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ENHSIN USERS: SCIENTIFIC AND WIDER

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THE ENHSIN USER SURVEY

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Millions of specimens are currently housed in the institutions of the European Natural History Specimen Information Network. These specimens vary greatly in kind, from plants in botanical gardens, animals in zoos, preserved animals, plants, fossils and minerals in museums to microbial and tissue collections for molecular studies. Each specimen carries information that, collectively, can inform a range of activities, including natural resource management, biotechnology, bioinformatics, medicine, and research and teaching on biodiversity. Although information associated with natural history specimens is becoming ever more accessible through electronic media, it remains scattered across holdings in many institutions. Furthermore, most of the information has not yet been stored electronically, which impedes considerably its access and thus effective use.

The task of making the specimen information available is, however, so great that it is necessary to prioritise. What information should institutions concentrate on making available first? This question is one of considerable interest to managers and curators of collections-based institutions; it is best addressed by attempting to gain some idea of the user community and its varied requirements and emphasis. The nature of the problem can be illustrated by considering the entomological collections of the Zoological Museum in Copenhagen. The museum houses approximately 7.5 million identified specimens, but very little information has yet been captured from these specimens and made available in electronic form. Estimates suggest that it will take on average ten minutes to capture the label information (species

name, date of collection, history, provenance, ecology etc.) for each specimen and to enter these data in a database. (The estimate includes time for handling the specimens – removing and returning them from the collection.) It would take, therefore, approximately 700 years for a full-time employee to register the specimen label information alone. To this should be added the time it would take to enter other important information that may be extracted from the specimens, such as molecular data, phylogenetic information and morphological data.

It should be clear from this example that we will not have the resources necessary to make all current information electronically available. Thus, in order to prioritise, and provide information of the highest possible quality with the highest degree of usefulness, we decided to carry out an exhaustive assessment of user needs. When users and their requirements are identified and described, guidelines can be provided to institutions holding collections to help them build an effective European network of natural history specimen databases.

THE ENHSIN QUESTIONNAIRE

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A provisional questionnaire was produced to assess the requirements for the design and content of an integrated network of databases on natural history specimens. This was tested early in the year 2000 on 40 selected users in Spain and Denmark. Based on the results from this preliminary study, a modified version of the questionnaire was compiled. To ease language problems and maximise the response from users, the questionnaire was made available in Spanish, Italian, German, French and English.

A database of names and addresses of potential and relevant recipients of the questionnaire across Europe was compiled. A useful starting point for the exercise was information accessible from The Biological Collection Information Service in Europe (*BioCISE*; www.bgbm.org/biocise/), which contains data on a large component of European biological collections. Other relevant organisations (private companies, non-governmental organisations (NGOs), administrative bodies etc.) were identified through contacts and knowledge from within the *ENHSIN* partnership. A total of 2,180 questionnaires were mailed in March 2000 to relevant organisations in 29 European countries (Table 1). To encourage a good response, the questionnaires were mailed, wherever possible, to particular individuals at the organisations.

The questionnaire (see Appendix) was arranged under five sections. Part A summarised the purpose of *ENHSIN* and the questionnaire. Part B enabled a user profile to be developed. Organisations were asked to provide basic information such as address and name of a contact person. They were also asked to indicate the organisational category to which they belonged (Table 2), and their main field(s) of interest (Table 3). Part C was designed to gain an understanding of the kinds of specimens held by institutions (Table 6), and what, broadly, they would wish to gain from a natural history specimen database

network (Fig. 1). Part D was designed to evaluate needs and expectations of organisations for different types of information in the network. In this section were included five groups of questions concerning the requirements for detailed information on natural history specimens (taxonomy, collecting details, storage, availability, and history of specimens, etc.). Organisations were asked to assign a level of importance to each subject under three headings: 'Very important', 'Desirable', and 'Of little or no importance'. Part E invited any special comments from the user.

All answers were incorporated in a Microsoft Access database, and, through selective queries, data were extracted and then analysed in Microsoft Excel. The full report on the analysis derived from responses to the questionnaire may be examined at www.nhm.ac.uk/science/enhsin/

THE RESPONSE

The number of questionnaires mailed differed greatly from country to country (Table 1). This disparity was due partly to the size of the country, and thus the number of relevant institutions. It was affected also by the partnership's pre-existing knowledge of institutions in the target countries.

The total number of questionnaires on which the analysis was based was corrected to allow for about 6% that were returned with an address unknown notice. Of the adjusted total, 82.1% of the questionnaires mailed apparently reached their destination but were either not answered, or were returned to us but rejected as invalid because of obvious misunderstandings by the recipient or with questions noted by the recipient as being not relevant. The overall response to the questionnaire was thus 17.9% (366 returns completed adequately, Table 1), ranging from 8.0% (Israel, 25 letters sent) to 87.5% (Estonia, eight letters sent), although one has to take into account, the difference in numbers of letters sent to each country (see above).

The figures in Table 1 were derived from the final version of the questionnaire. In addition, as mentioned above, a draft test questionnaire was sent to 20 Spanish and 20 Danish institutions. From Spain, 13 answers were received, and from Denmark 10. Since the draft questionnaire differed only slightly from the final version, the 23 answers from the draft questionnaire were therefore included in the analyses.

The countries whose answers dominated the total data set of valid answers (Table 1, n=366 plus 23 pilots) are: Germany (20.1%), France (12.3%), United Kingdom (11.1%), Spain (9.3%) and Italy (9.0%); secondly (3–5%) came: Netherlands (4.9%), Denmark (4.1%), and Austria (3.6%). Eleven countries each contributed to the data set between 1% and 3%, and lastly, a group of 10 countries each contributed with less than 1%. In total, the full report on which this chapter is based (www.nhm.ac.uk/science/enhsin/) involved 390 answers from 30 countries (including one answer received from Brazil, via the *ENHSIN* homepage).

Table 1. Country response to questionnaire. *Rightmost column *Percentage contribution to data set* includes pilot questionnaire answers from **Denmark (10 letters) and ***Spain (13 letters).

Country	No. letters	Invalid address, returned to sender	Corrected No. letters	Percentage of total sent	No answer/misunderstood/Not relevant	Positive response	Percentage response	Percentage contribution to data set (n=389)*
Austria	69	0	69	3.4	55	14	20.3	3.6
Belgium	68	8	60	2.9	52	8	13.3	2.1
Bulgaria	4	0	4	0.2	3	1	25.0	0.3
Cyprus	1	0	1	0.1	1	0	0.0	0.0
Czech rep.	68	0	68	3.3	61	7	10.3	1.8
Denmark	37	3	34	1.7	28	6	17.6	**4.1
Estonia	8	0	8	0.4	1	7	87.5	1.8
Finland	46	2	44	2.2	33	11	25.0	2.8
France	674	78	596	29.1	548	48	8.1	12.3
Germany	261	9	252	12.3	174	78	31.0	20.1
Greece	42	2	40	2.0	32	8	20.0	2.1
Hungary	14	0	14	0.7	12	2	14.3	0.5
Iceland	6	0	6	0.3	5	1	16.7	0.3
Israel	25	0	25	1.2	23	2	8.0	0.5
Italy	155	6	149	7.3	114	35	23.5	9.0
Latvia	6	0	6	0.3	5	1	16.7	0.3
Lithuania	4	0	4	0.2	2	2	50.0	0.5
Luxembourg	8	0	8	0.4	7	1	12.5	0.3
Netherlands	95	7	88	4.3	69	19	21.6	4.9
Norway	7	0	7	0.3	6	1	14.3	0.3
Poland	45	1	44	2.2	34	10	22.7	2.6
Portugal	54	1	53	2.6	47	6	11.3	1.5
Romania	17	0	17	0.8	12	5	29.4	1.3
Slovakia	34	0	34	1.7	27	7	20.6	1.8
Slovenia	2	0	2	0.1	1	1	50.0	0.3
Spain	100	3	97	4.7	74	23	23.7	***9.3
Sweden	48	2	46	2.2	38	8	17.4	2.1
Switzerland	15	0	15	0.7	4	11	73.3	2.8
United Kingdom	267	9	258	12.6	215	43	16.7	11.1
SUM	2180	131	2049		1683	366		

Wrong address 6%
Overall response 17.9%

RESULTS FROM PART B OF THE QUESTIONNAIRE: USER PROFILES

In the questionnaire, organisations were asked to provide their address, the person responsible for answering the questionnaire, and an indication of their type(s) of organisation (Table 2) and main field(s) of interest (Table 3). For clarity of presentation, the categories of organisation types (Table 2) and of fields of interest (Table 3) were ranked in descending order of percentages. Almost three quarters (73.8%) of the institutions were revealed to be a university/ other educational body, a research institution, or a public/private museum (Table 2). Accordingly, the predominant fields of interest were exhibition/ education, taxonomic research, and other types of research (Table 3). A small fraction of the organisations did not indicate any type of organisation or field of interest (Category: 'Not indicated'). About one-third of the institutions responded that they belonged to more than one category of organisation type (Table 4), and the majority of institutions indicated several kinds of (overlapping), interests (Table 5).

Table 2. The institutions are distributed on the following ranked groups of organisations. Botanical and zoological gardens were not included as separate categories in the original questionnaire, but have been added in this report since they were indicated by several institutions within the category 'other'.

Organisation type	Total	Percentage
University or other educational body	150	27.2
Research institution	135	24.5
Public museum	112	20.3
Non-governmental organisation (NGO)	33	6.0
Private company	30	5.4
Administrative body	27	4.9
Other type of organisation	25	4.5
Zoological garden	20	3.6
Private museum	10	1.8
Botanical garden	8	1.5
Not indicated	1	0.2
TOTAL	551	

RESULTS FROM PART C OF THE QUESTIONNAIRE: YOUR ORGANISATION'S INTEREST IN A NATURAL HISTORY SPECIMEN DATABASE NETWORK

Within the field of natural history (Table 6), the participating institutions may roughly be grouped into four principal blocks of interest types: 1) (the majority), preserved specimens of plants/fungi and animals (~20%); 2) living plants/fungi (13%); 3) fossils, live animals, and minerals/rocks (~9%), and 4) tissue samples, micro-organisms and other specimen types (~5%). A small

Table 3. The institutions have indicated the following ranked interest groups.

Interest types	Total	Percentage
Exhibition/education	227	22.2
Taxonomic research	207	20.3
Other types of research	201	19.7
Nature conservation	172	16.8
Natural resources management	102	10.0
Other interests	77	7.5
Industrial/commercial use of organisms	33	3.2
Not indicated	3	0.3
TOTAL	1022	

Table 4. Distribution of *Organisation types*.

No. types indicated	Total no. institutions (n=390)	
1	260	
2	100	Fraction with 2 or more organisation types indicated
3	29	
4	1	
		33%

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Table 5. Distribution of *Interest types*.

No. types indicated	Total no. institutions (n=390)
1	81
2	115
3	101
4	67
5	17
6	8
7	1

fraction of the organisations failed to indicate their interest either in kinds of specimens or, indeed, in their interest in a natural history specimen database network as a whole. Note that each institution may have indicated more than one field of interest.

A searchable network of specimen databases was considered very useful by as many as 92% of the organisations (Fig. 1, C1). There was also a general consensus that the network would benefit from being pan-European (86%) rather than a series of autonomous national networks (Fig. 1, C2). Regarding level of access to information on specimens (Fig. 1, C3, 4), 56% of respondents stated that it would suffice to have access to collections metadata in institutions (i.e., descriptive information about collections rather than data from individual specimens). Access to just lists of species represented in collections was not considered adequate by 52% of the respondents.

Table 6. The institutions grouped according to their main interests in ranked kinds of specimens. Note that each institution may have indicated more than one field of interest.

Natural History Specimen Kinds	Total	Percentage
Preserved plants/fungi	213	19.4
Preserved animals	201	18.3
Living plants/fungi	143	13.0
Fossils	116	10.5
Living animals	100	9.1
Minerals and rocks	92	8.4
Tissue samples for molecular/chemical analysis	72	6.5
Preserved micro-organisms	56	5.1
Living micro-organisms	56	5.1
Other specimen kinds	47	4.3
Not indicated	4	0.4
Total	1100	

**PART D OF THE QUESTIONNAIRE:
YOUR ORGANISATION'S NEEDS AND EXPECTATIONS FOR
DIFFERENT TYPES OF INFORMATION IN A NETWORK OF
NATURAL HISTORY SPECIMEN DATABASES**

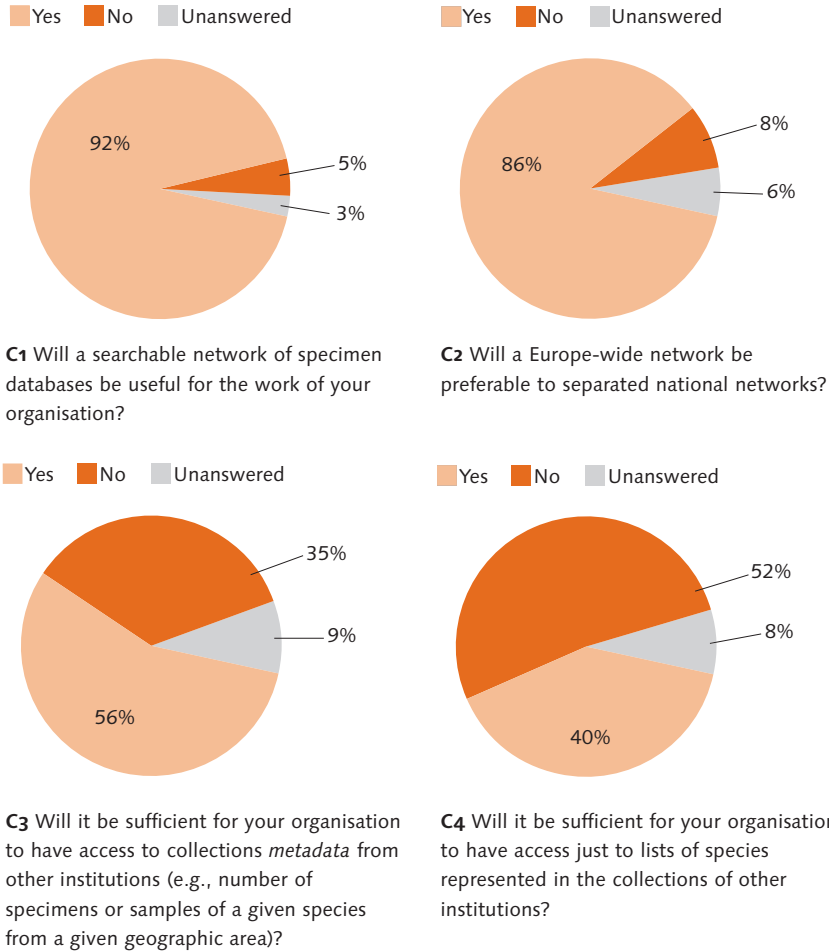
The purpose of Part D of the questionnaire was to identify in detail the level of need for the different kinds of information that might be included in the network, and the degree of importance assigned to them. This part of the questionnaire included 48 grouped questions relating specifically to specimen information:

- Section D1 **Taxonomy** (12 items)
- Section D2 **Collecting details** of specimen (7 items)
- Section D3 **Repository and storage** of specimen (3 items)
- Section D4 **Availability** of specimen (8 items)
- Section D5 **Further details** of specimen (14 items, plus an optional field for comments)
- Section D6 **History** of specimen (4 items)

USER ANALYSIS

The respondents were divided into Scientific and Sectoral users in order to reveal potential differences in the user needs of the two groups, and thus optimise the structure and data content of the future network so as to ensure the maximum interest and usefulness for each group.

Figure 1. Interest in a natural history specimen database network.



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SCIENTIFIC USER PROFILE. Scientific users were defined on the basis of their carrying out research. Thus all universities (and other educational bodies), and all research institutions (see Table 2) were included along with other bodies with a taxonomic or other research element noted as a main interest (see Table 3). Note that approximately one third of all institutions indicated that they belonged to two or more categories of *Organisation type* (see Table 7). An institution may, therefore, have ticked both *NGO* (non-governmental organisation) as well as *Research institution*. In such situations, institutions were included in the *Scientific user* group. An institution marked as *NGO* 'alone' was identified as falling into the *Sectoral user* category, unless *Research* was indicated as 'main interest'.

Table 8 lists institutions included as *Scientific users*, based solely on interest in *Taxonomic* or *Other research*, but excluding universities and research institutions. The table shows that the sample is composed approximately as

Table 7. Scientific users, distribution of *Organisation types*.

No. types indicated	No. scientific institutions (n=314)	
1	203	
2	85	Fraction with 2 or more organisation types indicated
3	25	
4	1	
		35%

follows: one half by museums plus zoological gardens; one third by botanical gardens, other organisations and NGOs; and one fifth by private companies plus administrative bodies. Apart from research, the main interest of Scientific users lay within *Exhibition/education* and *Nature conservation* (Table 9).

The Scientific users represented 80.5% of the total sample (n=314 out of 390).

Table 8. Organisations that have indicated research as among their main interests, but which are not universities or research institutions per se.

	Total count of organisation type	Indication of interest in taxonomic or other research	Percentage of total
Private museum	10	5	50.0
Zoological garden	20	9	45.0
Public museum	112	46	41.1
Botanical garden	8	3	37.5
Other type of organisation	25	8	32.0
Non-governmental organisation (NGO)	33	10	30.3
Private company	30	6	20.0
Administrative body	27	5	18.5

SECTORAL USER PROFILE. Sectoral users included organisations apart from universities (and other educational bodies) and research institutions. Only those museums, living collections, private companies, NGOs, administrative bodies, and other types of organisations that had **not** indicated taxonomic or other kinds of research as their main interest were deemed to be Sectoral users. In the last four types of organisations might be included Sectoral users such as fisheries, agriculture, mineral exploitation, and human and animal health.

The Sectoral institutions represented 19.5% of the total sample (n=76) and their main interests (Table 9) fell into the categories of *Exhibition/education*, *Nature conservation*, and secondly, *Natural resources management* and *other interests*.

Table 9. Distribution of *Interest groups* listed separately for the two user groups. Since selection of *Taxonomic* and/or *Other types of research* were among the criteria used to segregate Scientific from Sectoral users, in the Sectoral user group, zero institutions occur in these two categories.

Interest types	Scientific users		Sectoral users	
	Total	Percentage	Total	Percentage
Taxonomic research	207	23.1	-	-
Other types of research	201	22.4	-	-
Exhibition/education	184	20.5	43	34.4
Nature conservation	135	15.1	37	29.6
Natural resources management	85	9.5	17	13.6
Other interests	54	6.0	23	18.4
Industrial/commercial use of organisms	30	3.3	3	2.4
Not indicated	1	0.1	2	1.6
TOTAL	897		125	

RESULTS

SECTION D1 – TAXONOMY OF SPECIMEN, FIGS 2, 3.

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Very high importance was assigned by both groups of users to the *Valid/current scientific name* of a specimen (Figs 2, 3). Scientific users were also very interested in information on *Author of valid/current scientific name* (87.3% for the combined categories of 'very important' and 'desirable').

Sectoral users generally assigned a distinctly lower level of importance to taxonomic information than did Scientific users, and the difference was primarily found between the categories 'very important' and 'little importance'. The fraction assigned 'desirable' did not differ so markedly between the two user groups. Hence, apart from *Vernacular name* and *Infrasubspecific name* (e.g. variety, strain), the category 'little importance' never exceeded 20% within the Scientific user group, whereas the Sectoral user group range of 'little importance' assigned lay above 20% for eight out of twelve topics of the taxonomic section.

The *Vernacular name* was marked as of only 'little importance' by 41.7% of the Scientific users, whereas 48.7% of the Sectoral users found it 'desirable' to be provided with this information.

The *Name of person who identified a specimen* was only considered as 'very important' by 7.9% of the Sectoral users in contrast to 27.4% of the Scientific users.

SCIENTIFIC USERS. Almost one in two Scientific users considered *Subspecific name* to be 'very important' information. Topics relating to the description and nomenclature of species (*Original combination – for type specimens*, *Reference to original description*, *Year of publication of valid/current name*, *Synonyms under which the specimen has been recorded*) received high percentages of interest, the category 'very important' ranging from 47.1 to 40.4%.

Information relating to systematics was considered to be 'very important' by 37.6% of the users.

Other additional data such as: *Infrasubspecific name*, *Person who identified the specimen*, and *Reference to other papers of relevance for nomenclature/taxonomy*, do not show markedly high percentages in the 'very important' category, but they were considered to be fairly desirable.

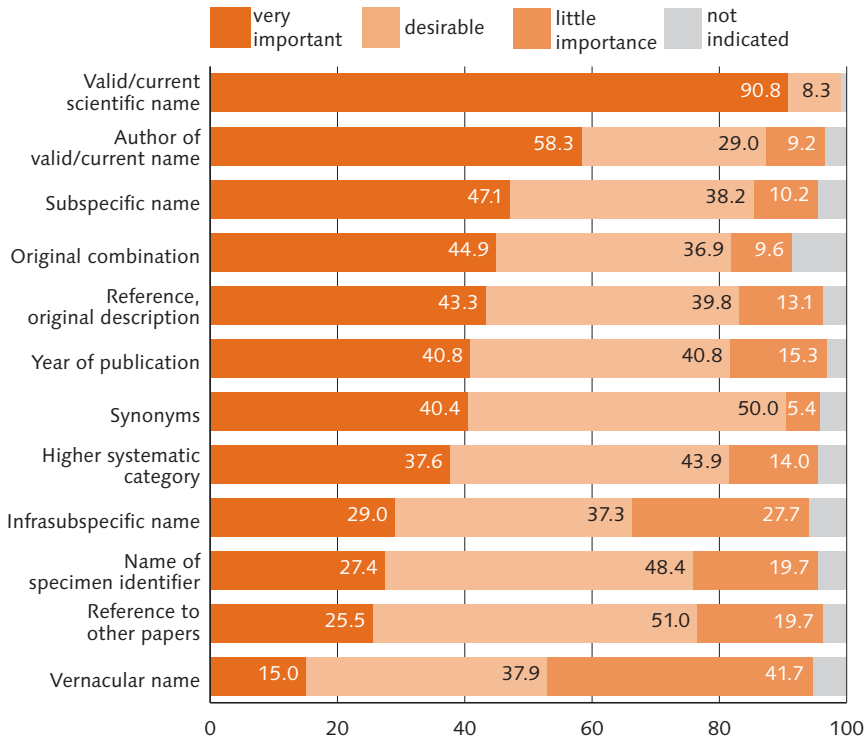


Figure 2. Scientific users: D1 – Taxonomy of specimen. Distribution of percentages of importance assigned.

SECTORAL USERS. The 12 taxonomic questions in section D1 (Fig. 3) may be grouped broadly into three blocks, retrospectively based on the percentages of users judging a given piece of taxonomic information as 'very important'. 1) the *Valid/current scientific name* was considered indispensable; 2) a group including *Higher systematic category*, *Subspecific name*, *Synonyms*, and *Author of the valid/current name* received high interest by more than 30% of the users; and 3) the remaining taxonomic questions all show percentages below 25%. Within this latter group, some items were considered more important than others: *Vernacular name* and *Reference to original description* were adjudged by almost 1 in 4 users to be 'very important'; and roughly 1 in 5 users desire *Infrasubspecific name* and *Year of publication*.

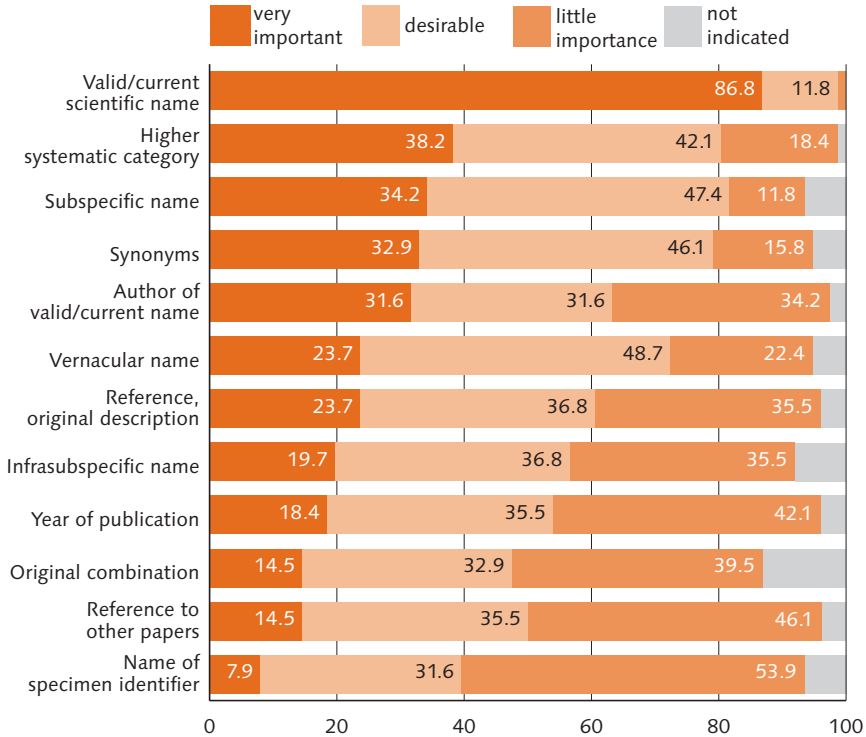


Figure 3. Sectoral users: D1 – Taxonomy of specimen. Distribution of percentages of importance assigned.

SECTION D2 – COLLECTING DETAILS OF SPECIMEN, FIGS 4, 5.

On the basis of percentages for the response of 'very important', the overall ranking of questions regarding collecting details associated with a specimen is similar both in Scientific and Sectoral user groups (Figs 4, 5).

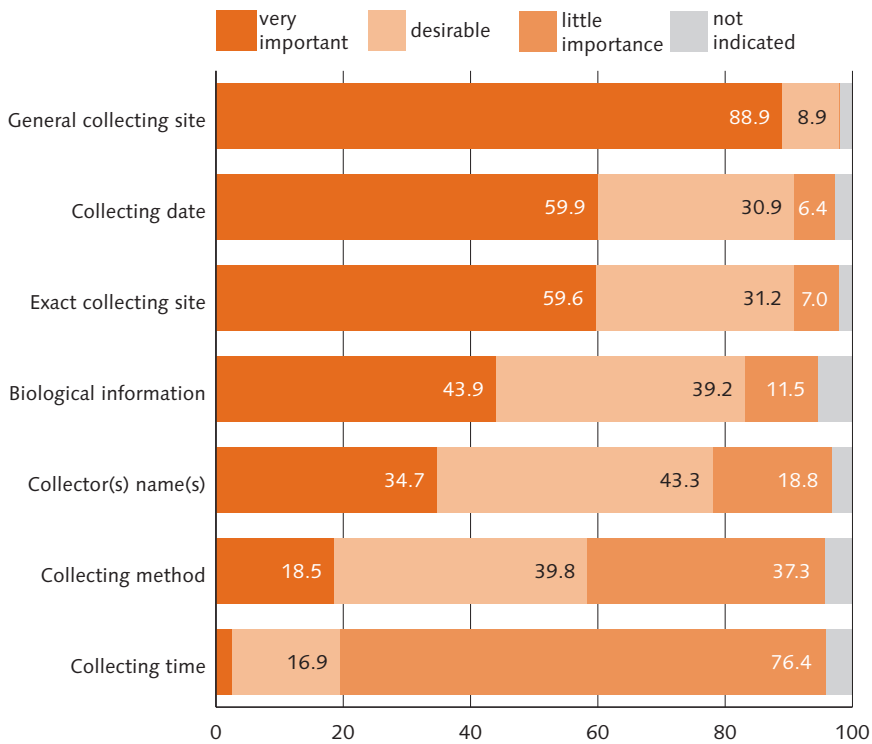
Combining the percentages in the categories 'very important' and 'desirable' shows, that *General collecting site*, (e.g. *country, province, water body*) was assigned a very high level of importance by both user groups (in total: 97.8% for Scientific users and 94.8% for Sectoral users). Conversely, Scientific users considered *Collecting date* and *Exact collecting site*, rather more important than did Sectoral users (in total: 90.8% for both items versus 75.0% and 67.1%). The information on *Collecting method* was generally regarded as 'desirable' or of only 'little importance' by the Scientific users, and more than half of the Sectoral users considered this item to be unimportant. The *Collecting time* (e.g. *9.15 a.m.*) was not considered to be of significant value by either of the user groups.

SCIENTIFIC USERS. The general and basic specimen information valued highly by Scientific users for research and publication were:

- ♦ General collecting site, (e.g. country, province, waterbody).
- ♦ Collecting date.
- ♦ Exact collecting site, (e.g. 'X km NE of Y', coordinates, depth/altitude).

Other data, such as *Biological information* (e.g. *host name*), was considered important by only a moderate number of users, and the *name(s) of collector(s)* was mostly perceived as being only 'desirable' to know.

Figure 4. Scientific users: D2 – Collecting details of specimen. Distribution of percentages of importance assigned.

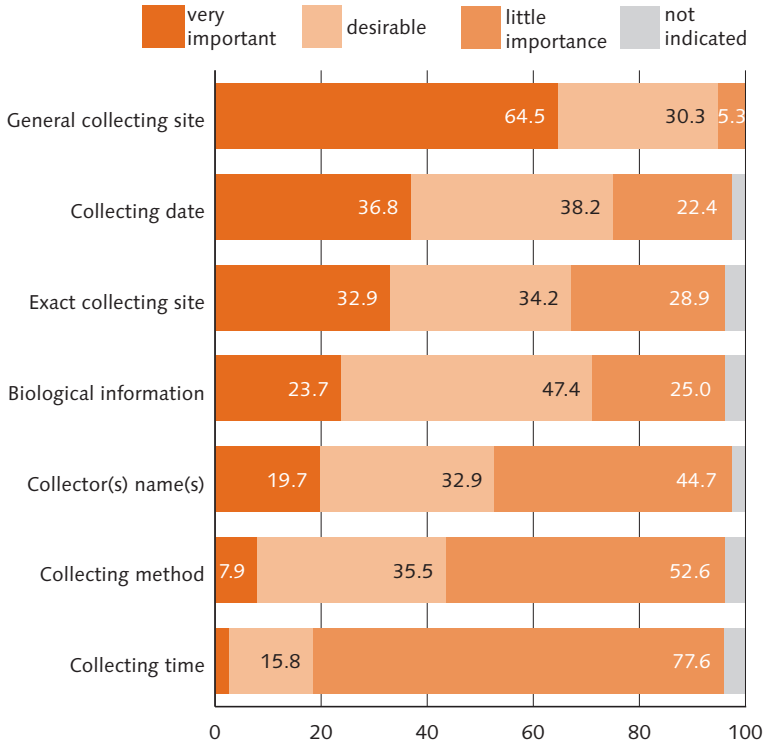


SECTORAL USERS. For *Collecting site*, general information was considered much more valuable than detailed data (in total 94.8% versus 67.1%). About one in four respondents found it very important to have biological information related to a specimen, and one in five wanted the name of the collector.

SECTION D3 – REPOSITORY AND STORAGE, FIGS 6, 7.

Almost 90% of the Scientific users considered information about the depository (*'location'*) e.g. Zoological Museum, Copenhagen, of the specimen to be 'very important' (Fig. 6). Catalogue number of the specimen was viewed as 'very important' or 'desirable' (in total 82.2%). These data are necessary to

Figure 5. Sectoral users: D2 – Collecting details of specimen. Distribution of percentages of importance assigned.



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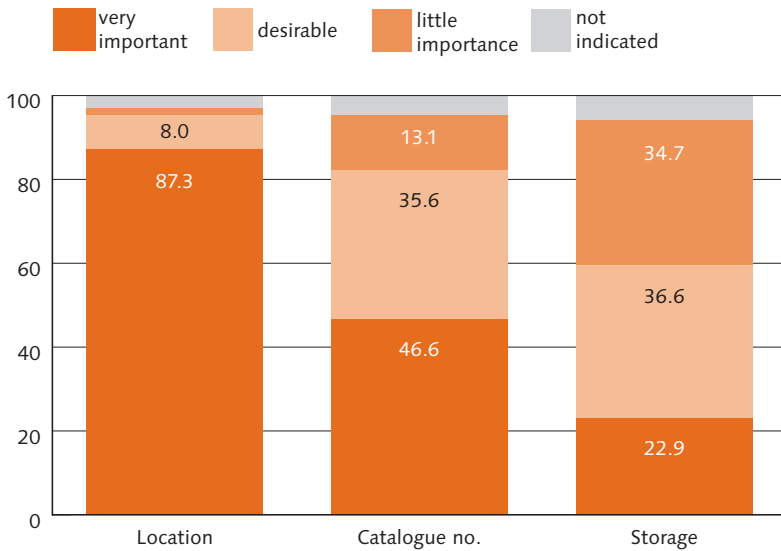
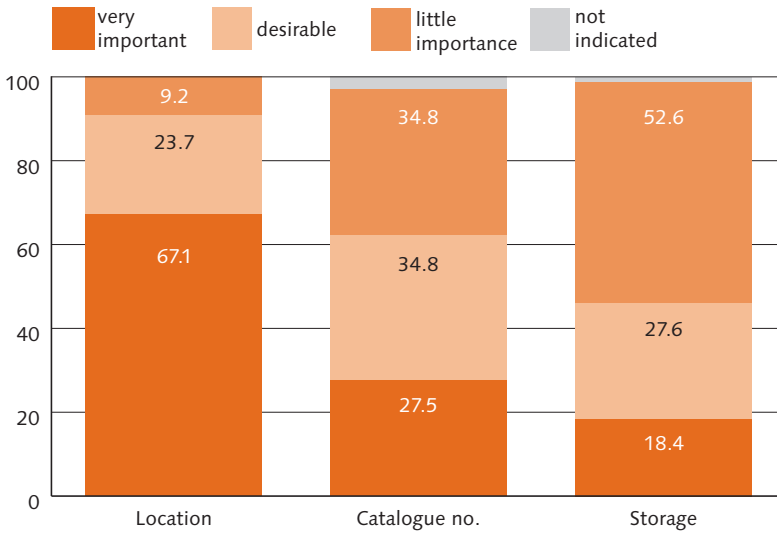


Figure 6. Scientific users: D3 – Repository and storage of specimen. Distribution of percentages of importance assigned.

locate collections material for study, and they are typically recorded in published scientific work. Storage conditions of specimens, such as *room temperature, cold, frozen, dark, oxygen-free*, was considered less important.

SECTORAL USERS. For the majority of Sectoral users, only the depository (*location*) of the specimen was considered to be 'very important' (67.1%).

Figure 7. Sectoral users: D3 – Repository and storage of specimen. Distribution of percentages of importance assigned.



SECTION D4 – AVAILABILITY OF SPECIMEN, FIGS 8, 9.

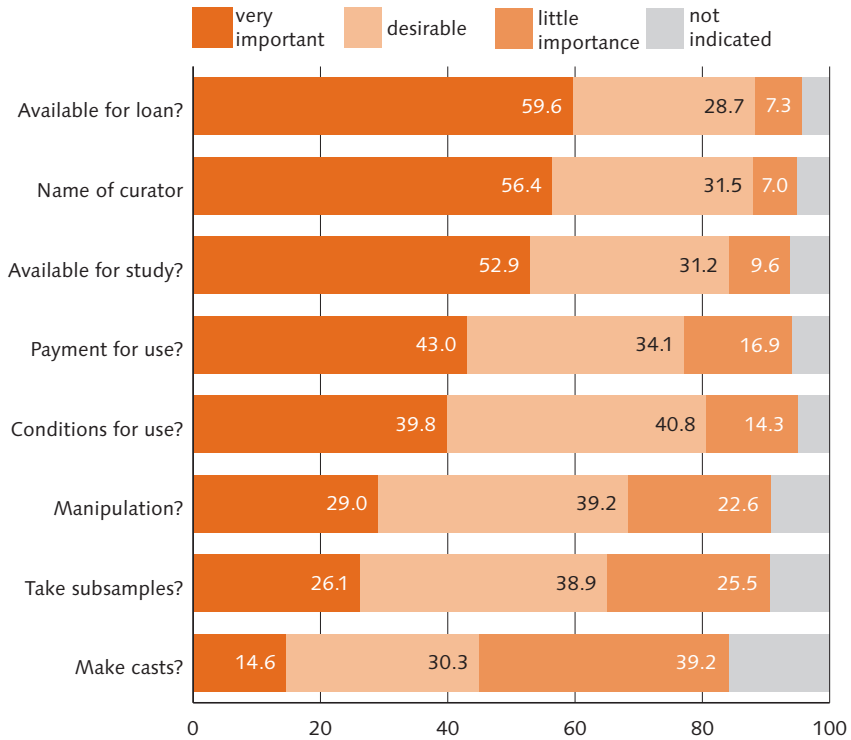
For Scientific users, only that information of the kind needed to carry out typical descriptive taxonomic studies was considered essential by a large section of the Scientific users, i.e.:

- ♦ Availability for loan.
- ♦ Name of curator/contact person.
- ♦ Availability for study on site.

Knowing if there were *Conditions or Payment required for use* of material was considered 'very important' by many users, yet of lesser importance than for 'basic study information' on specimens.

The possibilities of gaining permission to manipulate specimens or apply certain techniques to them (e.g. making casts or subsamples) was only considered 'very important' by a more limited percentage of the Scientific users. However, more considered it 'desirable' to have this information accessible through the network.

Figure 8. Scientific users: D4 – Availability of specimen. Distribution of percentages of importance assigned.

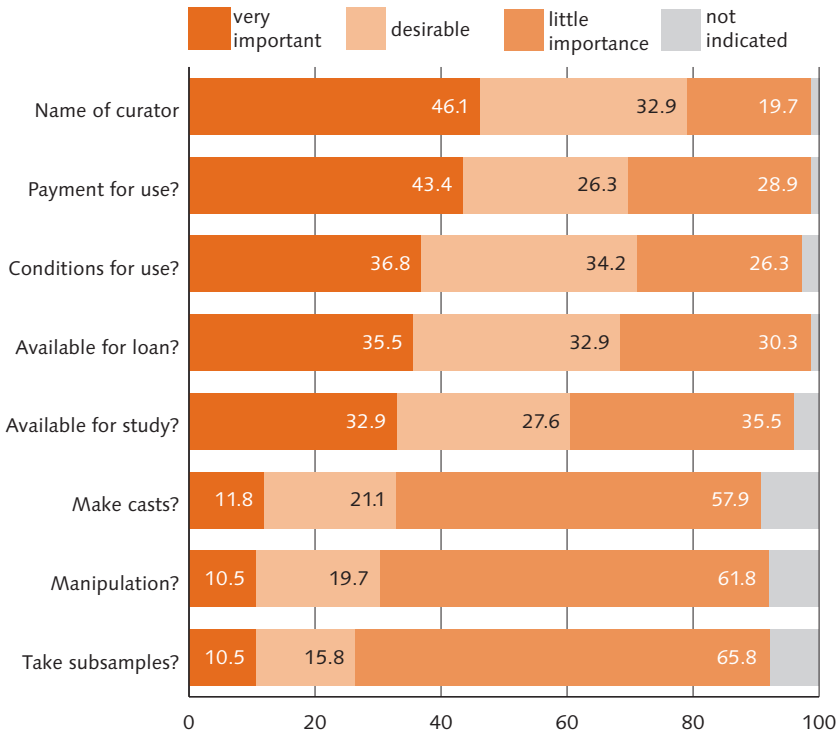


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SECTORAL USERS. Unlike the situation for Scientific users, *Availability for loan* and *Study* by Sectoral users emerged as falling only into the second most important group of questions. For the Sectoral users, *Name of curator* and, as opposed to Scientific users, *Payment for use*, seemed more important among the section D4 questions. Approximately one in three Sectoral users wanted to know whether there are *Conditions for use* of specimens, e.g. if images were to be made, or if copyright agreement is required from lending institution.

The majority of Sectoral users indicated little interest in gaining permission to manipulate or apply techniques to specimens (range 'little importance': 57.9% to 65.8%).

Figure 9. Sectoral users: D4 – Availability of specimen. Distribution of percentages of importance assigned.



SECTION D5 – FURTHER DETAILS OF SPECIMEN, FIGS 10, 11.

The questions concerning further details of specimens fall into five groups:

1. Biology
 - a. Sex.
 - b. Developmental stage (e.g. egg, larva, seed).
 - c. Size (e.g. length, diameter, weight).
 - d. Taxon-specific information (e.g. for preserved birds: brood patches; for fossils: geological age).
2. Aspects related to taxonomy and type status
 - a. Type status (e.g. holotype, lectotype).
 - b. Details of type designation.
 - c. Exact quotation of label text.
3. Legal aspects
 - a. Legal status (e.g. reference to collecting/export/import permits).
 - b. Ownership (e.g. for specimens owned by a government agency and deposited in a museum).
 - c. Commercial value.

4. Documentation
 - a. References to papers mentioning/based on/using the specimens.
 - b. Availability of images of specimen.
5. Preservation
 - a. Method of preservation (e.g. dry skeleton, in alcohol, slide, herbarium sheet, blood sample, cast).
 - b. Condition (e.g. perfect, damaged, faded, moth-eaten).

Within *group 1*: Biological questions on further specimen details (Figs 10, 11), the percentages of Scientific and Sectoral users assigning high or intermediate levels of importance to the different items were rather similar. A difference of about 15% occurred on *size* as 'desirable' information. A smaller but notable difference (~8%) was also seen for *Taxon-specific information*.

The biggest differences between the two user groups were seen within *group 2*: Aspects related to taxonomy and type status. The interest of Scientific users was here highly focused on *Type status* (In total 83.1%), whereas only 22.4% of the Sectoral users considered this to be 'very important'. Likewise, very large differences were seen between the two user groups for the two other items.

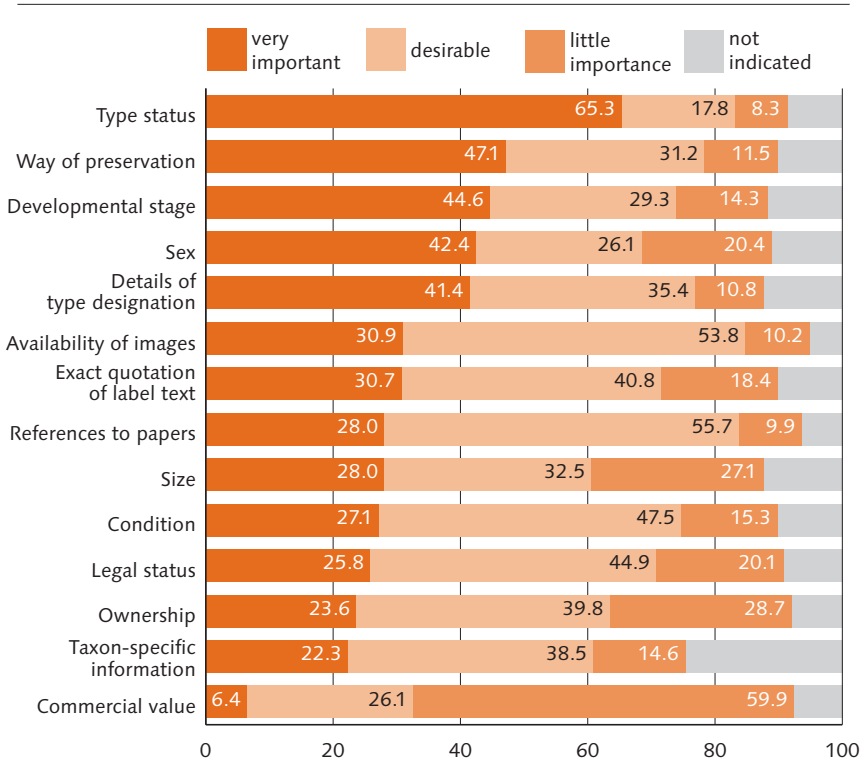


Figure 10. Scientific users: D5 – Further details of specimen. Distribution of percentages of importance assigned.

In *group 3* (legal aspects) only 6.4% of the Scientific users considered the *commercial value* of a specimen to be 'very important' information, as opposed to 18.4% of the Sectoral users.

Documentation in general (*group 4*) was considered 'important', or at least 'desirable', by many of the Scientific users, whereas only *availability of images* seemed 'very important' to a larger part of the Sectoral users.

Method of preservation (*group 5*) was the second most important topic for Scientific users (47.1%), but only 27.6% of the Sectoral users gave this item highest priority.

SCIENTIFIC USERS. Apart from *type status* other topics, such as *Way of preservation*, *Developmental stage*, *Sex*, and *Details of type designation* received more moderate percentages in the 'very important' category, ranging from 47.1% to 41.4%. The remainder of the questions, including all items on legal issues, were generally considered only 'desirable'. Within that latter cluster of questions, more than half the Scientific users found it 'desirable' to obtain images of specimens and references to additional publications about them.

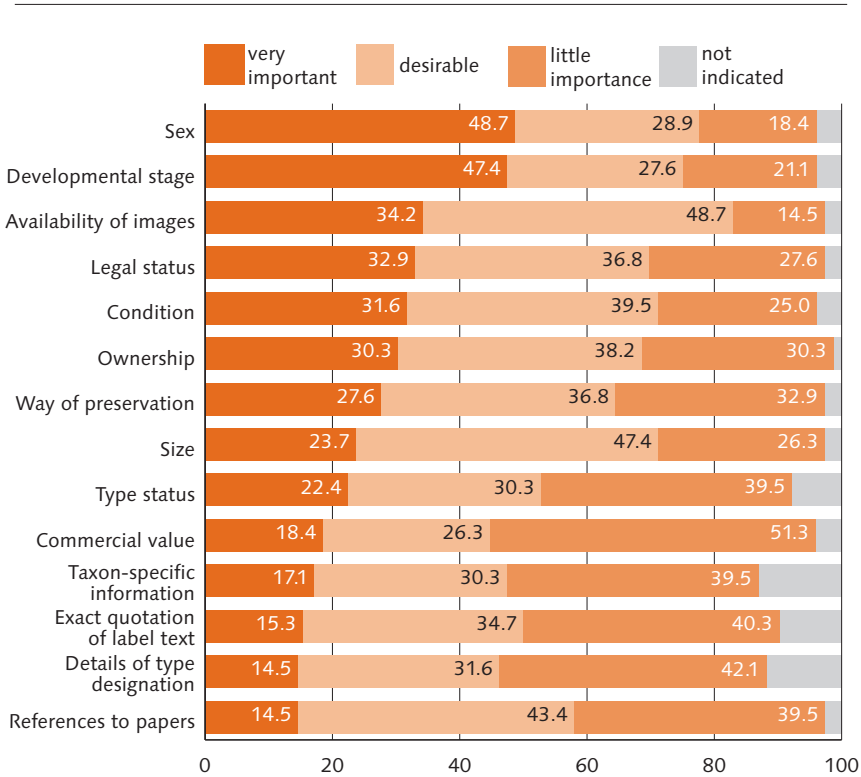


Figure 11. Sectoral users: D5 – Further details of specimen. Distribution of percentages of importance assigned.

SECTORAL USERS. Of the five groups of questions in section D5, *further details of specimen* (Figs 10, 11), two items in *group 1* (Biological aspects), received the highest 'very important' percentages of all items, namely *Sex* and *Developmental stage*. *Availability of images* was regarded as being 'very important' or 'desirable' (in total, over 80%).

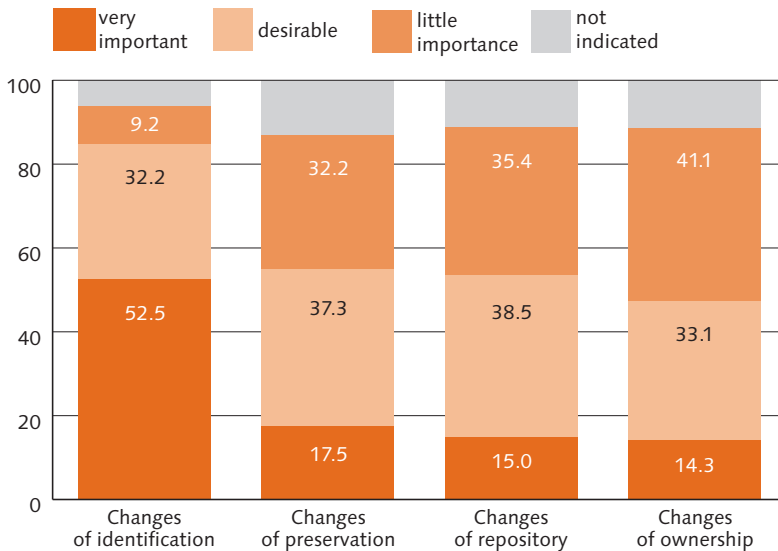
Legal aspects (*group 3*) was the third most important set of issues, that is: *Legal status*, *Ownership*, and to a lesser, but still notable, extent, the *Commercial value* of a specimen. This is understandable given the property rights and other legal aspects (good practice etc.) that are typically included in the work of such institutions. Apart from *Availability of images* (see above), documentation (*group 4*), and taxonomy (*group 2*) were generally judged to be of only lesser importance.

SECTION D6 – HISTORY OF SPECIMEN, FIGS 12, 13.

SCIENTIFIC USERS. With regard to information about the history of a given specimen, there was a strong need to know about changes of identification (Fig. 12). Other information, that is on changes of preservation, repository, and ownership, was generally considered to be of lesser importance, but, nevertheless, 'desirable', for about one third of the Scientific users.

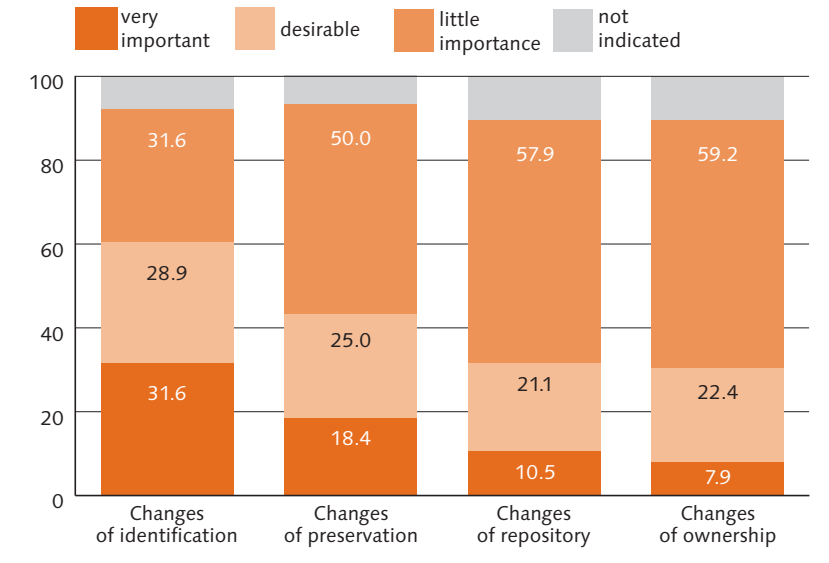
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Figure 12. Scientific users: D6 – History of specimen. Distribution of percentages of importance assigned.



SECTORAL USERS. A change in the identification of a specimen was the only topic that was regarded as 'very important' by at least a moderate number of Sectoral users. The other historical aspects of a specimen were assigned only quite low levels of importance by the majority of Sectoral users.

Figure 13. Sectoral users: D6 – History of specimen. Distribution of percentages of importance assigned.



COMPARISON OF SCIENTIFIC AND SECTORAL USER NEEDS, AND GENERAL DISCUSSION OF USER NEEDS IN SECTION D OF THE QUESTIONNAIRE

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In the previous section, results from each of the six groups of questions in Section D (i.e. detailed information on natural history specimens) were examined individually. The purpose of this exercise was to compare the importance assigned by all classes of users surveyed to items within the principal groups of information in the questionnaire: taxonomy, collecting details, storage, availability, history, and further details of specimen. Scientific/Sectoral comparison of the requirements of Scientific versus Sectoral users was made qualitatively. In the next section, the questions examined in Section D are studied collectively, so as to quantify, compare and contrast similarities and differences in the requirements of the two broad groups of users – Scientific and Sectoral. The relative importance assigned to the items in section D is then examined for these two groups. The results are summarised graphically and as tables.

Generally, the Sectoral users were less likely than the Scientific users to choose the response 'very important' (Fig. 14). Hence, in 36 out of the 48 questions in section D, for any given item, the category 'very important' is greater among Scientific users than among Sectoral users.

INFORMATION NEEDED BY ALL USERS

Eleven items were rated of maximum interest by the Scientific users, with percentages ranging from 90.8% down to a chosen limit of 50% (Fig. 14 and

Table 10). Among them, were three items that the Sectoral users considered of approximately equally importance:

1. *Valid/current scientific name*.
2. *General collecting site* (e.g. country, province, waterbody).
3. *Location of specimen* (e.g. Zoological Museum, Copenhagen).

No items were judged to be 'very important' by over 50% of the Sectoral users exist without this being also the case for Scientific users. The items *Sex* and *Developmental stage*, however, were considered slightly more important by almost 50% of Sectoral users compared with Scientific users (Table 10). The item *Name of curator* was also considered 'very important' by nearly 50% of the Sectoral users, but this was equally rated by more than half of the Scientific users.

An additional 12 items were given maximum priority by at least 37.5% of the Scientific users (items *Way of preservation* down to *Higher systematic category* in Fig. 15). Of the remaining 23 items, as many as 13 were assigned a high level of importance by at least 25% of either of the two user groups.

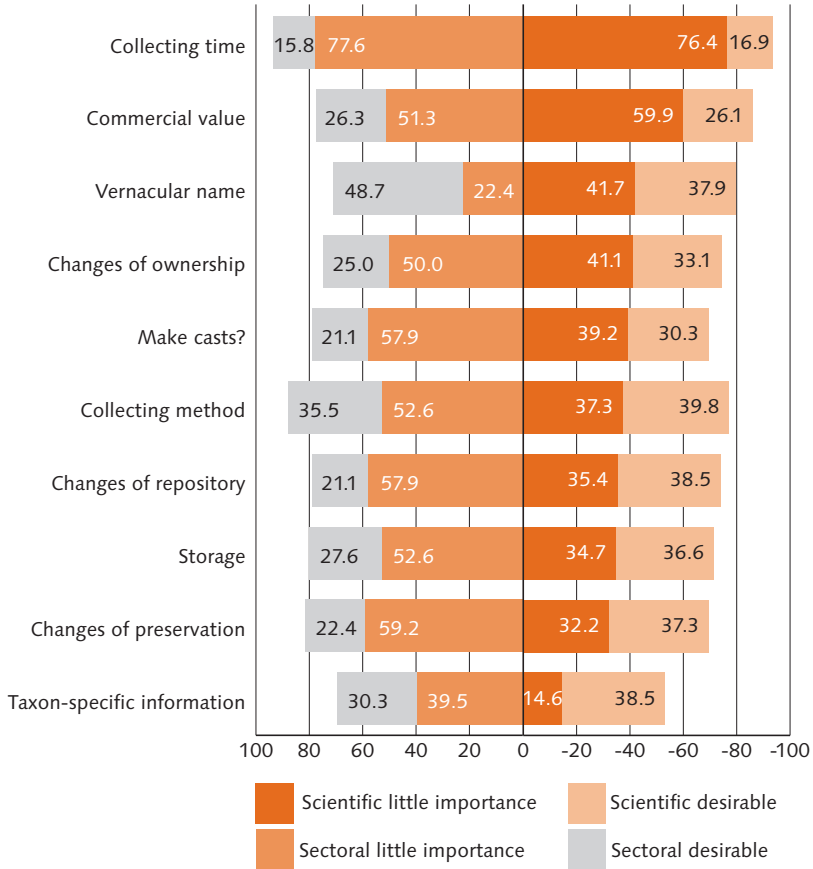
Table 10. Items extracted from all questions in section D based on being considered *very important* by at least (or close to) 50% of either Scientific or Sectoral users.

	Percentage assigned <i>very important</i>	
	Scientific users (n=314)	Sectoral users (n=76)
Valid/current scientific name	90.8	86.8
Collecting site, general	88.9	64.5
Location	87.3	67.1
Type status	65.3	22.4
Collecting date	59.9	36.8
Availability for loan	59.6	35.5
Collecting site, exact	59.6	32.9
Author of valid/current name	58.3	31.6
Name of curator/contact person	56.4	46.1
Availability for study on site	52.9	32.9
Changes of identification	52.5	31.6
Sex	42.4	48.7
Developmental stage	44.6	47.4

INFORMATION LITTLE REQUIRED BY USERS

The ten remaining items in Fig. 15 (items *Storage* through *Collecting time*) were analysed separately, based on ranked percentages within the categories of 'little importance', and including the category 'desirable' (Fig. 15). Clearly, the items *Collecting time* and *Commercial value* were the two types of information, that were assigned the lowest level of importance both by Sectoral and Scientific users.

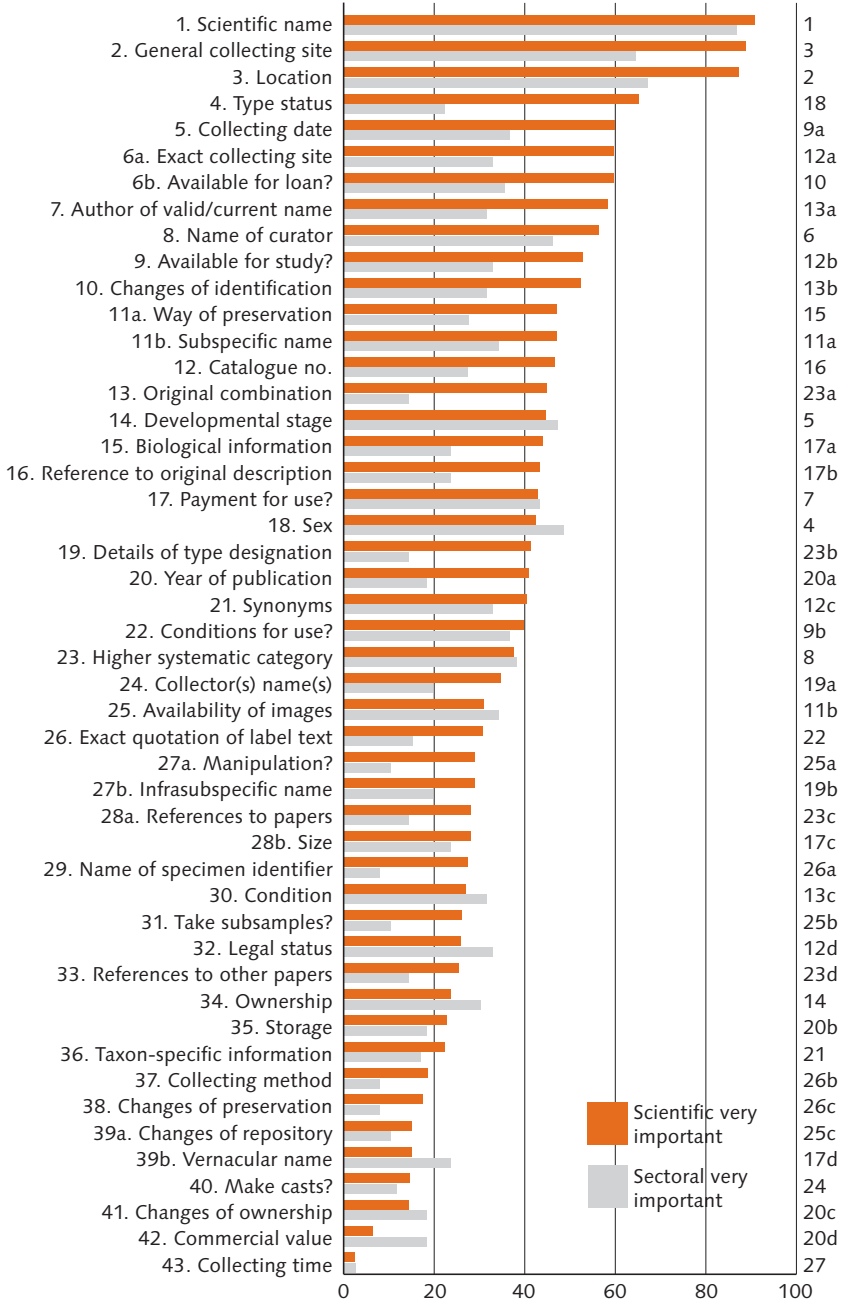
Figure 14. Ranked percentage values from categories regarded as 'little importance' for all questions in Section D. Scientific users – columns on the right. Sectoral users – columns on the left.



MAIN DIFFERENCES IN NEEDS BETWEEN SECTORS

The category 'little importance' was used as a basis for comparison to highlight the main differences in the requirements of the Scientific and Sectoral users, (see Table 11). A reason for using this category was to overcome possible bias in the responses from users. When distinguishing between 'very important' and 'desirable' as a response to requirements for detailed information on natural history specimens, it is likely that a person completing the questionnaire may have incorporated a certain experience-based estimated likelihood of such information being actually available. Hence, information that the person regarded as less likely to be available may have been designated as 'desirable' instead of 'very important'. In addition, and as mentioned earlier, the Sectoral users generally chose the category 'very important' less often than did the Scientific users. Data for Table 11 were chosen according to the following criteria. First, a given item should be considered of 'little

Figure 15. Scientific and Sectoral users, ranked percentage values from categories regarded as 'very important' for all questions in Section D. In addition to the question label, the left category axis includes rank of items for Scientific users (when similar values occur, a letter is added to the rank). Right category axis denotes rank of items for Sectoral users (when similar values occur, a letter is added to the rank).



importance' by at least 25% within any of the two user groups. Second, within this subgroup of items, the percentage of Scientific users that assigned 'little importance' to a given item, as a proportion of the same opinion in the Sectoral users, should be lower than 0.43 (chosen limit, the median of the proportional differences in opinion seen), and hence higher than 1.57 in cases where the fraction of Scientific users that assigned low importance to an item was larger than the corresponding group of Sectoral users. Recall that a proportion of 1 represents equality in opinion between the two user groups.

Table 11. Biggest differences in the needs of Scientific and Sectoral users. Calculation made as percentage of Sci. users as a proportion of percentage of Sect. users who assigned little importance to a given item.

Category	% Scientific users which assigned <i>Little importance</i>	% Sectoral users which assigned <i>Little importance</i>	Scientific users opinion as proportion of Sectoral users opinion
Vernacular name	41.7	22.4	1.86
Type status	8.3	39.5	0.21
Original combination	9.6	39.5	0.24
Exact collecting site	7	28.9	0.24
Available for loan?	7.3	30.3	0.24
Reference to papers	9.9	39.5	0.25
Details of type designation	10.8	42.1	0.26
Available for study?	9.6	35.5	0.27
Author of valid/current name	9.2	34.2	0.27
Changes of identification	9.2	31.6	0.29
Way of preservation	11.5	32.9	0.35
Year of publication	15.3	42.1	0.36
Name of specimen identifier	19.7	53.9	0.37
Manipulation?	22.6	61.8	0.37
Reference to original description	13.1	35.5	0.37
Taxon-specific information	14.6	39.5	0.37
Catalogue no.	13.1	34.8	0.38
Take subsamples?	25.5	65.8	0.39
Collector(s) name(s)	18.8	44.7	0.42
Reference to other papers	19.7	46.1	0.43

INFORMATION WANTED BY SCIENTIFIC, BUT NOT SECTORAL, USERS. The biggest relative differences in opinion between the sectors are listed in Table 11. For the following items, only about 5–10% of the Scientific users considered them to be of 'little importance', compared with between four and five times as many Sectoral users (up to ~40%):

- ♦ *Type status*
- ♦ *Original combination*

- ♦ *Exact collecting site*
- ♦ *Available for loan?*
- ♦ *Reference to papers*
- ♦ *Details of type designation*
- ♦ *Available for study?*
- ♦ *Author of valid/current name*

In addition to these items, four others notably were ranked among those assigned the lowest importance by Sectoral users:

- ♦ *Take subsamples* 65.8% 'little importance', and ranked 25th out of 27 in Fig. 14.
- ♦ *Manipulation* 61.8% 'little importance', and ranked 25th out of 27 in Fig. 14.
- ♦ *Name of specimen identifier* 53.9% 'little importance', and ranked 26th out of 27 in Fig. 14.
- ♦ *Reference to other papers* 46.1% 'little importance', and ranked 23rd out of 27 in Fig. 14.

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WHAT SECTORAL, BUT NOT SCIENTIFIC, USERS WANTED. *Vernacular name* was the only item that remarkably more Scientific users considered unimportant (see Table 11). Of the additional 47 items in section D of the questionnaire, only *Commercial value*, *Sex*, and *Size*, were considered of 'little importance' by a group of Scientific users that was larger than the Sectoral user group. For *Sex* and *Size*, the differences were insignificant, but, for the *Commercial value* of a specimen, the difference was 18.4% under 'very important' for Sectoral users compared with only 6.4% for the Scientific users (section D5 – Further details of specimen, Figs 10, 11).

SUMMARY & CONCLUSIONS

SECTION B, USER PROFILES

1. Almost three quarters (73.8%) of the institutions indicated that they are either a *University/Other educational body*, *Research institution* or a *Public/private museum* (Table 2). Accordingly, the dominant fields of interest to emerge were *Exhibition/education*, *Taxonomic research*, and *Other types of research* (Table 3). About one third of the institutions indicated that they belonged to more than one category of *Organisation type* (Table 4), and most indicated several kinds of interests (Table 5).

SECTION C, YOUR ORGANISATION'S INTEREST IN A NATURAL HISTORY SPECIMEN DATABASE NETWORK

2. Within the field of natural history (Table 6), the participating institutions fell broadly into four main fields of interest types: preserved specimens of plants/fungi and animals (~20%); living plants/fungi (13%); fossils, live animals, and minerals/rocks (~9%); and tissue samples, micro-organisms and other specimen types (~5%).
3. Results from the questions on usefulness, international scale, and level of access in a biological specimen network, differed only slightly when comparing all users combined (Part C of the questionnaire, Fig. 1, C1–C4) against Scientific and Sectoral users considered separately (no calculations indicated). A searchable network of specimen databases was considered very useful by 92% of all the organisations (Fig. 1, C1), and there was general consensus that the network should be pan-European (86%) rather than a series of unconnected national networks (Fig. 1, C2). Regarding the level of access to information on specimens (Fig. 1, C3, C4), 56% of respondents felt it sufficient to have access to descriptive data about the collections of other institutions, whereas simple lists of species names would fail to satisfy them (52% against).

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SECTION D, YOUR ORGANISATION'S NEEDS AND EXPECTATIONS FOR DIFFERENT TYPES OF INFORMATION IN A NETWORK OF NATURAL HISTORY SPECIMEN DATABASES

4. Scientific institutions represented 80.5% of the total sample (n=314 out of 390), while Sectoral institutions represented 19.5% of the total sample (n=76).
5. Generally, Sectoral users were less likely than Scientific users to choose the response 'very important' (Fig. 14). Hence, in 36 out of the 48 questions in section D, and for any given item, the Scientific users' category 'very important' is greater than for Sectoral users. Furthermore, the difference in user opinion lay primarily in 'very' versus 'little importance', whereas the fraction assigned 'desirable' did not differ so markedly between the two user groups.
6. *Vernacular name* was the only item that remarkably more Scientific than Sectoral users considered unimportant (see Table 11). Nevertheless, *Vernacular name* is considered an important piece of information by the Sectoral users (see Taxonomy of specimen, above, Figs 2, 3), and should be given high priority in a European network of natural history specimen databases. One reason for this importance is the use of vernacular names as entry points through user interfaces for accessing information in databases. It will thus be important to develop

multilingual access to collections data, preferably, for practical reasons, by means of automated translations. This subject is being addressed by the Biological Collections Access Service for Europe (*BioCASE*) and will be considered further by the European Network of Biodiversity Information, *ENBI*. Some biodiversity related networks, such as *EEA* – the European Environment Agency (www.eea.eu.int/) and *EIONET* – the European Environment Information and Observation Network (www.eionet.eu.int/), have already implemented this important feature.

7. Although information about *Exact collecting site* naturally is of great interest to all users (see Collection details of specimen, p58–59, Figs 14 and 15), this type of data can be sensitive in a conservational and management context. Publication of detailed geo-referenced data ought to be evaluated carefully in advance (see chapters elsewhere in this volume by Bailly and by Los & de Jong).
8. *Collecting time* (e.g. 9.15 a.m.) and *Commercial value* were considered least important by both Sectoral and Scientific users (Fig. 15). Nevertheless, there is a notable difference in user needs in terms of the *Commercial value* of a specimen: in the category 'very important', 18.4% of the Sectoral users indicated this opinion, compared with only 6.4% of the Scientific users.
9. For 'Further details of specimen', see above and Figs 10, 11.
10. For Sectoral users, items considered clearly the most important included (ranked in descending order of importance, see Fig. 14):
 - i. *Valid/current scientific name*
 - ii. *Location* (e.g. Zoological Museum, Copenhagen)
 - ii. *General collecting site* (e.g. country, province, waterbody)
 - iv. *Sex*
 - v. *Developmental stage*
 - vi. *Name of curator*
 - vii. *Payment for use*
11. For Scientific users, items considered most important included (ranked in descending order of importance, see Fig. 14):
 - i. *Valid/current scientific name*
 - ii. *General collecting site*
 - iii. *Location*
 - iv. *Type status*
 - v. *Collecting date*
 - vi. *Exact collecting site*
 - vii. *Availability for loan*

- viii. *Author of valid/current scientific name*
 - ix. *Name of curator/contact person*
 - x. *Availability for study on site*
 - xi. *Changes of identification*
12. Treating all users collectively (see www.nhm.ac.uk/science/enhsin/ for full report) only four of the 48 questions in section D of the questionnaire were categorized as 'little importance' by a fraction of users notably larger (>5% difference) than the fractions considered 'important' or 'desirable'. These items are: *Collecting time*, *Possibility of making casts*, *Commercial value*, and *Changes of ownership*. Overall, therefore, this survey demonstrates that users generally welcome any type of information: other than for a few specific issues, the more complete the information provided, the better.

APPENDIX - ENHSIN QUESTIONNAIRE

PART A: WHAT IS ENHSIN AND WHY ARE WE ASKING FOR YOUR HELP WITH THIS QUESTIONNAIRE?

ENHSIN stands for the **European Natural History Specimen Information Network** and is an Infrastructure Collaboration Network supported by the European Commission's Framework Programme V. The purpose of *ENHSIN* is to develop and assess protocols, standards, methods and management frameworks, together with a consensus on user needs, which will enable the development of a shared, interoperable European infrastructure of specimen databases.

The objectives of *ENHSIN* are:

- ♦ To confirm Scientific and Sectoral user needs for natural history specimen information in Europe.
- ♦ To agree standards and protocols for specimen information exchange, access, quality and terminology. To agree the core information to be searched and shared through the infrastructure collaboration.
- ♦ To establish protocols for retrieving data across multiple sites.
- ♦ To identify and address key legal and intellectual property issues.
- ♦ To develop policy and frameworks for implementation of collaborative infrastructure data networking.
- ♦ To assess the potential for complementarity with current developments of metadata and species-level data in Europe and elsewhere.

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The *ENHSIN* project is carried out by seven partners, viz., the Natural History Museum, London; Royal Botanic Gardens, Kew; Zoologisk Museum, University of Copenhagen; Museo Nacional de Ciencias Naturales, Madrid; Muséum National d'Histoire Naturelle, Paris; Botanischer Garten/Museum Dahlem, Berlin; Zoölogisch Museum, University of Amsterdam. The partners have divided the various tasks between them; user needs are being analysed by the Copenhagen and Madrid partners.

In order to produce a network of the highest possible quality and with the highest degree of usefulness, an exhaustive assessment of user needs is necessary. We therefore are distributing this questionnaire to a wide range of universities, museums, sectoral research institutions, administrative bodies, private companies and non-governmental organisations.

Your response will form an important part of the basis for decisions about a European network of natural history specimen databases. Therefore please take the time to fill out the questionnaire. It has been designed to minimise the time required to complete it. If some of the questions appear irrelevant to you, please simply ignore them. Also, please do not hesitate to make additional comments if you have any.

PART B: USER PROFILE.

Name and address of organisation:

Department (optional):

Homepage:

Name and address of person who has filled in the questionnaire

Name:

Position in organisation:

Postal address:

Phone/fax:

Email:

Is your organisation: (Please ✓ one or several)

- | | |
|---|--|
| <input type="checkbox"/> A university or other educational body | <input type="checkbox"/> An administrative body |
| <input type="checkbox"/> A public museum | <input type="checkbox"/> A private company |
| <input type="checkbox"/> A private museum | <input type="checkbox"/> A non-governmental organisation (NGO) |
| <input type="checkbox"/> A research institution | <input type="checkbox"/> Other (please specify): |

Main interest(s) of your organisation: (Please ✓ one or several)

- | | |
|---|---|
| <input type="checkbox"/> Taxonomic research | <input type="checkbox"/> Industrial/commercial use of organisms |
| <input type="checkbox"/> Other types of research | <input type="checkbox"/> Exhibition/education |
| <input type="checkbox"/> Natural resources management | <input type="checkbox"/> Other (please specify): |
| <input type="checkbox"/> Nature conservation | |

PART C: YOUR ORGANISATION'S INTEREST IN A NATURAL HISTORY SPECIMEN DATABASE NETWORK

A network of specimen databases could provide you with information on the holdings of a whole range of collections, including the geographical provenance, the scientific identification, and the availability of the individual specimens.

What kind of natural history specimens is your organisation interested in: (Please ✓ one or several)

- Preserved animals
- Preserved plants/fungi
- Preserved micro-organisms
- Tissue samples for molecular/chemical analysis
- Living animals
- Living plants/fungi
- Living micro-organisms
- Fossils
- Minerals and rocks
- Other (please specify):

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(Please circle yes or no)

Will a searchable network of specimen databases be useful for the work of your organisation?

yes / no

Will a Europe-wide network be preferable to separated national networks?

yes / no

Will it be sufficient for your organisation to have access to collections metadata from other institutions (e.g. number of specimens or samples of a given species from a given geographic area)?

yes / no

Will it be sufficient for your organisation to have access just to lists of species represented in the collections of other institutions?

yes / no

PART D: YOUR ORGANISATION'S NEEDS AND EXPECTATIONS FOR DIFFERENT TYPES OF INFORMATION IN A NETWORK OF NATURAL HISTORY SPECIMEN DATABASES.

In the questions that follow, we are trying to discover what levels of importance your organisation assigns to the different kinds of information one might expect in such a network.

Please tick **one category** for each question throughout Section D.

D1. Taxonomy of specimen

	very important	desirable	little or no importance
Valid/current scientific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Author of valid/current name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Year of publication of valid/current name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Original combination (for type specimens)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Subspecific name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Infrasubspecific name (e.g. variety, strain)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name of person who identified specimen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Synonyms under which the specimen has been recorded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher systematic category (e.g. family)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vernacular name	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reference to original description	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Reference to other papers of relevance for nomenclature/taxonomy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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D2. Collecting details of specimen

	very important	desirable	little or no importance
Collecting site, general (e.g. country, province, waterbody)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collecting site, exact (e.g. "X km NE of Y", co-ordinates, depth/altitude...)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collecting date (e.g. 24 January 1977)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collecting time (e.g. 9:15 a.m.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Collecting method	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological information (e.g. host name)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name(s) of collector(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D3. Repository and storage of specimen

	very important	desirable	little or no importance
Location (e.g. Zoological Museum, Copenhagen)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Storage (room temperature, cold, frozen, dark, oxygen-free)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Catalogue number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D4. Availability of specimen

	very important	desirable	little or no importance
Availability for loan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability for study on site	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possibility of manipulation (e.g. dissection, preparation for scanning electron microscopy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possibility of taking subsamples	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possibility of making casts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Name of curator/contact person	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whether there are conditions for use (e.g. if images taken require copyright agreement from lending institution)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Whether payment is required for use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D5. Further details of specimen

	very important	desirable	little or no importance
Sex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developmental stage (e.g. egg, larva, seed)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Size (e.g. length, diameter, weight)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Type status (e.g. holotype, lectotype)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Details of type designation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Exact quotation of label text	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Way of preservation (e.g. dry skeleton, in alcohol, slide, herbarium sheet, blood sample, cast)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Condition (e.g. perfect, broken, faded, moth-eaten)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	very important	desirable	little or no importance
Legal status (e.g. reference to collecting/export/import permits)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Ownership (e.g. for specimens owned by a government agency and deposited in a museum) commercial value	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
References to papers mentioning/based on/using the specimens (cf. section D1 Taxonomy)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Availability of images of specimen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Taxon-specific information (e.g. for preserved birds: brood patches, for fossils: geological age)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Optional, please specify in following rows:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

D6. History of specimen

	very important	desirable	little or no importance
Changes of identification	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes of preservation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes of repository	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Changes of ownership	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PART E: ANY COMMENTS YOU CARE TO GIVE.