Newsletter #11

October 2008

http://www.e-taxonomy.eu

EDIT

European
Distributed
Institute of
Taxonomy

Recent news

Geoplatform, a new web portal providing unified access to free environmental cartography

(Reprinted from the International Biogeography Society Newsletter, vol. 6, n. 2, Summer/Winter 2008)

Given the need for accessing and processing geographical data, one of the core projects of EDIT is the development of **Geoplatform**, a portal of geographical resources for biologists.

These resources include promoting the accessibility to the environmental digital data through a web page where environmental cartography from diverse sources gathered in a unified way is freely available. This web page is now online at http://edit.csic.es/GISdownloads.html, and includes an important amount of geographical information for a variety of thematic areas, from climate and topography to worldwide regular grids, stored in IDRISI® and ESRI® shapefile formats.

EDIT's Work Package on the Internet Platform for Cybertaxonomy invites the community of taxonomists, biogeographers, ecologists and conservation biologists to access and use this information freely.

They also will be grateful to receive any supplementary information on data sources and/or freely available digital cartography that could be incorporated to Geoplatform's GIS database, thus contributing to the original purpose of the corresponding open information sources: their universal availability.

House of Lords report on the State of Systematics and Taxonomy

The British House of Lords recently conducted its second inquiry into the current state of systematic and taxonomic sciences. EDIT, through its British members (Natural History Museum in London, Royal Botanic Gardens Kew), contributed its viewpoints and resources to the inquiry. The final report was released on the 13th of August. Among its conclusions were:

«(t)he state of systematics and taxonomy in the UK, both in terms of the professional taxonomic community and volunteers, is unsatisfactory—in some areas, such as mycology, to the point of crisis—and that more needs to be done to ensure the future health of the discipline (...) The study of systematic biology, in common with other areas of science, has been transformed by technological innovation. Of particular importance are the development of molecular taxonomy and the potential of web-based taxonomy.

We have no doubt that the benefits to be reaped from technological innovation are enormous. We are aware however that they need to be harnessed with discrimination and we call on the Research Councils and the taxonomic institutions to respond to this challenge.»

You can find the full report at http://www.e-taxonomy.eu/files/houseoflordsreports.pdf.

Erratum

In the previous EDIT Newsletter, the article «First Workshop of EDIT Directors of Collections» was authored by Christiane Quaisser, Leo Kriegsman and René Dekker at Naturalis. The last two were omitted in the first version of our newsletter; we apologise to them.

Publications

This contribution by Brown (Illinois State Uni.), Dubois (MNHN) and Shepard (Uni. of Oklahoma) takes part in an ongoing debate to define the best practice of internet tools for taxonomy. To improve and empower internet-based bibliographic searches, EDIT is developing the Virtual Taxonomic Library (ViTaL). Visit http://taxonlib.org/content/about-virtual-taxonomic-library-vital to know more about this part of the Platform for Cybertaxonomy.

Inefficiency and Bias of Search Engines in Retrieving References Containing Scientific Names of Fossil Amphibians (2008)

Authors: Brown L., Dubois A. & Shepard D.
Source: *Bulletin of Science, Technology and Society (28) 279.*

Abstract:
Retrieval efficiencies of paper-based references in journals and other serials containing 10 scientific names of fossil amphibians were determined for seven major search engines. Retrievals were compared to the number of references obtained covering the period 1895–2006 by a Comprehensive Search. The latter was primarily a traditional library-based search which involved intensive work from 2002–2007. Only a few references originally obtained by search engines were included. (...)

There was also retrieval inefficiency and bias of the search engines in: sampling over time, the top five journals containing the most references, the top five most prolific authors, and non-English references. Consequently, all seven search engines were unsatisfactory for retrieval of references for our scientific research.

FORTHCOMING EVENTS

Taxonomy focal points meeting
7 October 2008, Bratislava

Following the first EDIT meeting on «The future of taxonomy - the role of national focal point networks» held in Smolenice Castle, Slovakia on March 29-30, 2007, EDIT and PESI are organising a follow-up meeting to discuss a collaborative working program for national/regional focal points for European taxonomic checklists and species directories.

Websites: http://eu-nomen.eu (PESI) & http://www.e-taxonomy.eu (EDIT)

Sixth Annual RECOMB Satellite Meeting on Comparative Genomics
13-15 October 2008, Paris

Rapid DNA sequencing technologies have fueled an explosion in genome level data. RECOMB-CG is devoted to the development and utilization of computational methods for the comparative exploration of genome structure, function, and evolution. Both theoretical and applied contributions are welcome, and papers that combine new techniques with new knowledge derived from their application are highly encouraged.

Conference website: http://igm.univ-mlv.fr/RCG08

EDIT International Network Collaboration Workshop
15 October 2008, Copenhagen

EDIT supports the integration of international efforts in biodiversity (see our articles on EoL and PESI in this newsletter). This workshop will help the establishment of better working links all across the world in this vibrant field.

Conference website: http://www. e-taxonomy.eu/collectionusers

Broadening the User Base of Natural History Collections
4-5 November 2008, London

EDIT and SYNTHESYS co-sponsor this meeting of managers and users of natural history collections, aiming at unlocking the powerful potential of these exceptional resources. As society's needs change and grow, so will the importance of specimen collections as a massive library of biodiversity.

Conference website: http://www. e-taxonomy.eu/collectionusers

2nd Summit Forum of Eurasian Museums of Natural History
24-28 November 2008, Maastricht

Special topic: Natural History Museums and the Challenge of Climate Change . The directors of the Natural History Museums of Maastricht, Rotterdam and Brussels cordially invite their peers, influential scientists and senior managers of European and Asian natural history museums and botanical gardens to attend the second 'Summit Forum', to be held at Maastricht (the Netherlands) from 24 to 28 November 2008.

Conference email: summitforum@ maastricht.nl

AMIA Summit on Translational Bioinformatics
15-17 March 2009, San Francisco

Conducted in close partnership with the International Society for Computational Biology (ISCB), this meeting will be an indispensible gathering for translational bioinformatics research and development worldwide. With the completion of human and model organism genomes, and the increasing utilization of biomedical computational methods, translational bioinformatics is evolving rapidly.

The conference will include a track on **Dissecting Disease Through the Study of Organisms, Evolution, and Taxonomy.**

Conference website: http://www. amia.org/meetings/stb09

24th annual meeting of the Society for the Preservation of Natural History Collections
6 - 11 July 2009, Leiden

The topic of this year's SPNHC meeting is: **Bridging Continents - New Initiatives and Perspectives in Natural History Collections.**

Conference website: http:// www.spnhc2009.org

Reminders

- IUCN World Conservation Congress
5-14 October 2008, Barcelona
- e-Biosphere 09
1-5 June 2009, London

April Dinwiddie (Encyclopedia of Life)

EoL : Mirroring the Web of Life

Two-hundred-and-fifty years ago, Carl Linnaeus organized species into a catalogue of life, and today, taxonomists and systematists continue to use the system he founded for classifying the natural world. The process of placing scientific information into categories was not a new concept - methods for arranging knowledge in useful ways have been developed since the beginning of human history, providing the means by which new connections are linked and new discoveries are made. But in today's world traditional approaches to taxonomy are being challenged. Rapid DNA sequencing, new ways to analyze

genes and their products, and high-speed computer technology are accelerating the pace of discovery, and proper measures for managing the vast amounts of new Systema Naturae have yet to be established.

By now, most of the scientific community has heard about the Encyclopedia of Life (EOL) - E. O. Wilson's dream to extend the great Linnaean enterprise, connecting centuries of study to the newest discoveries and challenges in today's world. This project brings together the scattered and often obscure descriptions of the Earth's biodiversity into one web-based research tool. EOL will connect existing databases and compile contributions by experts (both professionals and amateurs) throughout the world. In a way, the World Wide Web, an organic metaphor for connected and exponentially growing knowledge, is meeting the web of life itself.

Within the EOL, five institutions have joined to organize five subprojects: the Species Sites Group, the Biodiversity Informatics Group, the Scanning and Digitization Group, the Education and Outreach Group, and the Biodiversity Synthesis Group. Together, they are working towards one goal: to create a web page for each of the 1.8 million known living species on earth. The EOL will be a powerful resource striving to make internet exploration of the tree of life possible, from its greatest or most isolated boughs, to its individual leaves.

In February 2008, less than one year after Wilson presented his idea at the 2007 TED (Technology, Entertainment, Design) conference, EOL unveiled its website with 25 exemplar species pages, 35,000 content-rich
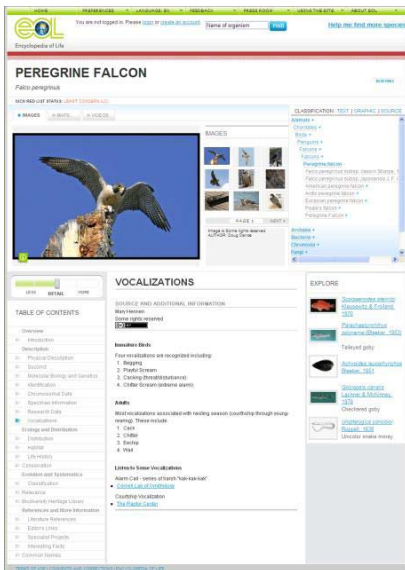
species pages, and over 1 million placeholder pages. While the launch demonstrated that bringing together species content from different sources was possible, the website also attracted criticism: the diverse range of species content that EOL advertised was not available for the alpha release, and the launch generated so much public attention that high amounts of user-traffic brought down the website.

"Once you launch a website," says Peter Mangiafico, with the Biodiversity Informatics Group at the Marine Biological Laboratory in Woods Hole, MA, "it is difficult to let the public know that it is a proof of concept and there is still much to be done."

In addition to regaining public enthusiasm, EOL will need to think creatively about how to assemble information about life on Earth into one fully functioning resource. Pliny the Elder, who produced one of the first encyclopedias, wrote that "it is a difficult task to give novelty to what is old." Compiling the EOL will not be easy, given that adequate taxonomic infrastructure and expertise is diminishing, a trend known as "the taxonomic impediment". Linnaeus himself suggested one truth, a metaphor that can be applied to EOL's ambitious endeavor: Natura non facit saltus - "Nature does not make leaps." While scientific and non-scientific communities urgently require information on Earth's biodiversity, that knowledge will arrive through a series of small steps - the final product of the EOL will be formed by continually achieving petite, but substantial goals.

Today there are fewer than 10,000 practicing taxonomists in the world, but this project will provide them with electronic means to access past and current research, and should inspire and enable many more to join their efforts. A planned Fellows program will allow rising or retiring taxonomists to share their expertise with students. EOL is partnering with the Biodiversity Heritage Library (BHL), a consortium of ten of the

world's largest natural history and botanical libraries, which are digitizing, indexing, and mounting much of the published literature on the Earth's biodiversity. A researcher will be able to electronically access all the literature about a particular species, and peruse the collected information provided by EOL, in order to more quickly prepare taxonomic revisions and monographs.

EOL hopes to reorganize Nature's lab bench, sorting past scientific research so that new connections can be made. This expanding resource will inspire new ways of analyzing and visualizing information, and will allow biologists and others around the world to participate together and present their findings to a wider audience.

"My hope is that this project will enable new types of questions to be asked about complex systems," says James Edwards, Executive Director of EOL. "Unlike microscopic queries of incredibly small things, the EOL will enable macroscopic questions to be asked about the Earth's species, and we will be able to visualize impacts on nature in a complete and global manner."

If you would like to know more about the Encyclopedia of Life and its efforts, please visit www.eol.org

A Pan-European Species directories Infrastructure (PESI)

Y. de Jong (UvA)

PESI is a new initiative, funded by the European Union under the Framework 7 Capacities Work Programme, Research Infrastructures. It will be a three-year project, starting in May 2008. Led by the University of Amsterdam, it will involve 40 partner organisations from 26 countries. PESI will take forward and build upon important components of the EDIT working program on establishing expertise networks and e-Infrastructures for pan-European species directories.

Expertise network integration

PESI defines and coordinates strategies to enhance the quality and reliability of European biodiversity information by integrating the infrastructural components of the major European networks on taxonomic indexing into a joint work programme. This will result in functional knowledge networks of taxonomic experts and regional focal points, which will collaborate on the establishment of standardised and authoritative taxonomic (meta-) data. The output will be a standards-based, quality-controlled, expert-validated, open-access infrastructure for research, education, and resource management.

Pan-European species registers integration

The PESI project is the next step in integrating and securing taxonomically authoritative species name registers that underpin the management of biodiversity in Europe. PESI will integrate the three main all-taxon registers in Europe, namely the European Register of Marine Species, Fauna Europaea, and Euro+Med PlantBase in coordination with EU-based nomenclators and the network of EU-based Global Species Databases (the latter in close collaboration with Species2000 Europe).

e-Infrastructure integration

PESI will coordinate the integration and synchronisation of the European taxonomic information systems into a joint e-infrastructure and the establishment of a common user interface disseminating the pan-European checklists and associated user services.

Focal Point networks set up

The organisation of national and regional focal point networks as projected not only assures the efficient access to local expertise, but is also important for the synergistic promotion of taxonomic standards throughout Europe. The latter includes proper liaisons with governmental bodies at the national level as taxonomic standards are a prerequisite for the implementation of European biodiversity legislation.

Contribution to global efforts

PESI supports international efforts on the development of a 'Global Names Architecture' by building a common intelligent name-matching device in consultation with other principal initiatives. PESI contributes to the development of a unified cross-reference system and provides high-quality taxonomic standards. PESI will involve the Europe-based nomenclatural services and link the planned joint European taxonomic e-infrastructure to the global e-gateway.

Website: http://www.eu-nomen.eu

M. Leal (Missouri Botanical Garden)

Locating climatically stable forests in West and Central Africa

Fig. 1: New species : *Amphiblemma mvensis* **Leal**

Recent studies from major NGO's like the Botanic Gardens Conservation International (BGCI) and WWF have raised the urgent need to adapt conservation strategies and approaches to climate change. Ahead of this awareness Missouri Botanical Garden already started searching for the climatically stable forests in Gabon and Equatorial Guinea a few years ago in the early phases of CARPE (Central African Regional Program for the Environment). These forests not only turn out be climatically stable, but also very high in biodiversity and rich in endemics and already several new species discovered in the areas have been described.
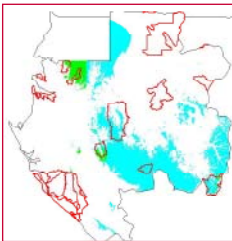
Mapping the climatically stable forests in Gabon also showed that much of it was present outside the park system. Knowing that with socio-economic development of Gabon much of the primary forest in between the parks would disappear by logging and plantations the urgency rose to try to protect as much additional forest as possible. Fortunately, by Gabonese law logging companies have to set aside 5 % of their concession, which can be turned into Biodiversity Sanctuaries.

The same analysis showed that searching for climatically stable forest in West Africa is already too late. Most of the forest in between the protected areas was already disappeared with socio-economic development and more will disappear with going global warming, especially with the Sahara so near. But more disturbing is the observation that virtually nothing is left from the climatically stable forest (see Fig. 2). It would be conservation wise to start to reforest this lost forest, and one way to help conserve the climatically stable forests in the rest of Central Africa would be to rate them with the highest carbon credits so that there is an economic incentive to preserve them. If not Europe will be the first to feel the heat with no north pole ice and an extended Sahara.
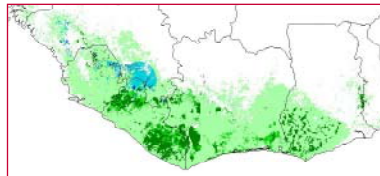

Fig. 2: Climatically stable forests (CSF) in Gabon (green: wet, blue: humid, outlined in red: parks)

Fig. 3: Croplands and plantations, dark blue: climatically stable forests; light blue: lost climatically stable forests).

7

P. Grard, J. Prosperi, P. Bonnet, C. Edelin
(UMR AMAP - CIRAD, Montpellier)

IT&C for understanding and assessing biodiversity

This paper focuses on an initiative in the emerging area of biodiversity informatics .

We explore different botanical groups, like weeds, mangrove trees, pollens, orchids, deciduous or evergreen trees from major "hotspots" of biodiversity with the view to learn about appropriate applications of IT&C for understanding and assessing the biodiversity.

Our botanical knowledge bases were built on a species identification system called IDAO (IDentification Assistée par Ordinateur, Grard, 2002).

This software is instrumental in understanding and assessing the biodiversity of these highly significant areas, as it provides and facilitates dissemination of scientific and traditional knowledge. It was conceived not only to facilitate the access to the information on species, but also to improve training initiatives. It proposes a new identification tool, different from classical floras frequently old and out-dated, unavailable or not easy to use for non specialists.
The effectiveness of identification methods has been profusely analysed and documented in recent years. IDAO differs from other computer-based species identification systems because:
- It uses only drawings instead of technical jargon and provides users the freedom to choose the character that needs to be described.
- Missing information or data are permitted, thus allowing for the identification of incomplete samples.

- A certain level of observational error is also tolerated and, at each step of the identification process, a probability of resemblance is calculated for each species. Thus, species are sorted by decreasing order of similarity.

The different implementations are available on-line, on CD-ROMs for personal computer platforms as well as on UMPC (ultra mobile PC) a low-cost computing device with local language support and which allows for regular updates of data through the web-based database. This UMPC seems to be appropriate to use in the field identification work.

The realization of these species identification system requires a fine expertise of the botanical discriminant characters between listed species
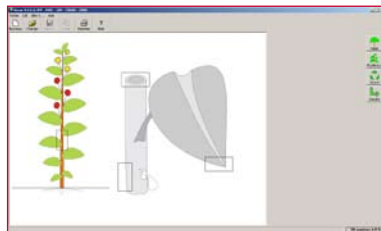

Figure 1: Weeds identikit - http://www.ifpin-dia.org/oscarasia/

in order to realize "the identikit".

The identikit uses a graphic interface based on a system which reconstitutes the plants using drawings. The identikit changes following the flora under study. It is relatively simple for
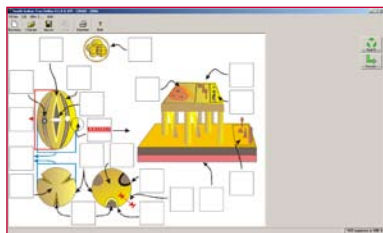
Figure 2: Pollen identikit - **http://www.ifpin-dia.org/Identification-des-Grains-de-Pollen.html**

weeds identification and much more complex for orchids, trees or pollen.

It comprises the most pertinent vegetative and sexual characters and all the states of these characters, and this, for at least more than 300 species. The identikit is quintessential to the software because this helps the end-user to cross-match any character to any others, making all kinds of combinations possible.

The users can access the photos, the description and the botanical illustrations of the species at any moment. In case users encounter doubt in the choice of characters (for description), they could ask the program for the most pertinent one. If the probability of a species identified is less than 100 per cent, the program indicates the characters that contain observation errors by the user.

The descriptions of the species can be available through the Internet website with any type of browser. Some implementations have been done with description files in Lao, Khmer, Hindi, Urdu, Kannada, Malayalam, Tamil, Bangla, Vietnamese, English and French, catering a larger section of people. All the technical terms used are highlighted and, at a click, a hypertext illustrated definition is accessible.

The IDAO projects belonging from CIRAD, aims to develop and sustain a long-term cooperation between Europe and South and South East Asia in the area of taxonomy and information technology.
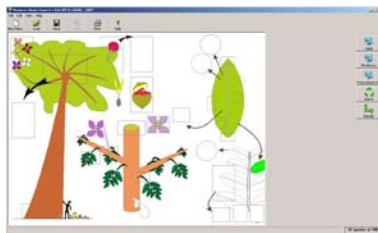
Figure 3: Trees identikit - **http://www.biotik.org/**

Thus, these collaborative initiatives allow us to build a large partnership with the French Institute of Pondicherry (FIP) in India, the Rice and Wheat consortium of Bangladesh, India and Nepal, the National University of Lao (UNoL) and the National Agriculture and Forestry Research Institute (NAFRI) in Lao PDR, the Royal University of Agriculture (RUA)

Figure 4: Orchids botanical description in Lao - **http://www.orchisasia.org/**

in Cambodia and, the Nationaal Herbarium Nederland (NHN), Leiden, in the Netherlands.

By sharing European know-how in the field of taxonomy with Asiatic and European partners, our projects intend to build knowledge bases, to benefit the South and European communities.

Most of our projects were co-funded by the European Commission under the ASIA IT&C and Asia-Invest ALLIANCE programmes.

9

P. Kelbert (FUB-BGBM), Berlin EDIT team

The new EDIT specimen and observation explorer for taxonomists

Since 2001, the GBIF (Global Biodiversity Information Facility) has been networking worldwide biodiversity data and making them freely available on the Internet. Currently, more than 150 million records (from simple occurrence data to highly structured specimen observation) are indexed by GBIF and accessible through several web portals. Almost all records available via these systems include the Latin name of the organism; which is used as a primary search term.

The scientific names provided by the data sources may include synonyms. For the GBIF Index, these are referred to accepted names in the indexing process, using checklists such as the Catalogue of Life (Froese and Bisby 2002). Users can only access records by searching the accepted name or the synonym referenced by the checklists used.

Search results could be significantly improved with a thesaurus system that allows for user-controlled expansion of query terms to synonyms, related taxa in the taxonomic hierarchy and related taxonomic concepts from additional checklists.

In the context of the SYNTHESYS project (Networking Activity D) a checklist-driven access to European collection and observation data was developed, the "TOTO prototype" (see http://search.biocase.org/toto). TOTO is capable of taking Latin names and expanding

Figure 1: The new EDIT data explorer – advanced search

them with related query terms from a taxonomic thesaurus (checklist).

EDIT has taken TOTO and the BioCASE portals (see http://search.biocase.org), further developed them, and integrated them into a search portal providing a new GBIF-data explorer for taxonomist. This new EDIT portal, tailored to taxonomist's needs, is giving users full control of the query expansion process (see figure 1).

Available in 11 languages (see figure 2),

this new interface provides users with fast and easy-to-use access to worldwide biodiversity data, and offers full control over taxonomic query expansion. Users can choose which thesauri to use; choose to include or exclude types of relationships (synonyms, related taxa in the taxonomic hierarchy, and related taxonomic concepts such as misapplied

Figure 2: EDIT data explorer: preferences and languages

names); and individually mark or unmark discovered "related" names for inclusion in the search (see figure 3).

The portal accepts one or more Latin names, suggests related query terms for both zoological and botanical data, expands the query accordingly and offers complete BioCASE portal functionality for resulting specimen and observation data. It can be accessed under http://search.biocase.org/edit.

Currently (August 2008), the EDIT data explorer for taxonomists uses the following sources for query expansion:
•"Euro+Med Plantbase" - an information resource for Euro-Mediterranean plant diversity
•"European Register of Marine Species" - an authoritative taxonomic list of species occurring in the European marine environment
•"Fauna Europaea" - a database of scientific names and distribution of all living multicellular

European land and fresh-water animals.
•"German standard checklist" - the standard list of the ferns and flowering plants of Germany
• "Reference list for the German Bryophytes"

Search example

Two kinds of search are available on the EDIT specimen and observation explorer for taxonomists: a simple search and an advanced search. The simple search makes it possible to search for units (collection and observational data) by entering a Latin name. The primary term used by the advanced search can be a scientific name, a vernacular name, a family, a genus, a collector name, a locality, a field number, a collector number or a unit ID (catalogue number). Both search types can be combined with a query extension.

Step 1: search form
- Simple search: enter a name in the search field – for example *Calendula aegyptiaca.*
- Advanced search: enter one or more fields to search.
- If you would like to expand the search to related names and synonyms using thesauri, click on the binocular icon. Note: this option is also available in the second step.
- Click on the "Search" button.

Step 2
Case 1: without query expansion
A preview of the available units is displayed. If you would like to expand your query, select several scientific names (max. 10), then click on the "Expanded search" button. All pre-defined thesauri will be used for the expansion process.

Case 2: with query expansion (see figure 3): A list of concepts returned by the thesauri is displayed. You can browse the list, choose the related names and synonyms you are interested in, and then click on the "Search!" button. You will be redirected to the preview page, where your query will have been
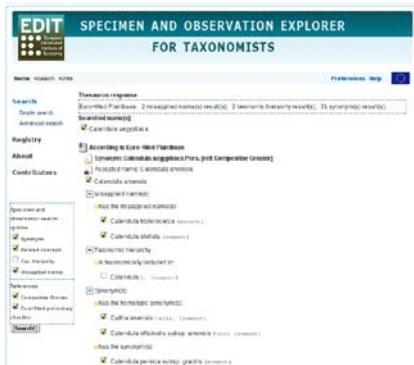
ARTICLES

Figure 3: List of related concepts and synonyms returned for *Calendula aegyptiaca*

expanded with the terms you selected.

Refine your query by selecting/deselecting items in the different tabs (collection, country, basis of record...), then click on the "Get units" button.

Note: if your search returns more than 10.000 units, you will have to add a filter to your search to refine it.

Step 3
A multi-paged table containing single units is displayed. You can change your preferences to see more detail columns.

Clicking on a scientific name shows the original provider record. You can also select several units at once then click on the "See details for the selected units" link.

As a next step in development, users will be able to save query results in a CDM (EDIT Common Data Model) database for use in the EDIT Platform for Cybertaxonomy. We also would like to incorporate or link further taxonomic datasets to widen the possibilities of query expansion.

We would therefore like to ask all EDIT Partners to provide further relevant taxonomic datasets to improve the possibilities of query expansion.

12

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