Population Biology (PopBio)

Simple Search and Browse

Answer key

Note, the URLs given in this tutorial are provided for confirmation and reassurance only. It should be possible to follow the workshop without having to type each URL into your browser.

Data in the PopBio resource is organized as follows:

There are three main "items" in the database:

1. Projects
2. Samples
3. Assays

Projects are like bags, containing samples and assays. Projects can be thought of as studies, experiments or publications. Sometimes a sample or assay might be re-used in different projects.

Let's take a look at a project page in the PopBio browser.

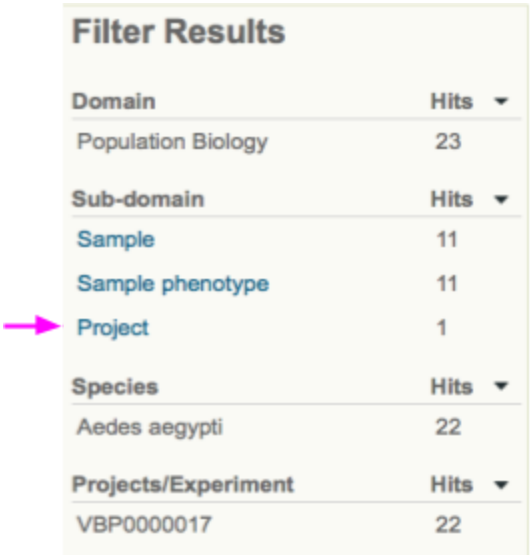
The project is called "*Susceptibility of Aedes aegypti larvae to the insecticide temephos in the Federal District, Brazil*" and its VectorBase stable ID is **VBP0000017**. You can search with either the title, words from the title, or the ID in the main top-right VectorBase search box …

… and eventually you will come to this page:

https://www.vectorbase.org/popbio/project/?id=VBP0000017

In the *Results page*, you can click either on the *project title* …

… or click on *Project* sub-domain. In this case it has a single hit because the project ID was used as the search keyword. Your number of hits in each category depends on the keyword(s) you use.



The basic information is listed. Some words and phrases are in green text. Click on one, perhaps "compound treatment design" to see what happens[1].

These are ontology terms. From the popup, you can browse parent and child terms and search VectorBase for data annotated with the term, its parent or its children.

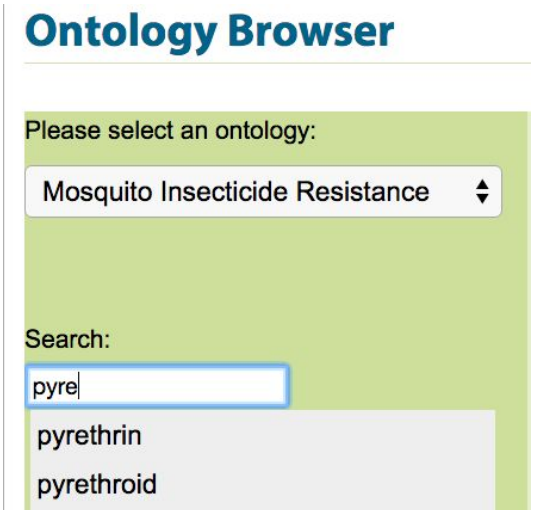
Let's take a look at a term in the ontology browser.

PopBio uses a lot of ontologies - experimental factor ontology (EFO, as you saw above), Units Ontology (UO) to name just two. VectorBase also maintains some specialist ontologies for disease transmission and insecticide resistance. These plus a few third party ontologies are available to browse in the Ontology Browser in the Tools menu.

https://www.vectorbase.org/ontology-browser

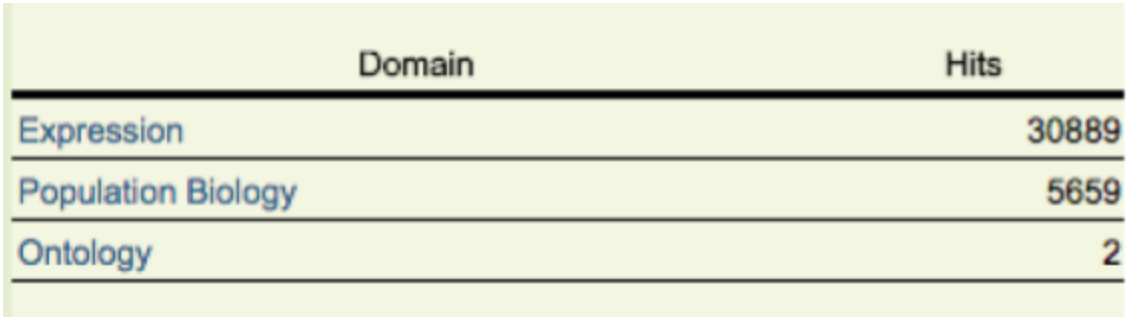
[1] For ontologies and acronyms please visit The OBO Foundry site http://www.obofoundry.org/ and the NCBO's BioPortal site http://bioportal.bioontology.org/ontologies

Find the term "pyrethroid" in the mosquito insecticide resistance ontology (MIRO)



The ontology browser also tells you how many search results there are within VectorBase for the current term.

1. How many Population Biology "hits" are there for pyrethroid?



Domain	Hits
Expression	30889
Population Biology	5659
Ontology	2

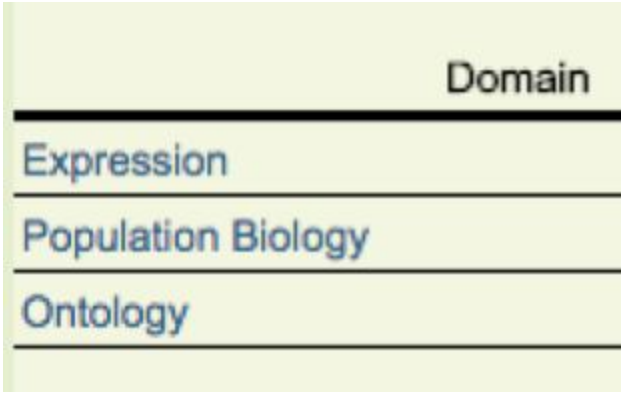
2. Expand the hierarchy to show the children of pyrethroid.

Click each of the children, one by one from the top until you see one with data in "Population Biology". What is the insecticide?

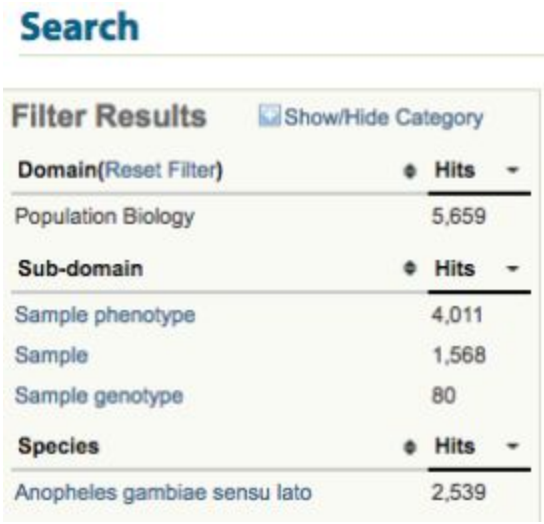
alpha-cypermethrin

Let's use Search to find an Assay:

3. **Right-click the "Population Biology" link** to open a new tab with those results.



On the search results page, **click the filter link "Anopheles gambiae sensu lato"** to examine the results for this species only.



If the top hit is "**mortality percentage:31.9, 12.5 microgram alpha-cypermethrin**", click on it. If not, use site search to find assay: **VBA0313843**

VBA0313843 is a **VectorBase Stable ID,** it will always allow you to find this assay, even if we make changes or corrections to the database.

On the assay page, again there are various tables of text information and green ontology term links.

4. Assays usually have one or more protocols to formalize what has been done, and one or more results. This is a phenotype assay and its results are phenotypes. Which of the following correctly paraphrases the phenotype?

	Answer
12.5% of mosquitoes in the sample die upon 30 minutes' exposure to 31.9µg alpha-cypermethrin in a WHO paper kit test	
31.9% of mosquitoes in the sample die upon 30 minutes' exposure to 12.5µg alpha-cypermethrin in a WHO paper kit test	
31.9% of mosquitoes in the sample die upon 30 minutes' exposure to 12.5µg alpha-cypermethrin in a bottle bioassay diagnostic test	X

5. Which sample and project does this assay belong to? Write the stable IDs down

Sample ID	VBS0058369
Project ID	VBP0000123

6. Click on the sample PMI538 / VBS0058369
Note the familiar layout of the sample page. Basic info is at the top, with tables and lists of associated items below.

You have now seen three types of VectorBase stable ID for PopBio data. Name the three types of IDs below:

	Answer
VBPnnnnnnn	Project
VBSnnnnnnn	Sample
VBAnnnnnnn	Assay

The field collection and assays are the main points of interest on the sample page.

Quickly take a look at the field collection page

https://www.vectorbase.org/popbio/assay/?id=VBA0176446

Note: field collections are stored inside PopBio as a subtype of assay. This is why the URL for field collections contains the word "assay" and field collections have VBA stable IDs.

Let's go back to the project we were looking at before, VBP0000017:

Hint: type the project ID in the search box.
https://www.vectorbase.org/popbio/project/?id=VBP0000017

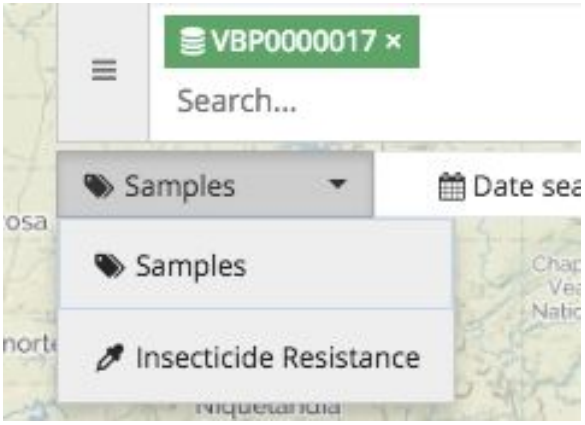
Scroll down to the "Map" section, click here. Here you can see a map showing where the collection sites are, in Brazil click on the 'marker'. Explore the menus and icons in this page.

7. What happens to the pie chart when you zoom in?

	Answer
They change color.	
They spin round.	
They break up into smaller pie charts.	X

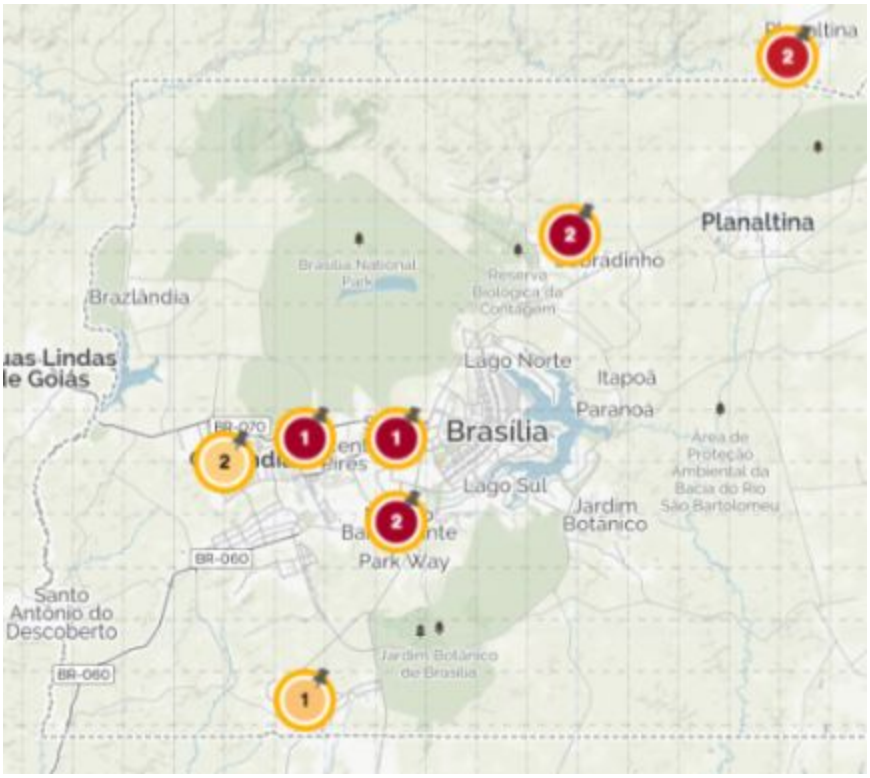
Let's briefly explore the map:

In the map switch to insecticide map type



Select a marker in the map and click on the lateral icons again

8. Explore the insecticide resistance statistics for the samples and investigate if tye are susceptible or resistant. What the outer ring and the internal circle color mean in each marker?



Use this information panel for clues:

Wrap up

Now you know what kind of data is available in PopBio and how it is stored and displayed as collections of projects, samples and assays.