Figure 105) to view the following information:

- number of subvocabularies of concepts (chemicals, Geographical Country level, Fishery related terms etc.),
- number of subvocabularies of terms (taxonomic terms for bacteria, plants, animals, common name for plants, viruses, animals etc.)

Note: This group is specific to the AGROVOC concept scheme.



ja	288
Common name for viruses	53
lo	1
sk	3
zh	3
it	3
hu	2
ko	2
fa	3
ar	1
hi	3
th	3
cs	3
de	9
pl	3
pt	2
en	6
ru	2
es	1
ja	3
Common name for plants	8,742
lo	17
sk	632
zh	332
it	526
tr	12
ms	1

Figure 105. option 'Stats on Agrovoc specific relations and properties'

- Select the group **Stats on workflow** (Figure 106) to view the following information:
  - total number of users,
  - last user connected,
  - number of users by language,
  - last modification by each user,
  - number of exports,

  for the scheme you are working on.

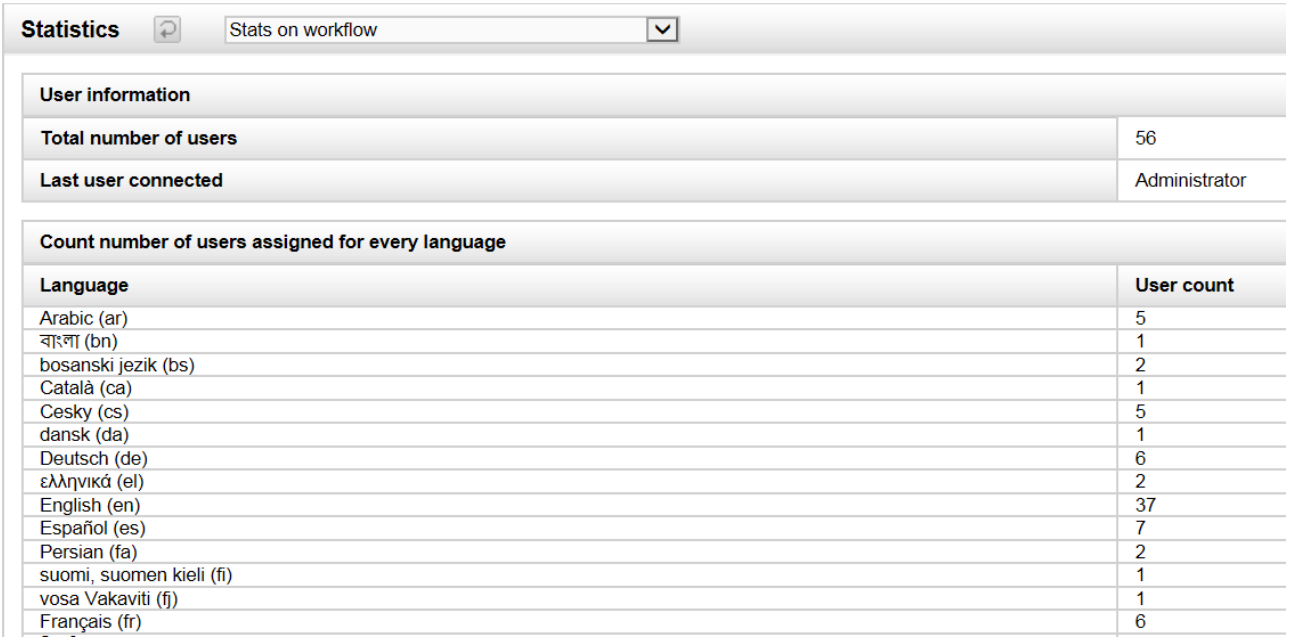


Figure 106. Option on 'Stats on workflow'

16. SPARQL module

The **SPARQL** query module contains:

- A menu box for selecting the SPARQL operation (QUERY or UPDATE) and language version (SPARQL 1.0 or 1.1[13]).
- A text area where to write the SPARQL query.
- An area showing the results in a table.

[13] Since VB can be used with different RDF middlewares, restricting the language version to SPARQL 1.0 can be useful for those connected middlewares which do not support SPARQL 1.1.

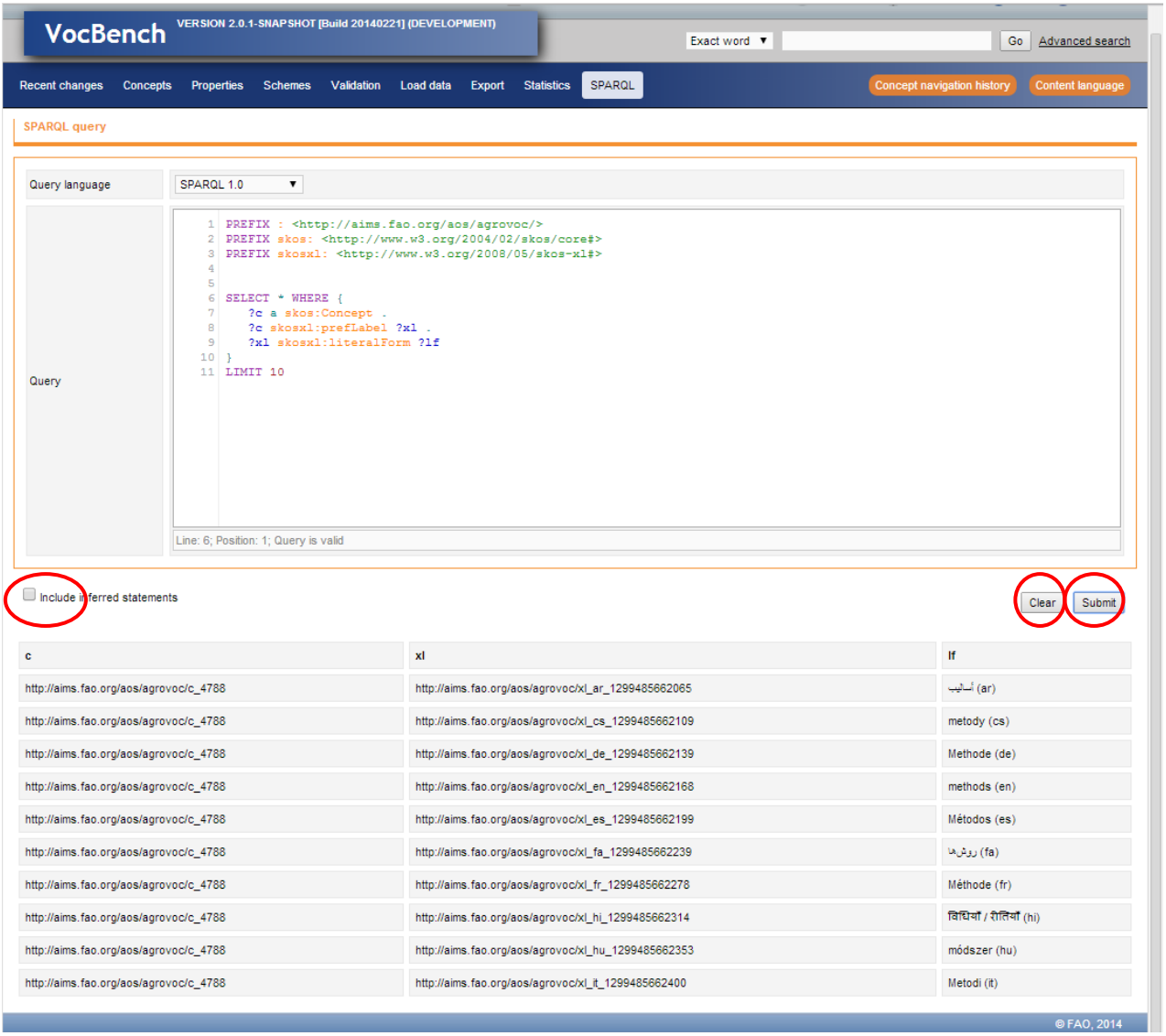


Figure 107. SPARQL querying VB

The checkbox at the bottom left of the query area **Include inferred statements** (Figure 107) sets a parameter in the query so that it includes or ignores triples inferred by reasoner from the search space.

The two buttons at the bottom right **Clear** and **Submit** (Figure 107) allow respectively for cleaning the query area and for submitting the query.

The UI engine behind this interface is based on Flint[14], an open source web editor for SPARQL offering syntax completion and highlighting. In VB, Flint has been customized to interact more

[14] http://openuplabs.tso.co.uk/demos/sparqleditor

deeply with the underlying data. For instance, by hitting CTRL+SPACEBAR at the top of a query, a list of suggestions will come up through a contextual menu .

If you select PREFIX, normally in Flint you would have to add manually a prefix to the query. In VB instead, by hitting CTRL+SPACEBAR again, the list of actual prefixes declared in the current project will be prompted (or a generic “all prefixes” option will immediately copy in the query a multiple PREFIX declaration containing all the prefixes declared in the project).