

EUdaphobase

European Soil-Biology Data Warehouse

Translating data into knowledge

David J. Russell
et al.!

SENCKENBERG
world of biodiversity



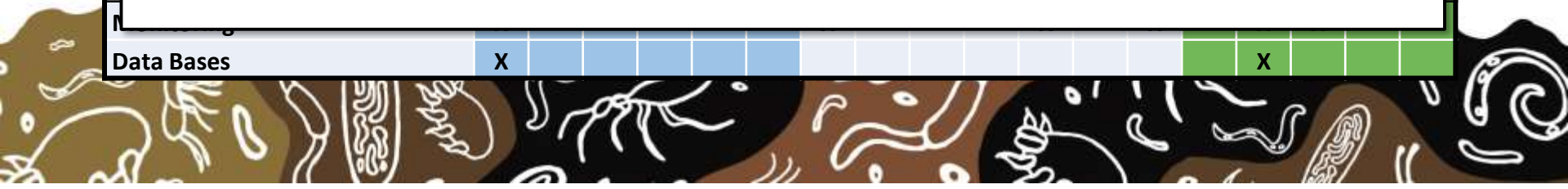
GLOBAL SYMPOSIUM ON SOIL BIODIVERSITY | 19-22 April 2021

Soil Biodiversity – Policy Needs

	Agricultural						Industrial						Environmental					
	CAP	Plant Protect. Products Direct.	Pesticide Use Directive	Biocidal Products Regulation	Nitrates Directive	GMO Directive	Industrial Emissions Directive	Mining Waste Directive	Landfill Directive	Waste Directive	Sewage Sludge Directive	Carbon Storage Directive	Renewable Energy Directive	Environmental Liability Direct.	Biodiversity Strategy	Forest Action Plan	Habitat Directive	Water Framework Directive
Environment, Ecosystem	X		X	X			X	X	X	X		X	X	X			X	
Soil, Soil quality	X			X	X	X	X	X	X	X	X	X	X		X	X		X
Biodiversity/Fauna/Species	X		X	X		X		X		X	X	X	X	X	X	X		
Food Web						X												
Genetic diversity	X														X			
Alien/Invasive species	X												X		X			
Ecosystem services / Soil functionality (general)	X					X							X		X			
Soil functions / Ecosystem services (specific)	X				X	X										X		
Ecosystem resilience	X															X		
Ecotoxicology/Risk Assessm.		X																
Monitoring	X						X				X		X		X	X		
Data Bases	X														X			

Soil Biodiversity – Policy Needs

	Agricultural					Industrial					Environmental							
	ect.	on				ive					e	ect.						
	<p style="text-align: center;"><u>Data-based</u> definition of:</p> <ul style="list-style-type: none">→ (site-specific) Baselines, Thresholds→ Time series → (site-specific) Drivers of soil-biodiversity <u>occurrence</u> (composition, structure) of soil-biodiversity <u>change/loss</u> → Soil-biodiversity Functionality																	
Data Bases						X												X





ELSEVIER

Applied Soil Ecology

journal homepage: www.elsevier.com/locate/apsoil

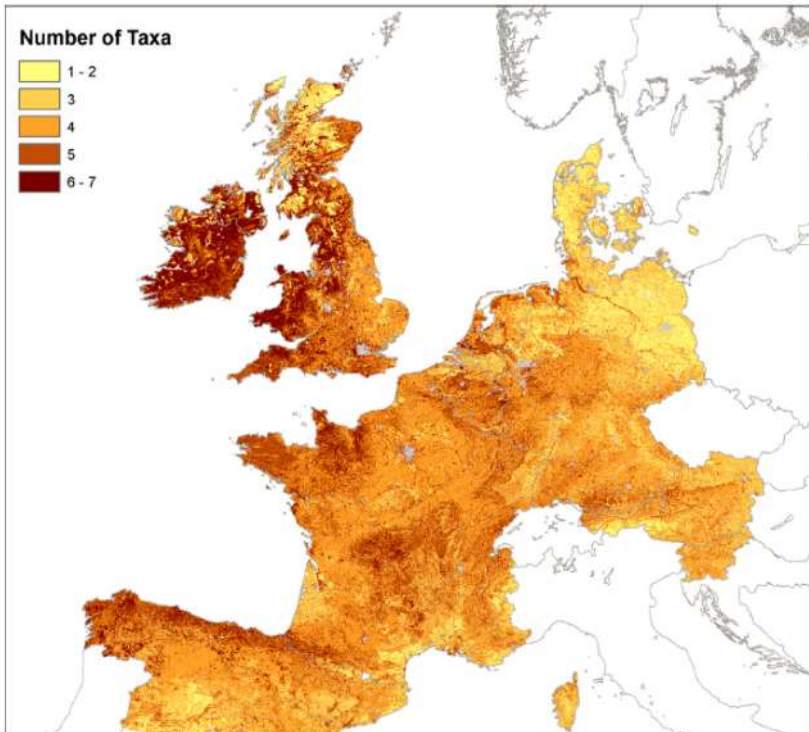
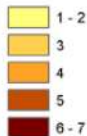


Mapping earthworm communities in Europe

Michiel Rutgers^{a,*}, Alberto Orgiazzi^b, Ciro Gardi^{b,c}, Jörg Römcke^d, Stephan Jänsch^d,
Aïda M. Keith^e, Dan Malcom^f, Brian Ross^g, Olof Schmidt^h, Archie V. Murchie^h

Roc
Jav
Iva
Hsu

Number of Taxa



ELSEVIER

Science of the Total Environment

journal homepage: www.elsevier.com/locate/scitotenv



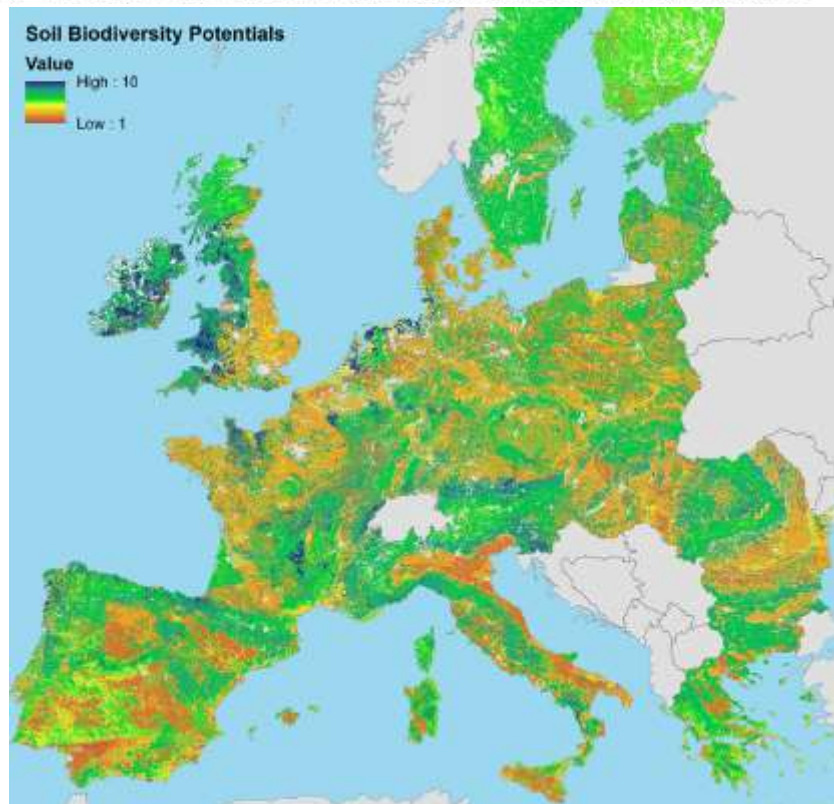
Assessing soil biodiversity potentials in Europe

Ece Aksoy^{a,*}, Geertrui Louwagie^b, Ciro Gardi^c, Mirko Gregor^d, Christoph Schröder^a, Manuel Löhnertz^d



Soil Biodiversity Potentials

Value





Pan-European Soil-Biodiversity Data Warehouse

- Establish current soil biodiversity (*ecology s.l.*)
- Assess state of soil-biodiversity and its changes



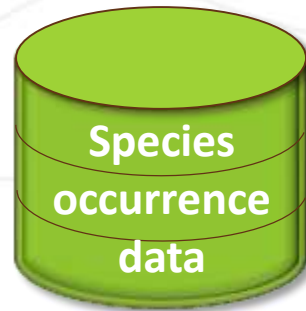
Data platform: Edaphobase

All databases are structured
according to their **goals**
how the data is to be (re-)used

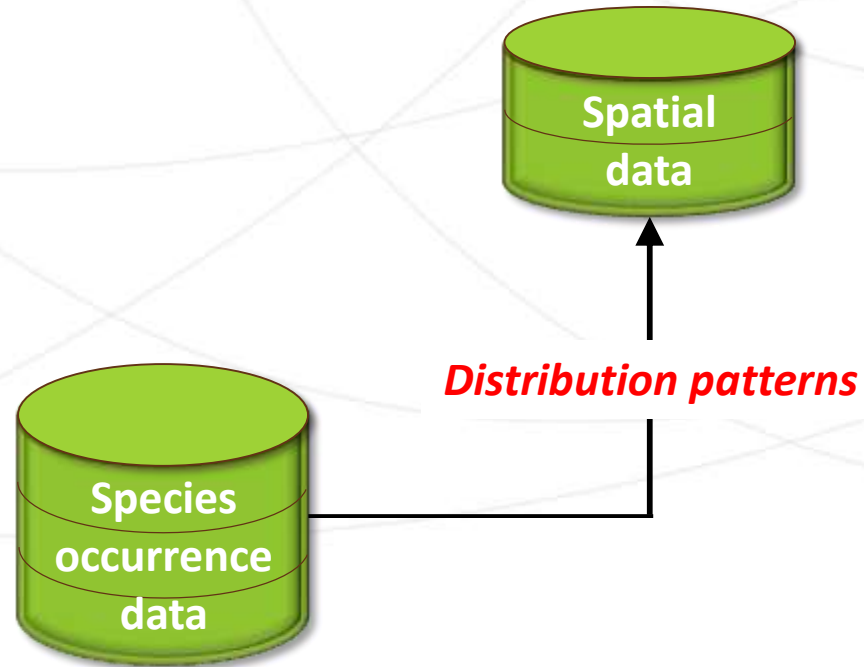
- Data management
- Mapping/Modelling Distributions (and *drivers*)
- (Species') niche-space modelling
- Soil-biodiversity predictions, assessments
- *Soil-biodiversity functional roles*



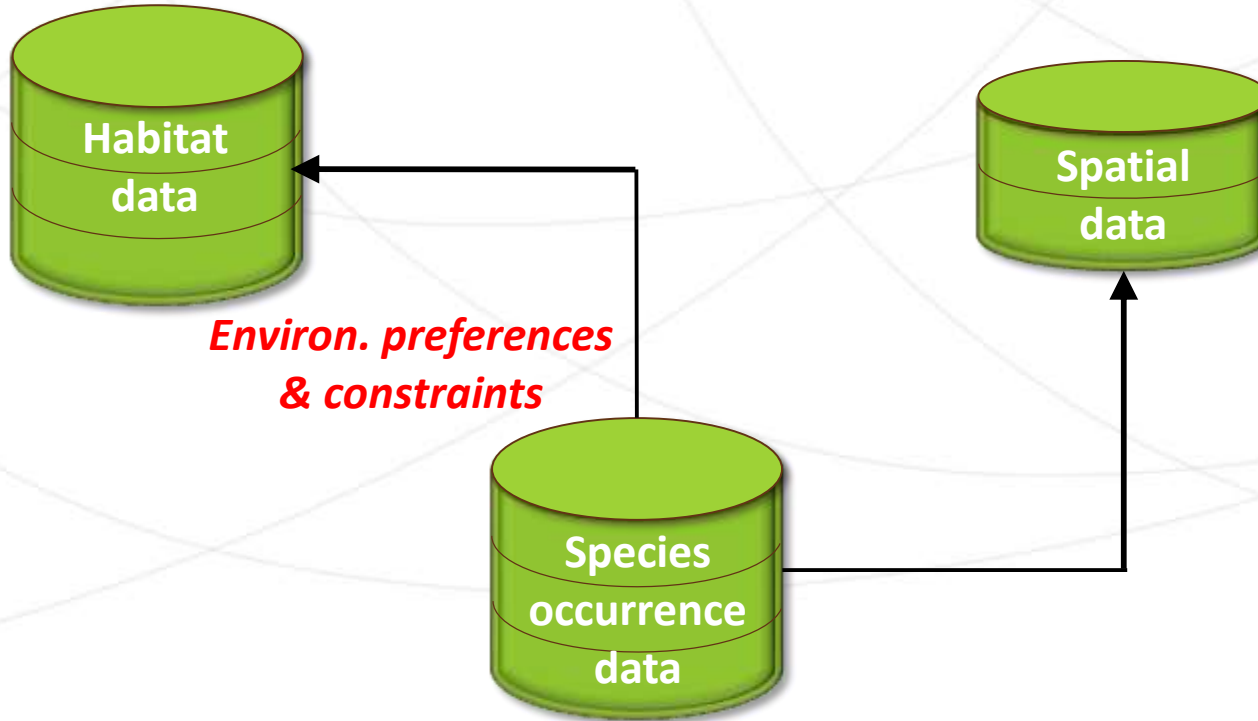
Data linkages → answerable questions
(*“Data → Knowledge”*)



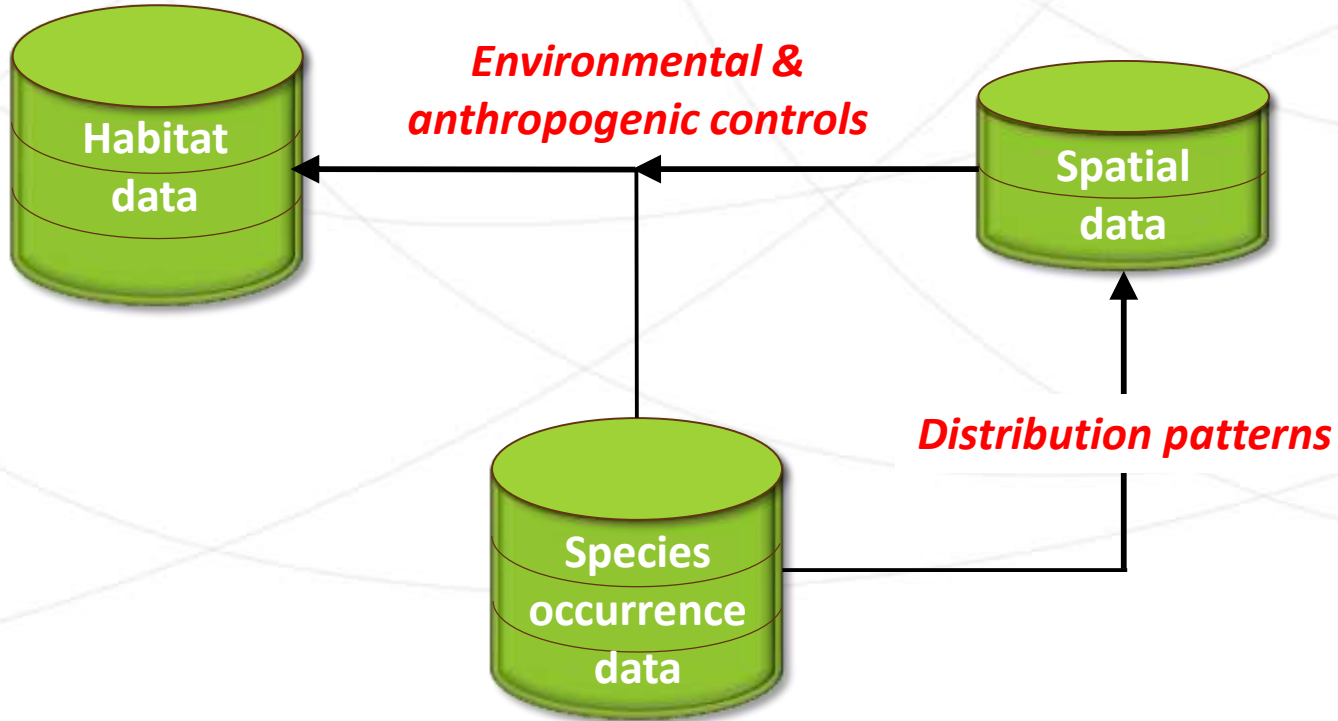
Data linkages → answerable questions (“Data → Knowledge”)



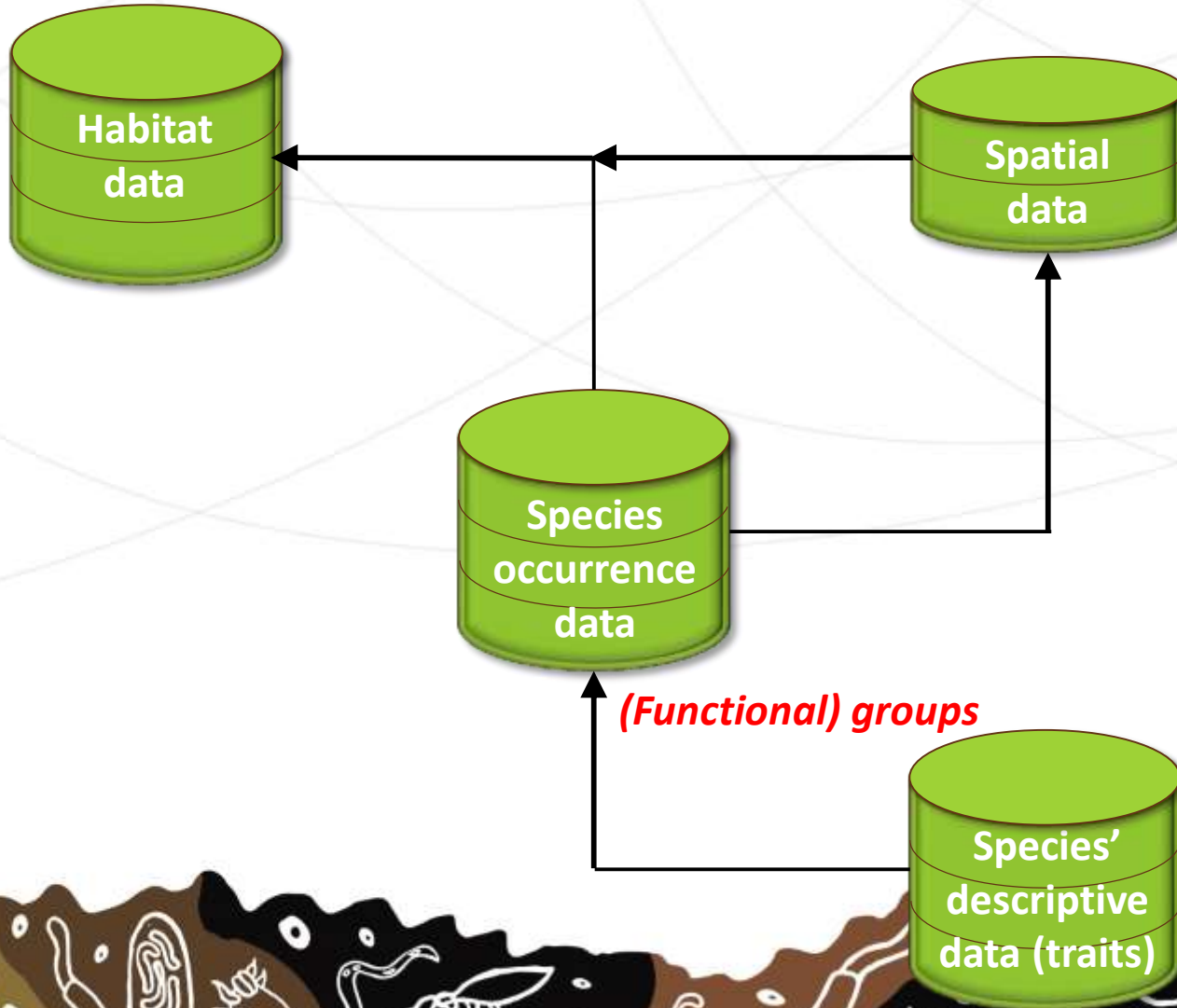
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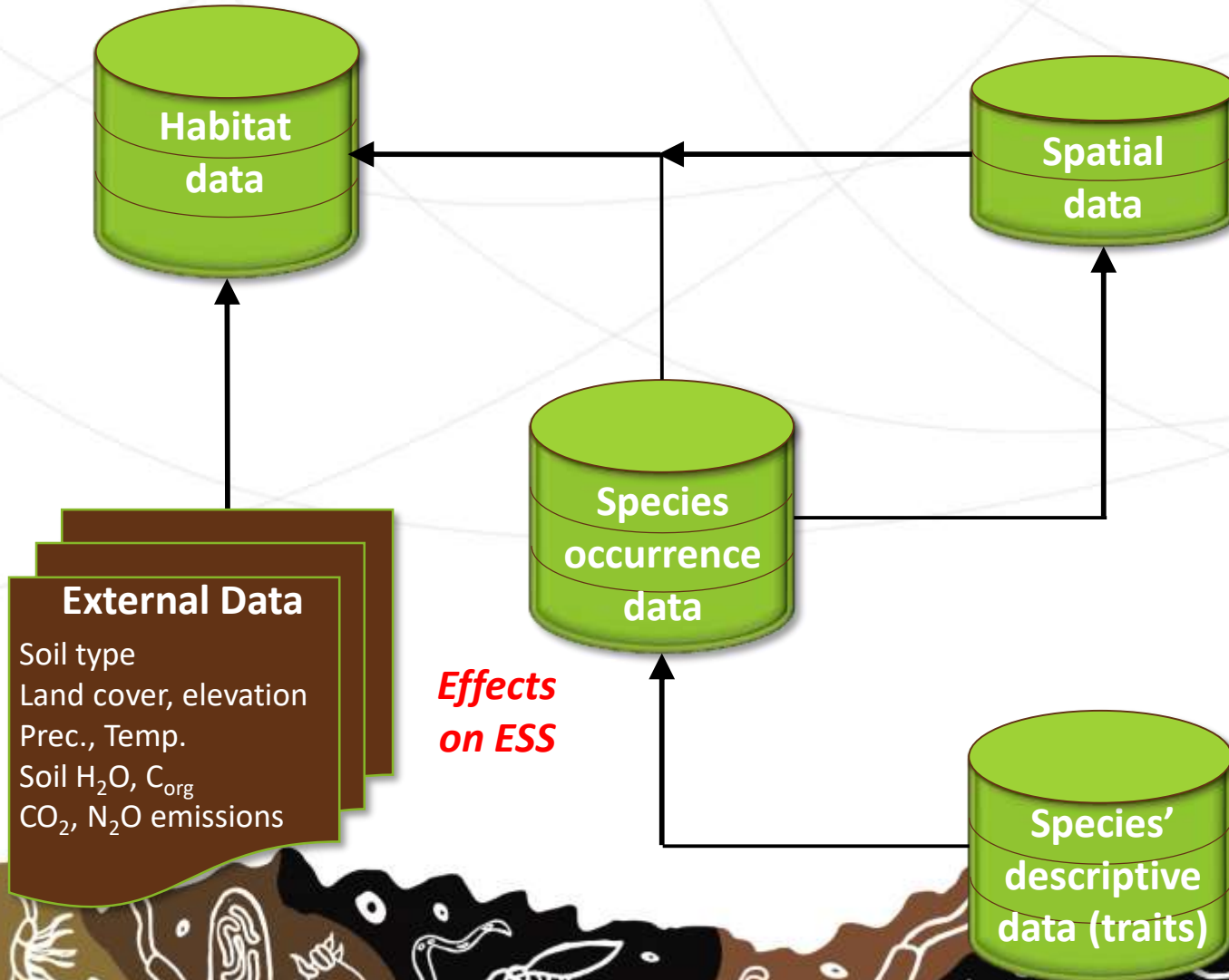
Data linkages → answerable questions (“Data → Knowledge”)



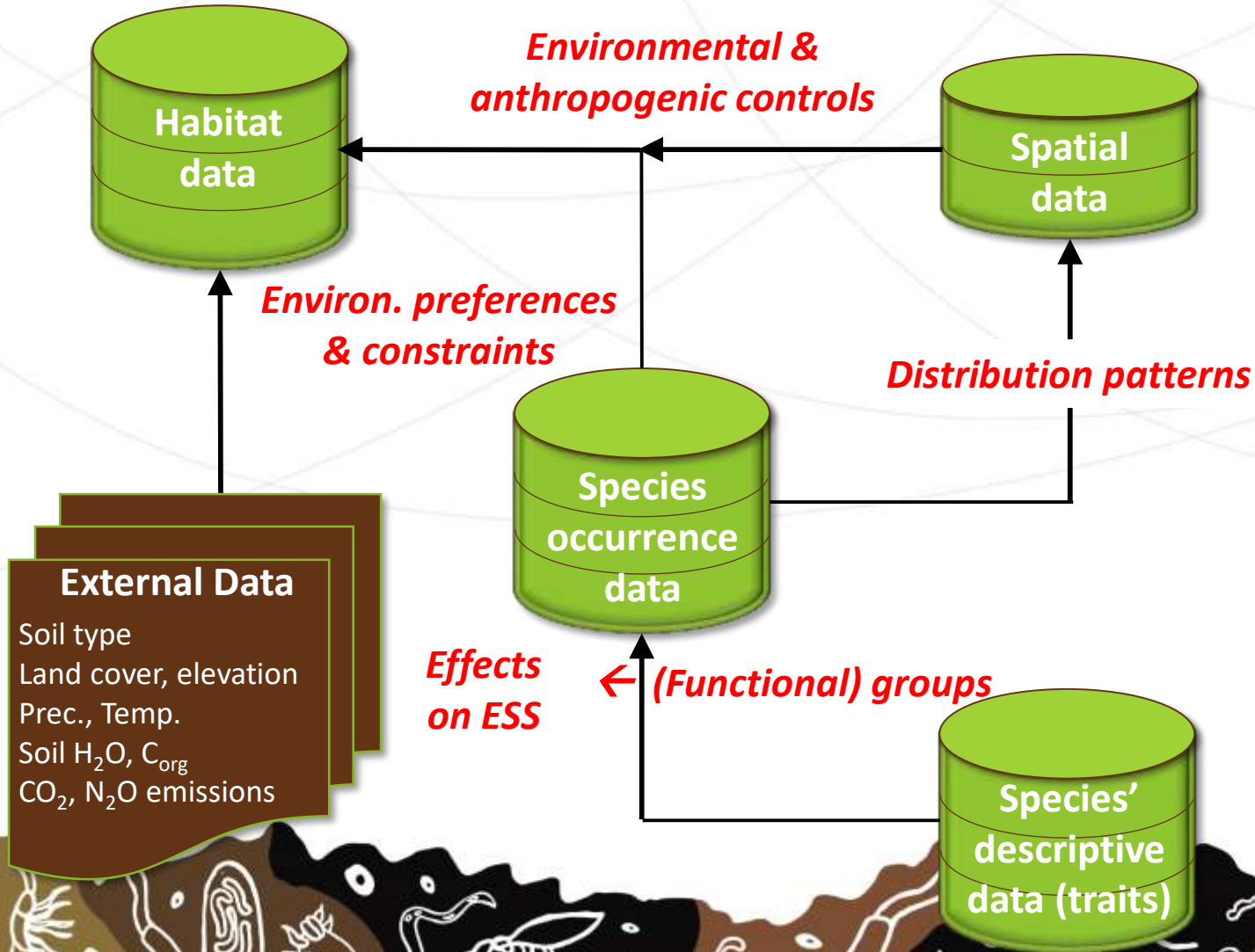
Data linkages → answerable questions (“Data → Knowledge”)



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Data linkages → answerable questions (“Data → Knowledge”)



Data Repository



Data Warehouse

- *Subject-oriented (soil biodiversity)*
- *Integrate heterogeneous data from multiple sources*
- *Time-variant; i.e., data from different acquisition dates*
- *(Homogeneously) structure data for query and analysis*
- *Non-volatile (i.e. data sustainably stored)*



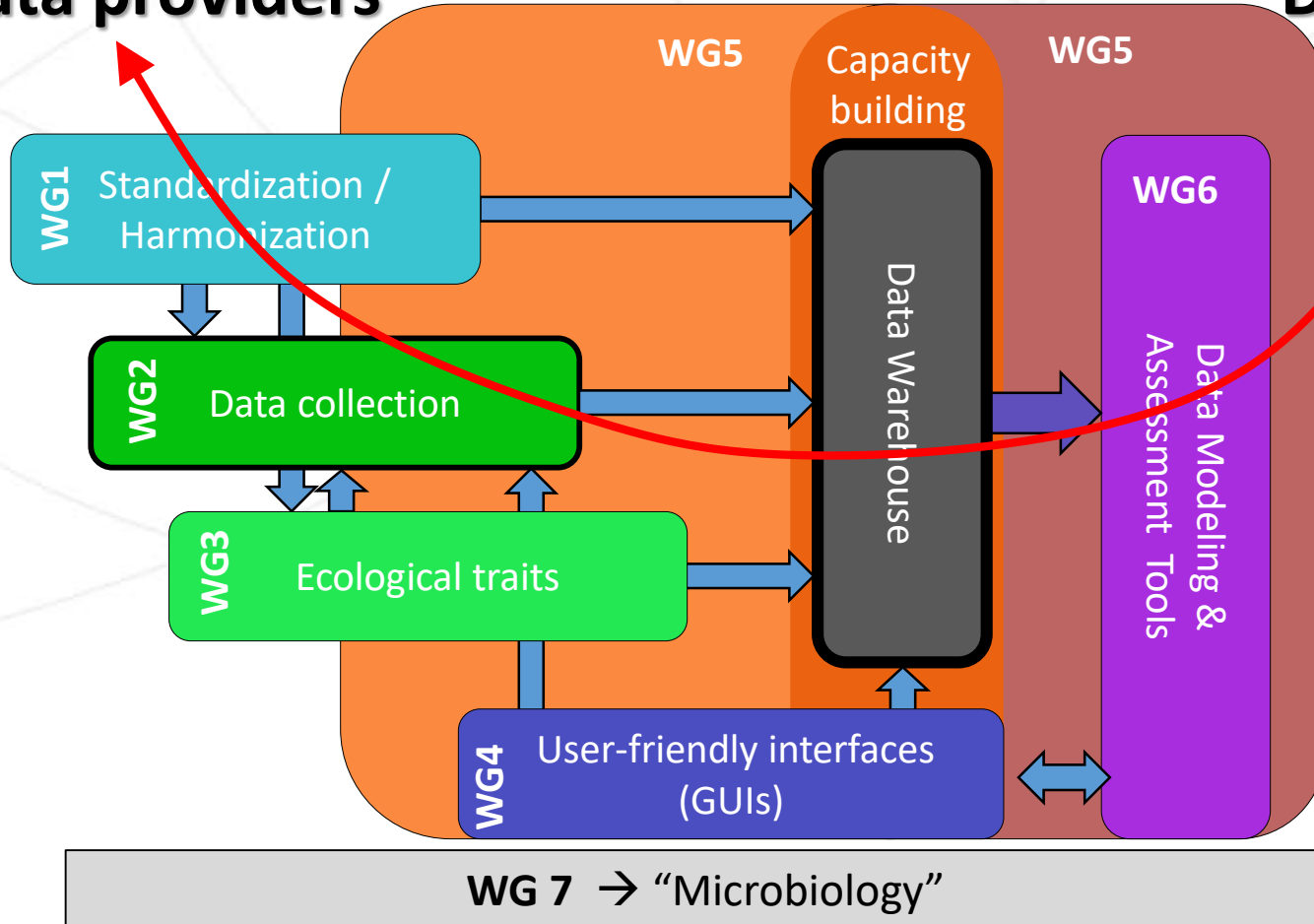
Data platform: Edaphobase

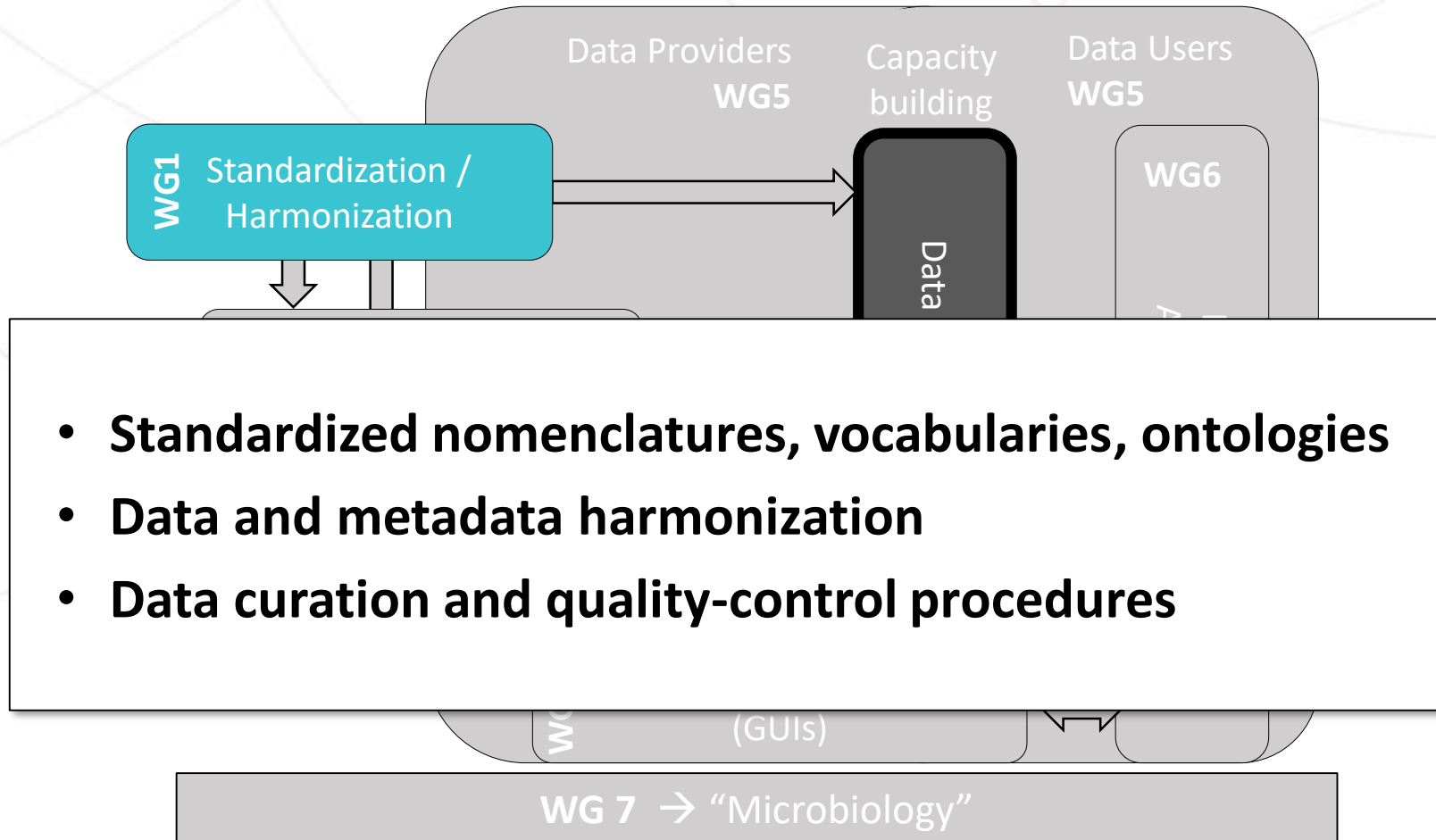
- Open-access, pan-European data warehouse for soil biodiversity
 - *Findable*
 - *Accessible*
- Use this data in online assessment tools
 - *Interoperable*
 - *Re-usable*

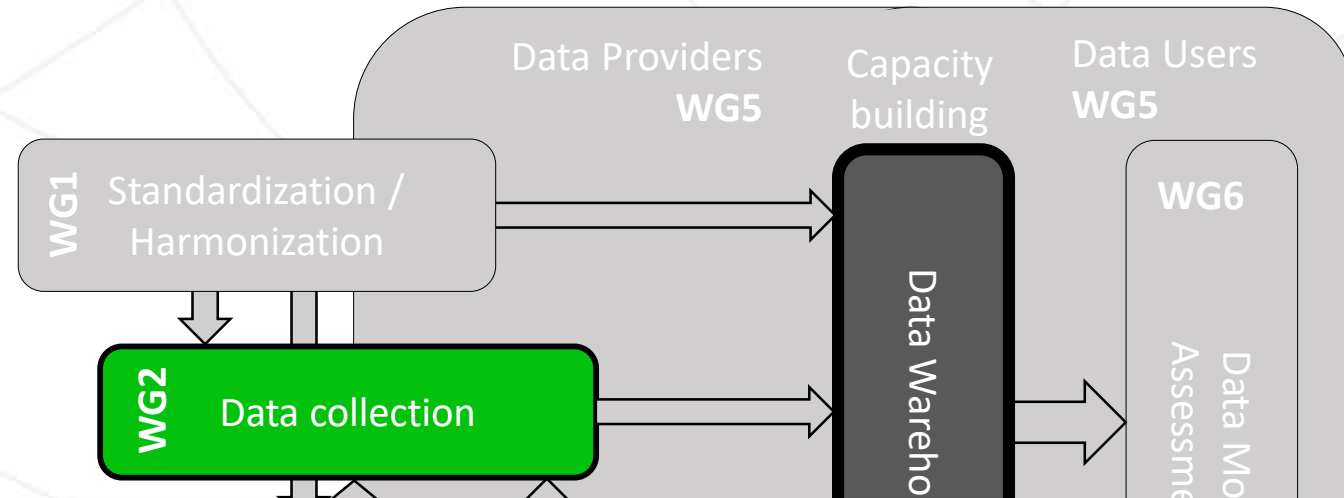


Data providers

Data users







- **Soil-biodiv. datasets throughout Europe**
- **Linking databases, text mining**
- **Data policy → *Open access* ↔ *IPRs***
- **Software tools for data import / integration**

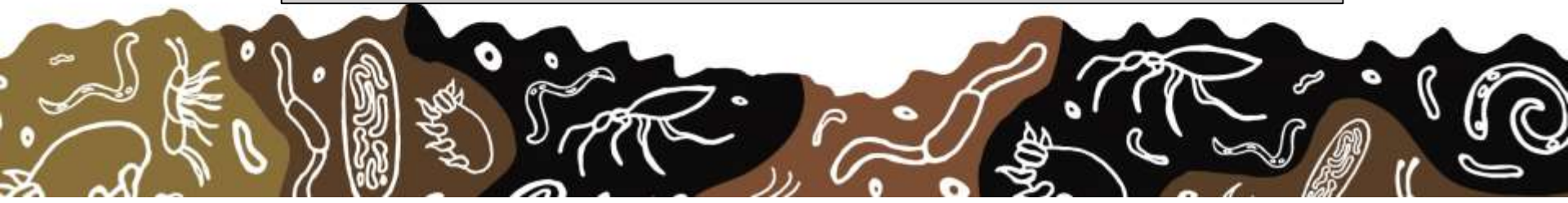
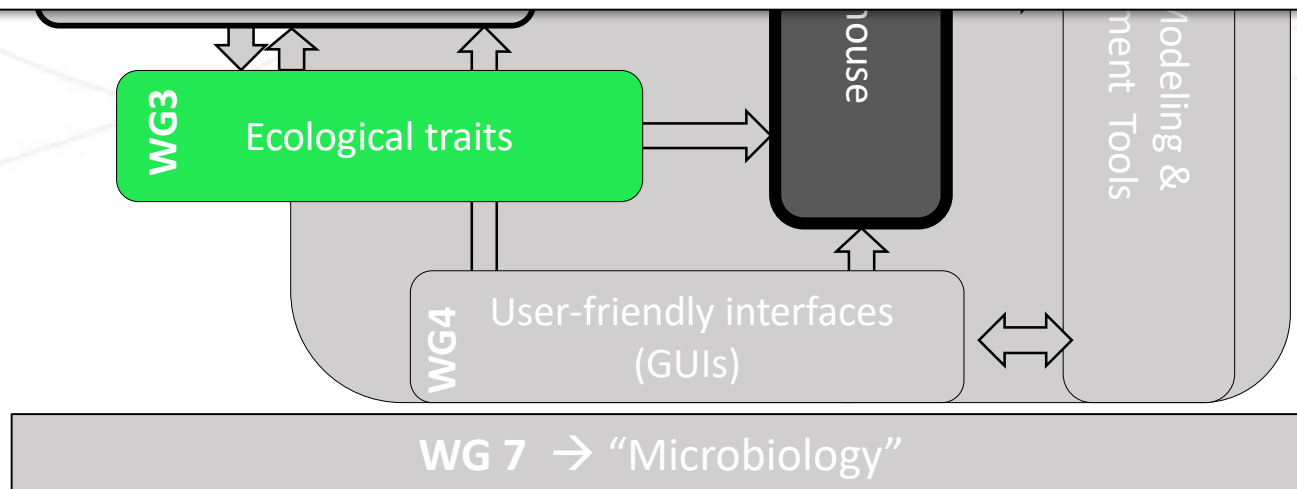


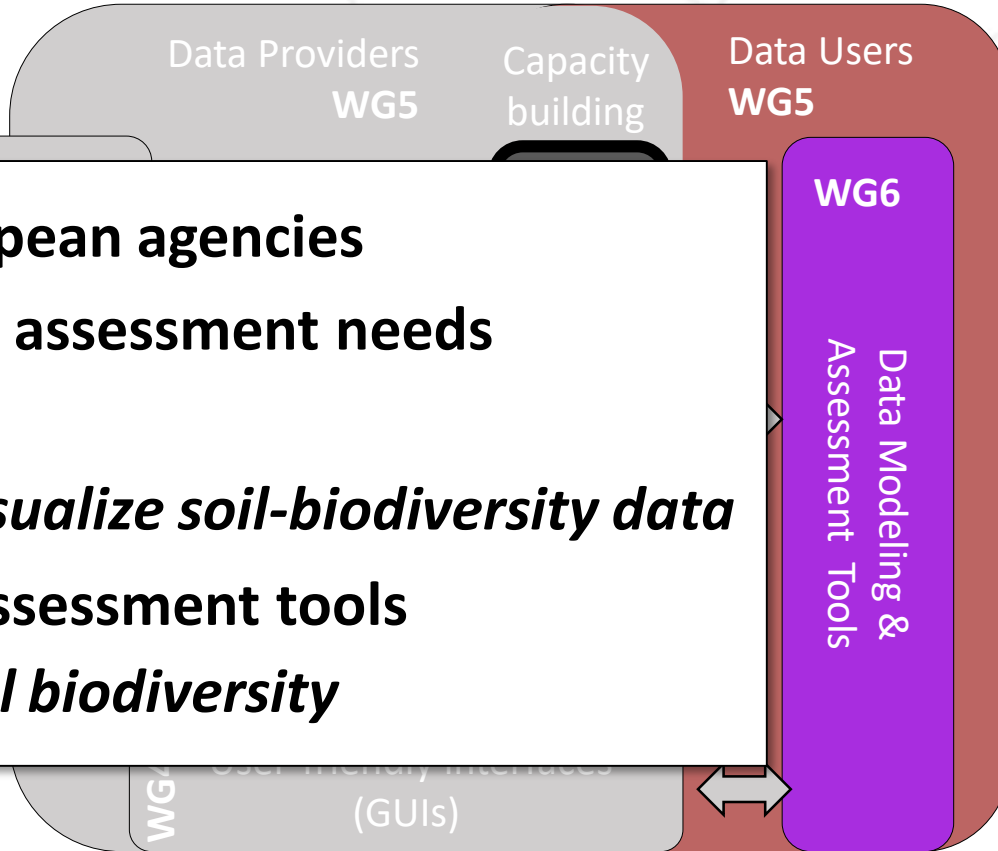
Data Providers

Capacity

Data Users

- Harmonized catalogue of soil-taxa traits
- Edaphobase ↔ BETSI ↔ EcoTaxonomy ↔ nat'l datasets
- Link trait data to species & sites of occurrence





- **National and European agencies**
- **Data availability & assessment needs**
- **Algorithms**
 - *analyze and visualize soil-biodiversity data*
- **Soil-biodiversity assessment tools**
 - *incl. functional biodiversity*

WG 7 → "Microbiology"



Standardization /

Data Providers
WG5

Capacity
building

Data Users
WG5

WG6

- Integrate microbial and faunal data
→ *OTUs & taxonomic annotation must be query-able !*
- Connect OTUs with spatial and habitat data
- Included in all previous WG

WG 7 → "Microbiology"



Edaphobase – Data Query and Presentation

The screenshot displays the Edaphobase Data-Query Portal interface. At the top, a green navigation bar contains a home icon, a refresh icon, and a URL <https://portal.edaphobase.org> which is circled in red. Below the navigation bar, a menu bar includes options like 'File', 'Select data', 'Create analysis', 'Extras', 'Tools', 'Tutorials', and 'Help'. The main content area is divided into a sidebar on the left and a map view on the right.

Left Sidebar:

- Selected d...:** Shows filters for Taxon (Collembola (100380 | 2349)) and Ort (Germany (273237 | 1541...)).
- Observations:** 85170 observations at 1712 localities found in Edaphobase.
- Actions:** Hide sampling sites, Raw data table, Matrix Location/Numeric parameters, Matrix Location/Categorical Parameters, Matrix location identification/Species (species q...).
- Analy...:** A section for analysis tools.

Map View:

- Map:** A map of Europe showing numerous orange circular markers representing sampling sites, primarily concentrated in Germany and Central Europe.
- Map Tools:** Add-on map, Sampling sites, Tools.
- Scale:** 100 km / 50 miles.
- Attribution:** © OpenStreetMap.
- Message:** 17:42:5... Since there are no coordinates given for 5 sampling sites they cannot be displayed on the map.

Edaphobase – Data Query and Presentation

The screenshot displays the Edaphobase Data-Query Portal interface. The browser address bar shows the URL <https://portal.edaphobase.org>. The page title is "edaphobase Data-Query Portal – Beta #200117".

The interface is divided into several sections:

- Navigation and Tools:** Includes a top menu with "Select data", "Create analysis", "Extras", "Tools", "Tutorials", and "Help". A toolbar below the menu contains icons for "Add-on map", "Sampling sites", and "Tools".
- Selected data:** A panel on the left lists the selected taxa:
 - Polydesmus angustus* Latzel, 1884 [Species] (22...)
 - Polydesmus complanatus* (Linnaeus, 1761) [Spe...]
- Groups:** A central panel with "Select all" and "Deselect all" buttons. It lists the selected groups:
 - Polydesmus angustus* Latzel, 1884
 - Polydesmus complanatus* (Linnaeus, 1761)
- Map view:** A large map of Europe showing sampling sites. Red circles represent *Polydesmus angustus* and cyan circles represent *Polydesmus complanatus*. The map includes a compass rose, a vertical scale bar, and a scale of 100 km / 50 miles. The map is powered by OpenStreetMap.
- Analysis and Grouping:** A bottom-left panel with "Analyses" and "Gruppierung" sections. The "Analyses" section includes buttons for "Show sampling sites", "Raw data table", "Matrix Location/Numeric parameters", "Matrix Location/Categorical Parameters", and "Matrix location identification/Species (species q...". The "Gruppierung" section has a "Species" button and a "Show grouping" button.

Edaphobase – Data Query and Presentation

The screenshot displays the Edaphobase Data-Query Portal interface. The browser address bar shows the URL <https://portal.edaphobase.org>. The page title is "edaphobase Data-Query Portal – Beta #200117".

Selected data:

- site identifier: All existing values (243920 | 9085)
- Taxon: *Polydesmus angustus* Latzei, 1884 [Species] (22...)

1361 observations at 696 localities found in Edaphobase

Analyses:

- Gruppierung: CORINE Land Cover (CLC)
- Site identifier
- Species
- Kreuztabelle: Edaphostat contingency table for undefined

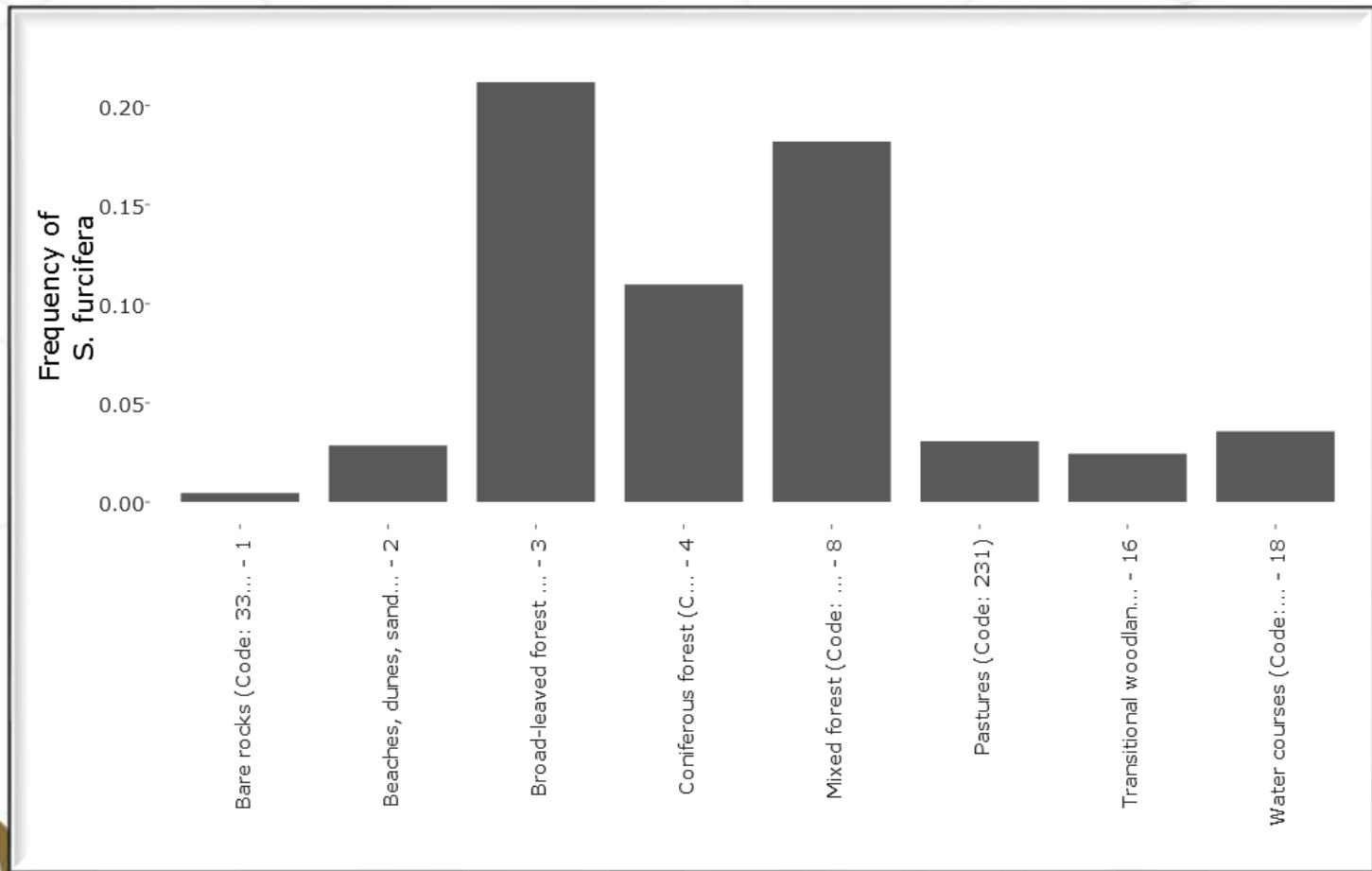
Groups:

- (not differentiable / N/A)
- Bare rocks (Code: 332)
- Beaches, dunes, sands (Code: 331)
- Broad-leaved forest (Code: 311)
- Coniferous forest (Code: 312)
- Green urban areas (Code: 141)
- Mixed forest (Code: 313)
- Pastures (Code: 231)
- Transitional woodland-shrub (Code: 324)
- Water courses (Code: 511)

Map view: A map of Europe showing sampling sites (colored dots) and various geographical features. The map includes a scale bar (0 to 100 km) and a compass rose.

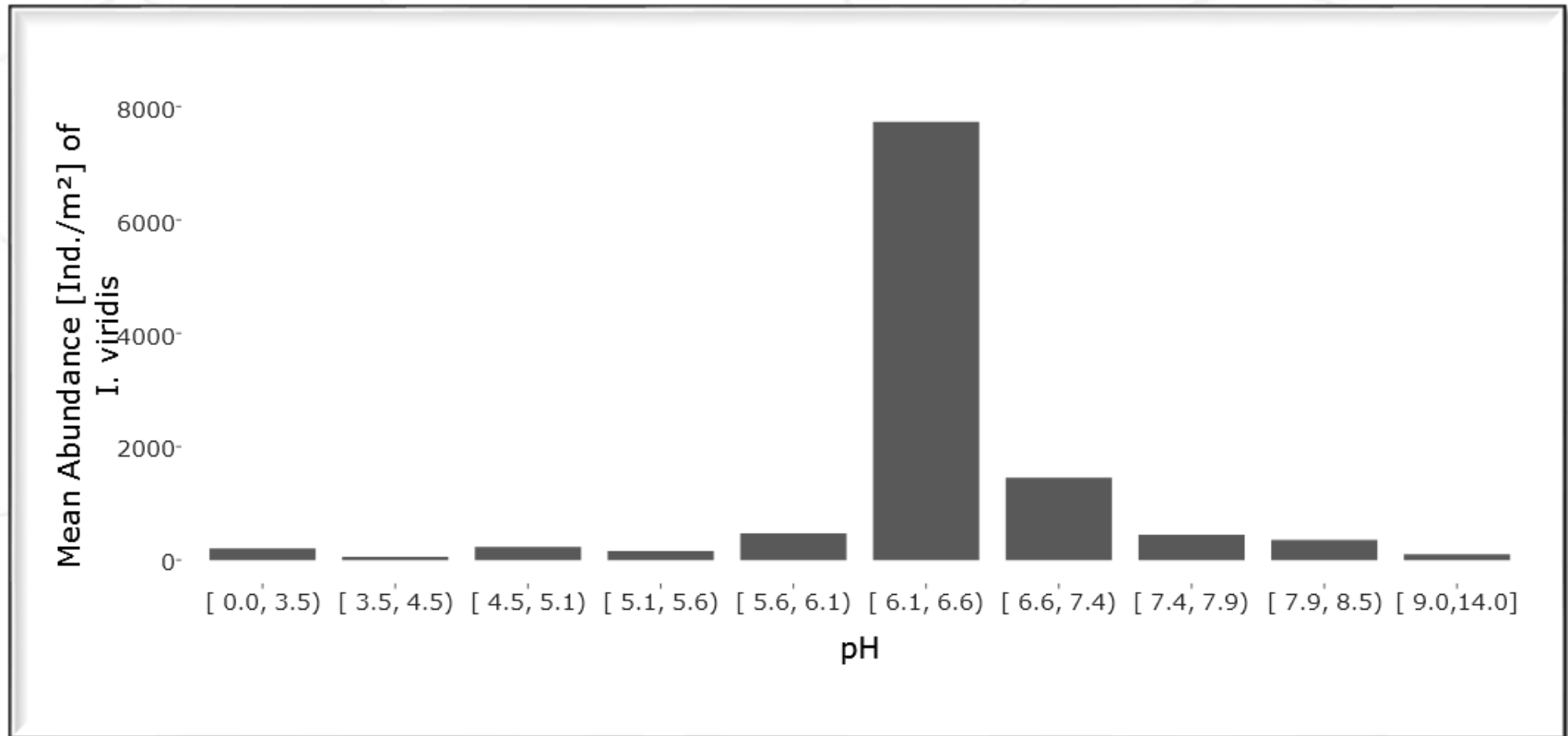
Edaphobase – Data Analysis and Presentation

Occurrence frequency – *Supraphorura furcifera* x habitat (CLC3)



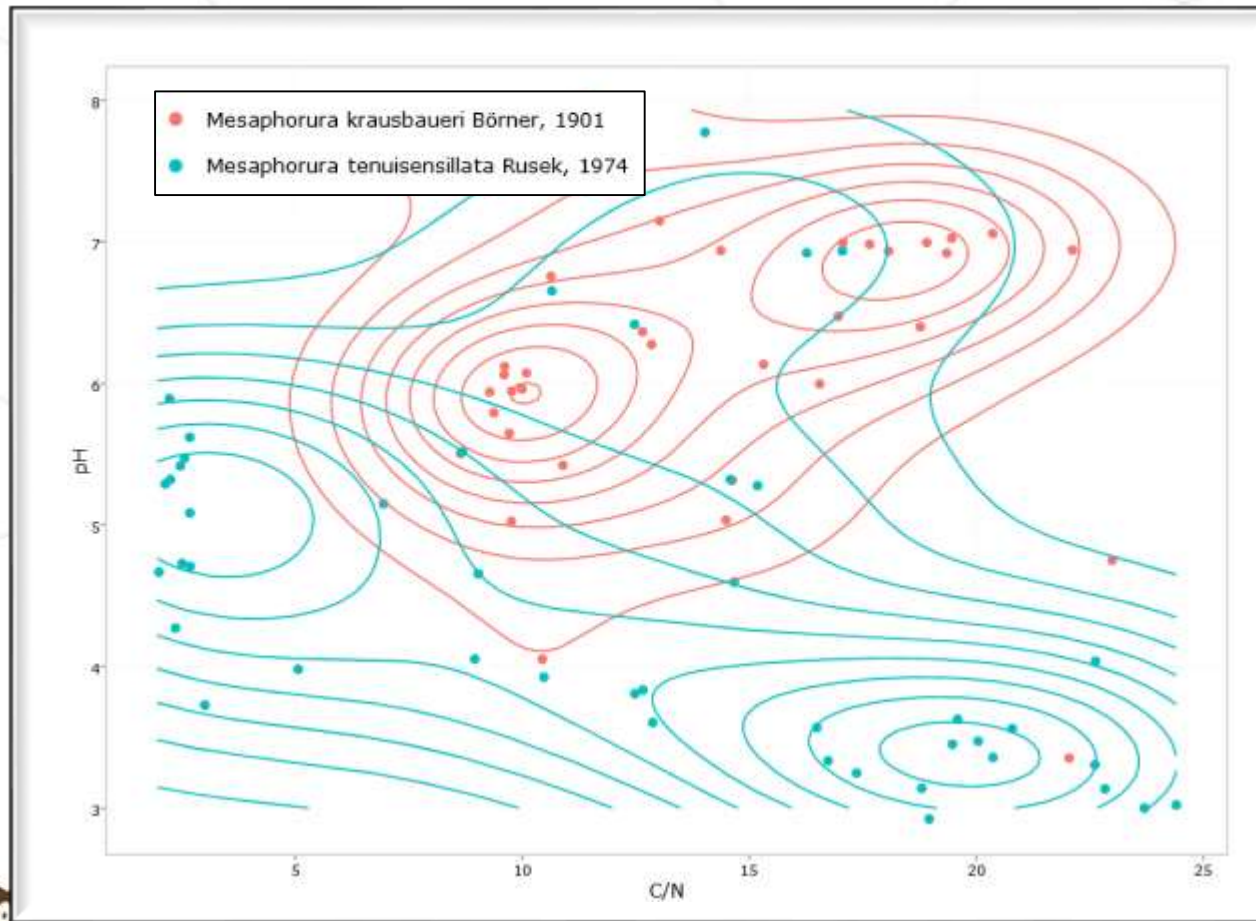
Edaphobase – Data Analysis and Presentation

Occurrence distribution – *Isotoma viridis* x soil pH [mean abundance]



Edaphobase – Data Analysis and Presentation

2-D niche space - related Tullbergiidae species (Collembola) [*presence-absence*]



Edaphobase – Data Analysis and Presentation

Expected Species Composition (Lumbricidae)

© Institute for Environmental Research
RWTH Aachen University

Choose a class of sites for the coenosis

Choose a Habitat type (German BfN) level 1 class

Arable and fallow land (Code: 33.)

Choose a C/N class

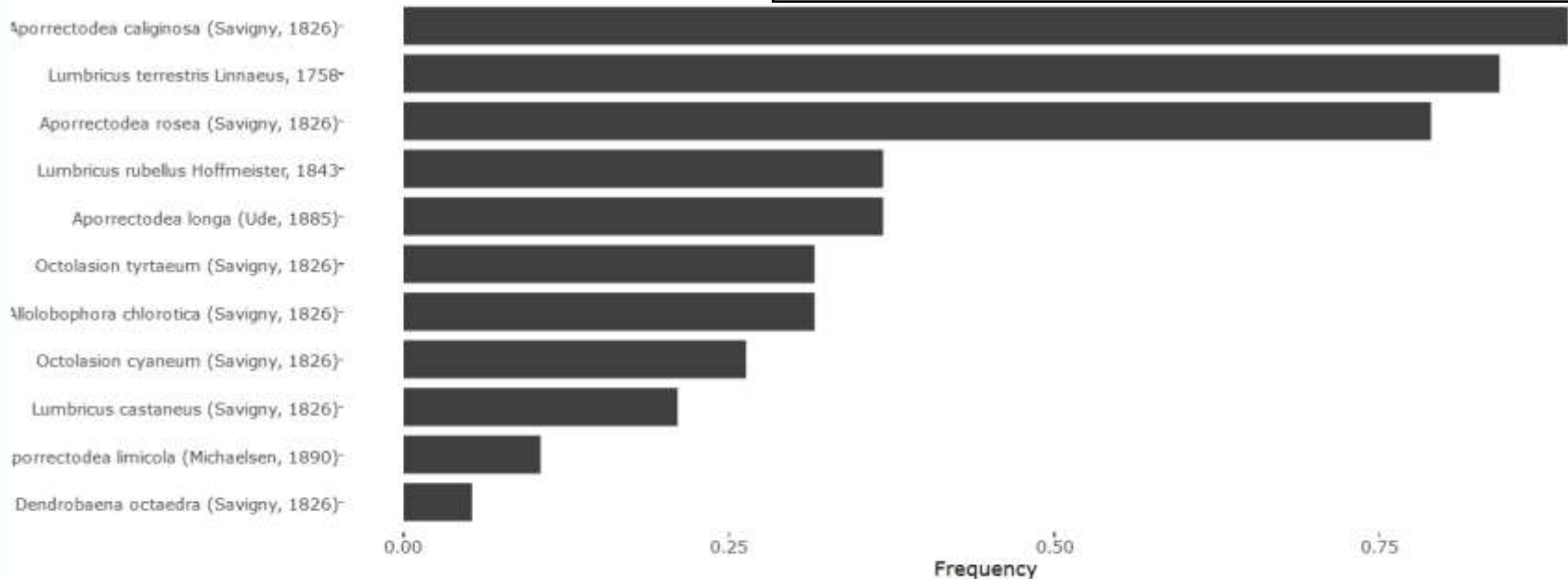
(8.39,14.8]

Choose a pH class

(5.25,6.52]

Coenosis

Show only species with atleast one presence value



EUdaphobase

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Visit us at: <https://eudaphobase.eu>
<https://portal.edaphobase.org>

Thank you for
your attention



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