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D2.1.1 Report on existing relevant directories

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PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

D2.1.1 Report on existing relevant directories

Introduction

Taken together, European taxonomists constitute a potentially extremely powerful workforce to deal with the challenges identified by EDIT. However, the European expertise is currently badly fragmented by taxa (e.g. botanists / zoologists, entomologists / other zoologists, etc.), by countries, by institutions, and by status of the experts (professional / amateurs), resulting in a suboptimal use of both human and financial resources: the rate of experts per taxon is extremely uneven, and needs for expertise have overall little effect on recruitment strategies because we have no overview of the existing spectrum of taxonomic expertise at the European level.

The major objective of EDIT Work Package 2 (WP2) is to provide the EDIT partner institutions, and potential users beyond, with a continuously updated and searchable web-based information service on taxonomists, their fields of expertise, and their ongoing and planned research projects. This information service on experts is meant for internal as well as external use – with corresponding different levels of access to the information – but it is designed (and content collected) with high priority on meeting the needs for information by EDIT partners regarding:

- Provision of a better knowledge base for an integrated recruitment strategy in EDIT, to optimize allocation of resources by avoiding unnecessary duplication of expertise
- Coordination of research organised by WP4 (especially regarding methodology)
- Formation of networks, committees and task-forces for activities in the exemplar groups of WP6 and the All Taxa Biodiversity Inventories and Monitoring of WP7
- WP8s assessment of training resources for taxonomy in Europe
- Taxonomic information backbone and Pan-European checklist activities of WP3

With the above needs in mind, content for the database behind the information service on experts is collected with priority as follows:

1. All researchers listed for the EDIT network of Excellence in the Description of Work, and other relevant employees of EDIT partner institutions who are engaged in taxonomic work.
2. At least one expert per taxon down to a reasonable level of detail, e.g. *Family*, depending on taxon.
3. All researchers engaged in WP6, WP7, WP4 and WP8 activities as outlined above

Relating to the priorities of the above list, it should be emphasised that this current prioritisation has evolved during the first operational year of EDIT and the formulation of the 2nd Joint Programme of Activities running Month 12 through 29. During this time it has become clear that initial focus for collection of content should be on providing an efficient and useful general management tool for the EDIT directors.

Objective

The objective of this report is to outline the preparatory work carried out to study existing internet-based directories of taxonomic experts and expertise, with an emphasis on, but not limited to Europe, with the aim to identify possible previous efforts and tools on which to build the WP2 work on designing and implementing an easily maintainable, continuously updated, web-based information service on taxonomic experts.

Method

As agreed at the EDIT WP2 kick-off meeting in Paris, June 29 2006, and based on thorough discussions at this meeting, the WP2 leader (UKBH) drafted an outline of:

- How to collect contents for the WP2 online information service on taxonomic experts, their expertise, and their ongoing and planned research projects
- The database structure for the taxonomic experts/-expertise/-projects info-service, based on previous similar efforts

The draft was reviewed by the WP2 partner institutions, modified accordingly by the WP2 leader and formatted into this current report. The previous drafts of the report have contributed to the specification for the current, ongoing, practical work (in collaboration with WP5, doing the programming part) on:

- The form to enter or update data on experts
- The actual database structure behind the information service
- What the service (the product) should be able to do
- How we could achieve designing and implementing the service.

The WP2 web-based online info-service on taxonomic experts/-expertise/-projects, should enable filtering and search facilities to **find taxonomic experts based on any combination of criteria** (see **Figure 1**) regarding the items listed in Table 1.

Table 1

1	Taxon or taxa which their expertise covers - searchable by all levels down to a reasonable level of detail, e.g. family, depending on taxon
2	Geographic area(s) (countries, terrestrial areas, aquatic areas) to which their expertise relates
3	Which of 7 kinds of taxonomic activities (see Table 2 and Enghoff & Seberg, 2006¹) they engage in within their field of research
4	Methodological approach to the taxonomic work (see Appendix 1), including which specialised applications / software are used
5	Environment of their taxonomic group (see Figure 2)
6	Their ongoing and planned taxonomic research projects
7	National / International taxonomic research projects they are involved in (facultative)
8	Country they reside in
9	Institution they work in

In order to find out whether a system (preferably web-based) which could fulfil the above roughly specified needs already existed, we started an intensive market screening and product

¹ Henrik Enghoff & Ole Seberg (2006): *A Taxonomy of Taxonomy and Taxonomists*, The Systematist No. 27, pp. 13-15

survey on the internet, and by consulting EDIT WP2 partners. Also, it was anticipated that some of these encountered systems might contain data on taxonomic experts which later could be mirrored or migrated to the WP2 info-service on taxonomic experts/-expertise/-projects. Hence we have initiated a web-based online collection of URLs for relevant existing services – see Appendix 2 and

www.connotea.org/user/icalabuig/tag/List%20taxonomic%20experts?num=100

It should be noted that the abovementioned survey only included services which offer information related to taxonomy / biodiversity, and did not include other e.g. commercial and/or off-the-shelf products designed for other purposes (health sciences etc.).

Table 2 Excerpt from Enghoff & Seberg, 2006 ^{1 above}

<i>For the purpose of the EDIT project, taxonomy is understood in a very broad sense similar to the one adopted by the work program for the Global Taxonomy Initiative (Decision VI/8 of the 6th Conference of Parties to the Convention on Biological Diversity, e.g. www.gti-kontaktstelle.de/toolkit/workshop/GTI_Program_COP06.pdf): “Broadly understood, taxonomy is the classification of life, though it is most often focused on describing species, their genetic variability, and their relationships to one another. For the purposes of the Convention taxonomy is taken in its broadest sense and is inclusive of systematics and biosystematics at the genetic, species and ecosystem levels.” In this broad sense, taxonomy includes various types of often tightly interlinked activities:</i>	
1. Recognition, description and naming of taxa (species, genera, families etc., also revision of older description, synonymisations, etc.).	≈ Alpha-taxonomy
2. Comparison of taxa, including studies of relationship (phylogeny).	≈ Part of beta-taxonomy
3. Classification of taxa (preferably based on phylogenetic analyses).	≈ Part of beta-taxonomy
4. Study of (genetic) variation within species ² .	≈ Gamma-taxonomy
5. Construction of tools for identification.	i.e. keys, DNA barcodes
6. Identification of specimens	i.e. referring them to taxa, using the tools
7. Inventories of taxa in specific areas or ecosystems	e.g. using the tools for identification

Results

A main conclusion from the discussions within the group of WP2 partners is, that for the info-service on taxonomic experts/-expertise/-projects to be truly useful, it should list the expertise items 1 through 5 of Table 1 as one complete record (see **Figure 1**). This means that *geography*, *taxonomic activity*, *approach* and *environment* should be entered for each single taxon on which an expert works. It is important to note that all other known existing internet-based services list these items separately so that *if a researcher has indicated expertise in two major taxa and expertise on three geographic areas, it is not possible to see which area goes together with which taxon*.

The websites explored and found relevant, at least regarding future capture of content, are listed in Appendix 2 and on www.connotea.org/user/icalabuig/tag/List%20taxonomic%20experts?num=100. Appendix 2 also includes stand-alone CDs explored. From this extensive list we have extracted the

² However, this does not encompass population genetics and population biology per se.

web-based online services which in addition to relevant contents also have filter & query features and other functionality that have acted as inspiration for the specification of the WP2 service. These are:

- **DAISIE European Alien Species Expertise Registry:** <http://daisie.ckff.si/> – The portal contains special functionality for standardised entering and editing of data on expertise, especially regarding taxa and geography. This functionality is not to our knowledge covered by any of the other services. Also, an extensive summary feature is served (<http://daisie.ckff.si/index.php?pid=7>), and this with the enter/edit functionality could be used as inspiration for the WP2/WP5 development of the info-service on experts. Good communication persists(exsits?) with relevant people involved in the DAISIE expertise registry.
- **ETI World Taxonomist Database:** www.eti.uva.nl/tools/wtd.php – hosted and maintained by ETI, the Expert Center for Taxonomic Identification.
- **The UK Register of Taxonomic Expertise:** URL from the UK GTI focal point web-pages hosted by the Natural History Museum of London - <http://www.nhm.ac.uk/research-curation/biodiversity-museum/global-taxonomic-initiative/index.html>
- **“New Accession States” extension to Fauna Europaea, FaEu-NAS:** http://zoology.fns.uniba.sk/faeu/search_service/search_index.htm
- **Fauna Europaea experts database:** www.faunaeur.org/experts.php

Further services, lists and tools, still to be explored in more detail for possible integration / linking / inspiration / migration of content etc., based on recent feed-back from EDIT WP2 partners, include:

1. The recently released **Belgian information service BioBel:** <http://biobel.biodiversity.be/>
2. **Index Herbariorum:** <http://sciweb.nybg.org/science2/IndexHerbariorum.asp>
3. **SYNTHESYS matrix on experts**
4. Tools developed under **Fauna Iberica:** <http://faunaiberica.org/>

The single-most relevant existing service on which to build the WP2 the info-service on taxonomic experts/-expertise/-projects has turned out to be a stand-alone database application developed by the German focal point for the GTI (Global Taxonomy Initiative) at Staatliches Museum für Naturkunde, Stuttgart, Germany (<http://www.gti-kontaktstelle.de/>) .

The German GTI has already designed a database which in structure and defined database fields almost completely meets the needs described in the paragraph on *Methods*. But the database was made with the application FileMaker 5 to be run on a local server.

Hence, the major task identified is to build a similar functionality into a web-based online database application that permits personal login and enter/edit of data, and which provides a search and filter user-interface with different levels of access to information on the experts, depending on the type of user (from EDIT director to e.g. the public). WP2 and WP5 are currently working on this



WP2 information service on taxonomic expertise - Multidimensional entries

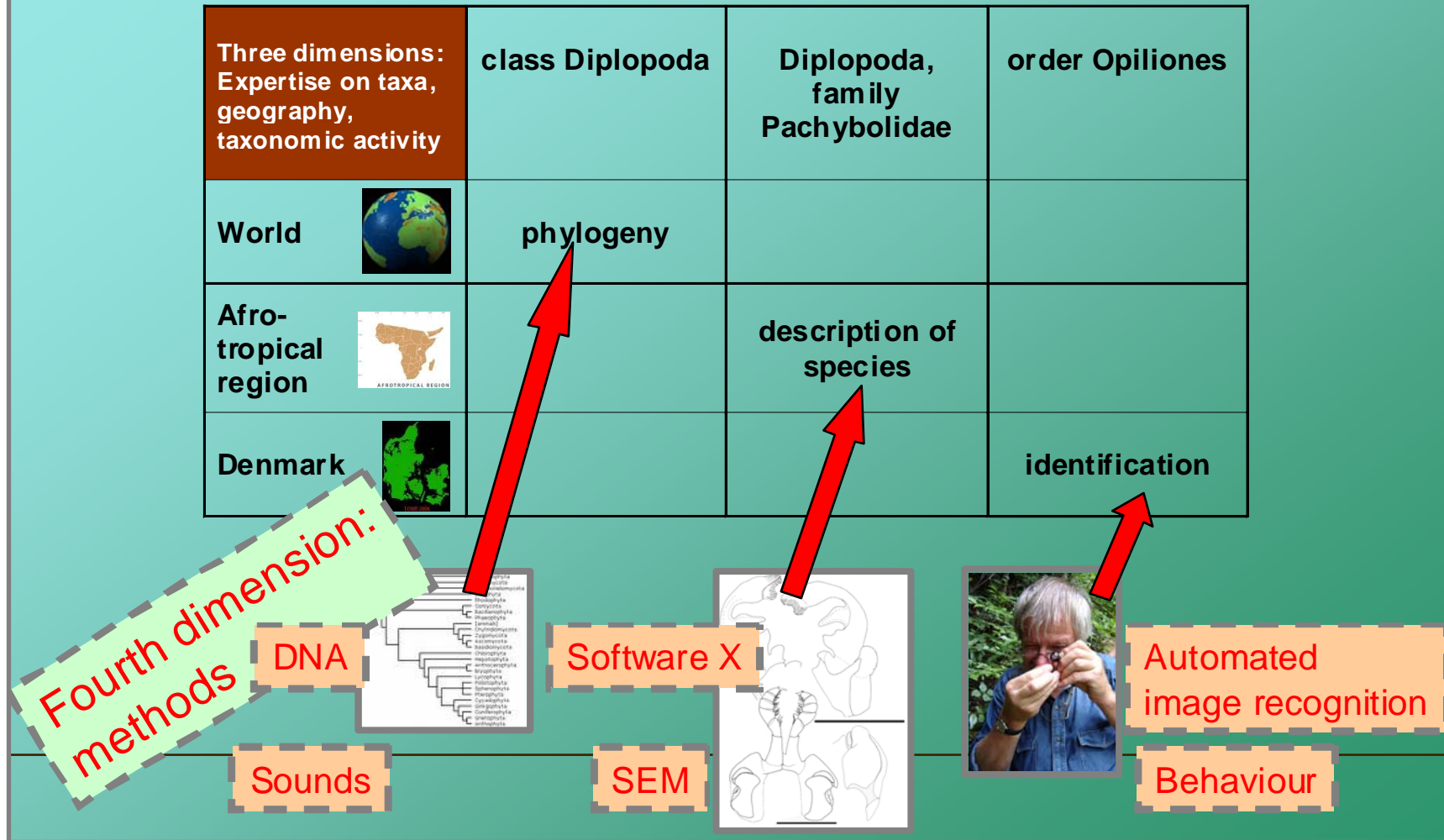


Figure 1: Instead of just indicating that an expert has expertise in geographic range YY AND expertise in taxa XX, it should be specified that given expertise in taxon X concerns geographic area Y whereas expertise in taxon Z concerns geographic area W.

Miscellaneous recommendations to obtain content for the database

We propose to identify at least one contact person in each department of the EDIT institutions who, among other things, would be willing to act as “EDIT ambassador” at the department and encourage the taxonomists to provide information about their expertise.

In addition, we plan to ask the EDIT Board of Directors to require of their employees that they provide this information.

In June 2004, a workshop was held on ‘Building Capacity for the Global Taxonomy Initiative (GTI) in a larger Europe’. It brought together 16 representatives of 13 countries and international organisations to report about the current state of taxonomy and taxonomic institutions in their countries, and to discuss further steps in implementing the GTI in a wider Europe. It was decided to call for the production of ‘**The European GTI-Toolkit**’, in which relevant documents and reports from CBD (Convention on Biological Diversity) bodies, information about funding mechanisms and opportunities for taxonomists, sources for taxonomic data, such as maps, gazetteers, could be collected. This European Toolkit development was continued by 14 specialists from 11 countries meeting in Stuttgart at the Staatliches Museum für Naturkunde in June 2005. From this work a CD (and a web-based version at http://www.gti-kontaktstelle.de/toolkit/task_11.html) has been produced which among many other things contain a chapter on *Lists & databases on taxonomic experts*. Many of the list and database services mentioned in this current EDIT report already were identified by the German GTI toolkit, and the toolkit also contains a vast source for further list services to be explored, when content for the WP2 info-service on taxonomic experts/-expertise/-projects is collected from beyond the EDIT institutions.

To further identify sources for future content for the WP2 info-service on experts, the list of existing services (Appendix 2 and online catalogues of URLs³) should be expanded, including a list of existing resources that keep catalogues of experts.

Environment of your taxonomic group	
<input type="checkbox"/> Alpine	<input type="checkbox"/> Arboreal
<input type="checkbox"/> Epiphytic	<input type="checkbox"/> Desert
<input type="checkbox"/> Freshwater	<input type="checkbox"/> Marine benthic
<input type="checkbox"/> Marine pelagic	<input type="checkbox"/> Neritic
<input type="checkbox"/> Paleontological	<input checked="" type="checkbox"/> Parasitic
<input type="checkbox"/> Subterranean	<input checked="" type="checkbox"/> Terrestrial

Figure 2: Indication of environment for taxonomic group, as provided in the ETI expert registration form of the World Taxonomist Database at <http://www.eti.uva.nl/tools/wtd.php>

³ www.connotea.org/user/icalabuig/tag/List%20taxonomic%20experts?num=100

Use-cases

Optimally, when the info-service has been populated with data on experts, including the environment of the taxa they work on, and the approach taken in the research, a user of the final online service would be able to ask questions such as:

- Who does global phylogenetic analysis on marine mammal species?
- Who does alpha-taxonomy on parasitic Hymenoptera species of Europe?
- Who uses analysis of light patterns emitted by species when they do phylogenetic studies (Beta-taxonomy) on Lampyridae (fireflies)?
- Who uses analysis of sound patterns emitted by species when they design identification tools for Anurans?

Conclusion

There might be other splendid services out there, which the WP2 secretariat does not yet know about, but the ones listed in Appendix 2 are the main ones we were able to find based on our own search and a query among EDIT partner institutions. Based on the above market screening and information provided to us, we conclude that none of these online services fulfil the requirements identified by WP2 for an info-service on taxonomic experts/-expertise/-projects.

Hence, the way ahead has clearly been to commence developing and implementing a web-enabled info-service on experts/-expertise/-projects nested within the WP5 developed Internet Platform for Cybertaxonomy (<http://wp5.e-taxonomy.eu/blog/about>), based on the database fields and functionality of the existing stand-alone database on German taxonomic experts previously developed by the German Global Taxonomy Initiative (under the CBD) focal point at Staatliches Museum für Naturkunde, Stuttgart, Germany.

*Report deliverable prepared by Dr. Isabel Calabuig (icalabuig@snm.ku.dk),
Natural History Museum of Denmark, University of Copenhagen, Denmark*

Appendix 1 – Draft of table on Methodological Approaches to taxonomic work (currently in review, in collaboration with WP4)

CATEGORY	SUBCATEGORY
MICROSCOPY	standard light microscopy
	photomicroscopy
	scanning electron microscopy
	transmission electron microscopy
	laser confocal microscopy
	interference contrast microscopy
	fluorescence microscopy
	video microscopy
	other
STATISTICS	multivariate statistics
	other
KEY CONSTRUCTION	
PHYLOGENY RECONSTRUCTION	morphological
	molecular
	parsimony
	maximum likelihood
	Bayesian analysis
	other
MORPHOMETRY	
AUTOMATIC IMAGE RECOGNITION	
3D RECONSTRUCTION	
ACOUSTICS	
VITAL TAXONOMY	
BEHAVIOURAL STUDIES	
GENOME ANALYSIS	Chromosome counts
	Fluorescence in situ hybridization (FISH)
	Genomic in situ hybridization (GISH)
	Meiotics pairing analysis
EMBRYOLOGY	
MOLECULAR METHODS	DNA barcoding
	other sequence approaches
	RFLP/AFLP
	allozymes
	other
CHEMICAL METHODS	Secondary compounds analysis
	High Performance Liquid Chromatography (HPLC)
<OTHER>	

Appendix 2 – Currently identified relevant existing services

- Apart from CD's explored, all items are also listed at the web-based online collection of URLs at www.connotea.org/user/icalabuig/tag/List%20taxonomic%20experts?num=100

Stand-alone CD's explored

- **German Taxonomists Database** developed by the German Global Taxonomy Initiative (under the CBD) at Staatliches Museum für Naturkunde, Stuttgart, Germany (developed by Dr. Fabian Haas)
- **The European GTI-Toolkit** - contains the materials collected by the participants of the workshop on 'The European GTI Toolkit' - Capacity Building for the Global Taxonomy Initiative, held by the German National Focal Point (NFP) for the Global Taxonomy Initiative (GTI) in Stuttgart, the 6th-9th June 2005. (Editors: Dr. Christoph L Häuser & Dr. Fabian Haas) – also available online at <http://www.gti-kontaktstelle.de/toolkit/index.html>
- **ILDIS World Database of Legumes** - (version 10, November 2005) @ILDIS, 2005; Editors: Roskov Y.R., Bisby F.A., Zarucchi J.L., Schrire B.D., White R.J. – with link to online version at *International Legume Database & Information Service* <http://www.ildis.org/>
- **Species 2000 & ITIS Catalogue of Life** (<http://www.sp2000.org/index.php>): 2006 Annual Checklist on CD and dynamic checklist at <http://col2006ac:81/search.php>

Online services explored, listed at:

www.connotea.org/user/icalabuig/tag/List%20taxonomic%20experts?num=100

Nationale Kontaktstelle der Globalen Taxonomie Initiative (GTI)
www.gti-kontaktstelle.de
Species 2000 - Welcome to Species 2000 website
www.sp2000.org
ILDIS home page
www.ildis.org - International Legume Database & Information Service
Fauna Iberica · Bienvenid@ a Fauna Ibérica
faunaiberica.org
NYBG.org: Index Herbariorum
sciweb.nybg.org
BioBel - Belgian Biodiversity Platform
biobel.biodiversity.be
Universal Chalcidoidea Database
www.nhm.ac.uk
ARAGES : Arachnologische Gesellschaft
www.arages.de
The Royal Belgian Zoological Society
www.naturalsciences.be
HymATol Hymenoptera--Assembling the Tree of Life
www.hymatol.org
PROPEtaxon
www.medobis.org - Web Accessible Taxonomic Expertise in MARBEF: PROviding an e-Platform for the European Taxonomists (PROPE-taxon)

Zentralregister biologischer Forschungssammlungen in Deutschland (ZEFOD)
www.genres.de
MarBEF
www.marbef.org - Register of Resources at Marine Biodiversity and Ecosystem Functioning, EU Network of Excellence
:: Fonzoo - Fonoteca Zoológica - Museo Nacional de Ciencias Naturales ::
www.fonzoo.com
Livingunderworld.org Amphibian Information Resource
www.livingunderworld.org
The Orthopterists' Society
140.247.119.138
The Systematics Association
www.systass.org
Sharing Earth Observation Resources
www.eoportal.org
Index to Family Identification Web Pages
eny3005.ifas.ufl.edu - University of Florida links to describe Insect Orders and Common Families
UNIVERSITY OF FLORIDA ENTOMOLOGY AND NEMATOLOGY DEPARTMENT
entnemdept.ifas.ufl.edu
MARBEF - Marine Biodiversity and Ecosystem Functioning
www.marbef.org - MarBEF, a network of excellence funded by the European Union and consisting of 83 European marine institutes, is a platform to integrate and disseminate knowledge and expertise on marine biodiversity, with links to researchers, industry, stakeholders and the general public.
Web-resources for Myrmecologists
www.myrmecology.info - Paper by David R. Nash
antbase.org
www.antbase.org - Access to all the ant species of the world
Hymenoptera Name Server
atbi.biosci.ohio-state.edu
Belgian experts on biological diversity listed by the Belgian CBD-CHM
bch-cbd.naturalsciences.be
NBII Expertise Databases
www.nbii.gov - Expertise databases listed in the US National Biological Information Infrastructure
Nationale Kontaktstelle der GTI: Taxonomists and Users
www.gti-kontaktstelle.de - Discussion paper by Fabian Haas (SMNS) on "Taxonomists and Users: two species that rarely meet"
The Coleopterists Society
www.coleopsoc.org - Organization devoted to the study of all aspects of systematics and biology of beetles of the world. Membership is open to any individual interested in the object of the society
Catalogue of Life : Dynamic Checklist : Search the Dynamic Checklist
spice.sp2000.org
German National Focal Point of the GTI
www.gti-kontaktstelle.de - Toolkit Chapter 11: Lists & databases on taxonomic experts

<u>International Society for Arachnology</u>
<i>www.arachnology.org</i> - ISA focuses on the arachnid orders Amblypygi, Araneae, Opiliones, Palpigradi, Pseudoscorpiones, Ricinulei, Schizomida, Scorpiones, and Uropygi, but not Acari, as other societies dedicated to acarology exist.
<u>Tree of Life Web Project Home</u>
<i>tolweb.org</i>
<u>AntWeb</u>
<i>www.antweb.org</i> - AntWeb provides tools for exploring the diversity and identification of ants (Hymenoptera: Formicidae).
<u>ETI World Taxonomist Database</u>
<i>www.eti.uva.nl</i> - an online directory service with continuously updated information on thousands of taxonomists/specialists worldwide
<u>DAISIE - Delivering Alien Invasive Inventories for Europe</u>
<i>www.europe-aliens.org</i> - includes DAISIE Home Page with information about the DAISIE project and participants and the European Alien Species Expertise Registry
<u>The Global Invasive Species Programme</u>
<i>www.gisp.org</i> - The GISP mission is to conserve biodiversity and sustain human livelihoods by minimizing the spread and impact of invasive alien species
<u>International Society of Myriapodology and Onychophorology</u>
<i>www.mnhn.fr</i>
<u>NSF PEET Project Homepage</u>
<i>www.nhm.ku.edu</i> - NSF announces a special competition, Partnerships for Enhancing Expertise in Taxonomy (PEET), to support competitively reviewed research projects that target groups of poorly known organisms.
<u>Milli-PEET - Taxonomy, Systematics, and Evolution of the Diplopoda</u>
<i>www.fieldmuseum.org</i>
<u>EuMon</u>
<i>eumon.ckff.si</i> - EU-wide monitoring methods and systems of surveillance for species and habitats of Community interest
<u>Research projects - Natural History Museum</u>
<i>www.nhm.ac.uk</i>
<u>The UK Register of Taxonomic Expertise - Natural History Museum</u>
<i>www.nhm.ac.uk</i> - The UK Register of Taxonomic Expertise. UK National Focal Point for the Global Taxonomy Initiative (GTI) has compiled a Register of Practising Taxonomists for the UK.
<u>The ECAT World taxonomies; documentation etc. available on web!</u>
<i>circa.gbif.net</i> - Taxonomic databases of the world. The DB compiled from 4 principal sources: ITIS Data Status Summary Table; Sp2000 metadatabase; MetaDB from Global Strategy for Plant Conservation; ECAT connections, especially GBIF Seed Money
<u>BIODIVERSITY Resources in Belgium DATABASE</u>
<i>www.br.fgov.be</i> - This website is an inventory of the resources concerning biodiversity available in Belgium. It is not limited to the biodiversity of the Belgian territory. The inventory concerns: Institutions, People, research subjects and collections.
<u>Staff of the National Botanic Garden of Belgium</u>
<i>www.br.fgov.be</i>
<u>Africa museum Tervuren - African Zoology, Entomology experts</u>
<i>www.africamuseum.be</i>

Africa museum Tervuren - African Zoology, Vertebrate experts
<i>www.africamuseum.be</i>
Species 2000 Metadatabase
<i>metadb.sp2000europa.org</i> - Summary report on Metadata on Global Species DBs (GSDs) and the associated experts
Fauna Europaea NAS Extension
<i>zoology.fns.uniba.sk</i> - Search service on experts, institutions, societies, taxonomic resources and focal points in newly associated countries (NAS)
Fauna Europaea : Focal point network
<i>www.faunaeur.org</i> - Fauna Europaea national focal points details.
Society for the Management of European Biodiversity Data - Current members
<i>www.smebd.org</i> - SMEBD list of ERMS experts
Society for the Management of European Biodiversity Data - List of experts
<i>www.smebd.org</i> - SMEBD list of FaEu experts
Orthoptera Species File Online
<i>osf2x.orthoptera.org</i> - Includes list of experts arranged in taxonomic hierarchy
The Orthopterists' Society
<i>www.orthoptera.org</i> - Includes searchable and browsable DB of the some 620 members.
MarBEF Data System - European Register of Marine Species (ERMS)
<i>www.marbef.org</i> - ERMS experts
Fauna Europaea : Experts
<i>www.faunaeur.org</i> - A database of the scientific names and distribution of all living multicellular European land and fresh-water animals. A DB of the experts involved.
Diptera Who's Who
<i>www.sel.barc.usda.gov</i> - A DB serving as a resource reference for systematists worldwide, especially those who work on Diptera. Include names and addresses of some 1,945 specialists (from over 73 countries) in the systematics of Diptera. Some 1,180 specialists also provided information about their interests and taxonomic speciality.
IUCN Species Survival Commission Specialist Groups
<i>www.iucn.org</i> - SSC's 7,000 members are deployed in over 100 Specialist Groups, Disciplinary Groups, Task Forces, and Working Groups based on their area of expertise. Most of the Groups are taxon based. Each Specialist Group is led by a volunteer Chair.