



# USER MANUAL

Version 2.5

Computer and Communication Unit  
VISAVET HEALTH SURVEILLANCE CENTRE  
COMPLUTENSE UNIVERSITY OF MADRID



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## 1. Database outline

The VISAVET Health Surveillance Centre is responsible for the National Database of Animal Mycobacteriosis (**mycoDB**) under contract between the Ministry of the Environment and Rural and Marine Affairs (MARM) and the Complutense University of Madrid for technical and scientific support for the development and implementation of advanced techniques for diagnosis of bovine tuberculosis. This database contains animal mycobacterial isolates from animal origin referred to VISAVET Center from 1996 to present, once characterised by molecular typing.

The minimum sample data needed for epidemiological studies included in **mycoDB** are: date of isolation, species and geographic location (region, province and municipality). The database is regularly updated with the results obtained or referred to VISAVET.

The submission of samples to VISAVET is performed by the Regional and Provincial Laboratories and by the Central Animal Health Laboratory in Santa Fe (Granada), the Basque Institute for Agricultural Research and Development (Neiker), the Centre for Research in the Animal Health (CReSA) and the Research Institute of Hunting Resources (IREC). According to the "Manual of Procedure for the collection and shipment of samples for microbiological culture of tuberculosis" (VISAVET Health Surveillance Centre. UCM and Ministry of Environment and Rural and Marine Affairs. Manual of Procedure of National Disease Eradication Program. Ministry of Environment and Rural and Marine Affairs. Ed. 1. 2006.) samples that can be submitted to the Centre are: tissue samples, bacteriological culture media, DNA and spoligotype data.

**mycoDB** contains information for epidemiological studies on the variability of genotypes in Spain, the presence of characteristic genotypes of a specific region, or the importance of wildlife as reservoirs for domestic animals.

The database is complemented with a map viewer that shows the geographical distribution of mycobacterial isolates in Spain according to combined query criteria: year, animal species, genotype, etc.

## 2. Access to mycoDB

The database is hosted on a server at the VISAVET Health Surveillance Centre of the Complutense University of Madrid. Access is available through a link on the website of the Veterinary Health Alert Network of Spain (RASVE) of the Spanish Ministry for Environment and Rural and Marine Affairs. (<http://rasve.mapa.es/>) or web address <http://www.mycodb.es>



**mycoDB** has two versions:

**2.1. Full version:** The full version includes all records of animal mycobacteriosis from Spain. The query is limited to Veterinary Services and Laboratories participating in the Spanish Bovine Tuberculosis Eradication Program, and the access is restricted by login.

**2.2. Demo version:** The demo is a free access version, but is only for demonstration purposes and contains simulated data. Any resemblance to reality is purely coincidental. Follow the link on the application main page to access the demo version of mycoDB.



## 3. Technical Requirements

For correct display and operation mycoDB web application requires:

- Microsoft © Windows XP / Vista / 7.
- Updated Web Browser (Microsoft © Explorer 7.0 or higher, Mozilla © Firefox 3.0 or higher ...) and JavaScript enabled.
- Oracle © Java Software: Required for proper display of maps. You can get an updated version: <http://www.java.com/download/>
- Adobe © Reader: Required for proper display of documents in PDF format. You can find an updated version here: <http://get.adobe.com/reader/>

## 4. Nomenclature of genotype profiles

Currently, **mycoDB** shows the profiles of two techniques used for molecular characterization of mycobacterial isolates:

**4.1. DVR-spoligotyping:** The Direct Variable Repeat Spacer Oligonucleotide Typing technique or DVR-spoligotyping, results in a pattern called spoligotype profile represented by a binary code of 43 digits.

Ex: **11011111011111011011011111111111011111100000**

To call these profiles VISAVET Center uses two classifications:

- International number:
  - *M. bovis* y *M. caprae* isolates: SB prefix followed by a correlative four-digit number (*M. bovis* Spoligotype Database, [www.mbovis.org](http://www.mbovis.org)).
  - *M. tuberculosis* isolates: SIT prefix followed by a correlative number from one to four digits (SITVIT Database, <http://www.pasteur-guadeloupe.fr:8081/SITVITDemo/>).
- VISAVET number: Code distinguishes between three types of profiles: SPT (*M. tuberculosis* spoligotype), SPB (*M. bovis* spoligotype) y SPC (*M. caprae* spoligotype). It is designated by the three letters plus three correlative digits separated by a hyphen. Ej.: **SPT-001**

The **mycoDB** Spoligotype query (**SPOLIGOTYPE SEARCH**) has a section for the relationship of equivalence between the codes described, with the possibility of introducing the binary code to verify the existence of a spoligotype in **mycoDB**.

**Spoligotype´s numbers equivalence**

Please fill in spoligotype profile binary number and press enter or select VISAVET or International number to see the connections

Binary number

International Number

VISAVET Number

**4.2. MIRU-VNTR:** Mycobacterial Interspersed Repetitive Units -Variable Number Tandem Repeats (MIRU-VNTR), produces a pattern based on the number of repeat sequences at each locus.

Loci analyzed in **mycoDB** are VNTR 2165, VNTR 2461, VNTR 0580, VNTR 3192, VNTR 2996, VNTR 2163a, VNTR 2163b, VNTR 4052 and VNTR 3232 obtained 9 digits patterns.

Ex: **4-4-3-3-5-10-2-5-8**

The **?** indicates a not analyzed locus while **F** indicates a failure in the amplification of this locus.

In the documentation section ([Documents](#)) the relationship between the nomenclatures used in **mycoDB** with other frequently used for MIRU-VNTR loci is available.

## 5. mycoDB web application

The web application that allows access to data is available in Spanish and English and consists of four main sections that correspond to the four types of queries:

**SPOLIGOTYPE SEARCH**

**MIRU-VNTRTYPE SEARCH**

**ISOLATE SEARCH**

**ISOLATE MAPS**

On the main page are a brief description of the techniques of DVR-spoligotyping and MIRU-VNTR, and also a link to this user manual and before-mentioned documentation.



The screenshot shows the mycoDB.es website interface. On the left, a vertical navigation menu contains several callout boxes pointing to specific features: 'Last update of the Database', 'SPOLIGOTYPE SEARCH', 'MIRU-VNTRTYPE SEARCH', 'ISOLATE SEARCH', 'ISOLATE MAPS', 'mycoDB demo', and 'Documentation'. The main content area includes a header with the mycoDB.es logo and navigation links, a sidebar with a menu, and several informational sections: 'Spanish Database of Animal Mycobacteriosis mycoDB: Research Agreement MARM-UCM', 'DVR - spoligotyping', and 'MIRU-VNTR'. Each section contains detailed text and references. The footer includes copyright information for VISAVET and Complutense University.

Last update of the Database

SPOLIGOTYPE SEARCH

MIRU-VNTRTYPE SEARCH

ISOLATE SEARCH

ISOLATE MAPS

mycoDB demo

Documentation

Information about mycoDB

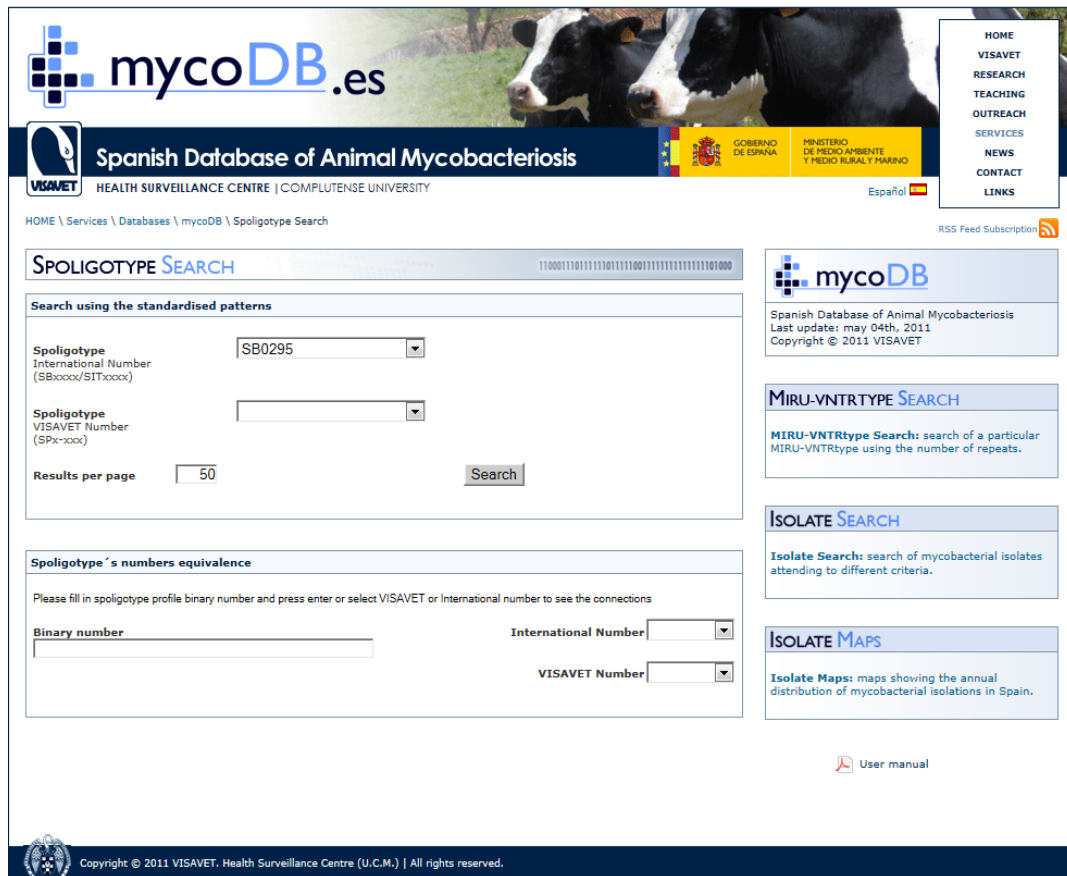
Information about DVR-spoligotyping

Information on MIRU-VNTR

## 6. SPOLIGOTYPE SEARCH

**SPOLIGOTYPE SEARCH** is a query tool that allows searches by spoligotype profile to view the geographical distribution of isolates in different animal species from 1996 to date. Searches can be performed by the international nomenclature or VISAVET internal nomenclature.

The following example describes the search for spoligotype SB0295:



The screenshot shows the 'SPOLIGOTYPE SEARCH' page on the mycoDB.es website. The page features a search form with the following elements:

- Search using the standardised patterns:**
  - Spoligotype International Number (SBxxxx/SITxxxx): A dropdown menu with 'SB0295' selected.
  - Spoligotype VISAVET Number (SPxxxx): An empty dropdown menu.
  - Results per page: A text input field containing '50'.
  - A 'Search' button.
- Spoligotype's numbers equivalence:**
  - Instructions: 'Please fill in spoligotype profile binary number and press enter or select VISAVET or International number to see the connections'.
  - Binary number: An empty text input field.
  - International Number: A dropdown menu.
  - VISAVET Number: A dropdown menu.

On the right side of the page, there is a navigation menu with links for HOME, VISAVET, RESEARCH, TEACHING, OUTREACH, SERVICES, NEWS, CONTACT, and LINKS. Below the menu, there is an RSS Feed Subscription icon and a 'User manual' link.

The next screen provides the results in a table with a map of geographic location. The map shows the municipalities where it has identified SB0295 profiles in blue. The maps provide information on the presence of spoligotypes specific to a given geographical region at municipality level.



**MIRU-VNTRTable** ▲

MIRU-VNTRtyped isolates: 46 of 720

MIRU-VNTRtype	Σ Isolations
3-3-3-3-5-11-2-4-7	1
4-4-3-3-5-11-2-5-13	1
6-2-3-3-5-11-2-5-7	1
6-4-3-3-4-11-2-5-7	1
6-4-3-3-5-11-2-4-7	1
6-4-3-3-5-11-2-5-12	2
6-4-3-3-5-11-2-5-7	14
6-4-3-3-5-11-2-5-8	3
6-4-3-3-5-12-2-5-7	2
6-4-3-3-F-11-2-F-8	1
6-4-3-4-5-11-2-5-6	2
6-4-3-4-5-11-2-5-7	1
6-4-3-4-5-F-2-5-6	1
6-4-3-7-7-11-2-5-7	1
6-4-3-7-7-2-5-7	12
6-4-F-3-5-11-2-5-7	1
6-5-3-3-6-11-2-5-7	1

- **RegionTable**: Shows the provinces and the number of isolates in each.

**RegionTable** ▲

Province	Σ <i>M. bovis</i> Isolations	Σ Total isolations
Alacant	2	2
Albacete	7	7
Almeria	1	1
Asturias	10	10
Avila	23	23
Badajoz	22	22
Barcelona	2	2
Burgos	1	1
Caceres	4	4
Cadiz	106	106
Cantabria	19	19
Castello	5	5
Ciudad Real	23	23
Cordoba	104	104
Coruña (a)	1	1
Girona	1	1
Granada	2	2
Guadalajara	4	4
Huelva	34	34
Huesca	1	1
Jaen	96	96
Leon	1	1
Lleida	12	12
Madrid	20	20
Malaga	4	4
Navarra	14	14
Orense	6	6
Palencia	1	1
Pontevedra	1	1
Salamanca	86	86
Segovia	3	3
Sevilla	47	47
Toledo	33	33
Valencia	3	3
Valladolid	3	3
Zamora	14	14
Zaragoza	4	4

- **AnimalTable**: Shows the animal species and number of isolates of each.

**AnimalTable** ▲

Animal species	Common name	Σ <i>M. bovis</i> Isolations	Σ <i>M. caprae</i> Isolations	Σ <i>M. tuberculosis</i> Isolations	Σ Total isolations
<i>Lama pacos</i>	Alpaca	3	0	0	3
<i>Bos taurus</i>	Cattle	668	0	0	668
<i>Capra aegagrus hircus</i>	Goat	1	0	0	1
<i>Cervus elaphus</i>	Red deer	9	0	0	9
<i>Sus scrofa</i>	Wild boar	31	0	0	31
<i>Lynx pardinus</i>	Iberian lynx	1	0	0	1
<i>Sus scrofa domestica</i>	Domestic pig	7	0	0	7

- **SpoligoTable**: Shows the spoligotypes and the total number of isolates.

**SpoligoTable** ▲

Spoligotype	Σ Total isolations
SB0295	720

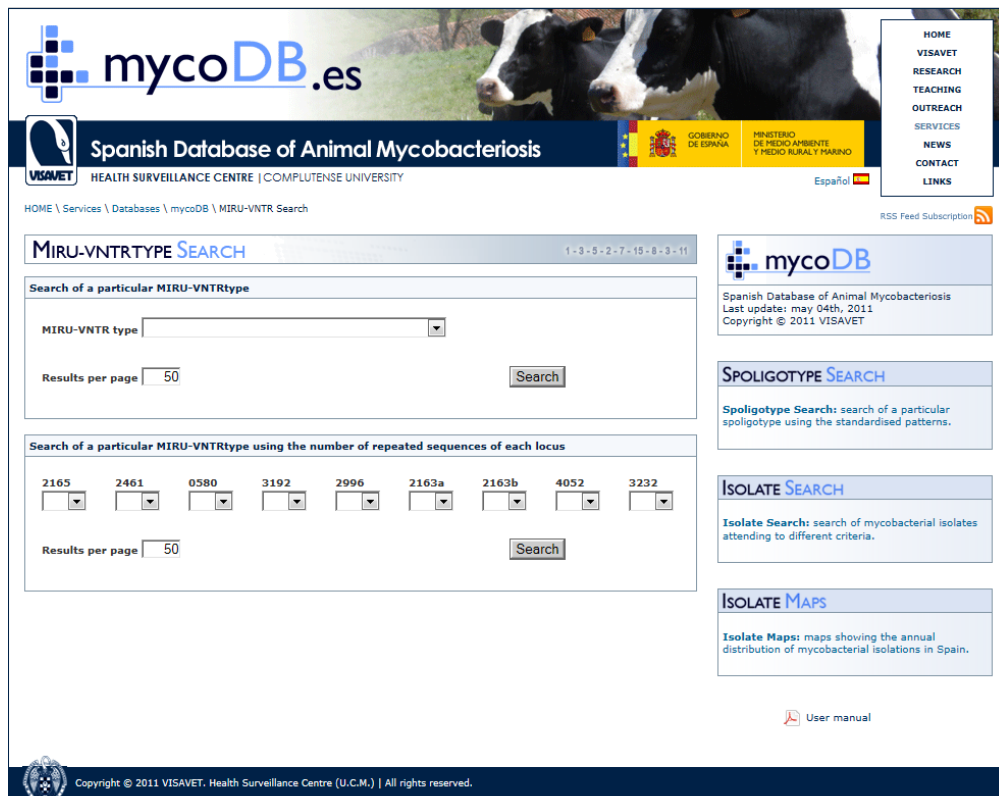
- **DataTable**: Displays all the data from each of the isolates sorted by region.

Spoligotype	MIRU-VNTRtype	Date	Region	Code	Province	Municipality	Code	Animal species	Identif.
SB0295	6-4-3-3-5-11-2-5-8	15/7/2008	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		17/2/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295	6-5-3-3-6-11-2-5-7	17/2/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		17/2/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295	6-4-3-3-5-11-2-5-7	27/8/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		27/8/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295	6-4-3-3-5-11-2-5-7	14/10/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11011	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		2/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>
SB0295		16/12/2009	Andalucia	1	Cadiz	Alcalá de los Gazules	11001	<i>Bos taurus</i>	<i>M. bovis</i>

A printable version of all data is also available.

## 7. MIRU-VNTRTYPE SEARCH

**MIRU-VNTRTYPE SEARCH** is a tool that allows MIRU-VNTR profile searches in order to view their geographical distribution and isolation in different animal species from 1996 to present.



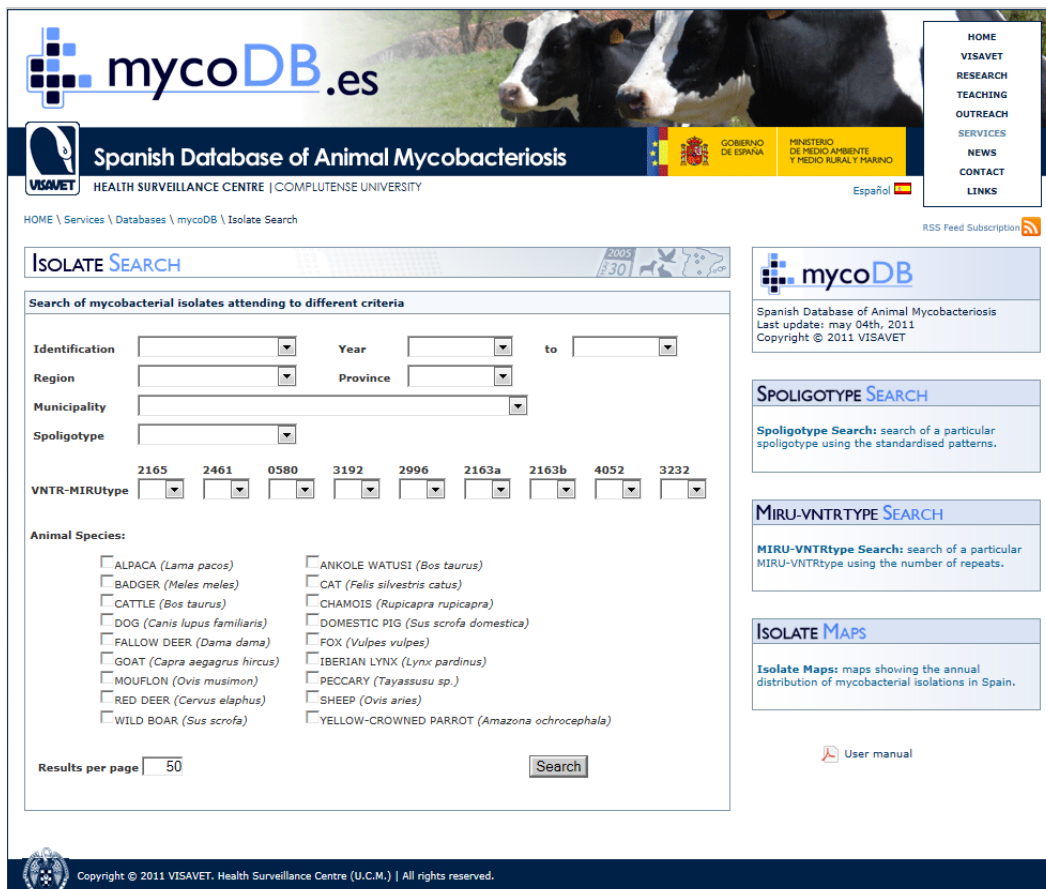
The screenshot displays the mycoDB.es website interface. At the top, there is a navigation menu with links for HOME, VISAVET, RESEARCH, TEACHING, OUTREACH, SERVICES, NEWS, CONTACT, and LINKS. The main content area features a search form titled "MIRU-VNTRTYPE SEARCH" with a search bar and a "Search" button. Below this, there is a section for "Search of a particular MIRU-VNTRtype" with a dropdown menu for "MIRU-VNTR type" and a "Results per page" field set to 50. Another section, "Search of a particular MIRU-VNTRtype using the number of repeated sequences of each locus", includes dropdown menus for loci 2165, 2461, 0580, 3192, 2996, 2163a, 2163b, 4052, and 3232, along with a "Results per page" field and a "Search" button. The sidebar on the right contains additional search options: "SPOLIGOTYPE SEARCH", "ISOLATE SEARCH", and "ISOLATE MAPS". The footer of the page includes the copyright notice: "Copyright © 2011 VISAVET, Health Surveillance Centre (U.C.M.) | All rights reserved."

Searches can be performed by the pattern of repetitions for the 9 loci: VNTR 2165 - VNTR 2461 - VNTR 0580 - VNTR 3192 - VNTR 2996 - VNTR 2163a - VNTR 2163b - VNTR 4052 - VNTR 3232 or by the number of repeated sequences at each locus.

The query results are shown in the same way as described for the first tool.

## 8. ISOLATE SEARCH

**ISOLATE SEARCH** is a tool that allows searches of mycobacteria isolated attending different criteria such as the spoligotype, MIRU-VNTRtype, isolation year, mycobacterial identification, region, province, municipality, animal species or combinations of these. This tool allows therefore the inclusion of various parameters in a single search.

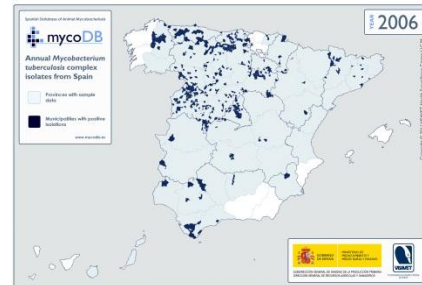


The screenshot shows the 'ISOLATE SEARCH' interface on the mycoDB.es website. The page includes a navigation menu on the right with links for HOME, VISAVET, RESEARCH, TEACHING, OUTREACH, SERVICES, NEWS, CONTACT, and LINKS. The main search area is titled 'ISOLATE SEARCH' and contains a form for searching mycobacterial isolates. The form includes dropdown menus for Identification, Year (with a 'to' field), Region, Province, Municipality, and Spoligotype. Below these are dropdown menus for VNTR-MIRUtype, with specific loci (2165, 2461, 0580, 3192, 2996, 2163a, 2163b, 4052, 3232) listed above. There is a section for 'Animal Species' with checkboxes for various species including ALPACA, BADGER, CATTLE, DOG, FALLOW DEER, GOAT, MOUFLON, RED DEER, WILD BOAR, ANKOLE WATUSI, CAT, CHAMOIS, DOMESTIC PIG, FOX, IBERIAN LYNX, PECCARY, SHEEP, and YELLOW-CROWNED PARROT. At the bottom of the form, there is a 'Results per page' field set to 50 and a 'Search' button. The footer of the page contains copyright information: 'Copyright © 2011 VISAVET, Health Surveillance Centre (U.C.M.) | All rights reserved.'

The query results are shown in the same way as described for the first tool.

## 9. ISOLATE MAPS

Tissue samples, bacteriological culture media, DNA or spoligotype data are included in the database since 1996 until today. This query shows maps displaying the isolate distribution per year which reflect, in light blue, provinces that have sent samples and in dark blue municipalities that have been identified and characterized by molecular typing. This tool is only available in the full version of **mycoDB**.



## 10. Technical assistance

VISAVET Center gives full version **mycoDB** users the assistance necessary for optimised use. Please contact us for help with any problems regarding the **mycoDB** management or operation. Any suggestions or indications for the improvement of this application are welcome.

Contact:

- **Computer and Communication Unit**

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