



Ecotaxonomy

DATABASE
traits and species

1 - Overview

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- ❖ Tropical region with undescribed invertebrate diversity
 - ✓ **Standardize and store morphospecies**
 - ✓ **Create identification keys**
- ❖ Trait-based ecology
 - ✓ **Describe traits and link them to taxa**
 - ✓ **Customise parameters for different groups**
- ❖ Environmental samples with many individuals
 - ✓ **Modify many individuals of many taxa in one interface**
 - ✓ **Link individuals to environmental context**
- ❖ Ecological projects across people and continents
 - ✓ **Ensure simultaneous access of many people**
 - ✓ **Ensure data compatibility and standardization**
 - ✓ **User-friendly interface**



Ecotaxonomy

DATABASE
traits and species

I

Platform for **real-time data collection** and standardization in ecological projects



Projects

B08

Image:



+ Add child project

+ Add new organisms

Edit project collection

Name:

B08

Title:

Structure and functioning of the decomposer system in lowland rainforest transformation systems

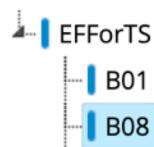
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01.01.2012 00:00:00

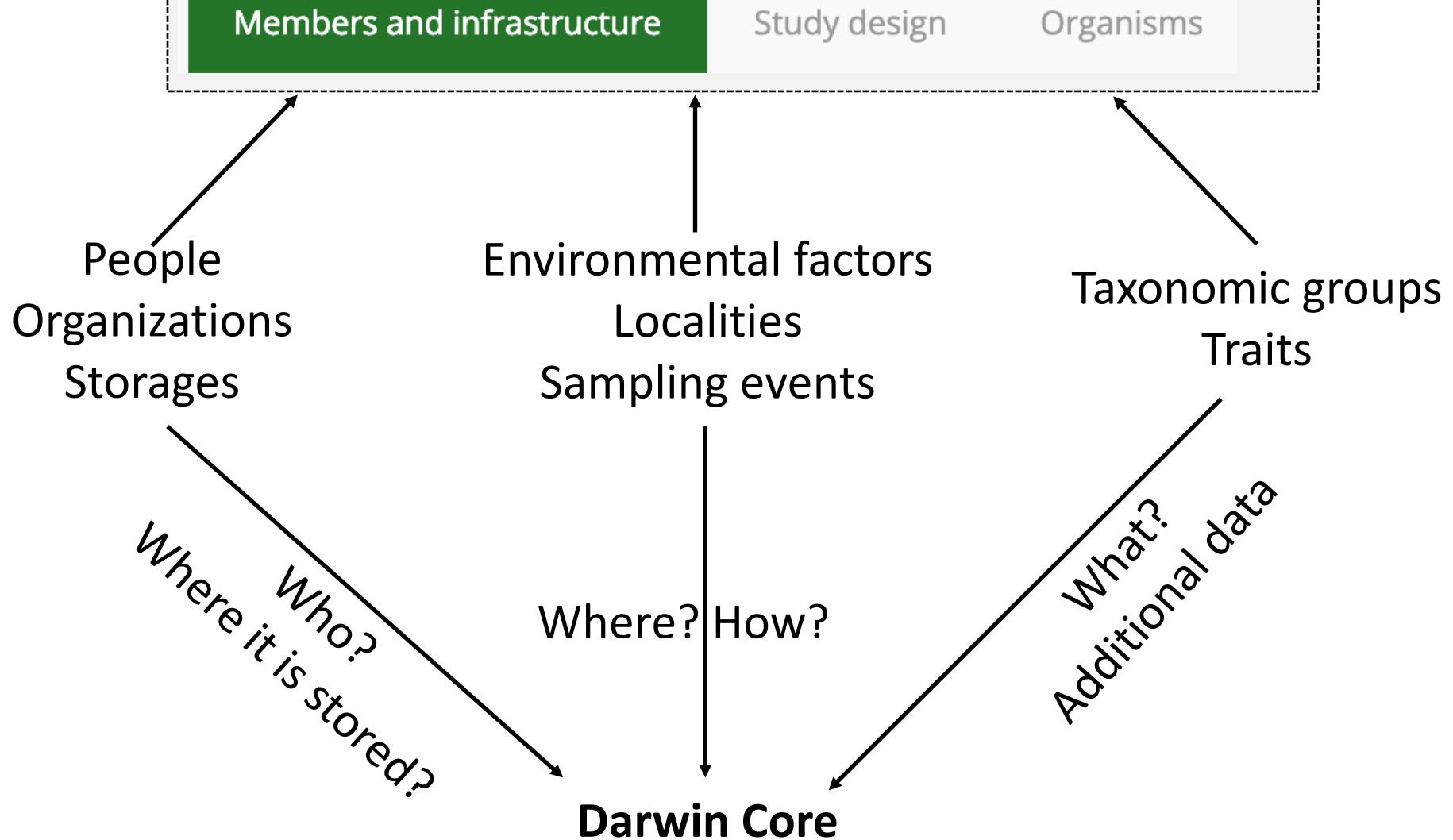
Date finish:

31.12.2019 00:00:00

Projects tree



Project



Ecotaxonomy virtual research environment

Save
Print labels
Finish the sample

Organisms

| | Name | Taxon | Storage | Sample | Count | Sampling event | Pictures | Has pictures | |
|---|------|-------------|-----------------------------|----------|-------|-----------------|----------|--------------|---|
| 1 | DI-5 | Collembola | Collembola-B08-2016-G1a/b/c | sample 1 | 2 | Sampling event1 | | | t |
| 2 | DI-4 | Collembola | Collembola-B08-2016-G1a/b/c | sample 1 | 1 | Sampling event1 | | | t |
| 3 | DI-3 | Collembola | Collembola-B08-2016-G1a/b/c | sample 1 | 1 | Sampling event1 | | | t |
| 4 | DI-2 | Araneae | Araneae-B08-2016-G1/G2 | sample 1 | 3 | Sampling event1 | | | t |
| 5 | DI-1 | Lumbricidae | Others-B08-2016-G1 | sample 1 | 1 | Sampling event1 | | | t |

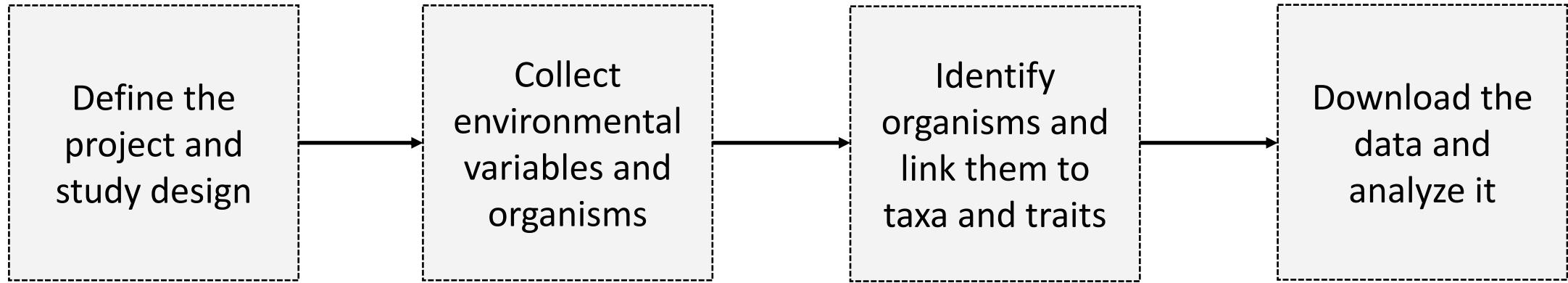
People
Organizations
Storages

Environmental factors
Localities
Sampling events

Taxonomic groups
Traits

+ Add custom traits and custom factors

Project workflow



Profit:

- Data cleaning
- Data standardization
- Use of existing information (traits, taxa, plots etc.)
- Simultaneous data collection by many people

II

Open online cloud repository for (morpho)species and traits

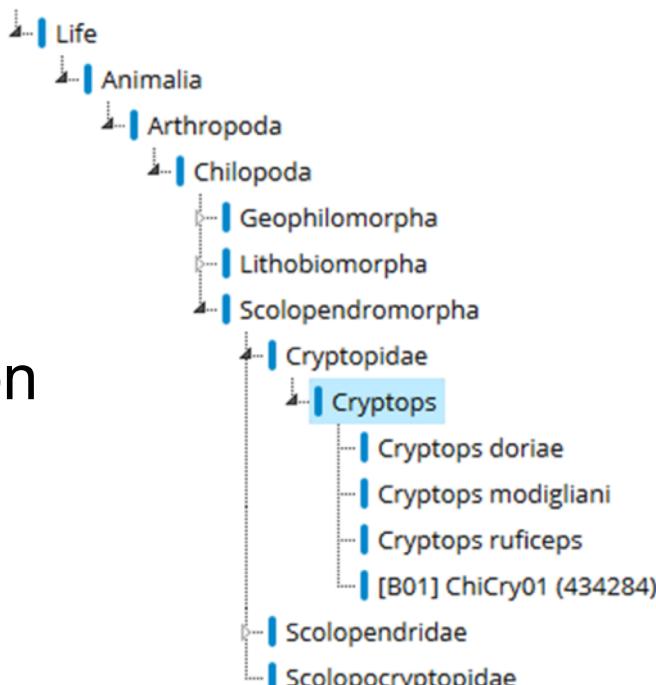


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Pictures from Ecotaxonomy

Ecotaxonomy taxonomic backbone

Tree of life

Browse tree to switch between taxa



- Pictures
- Literature
- Distribution
- Habitat
- Taxonomic diagnosis



Morphospecies



Cleaning
Customization

Taxonomists



Ecologists



Ecotaxonomy trait catalogue

Moretti et al. 2017



Cleaning
Customization

Taxonomists

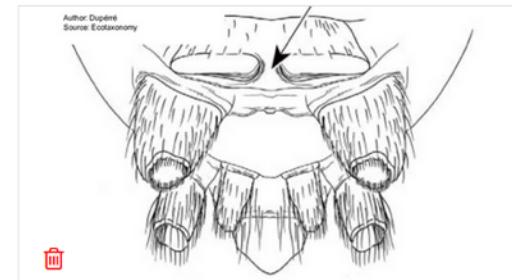


Ecologists



Taxon characters

| | + id | Name | Taxon | Trait type | Primary filter |
|----|------|------------------------------------|----------|------------|----------------|
| 1 | 6645 | Body length (min), micrometers | Animalia | Character | |
| 2 | 6646 | Body length (max), micrometers | Animalia | Character | |
| 3 | 6664 | Body width (min), micrometers | Animalia | Character | |
| 4 | 6665 | Body width (max), micrometers | Animalia | Character | |
| 5 | 6725 | Endites orientation | Araneae | Character | |
| 6 | 6737 | Chelicerae orientation | Araneae | Character | |
| 7 | 6738 | Cheliceral margin denticles | Araneae | Character | |
| 8 | 6739 | Cheliceral promargin modifications | Araneae | Character | |
| 9 | 6743 | Endites serrula | Araneae | Character | |
| 10 | 6744 | Endites | Araneae | Character | |
| 11 | 6745 | Endites cuspules | Araneae | Character | |
| 12 | 6746 | Endites depression | Araneae | Character | |
| 13 | 6747 | Rastellum presence | Araneae | Character | |
| 14 | 6748 | Labium division | Araneae | Character | |
| 15 | 6749 | Labium border | Araneae | Character | |
| 16 | 6750 | Carapace shape (in lateral view) | Araneae | Character | |
| 17 | 6752 | Carapace shape (in dorsal view) | Araneae | Character | |
| 18 | 6753 | Number of eyes | Araneae | Character | |
| 19 | 6755 | 6-eyes-position | Araneae | Character | |
| 20 | 6756 | 8-eyes-position | Araneae | Character | |
| 21 | 6757 | Number of Spinnerets | Araneae | Character | |
| 22 | 6758 | Shape of Spinnerets | Araneae | Character | |
| 23 | 6759 | Colulus presence | Araneae | Character | |
| 24 | 6760 | Colulus shape | Araneae | Character | |



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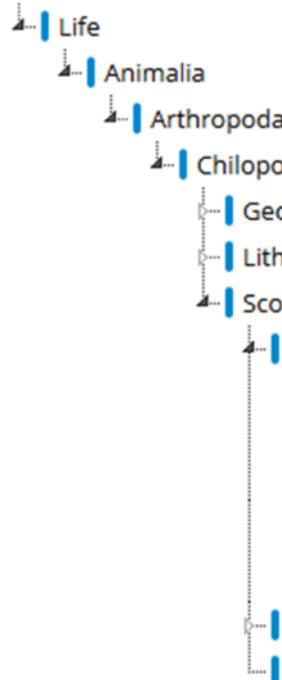
Source: Ecotaxonomy

- Functional / identification / individual
- External ID (URI)
- Description
- Pictures
- Data type
- Taxon-specific

Linking traits to the taxonomic backbone: Top-down data feeding

Tree of life

Browse tree to switch between taxa



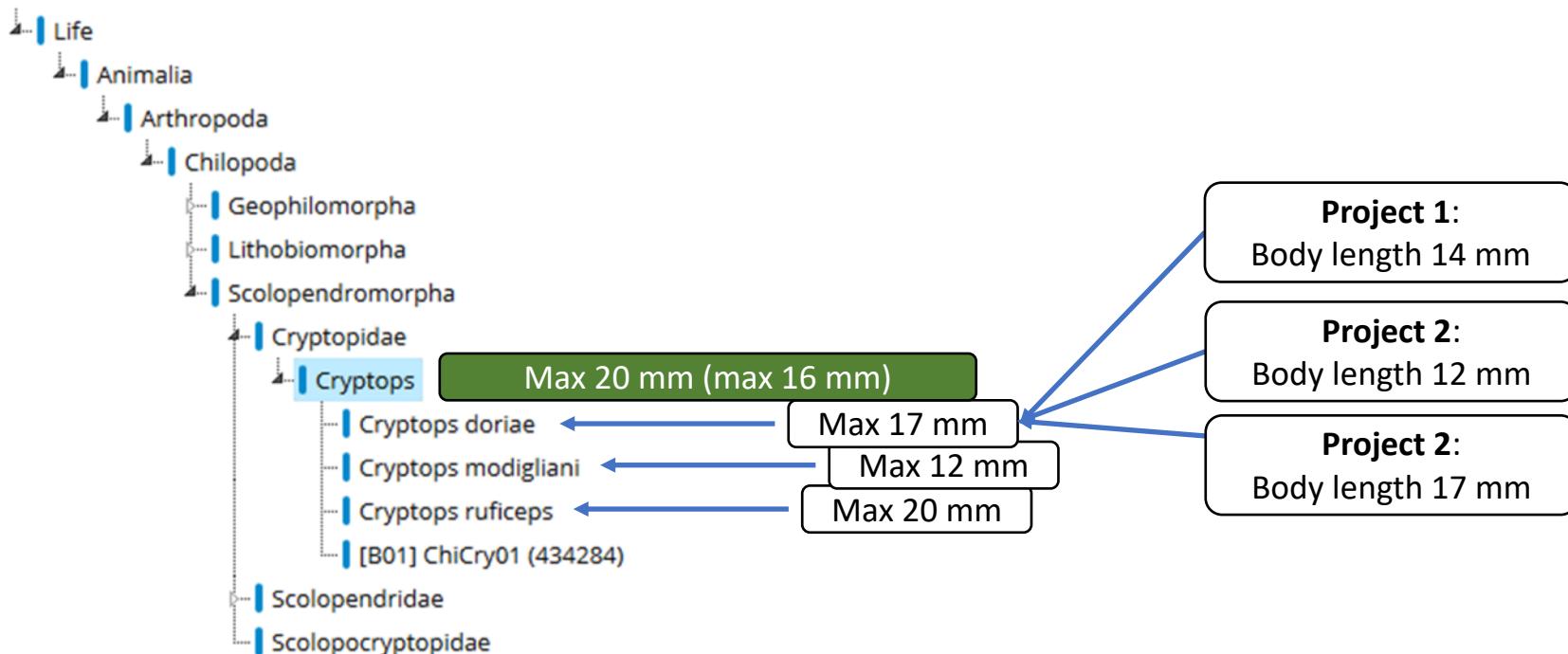
A PREDATOR + literature reference

A HERBIVORE

Linking traits to the taxonomic backbone: Bottom-up and individual data feeding

Tree of life

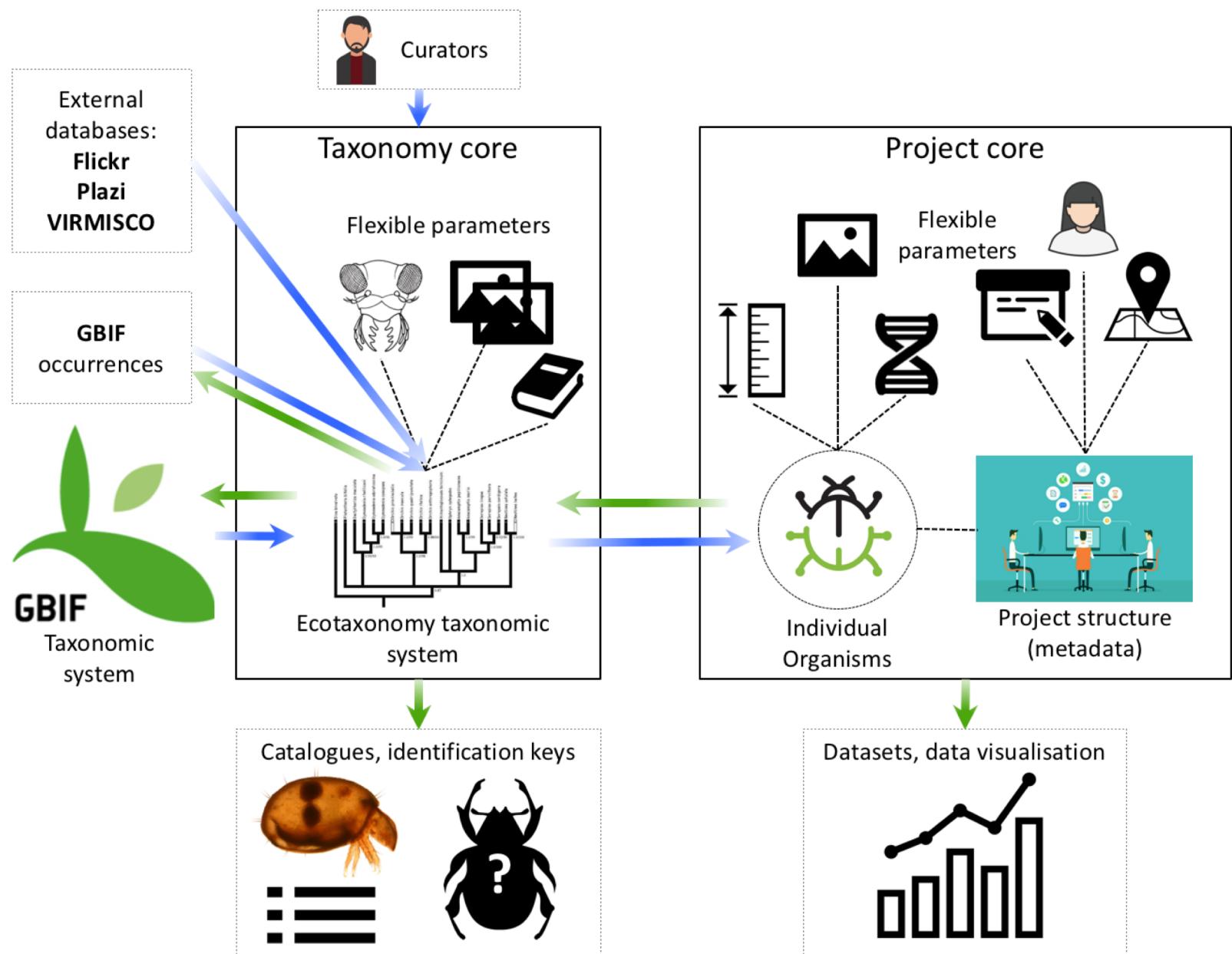
Browse tree to switch between taxa



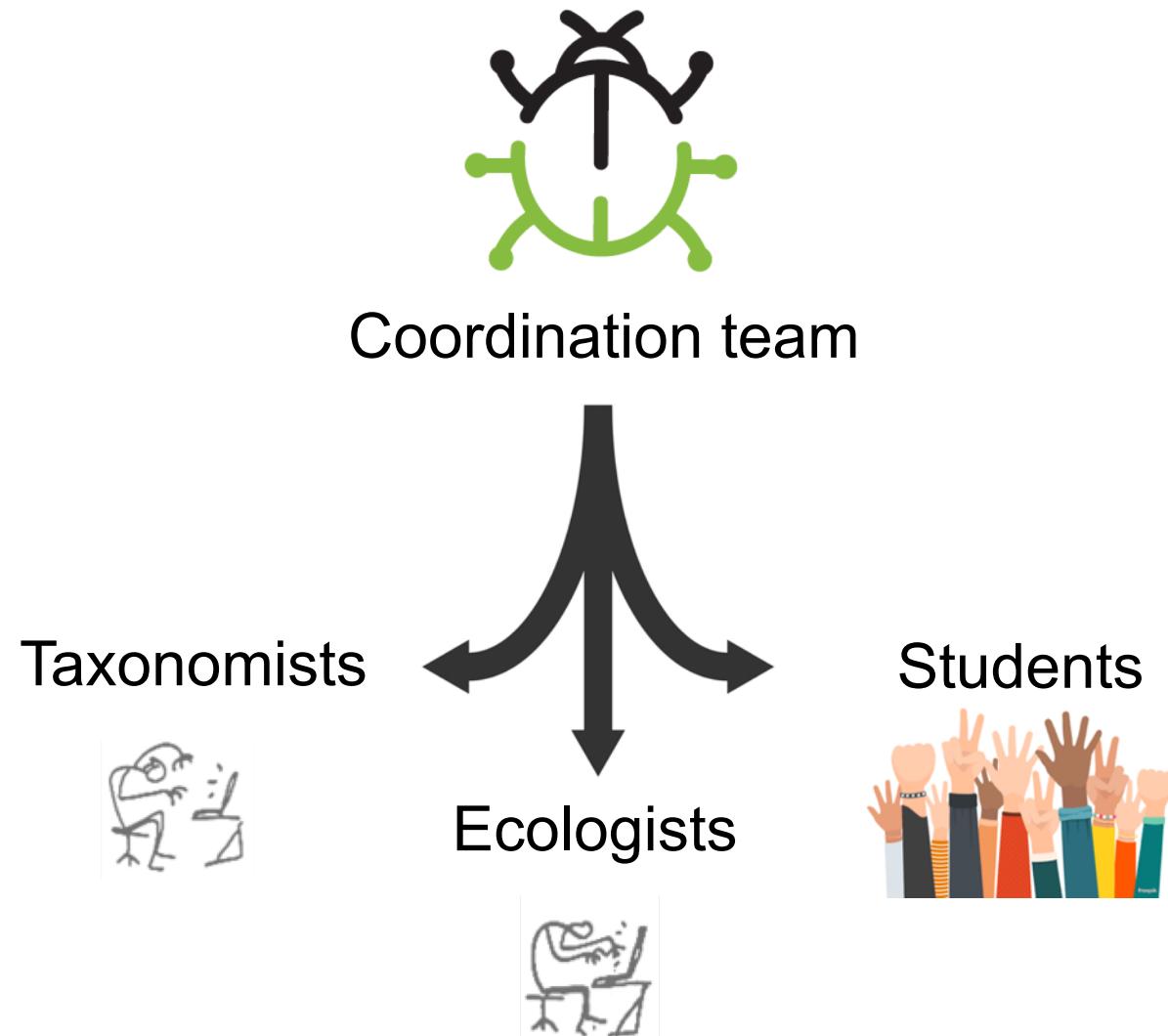
Ecotaxonomy deliverables now

- Project / collection management (virtual research environment)
- Curation of a taxonomic group / morphospecies collection
- Open taxa catalog
- Open trait catalog
- Trait matrices for taxa
- Identification keys

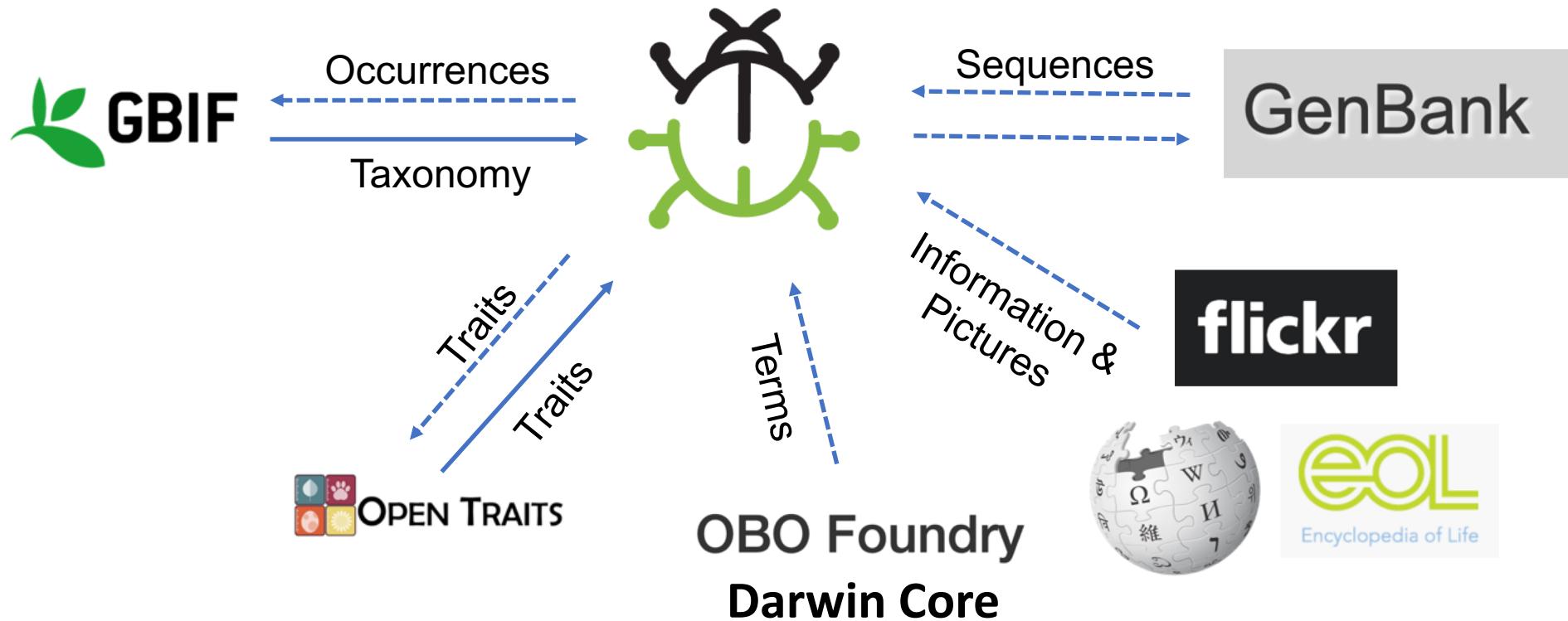




Ecotaxonomy community



Ecotaxonomy in the global online environment



IT development

- Developed by Complex Cloud Solutions (<http://ccs.msk.ru/en/>)
- GoCore platform, based on Node.js, allowing for fast and efficient standardized programming
- Core documentation is available, Ecotaxonomy documentation is in progress
- Custom modules can be implemented in the future by external developers in the framework of the platform.

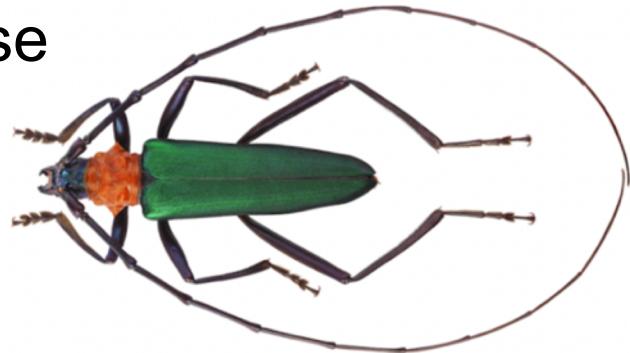


Development stage: Beta testing

Status November 2019



- Beta testing and optimization phase
- Advanced features in 2020
- Funding and maintenance:
University of Goettingen, EFForTS, AG Scheu,
'crowd'funding/maintainance



Total traits:

411

Total morphospecies:

1,444

Total pictures:

21,112

Total projects:

7

Acknowledgements

DFG #CRC990 EFForTS

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Dorothee Sandmann and Stefan Scheu

Collaborators around the world



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Complex
Cloud Solutions
Nontrivial solutions development

