

Identifications in BioPortals™

Wouter Addink, Edwin van Spronsen, Peter H. Schalk

Abstract — BioPortals are a ‘Google-like’ webportal solution tailored for national or thematic biological diversity information needs. This solution allows for an efficient route to retrieve information from heterogeneous biological information sources after identification with integrated identification systems. BioPortals can be used in combination with mobile devices and provide options to share biological observation data after identification in the field.

Index Terms — BioPortals, species information, identification, webportal, mobile platforms.



1 INTRODUCTION

Digital information on biological diversity (i.e. on identification, species, taxonomy, ecology, genetics, conservation, legislation) is often compiled for a specific purpose and stored in custom-made, geographically distributed software using different formats. Mining this information can therefore be time consuming, and recombination of data can be cumbersome because of incompatibilities. Furthermore, a proper identification of the species is required in order to be able to retrieve the right biological information.

International initiatives, such as the Global Biodiversity Information Facility (GBIF), the Encyclopedia of Life (EoL), and the Consortium for the Barcode of Life (CBOL), are paving the way to make data in a specific domain globally accessible. However, much of the demand for information is on a national or thematic level, driven by defined groups of users with specific questions or problems. These call for a custom-made answer to their information needs.

ETI developed a ‘Google-like’ webportal solution that provides a single access point to a large array of heterogeneous biodiversity information sources, combining them with identification keys. The so-called *BioPortal* can be customized to specific information needs and user levels: from scientists to conservationists, from governments to schools.

2 IDENTIFICATION KEYS

Keys are a method to identify by asking a series of questions to the user.

W. Addink is Head of Informatics, ETI BioInformatics, Amsterdam. wouter@eti.uva.nl.
E. van Spronsen is Head of Information, ETI BioInformatics, Amsterdam. edwin@eti.uva.nl.
P. Schalk is Director of ETI BioInformatics, Amsterdam. peter@eti.uva.nl.

Each answer excludes some names, until the most likely name for the species remains. This name can then be compared with the description of the species to confirm the identification. This method is more efficient than going through a series of species descriptions until a description has been found that fully matches the observed species.

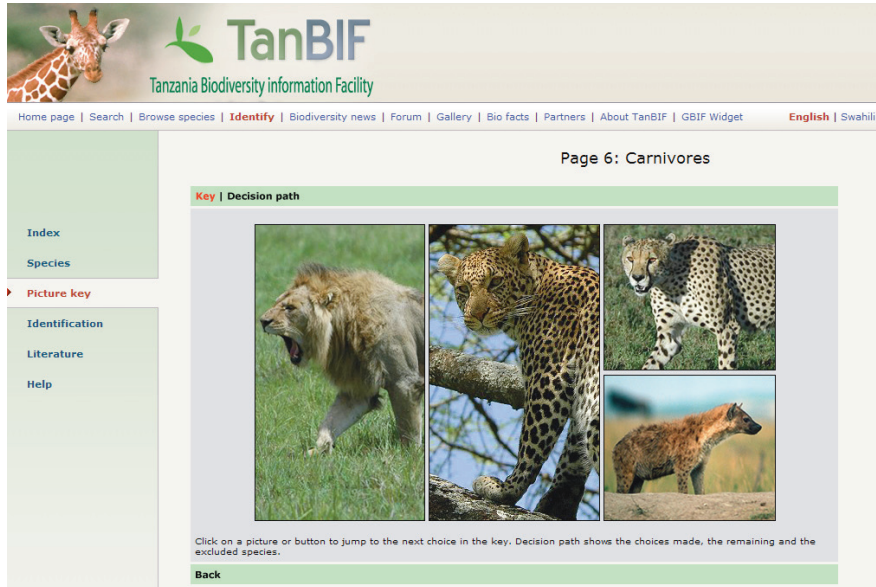


Fig. 1 – A picture key in the Tanzanian national biodiversity portal, built with the BioPortal toolkit.

Traditional keys published on paper are usually dichotomous, text-based keys, where the user is given a sequence of choices, each choice leading to a new choice and excluding some names until only one name remains. The BioPortal toolkit supports such traditional keys, but also other types of keys that allow for more interaction and easier identification. In such keys the user can select only the characters that are visible, for example only leaf characters to identify a plant that is not flowering, or by using suggestions for the characters that are the most separating ones. Keys that use illustrations or sounds instead of text, or combinations of these are also supported.

3 FROM IDENTIFICATION TO INFORMATION

The BioPortal toolkit includes the *Linnaeus II* Species Bank compiler that allows the creation of targeted (e.g., national) species information systems with identification tools for the Internet (e.g. www.soortenbank.nl), accessible with web browsers on computers or on mobile devices such as iPad, PDA or iPhone. The *Linnaeus II* compiler is compatible with the systems and exchange formats developed in the *KeyToNature* project. Identification keys that have been made available in *KeyToNature* can therefore be used in BioPortals. This allows users

of BioPortals to go directly from an identification made with a *KeyToNature* identification key to information about the identified species from a range of online information sources.

4 SHARING INFORMATION AFTER IDENTIFICATION

With mobile identification tools like the Netherlands e-Flora application for iPhone, identifications can be made on spot. When a species is identified, the species observation (identified species name, photo, date, long-lat location, observer) can be uploaded directly to a central server and, after vetting, displayed in a BioPortal. This allows BioPortal users to see the identified observations in the portal together with related information from other sources.

5 *BioPortal* DESIGN AND IMPLEMENTATION

The *BioPortal* toolkit has a modular design that can be tuned to user needs, including customizing the web-interface and providing support for multiple languages. The toolkit combines content management system (CMS) functionality, such as news items and static pages, event tracking, and forum modules, with functions to access the scientific core data. These are biological collections, observations, ecological relations, molecular data, and image libraries compiled on a national or local level, combined with external sources such as GBIF or EMBnet (European Molecular Biology Network). Sophisticated technology allows for simultaneous server-side asynchronous searches in several distributed data sources on the web. The Catalogue of Life is used as a validated taxonomic index to match searches to connected data sources.

ETI's *BioPortal* toolkit was used to build the Netherlands' national GBIF portal (NLBIF), <http://www.nlbif.nl> and the Tanzanian national biodiversity portal (TanBIF: <http://www.tanbif.or.tz>). It is also used to build the global pollinators portal.

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