SMALL PIECES
LOOSELY JOINED

PRODUCTS OF THE ViBRANT
VIRTUAL RESEARCH COMMUNITY

ViBRANT
Virtual Biodiversity

ViBRANT
Virtual Biodiversity

ViBRANT Products Brochure

Produced in November 2013

ViBRANT is funded by the European Union 7th Framework Programme within the Research Infrastructure group.

Contract no. RI-261532

Coordinator Dr Vincent S. Smith

Email: enquiries@vbrant.eu

Designed by Fredrik Ringefors
and Malin Nikunlassi

Introduction

Virtual Biodiversity Research and Access Network for Taxonomy (ViBRANT) is a European Union funded project that supports the development of virtual research communities involved in biodiversity science.

ViBRANT
Virtual Biodiversity

Small Pieces Loosely Joined

In 2009, when ViBRANT was planned, the landscape of biodiversity informatics systems and software was highly fragmented. The FP7 funded ViBRANT project has played a significant role in reducing that fragmentation, by developing a robust network of compatible services that are integrated through the Scratchpad virtual research environment.

Scratchpads are a tool that allow individuals or groups to self-assemble around research topics of mutual interest and share their data in a structured and reusable form. Scratchpads are the coordination point for ViBRANT, helping to bring together a diverse network of biodiversity tools and connecting them to researchers in a unified way. Through this network our goal was to shed light on the long tail of dark data being generated by biodiversity scientists, and make these data accessible and reusable to all.

Within this booklet you will find brief descriptions of the major products of the ViBRANT project and see how they are interlinked. Although the EU-funded phase of ViBRANT comes to an end in November 2013, all these products have been adopted by a host institution and have a sustainable future beyond the project. On behalf of the ViBRANT consortium, we hope that you will find something in here of direct relevance to your own work.

Dr Vincent S. Smith, ViBRANT Coordinator
Natural History Museum, London, November, 2013

Scratchpads

biodiversity online

scratchpads.eu

Scratchpads is an open source and free to use platform that enables researchers to work in a collaborative online environment. With a Scratchpad you can easily create a website to structure, manage, link and publish biodiversity data.

Scratchpads store all kinds of biodiversity data from taxonomies, media, literature to structured species descriptions, biological observations, morphological and ecological traits, and more. These data are connected through workflows and enable researchers to share and link information with all the major biodiversity repositories including: Encyclopedia of Life (EOL), IUCN Red List, the Global Biodiversity Information Facility (GBIF), Biodiversity Heritage Library (BHL) and the Bibliography of Life. An extensive suite of communication tools, including forums, blogs, newsletters and content feedback allow users to nurture and sustain vital online discussions with their peers. With the new Scratchpads publication module users can formally publish data from their Scratchpad to Pensoft's Biodiversity Data Journal.

The Scratchpads homepage where anyone can sign up for a Scratchpad site.

Team / lead partners:

Natural History Museum, London.

Who is it for?

Researchers, amateur naturalists and citizen scientists. Scratchpads are an online virtual research environment for biodiversity, allowing anyone to share their data and create their own biodiversity research networks.

How is it used?

Scratchpads can focus on specific taxonomic groups, the biodiversity of a biogeographic region, or indeed any aspect of natural history. Scratchpads are also suitable for societies or for managing and presenting projects. Key features of Scratchpads include: tools to manage biological classifications, bibliography management, media (images, video and audio), rich taxon pages (with structured descriptions, specimen records, and distribution data) and character matrices.

How much is it used?

As of November 2013 there are 627 Scratchpad communities created by over 6,900 users, with over 650,000 pages of content (http://scratchpads.eu/explore).

Training, Support and Outreach

scratchpads.eu/support/training

You do not need to be a website developer to build a Scratchpad. We provide comprehensive training and support to help users customise their site.

A major part of the project is dedicated to training and promoting the Scratchpads platform. International training sessions, given online and on-site, play an important part in assisting both new and existing Scratchpad users.

Scratchpads use a wiki-based documentation system and a public bug/issues tracker. Together, these play a vital role in connecting Scratchpad users with the Scratchpad developers.

Throughout ViBRANT we have built up a global network of Scratchpad Ambassadors. These are experienced Scratchpads users from around the world that support their local user community, linking the Scratchpads Support Team with their user base.

How does it connect with Scratchpads?

The major objective of the 'Training, Support & Ambassadors' programme is to enhance the development of Scratchpads and to support and grow the user communities, leading to increased production of digital biodiversity information.

A Scratchpads training course for scientists attending the pro-iBiosphere meeting, February 2013.

Team / lead partners:
Royal Belgian Institute of Natural Sciences; Natural History Museum, London; Vrije Universiteit Amsterdam.

Who is it for?
Anyone using Scratchpads or for new users who want to create a Scratchpad to share and manage their data.

How is it used?
Scratchpads support is provided in multiple ways:

- On-site and online training to help current and prospective Scratchpads users to develop site building skills and to guide them through major Scratchpads features;
- A wiki-based help system which provides the basis for online and printed training manuals, an FAQ and training videos;
- A project-management system (Redmine) that the team use to track all bug reports, feature requests and support queries posted by users;
- A worldwide network of Ambassadors that supports local Scratchpads communities

How much is it used?
Over 450 participants have attended 38 international on-site & online training sessions throughout ViBRANT. We have tracked a total of 2,907 issues that have been submitted to the Scratchpad project management system. Of these more than 2,500 have been successfully resolved. The Scratchpads help wiki has had over 128,000 views since its creation in March 2012. Twenty users from 16 different countries have signed up for the ambassadors scheme.

KOS
Knowledge Organisation System

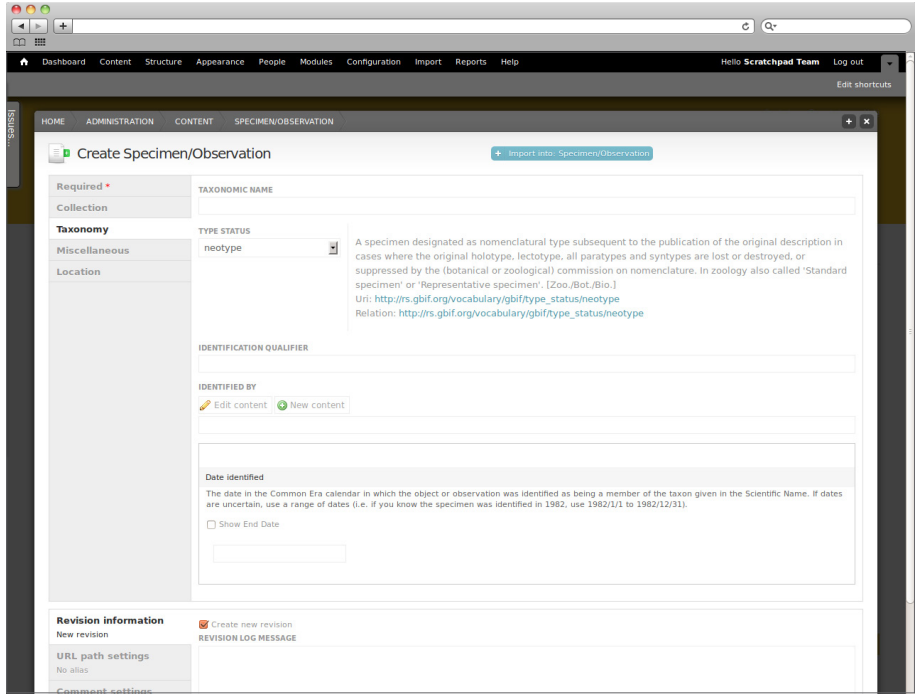
kos.gbif.org

Controlled vocabularies are an essential foundation for data interoperability within the biodiversity domain. During the ViBRANT project, routines and mechanisms to build, manage and exchange vocabularies have been developed.

Vocabulary management systems enable a community to develop and manage terminology for their domain. After the evaluation of different tools, Semantic MediaWiki (SMW) was selected as the application of choice for the GBIF/ViBRANT community. Once a vocabulary is ready, it is published in relevant registries for discovery and access through the wiki. An example of a ViBRANT registry is the GBIF Resources Repository, enabling the use of vocabularies by other systems, including Scratchpads. Both vocabulary management and discovery systems are part of the Knowledge Organisation System (KOS), which is being developed as a new architecture for biodiversity information resources and is hosted by GBIF.

How does it connect with Scratchpads?

The controlled vocabularies in Scratchpads are replaced by vocabularies from the GBIF Resources Repository. Updates of GBIF terms can be applied on the Scratchpads sites, giving maintainers the option to decide how the changes are applied.



Using a GBIF vocabulary in Scratchpads for definitions of biological specimen type status.

Team / lead partners:

Global Biodiversity Information Facility; Julius Kühn-Institute, Berlin; Natural History Museum, London; Royal Belgian Institute of Natural Sciences.

Who is it for?

The GBIF Knowledge Organization System (KOS) is available for any user to develop or publish controlled vocabularies.

How is it used?

For the development of vocabularies GBIF/ViBRANT uses the Semantic MediaWiki as a community platform (see http://species-id.net). For wider outreach and access of the vocabularies, the GBIF Resources Repository and GBIF Resources Browser Tools provides interfaces for machine or human access respectively. In Scratchpads, terms are linked to the MediaWiki, where changes or additions can be proposed.

How much is it used?

The KOS system is still in an early stage of development and is routinely used by a few researchers seeking to build more effective tools for the rest of the community.

Platform for Cybertaxonomy

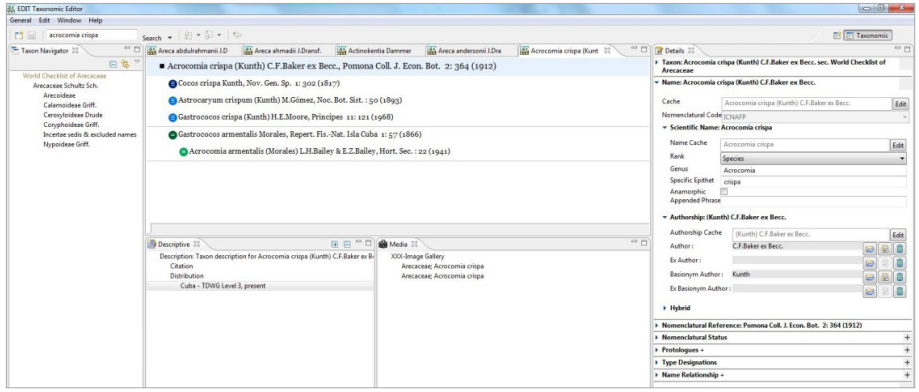
cybertaxonomy.eu

The EDIT Platform for Cybertaxonomy consists of a set of software tools that enable taxonomists to process taxonomic data and to share these data with the community.

The EDIT Platform supports the full taxonomic workflow from data acquisition to publication. It consists of a data store (the CDM), software for advanced data processing and capture (the Taxonomic Editor), and a series of web portals for viewing and querying these data. In ViBRANT the emphasis is interoperability – taxonomists using the EDIT Platform can now share their data with users of other platforms (for example Scratchpads) by means of agreed international data standards. The Platform benefits from extensible and flexible data import and export facilities. For example, these allow import of data from all the Scratchpads to create a single web service that allows searching of all Scratchpads, as well as exporting tools that support publishing PDF documents for floral treatments and publishing Mediawiki taxon pages of taxonomic hierarchies.

How does it connect with Scratchpads?

Scratchpads and the CDM are interoperable. Data can be exported from Scratchpads and imported into the CDM where it can be processed, edited and queried using the CDM toolset.



The EDIT Taxonomic Editor showing the taxonomy editor and taxon metadata.

Team / lead partners:

Freie Universität Berlin; Botanic Garden and Botanical Museum Berlin-Dahlem.

Who is it for?

The EDIT platform is suitable for taxonomists who wish to optimise and accelerate the taxonomic workflow, starting with field work, collection and observation, and ending with publication. It is largely geared towards taxonomists working as part of a community wishing to work on shared datasets.

How is it used?

The EDIT Platform is used to edit, search and integrate taxonomic data from a variety of sources. It consists of a collection of tools and services which together cover all aspects of the taxonomic workflow. Data can be imported into the platform from Scratchpads. In addition data can be exported and published as PDF documents or as Mediawiki pages for archiving.

How much is it used?

The CDM hosts two of the major European checklists (Fauna Europea and E+Med Plantbase) organised by PESI (http://www.eu-nomen.eu), a variety of faunas and floras, as well as serving the needs of researchers within the Berlin Botanical Gardens.

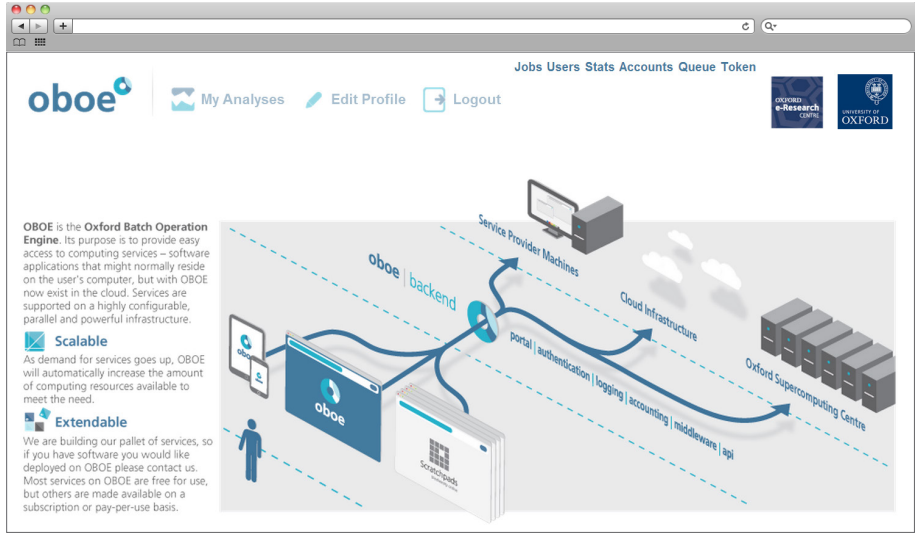
oboe.oerc.ox.ac.uk

OBOE is a web-based platform providing easy access to research computing applications for biodiversity researchers and Scratchpad users.

The trend in research computing is moving towards the delivery of community applications through a uniform interface and user experience. OBOE is a science gateway to research computing, with new methods available to developers to integrate new applications as software services, removing the need for them to build bespoke user interfaces or manage software delivery. For the user, OBOE provides easy and uniform access to well-known community research applications without the need for software installation or technical knowledge of running software in the cloud.

How does it connect with Scratchpads?

Scratchpad users can access all of OBOE's functionality directly from within the site. The technology underpinning Scratchpads communicates seamlessly with OBOE's web services.



OBOE homepage showing a structural overview of the platform.

Team / lead partners:

Oxford e-Research Centre, University of Oxford.

Who is it for?

The applications available through OBOE are currently for taxonomists, biodiversity researchers, and land-use planners. OBOE is a general platform for access to research computing with a growing number of powerful research applications.

How is it used?

OBOE is a cloud-based web platform, meaning that the computing applications made available are all hosted in the cloud and the user never has to deal with software installation.

How much is it used?

During ViBRANT the OBOE service has been used by 200 researchers from 30 countries to perform over 950 tasks.

A peer-reviewed open-access journal

Biodiversity Data Journal

Launched to accelerate biodiversity data journal

biodiversitydatajournal.com

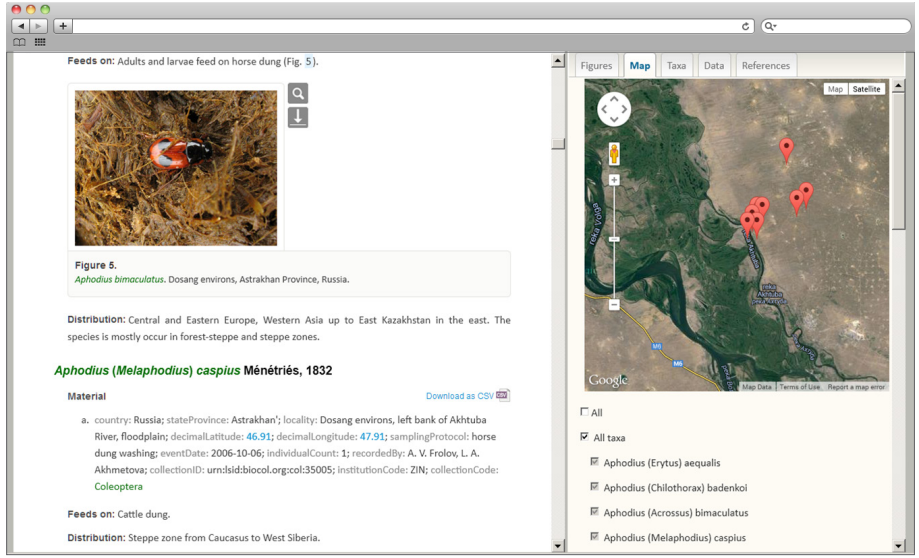
The Biodiversity Data Journal (BDJ) and associated Pensoft Writing Tool represents the next generation of scholarly publishing through a single authoring, peer-review, publishing and online collaborative platform.

The BDJ is a novel, community peer-reviewed, open-access journal, launched to accelerate the mobilisation, dissemination and sharing of any biodiversity-related data. All elements of the articles – text, descriptions, species occurrences, data tables, etc. – are treated, stored and downloaded as data in both human and machine-readable formats. The journal publishes papers on any taxon of any geological age from any part of the world with no limit on manuscript size, for example:

- new taxa, nomenclatural acts, traditional & interactive identification keys;
- Local or regional checklists, ecological and biological observations of species and communities;
- Data papers describing biodiversity-related databases & descriptions of biodiversity-related software tools.

How does it connect with Scratchpads?

The journal accepts manuscripts generated by the Scratchpads Publication Module in XML format through the Pensoft Writing Tool, at the “click of a button”.



A recently published BDJ article on Aphodiini scarab beetles showing distribution data.

Team / lead partners:

Pensoft Publishers; Natural History Museum, London.

Who is it for?

Biodiversity scientists and data managers, aggregators and users of biodiversity information.

How much is it used?

During the first two months after its launch on 16th of September 2013, BDJ published some 50 articles (taxonomic descriptions, data papers, software descriptions and general research articles) including *Beyond dead trees: integrating the scientific process in the Biodiversity Data Journal* and *Eupolybothrus cavernicolus Komerički & Stoev sp. n. (Chilopoda: Lithobiomorpha: Lithobiidae): the first eukaryotic species description combining transcriptomic, DNA barcoding and micro-CT imaging data.* In the first three months since launch the journal has attracted more than 1,000 users and this number increases daily

PENSOFT Writing Tool

pwt.pensoft.net

The Pensoft Writing Tool (PWT) is a manuscript-authoring, online, collaborative platform that is able to accept XML-born manuscripts. It is integrated with peer-review and editorial management, publishing and dissemination tools, currently realised through the Biodiversity Data Journal.

The Pensoft Writing Tool supports the full life cycle of a manuscript, from writing through submission, revisions and re-submission within a single online collaborative platform. Authors can select from a set of pre-defined, but flexible, nomenclatural codes and Darwin Core compliant article templates. The tool can convert Darwin Core and other data files into text and vice versa, from text to data. Data-structured manuscripts can be automatically generated from various platforms (Scratchpads, GBIF Integrated Publishing Toolkit, authors' databases). Authors can also choose to create a manuscript, collaborate with co-authors and peers before having their manuscript formally peer-reviewed.

How does it connect with Scratchpads?

The PWT accepts manuscripts generated by the Scratchpads Publication Module through a novel, entirely XML-based workflow.

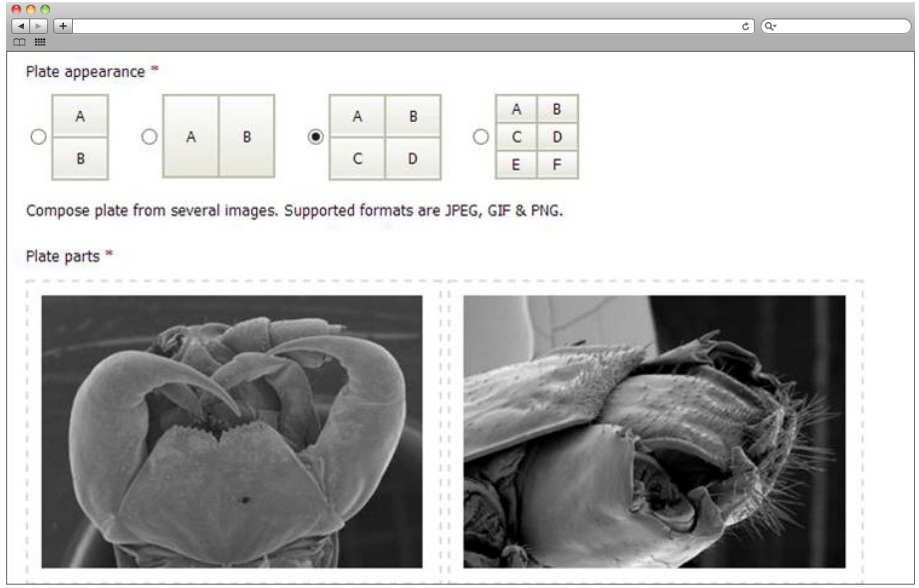


Figure and plate creation in the Pensoft Writing Tool.

Team / lead partners:
Pensoft Publishers; Natural History Museum, London.

Who is it for?
Authors, reviewers, editors and publishers.

How is it used?
The PWT is used by authors and collaborators to easily create manuscripts using flexible structured templates. Authors can also import data from other online platforms, such as Scratchpads and taxonomic databases. The integrated article reviewing and management tools in the PWT are used by reviewers and editors after articles are formally submitted.

How much is it used?
Launched in September 2013, more than 50 articles and 120 manuscripts of some 300 authors have been created in the PWT by end of November 2013.

GeoCAT

Geospatial Conservation Assessment Tool

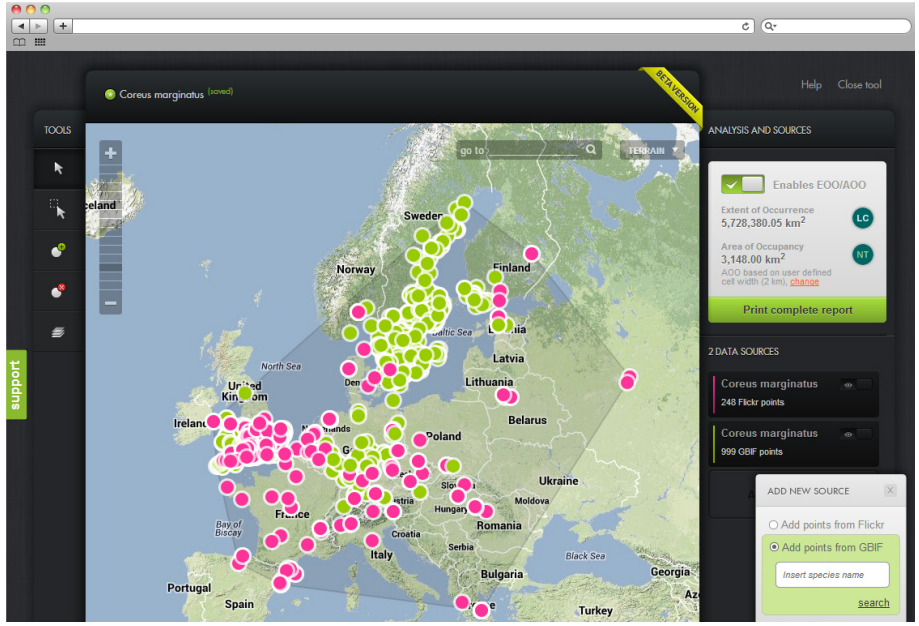
geocat.kew.org

The Geospatial Conservation Assessment Tool allows users to perform rapid geospatial analysis of species in a simple and powerful way.

GeoCAT simplifies the process of Red Listing and helps to identify threatened species. GeoCAT is an open source, browser-based tool that performs rapid geospatial analysis for Red List assessment. Developed to utilise spatially referenced primary occurrence data, the analysis focuses on two aspects of the geographic range of a taxon: the extent of occurrence (EOO) and the area of occupancy (AOO). These metrics form part of the IUCN Red List categories and their consistent calculation has often proved challenging for many researchers. Within a familiar Google Maps environment, GeoCAT users can quickly and easily combine data from multiple sources such as GBIF, Flickr and Scratchpads as well as user-generated occurrence data to produce these metrics.

How does it connect with Scratchpads?

GeoCAT supports Darwin Core Archive allowing the use of data from Scratchpads sites directly with the tool. Specimen records in Scratchpads can be analysed automatically.



An illustrative map in GeoCAT showing the extent of occurrence.

Team / lead partners:

Vizzuality; Royal Botanic Gardens, Kew.

Who is it for?

Researchers interested in performing conservation threat assessments as part of their publications or for submission to the IUCN Red List.

How is it used?

GeoCAT is designed to produce rapid species level conservation assessments based on IUCN Red List Categories and Criteria (IUCN 2001). Through an easy to use interface with a familiar Google Map underlay, you can upload primary occurrence data for a species and, at the click of a button, calculate values relating to the geographic range of a species.

How much is it used?

In 2012 more than 1,000 assessments were made in GeoCAT with at least 5 assessments officially published by IUCN. There were 7,082 unique visitors to the GeoCAT website. Around 40% of the users came from UK, 20% Brazil, 10% USA and the remainder from countries around the world.

IKey+
MKey+

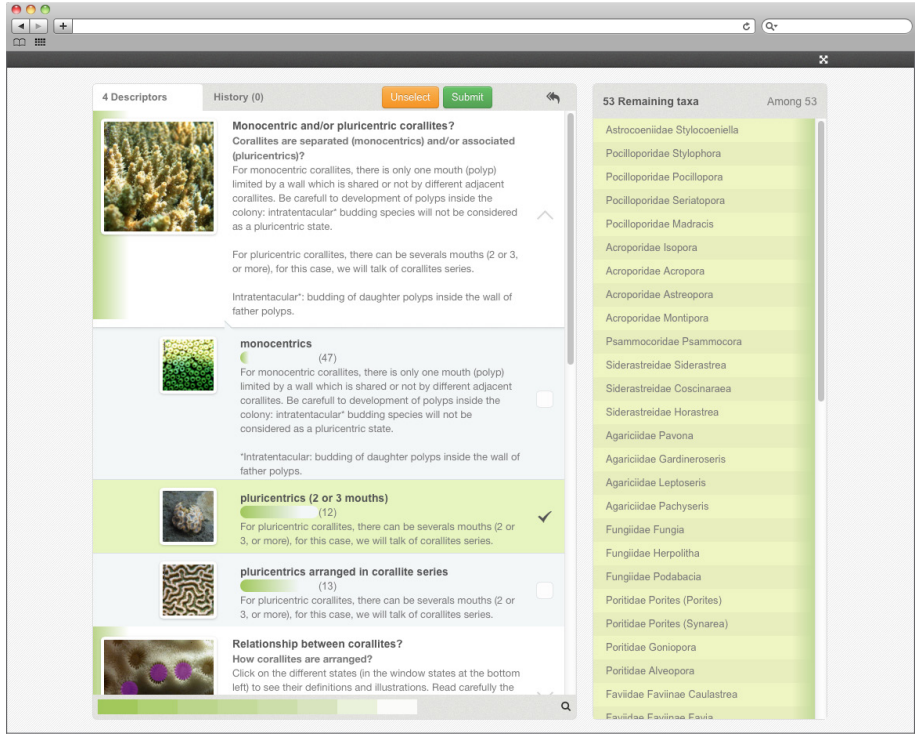
identificationkey.fr

Ikey+ and MKey+ provide online services for identification using structured descriptive data (SDD) to produce single-access keys (IKey+) and multi-access keys (MKey+).

Keys are major tools for researchers who need to identify specimens, but the process of constructing keys is complex. Ikey+ and MKey+ are open source and free web services that enable taxonomists to automatically generate and publish keys from their existing descriptive data stored in an SDD file. With IKey+ different parameters can be defined to optimize criteria on the key and to choose the output format of the key. MKey+ offers a service to build interactive multi-access keys and is a major tool for systematists who need to transmit their taxonomic expertise to other scientists or amateurs. Both tools are available at www.identificationkey.fr and can also be queried by software as a web service.

How does it connect with Scratchpads?

Users can generate keys from the descriptive data in their Scratchpads. See an example of Scratchpads including an identification key at *http://dombeya.myspecies.info/*



Online key of the corals of Mascareignes produced by the MKey+ webservice.

Team / lead partners:
Université Pierre et Marie Curie, Paris.

Who is it for?
Taxonomists who wish to generate and to publish identification keys automatically.

How is it used?
A client component of the IKey/MKey web service is integrated within the Scratchpads, making the tool available to Scratchpads users.

How much is it used?
IKey+ and Mkey+ are recently introduced services that are expected to grow quickly. Between October and November 2013 over 350 keys have been produced in IKey+. During the same period MKey+ was used more than 150 times.

Bibliography of Life

biblife.org

The Bibliography of Life assists the biodiversity research community by aiming to provide freely accessible bibliographic citations for every taxonomic paper ever published.

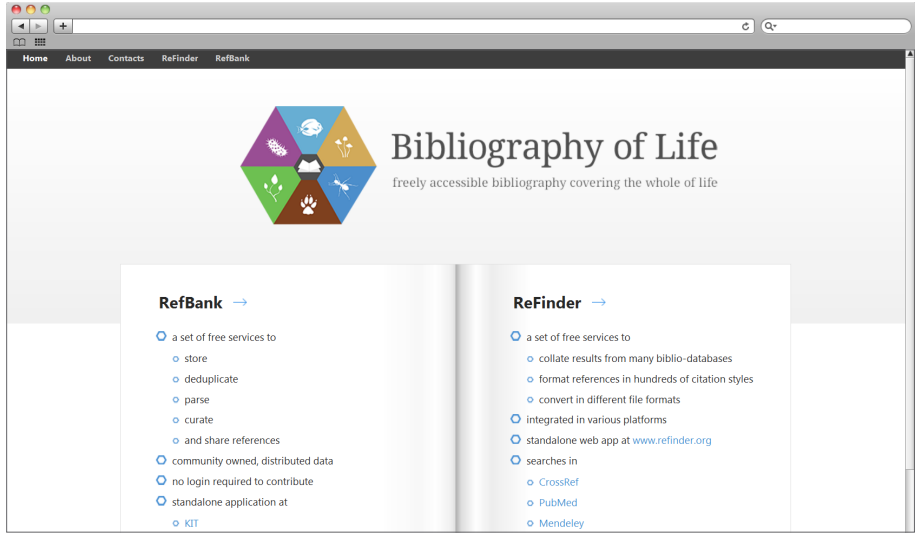
The Bibliography of Life consists of two tools: ReFinder and RefBank.

ReFinder is designed to discover and download references from a wide range of open access online bibliographies, such as CrossRef, Biodiversity Heritage Library (BHL), BioNames, RefBank and others. ReFinder provides the breadth of coverage of bibliographic references to deliver the Bibliography of Life.

RefBank is a network that stores, de-duplicates and parses bibliographic references. Users, who include citizen scientists and professionals, can load, edit and delete references. RefBank provides a curated in-depth view of bibliographic references to support the delivery of the Bibliography of Life.

How does it connect with Scratchpads?

Scratchpads bibliographic entries are automatically harvested and de-duplicated by RefBank with no intervention required by the researcher. RefBank entries can be imported directly into a Scratchpad site.



Biblography of Life homepage.

Team / lead partners:

The Open University; Karlsruhe Institute for Technology; Pensoft Publishers.

Who is it for?

The Bibliography of Life is aimed at anyone working in biodiversity who wants to accurately cite correct taxonomic bibliographic references in their writing.

How is it used?

The Bibliography of Life is integrated into a variety of systems. All Scratchpad bibliographic references are automatically harvested into RefBank. Likewise the Pensoft Writing Tool uses RefBank and ReFinder which allows users to search and insert references quickly and easily.

Researchers can also use the two components directly, incorporating them into their workflow as they desire. See http://refbank.org/ and http://refinder.org/ for more details. Developers can exploit the two tools too. Each tool has an API so that they can be accessed programmatically. See http://refbank.org/api.html and http://refinder.org/api.html for more details.

How much is it used?

As of November 2013 Refbank holds over 215,000 references and has had over 66,000 individual users in the past 3 months. ReFinder is, in addition to being a stand-alone tool, an integral part of the Pensoft Writing Tool (see page 15).

COMBER
Citizens' Network for the Observation of Marine BiodivERsity

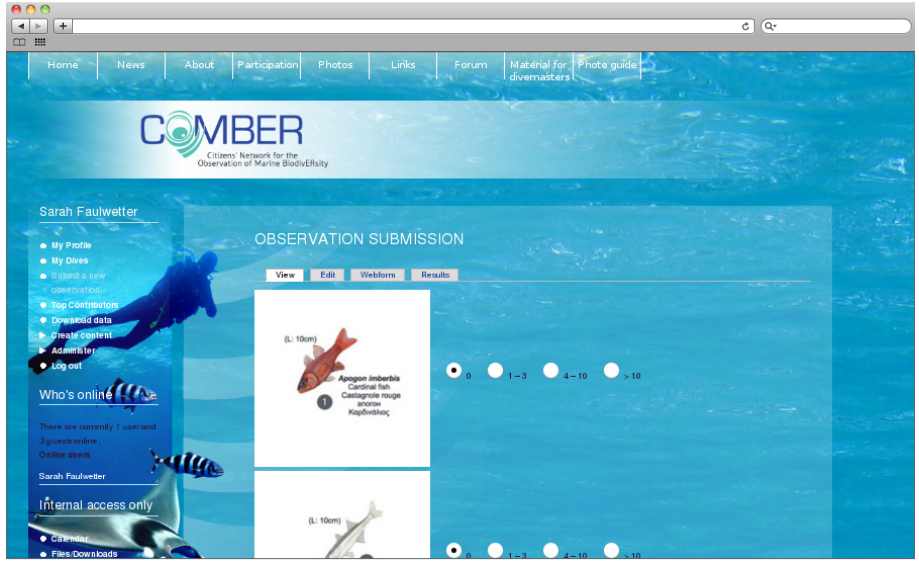
comber.hcmr.gr

COMBER is a citizen science project for divers and snorkelers to collect information on marine species and contribute to biodiversity monitoring. The software serves as a platform for similar citizen science projects.

COMBER aims to engage anyone interested in nature through a coastal marine biodiversity observation network. COMBER offers a website which provides project information and data recording tools for citizen scientists. Data collected in COMBER are disseminated to large biodiversity data aggregators like GBIF, formally published via PENSOFT and are being analysed for biodiversity monitoring potential. The project has expanded from the Aegean Sea to the Mediterranean basin, where it has been adopted by other projects, and is developing a sustainable model by working with commercial diving centres and sailing companies throughout the region. COMBER has produced a waterproof marine species identification guide. The project provides professional lectures and underwater training.

How does it connect with Scratchpads?

The COMBER application is built using Scratchpads and can be downloaded and installed to serve the needs of any interested marine community or network.



COMBER website showing the marine observation submission interface.

Team / lead partners:

Hellenic Centre for Marine Research; Natural History Museum, London; Pensoft Publishers; Global Biodiversity Information Facility; Museum für Naturkunde, Berlin.

Who is it for?

Snorkelers, SCUBA divers, diving associations, diving club managers, sailing boat owners, tourist managers, educational establishments, students, photographers, nature-lovers.

How is it used?

The data collection phase consists of a short introduction to the project and an underwater or water-surface training session for the contributors of marine animal identifications. The submission of the data is made via a user-friendly web interface. Any user can view and explore the data contributed to COMBER. The supporting scientific team periodically check the validity of the data and publish scientific research based on these data.

How much is it used?

Over 5,600 marine observations were made during 409 activities (SCUBA diving or snorkeling) and submitted to the COMBER site between May 2011 and September 2013. Observations were made by 141 citizen scientists from 15 countries.

NPT Startup
National biodiversity web presence

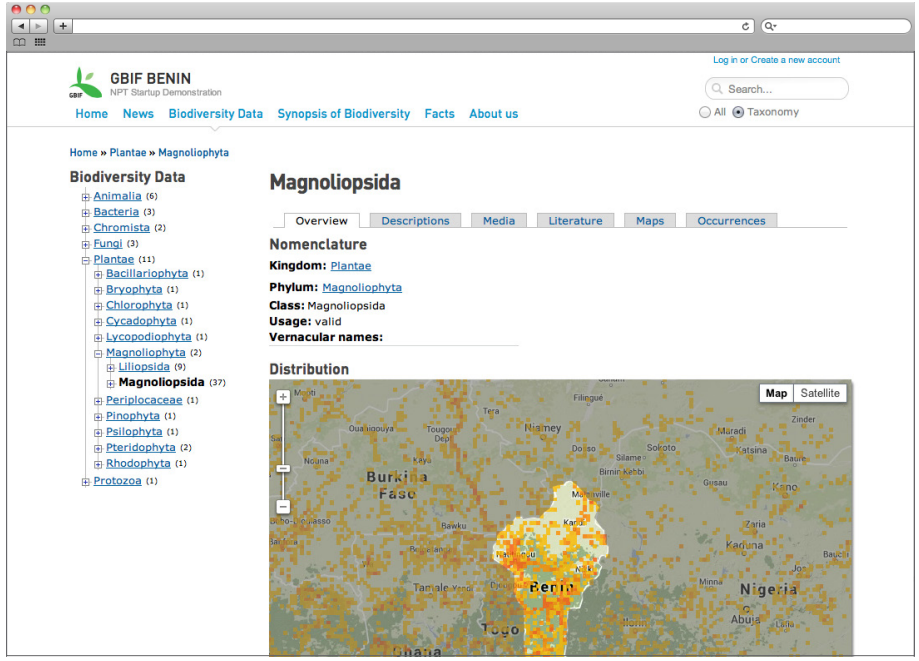
github.com/gbif/gbif-npt-startup/wiki

The Nodes Portal Toolkit (NPT) Startup is an open source tool that provides a biodiversity information web presence for GBIF Participants. The NPT Startup supports countries by highlighting the available national biodiversity species data for the benefit of science and society.

Approximately 40% of the GBIF Participants do not currently have a web presence and the NPT Startup aims to fill this gap. The NPT Startup was developed in close cooperation with the GBIF community. It combines biodiversity information coming from the GBIF Data Portal (www.gbif.org) and from the Encyclopedia of Life. Information is displayed as species occurrence data on maps, as media, and as descriptions e.g. on species. The tool also functions as a communication platform, providing common website features like news, forums and blogs.

How does it connect with Scratchpads?

NPT Startup utilizes a Drupal profile to configure a Scratchpad to meet the requirements of targeted GBIF Participants. Most functionality available in Scratchpads is available in the NPT Startup.



An overview of biodiversity data using the NPT for Benin in West Africa.

Team / lead partners:
Global Biodiversity Information Facility.

Who is it for?
NPT Startup targets GBIF Participants that have no or limited web presence.

How is it used?
Through an early adoption programme, GBIF Participants will start to install, customise, and use the NPT Startup as an initial biodiversity information website for a country. Potentially, the tool could be used for engaging local experts to collaborate on biodiversity content management and authoring. NPT Startup is setup in such a way it can be relatively easily customised or extended with new features. This flexibility could also foster joint collaboration between GBIF Participants.

How much is it used?
Ten GBIF Participants have expressed interest in joining the early adopter programme on deploying NPT Startup.

ViBRANT Partners

The Natural History Museum, London (NHM)
www.nhm.ac.uk

Hellenic Center for Marine Research (HCMR)
www.hcmr.gr

Oxford e-Research Centre (UOXF.E9)
www.oerc.ox.ac.uk

Vrije Universiteit Amsterdam (VU)
www.vu.nl

Karlsruher Institut für Technologie (KIT)
www.kit.edu

Julius Kühn-Institute, Berlin (JKI)
www.jki.bund.de

Museum für Naturkunde, Berlin (MFN)
www.naturkundemuseum-berlin.de

University of Amsterdam (UvA)
www.uva.nl

The Open University (OU)
www.open.ac.uk

Royal Belgian Institute of Natural Sciences (RBINS)
www.naturalsciences.be

Global Biodiversity Information Facility (GBIF)
www.gbif.org

Vizzuality (Vizz)
vizzuality.com

Pensoft Publishers (PENSOFT)
www.pensoft.net

Université Pierre et Marie Curie-Paris 6 (UPMC)
www.upmc.fr

Freie Universität Berlin (BGBM)
www.fu-berlin.de

Université de la Réunion (UdIR)
www.univ-reunion.fr

University of Trieste (UNITS)
www.units.it

Acknowledgements

ViBRANT is funded by the European Union 7th Framework Programme within the Research Infrastructures group.

The project is composed of a consortium of 17 partners in nine countries led by the Natural History Museum, London.

Contract no. RI-261532
Coordinator: Dr Vincent S. Smith

For further information please contact:
enquiries@vbrant.eu

http://vbrant.eu

Supporting biodiversity research communities