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FACT SHEET OF THE MÉTA DATABASE 1.2

F. HORVÁTH, ZS. MOLNÁR, J. BÖLÖNI, ZS. PATAKI
L. POLGÁR, A. RÉVÉSZ, K. OLÁH, D. KRASSER and E. ILLYÉS

Institute of Ecology and Botany, Hungarian Academy of Sciences
H–2163 Vácrátót, Alkotmány u. 2–4, Hungary, E-mail: horvfe@botanika.hu

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The survey results of the MÉTA program are managed with centralised relational database management system (MS SQL 2000) developed and set up in a local area network. Besides the MÉTA database server, a publishing server, an archiving server and a GIS workstation were applied. The core information entities of the MÉTA database are: information subproject, MÉTA quadrate, MÉTA hexagon, (semi-)natural habitat, potential vegetation with numerous habitats, landscape ecology and land use attributes, and surveyor. This information is coded in the nine main tables of the normalised database. In the recent state there are almost 1,500,000 records in the main tables that are managed in 241 independent fields. The published version of the MÉTA database supports the query service, and handles this information in 7 denormalised main tables. This much more redundant version is 11 GB in size. The 20.6% (179 man-month) of the human resources in the MÉTA program were devoted to the information tasks (set up and preparation, MÉTA database and information system development, replenishment and quality assessment, MÉTA query, GIS and printing services) between 2002 and 2007. The basic structure of the MÉTA database version 1.2 is finalised and the main functions regarding data processing have been developed. The accomplishment is higher than 90%, quality assessment is under way, while scientific verification and data harmonisation are started. The area of (semi-)natural and degraded vegetation of Hungary is estimated to 1,800,000 hectares (19.4% of the country) of which the natural, semi-natural is about 1,200,000 hectares (12.9% of the country). All of these are highly fragmented and unevenly distributed over the country. It is shown by several basic figures, professional content and quality measure facts of the database. There is also a fact sheet of surveyors that shapes the important characters of their field experience profile also.

Key words: GIS, landscape ecology, relational database management system, vegetation survey

INTRODUCTION

Several efforts are ongoing worldwide to ensure that biodiversity, vegetation and ecological data are well documented, archived and made accessible to support research, nature conservation, environmental policy, education and other public needs (i.e. Anon. 2006, Baker *et al.* 2000, Canhos *et al.* 2004, EEA 2004, Johnson 2003, UNEP-WCMC 2006). Types of the developed information systems are highly depending on the scope and nature of datasets and user needs. There are several examples of huge, centralised, single databases for managing datasets with the same or standardised structure (i.e. Czech National Phytosociological Database – Chytrý and Rafajová 2003, Turboveg – Hennekens and Schaminée 2001, CORINE land cover – Heymann *et al.* 1994, Büttner *et al.* 2002, New Zealand's National Vegetation Survey databank – Wiser *et al.* 2001). Recently, the share of primary biodiversity data and the advances in information technology resulted a new class of information systems: the distributed databases, where primary data remain at the owner institutions. Standard data exchange protocols and specialised internet access engines ensure access to the contents of these dispersed databases (BioCASE – Berendshon *et al.* 2000, GBIF – Canhos *et al.* 2004, MaPSTeDI – Guralnik and Neufeld 2005, The Species Analyst and REMIB – Soberón and Peterson 2004). Meanwhile, the LTER Network has a different information management paradigm. That kind of information system (IS) is a cooperative, federated multisite network IS that can provide access to various different site datasets, as well as to centralised databases and distributed data. The key elements of that system are standard metadata and data catalogue descriptions, modular structuring and management of information flow (Michener 1998, Baker *et al.* 2000). Similarly, a highly complex information system was developed by the Countryside Survey 2000 (Haines-Young *et al.* 2000, Rennie *et al.* 2000). Scopes and solutions differ considerably, however each of them provides efficient access to a large volume of biological data and increasingly applies and develops web services and applications (BioCASE – *http://www.biocase.org/*, GBIF – *http://data.gbif.org/*, LTERnet – *http://www.lternet.edu/*, MaPSTeDI – *http://mapstedi.colorado.edu/*, Countryside Survey – *http://www.cs2000.org.uk/*, NVS – *http://nvs.landcareresearch.co.nz/* and Romanello *et al.* 2005 – SEEK – *http://seek.ecoinformatics.org/*).

The MÉTA database was designed and developed according to the requirements of the MÉTA program and methodology (Molnár 2003, Bölöni *et al.* 2003, 2007, Molnár Zs. *et al.* 2007) and was implemented in a centralised relational database management system. Our aim in this paper is to give an overview of the main characteristics and most important up-to-date features of the database and information system.

BASIC FACTS ABOUT THE MÉTA DATABASE 1.2

Brief overview of the hardware, software and network architecture

The MÉTA database was implemented and developed in MS SQL 2000 Server (operation system: Microsoft Windows 2000 Server) environment, which runs on dual Intel Xeon processors. Terminal Services were applied for remote access to manage MS SQL and input data into database up to 10 parallel users through Microsoft Network. This “MÉTA database server” is dedicated processing of the MÉTA datasheets and data entry, quality control of the MÉTA records entered, database management and development. There are running procedures and applications developed under MS SQL, ArcView 3.3 Avenue and Microsoft dotNET. The server has an external SCSI hard disk to allow fast backup copy of database regularly and/or temporarily.

Another server computer (Intel X86 processor, MS Windows 2000 Server, MS SQL 2000 Server) is dedicated to provide a secured and user-friendly access to a so-called “published” version of the MÉTA database through the internet (see Fig. 1). The MÉTA SQL Expert Interface and Access Service (Horváth and Polgár 2008) are running on this “MÉTA publishing server”. A

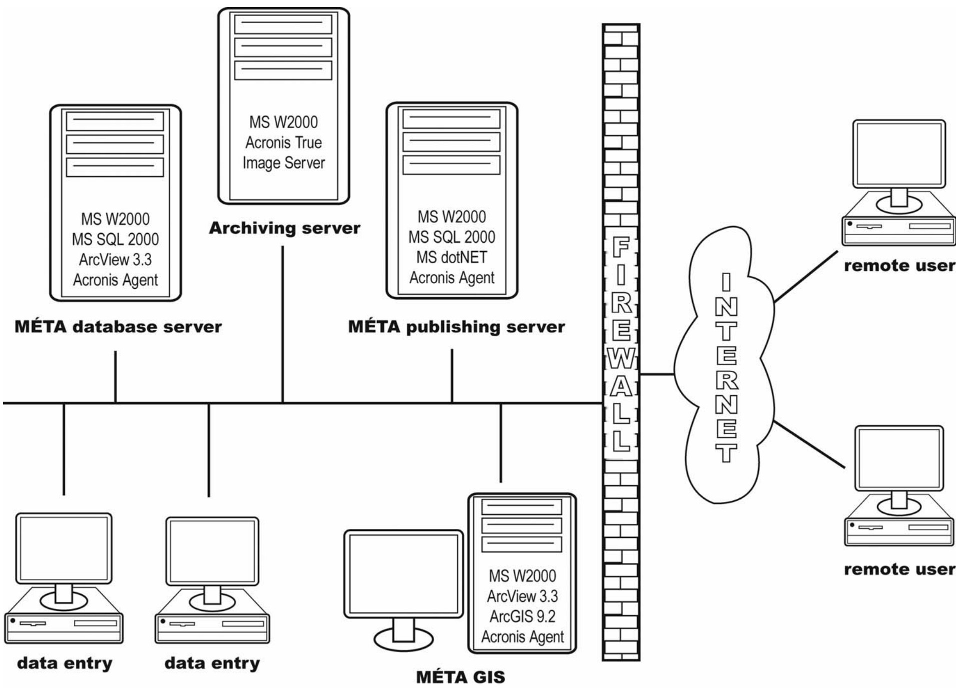

Fig. 1. Computer and network diagram of the MÉTA information system

Table 1
Fact sheet of hardware, software and network architecture

Dedicated servers	MÉTA database server (Intel Xeon)	1
	MÉTA publishing server (Intel X86)	1
Auxiliary computers and LAN	Local area network	1
	Personal computers as terminals	up to 10
	Archiving server	1
Software components	MS Windows 2000 Server with Terminal Services	2
	MS SQL 2000 Server	2
	MS Network	1
	ArcView 3.3 (ESRI)	1
	MS dotNET Development Kit 1.1 (Microsoft)	1

further computer is dedicated to running GIS applications to prepare maps and perform spatial analysis (ArcView 3, ArcGIS 9).

A centralised archiving and recovery system (Acronis True Image Enterprise Server) ensures regular and permanent copies of databases, software and system environments both of the servers through the local area network of the institute (see Fig. 1 and Table 1).

Overview of data model and database structure

Design and development of data model and database structure were based on the concept of the MÉTA survey methodology (Molnár 2003), the habitat classification system (Bölöni *et al.* 2003) and further requirements defined by the Quality Control Working Group and the Working Group of Information System and Database Development. The following list contains the main considerations regarding the MÉTA database design.

– MÉTA quadrate is the organisational, spatial and contracting unit of the field work that is surveyed by one (occasionally associated with other) data provider/field surveyor.
– The surveyor documents the result of the survey of her/his MÉTA quadrate on standard datasheets (Data Sheet for Habitat Description of MÉTA quadrate – DSHDMQ, "Compulsory" and "Non-Compulsory" Data Sheets of MÉTA hexagon – CDSMH and NCDSMH, Data Sheet for Grassland Dynamics – DSGD, Data Sheet for Forest Dynamics – DSFD). Datasheets of different type belonging to one MÉTA quadrate form together the MÉTA data sheet package that can be completed posteriorly with further auxiliary and data correcting documents.
– In this way, the basic documents of input and processing of the results and of primary data quality control are the MÉTA data sheet packages, compiled with the above mentioned method.

– The data of the datasheets have been processed centrally. Datasheets DSGD and DSFD are not considered as part of the MÉTA database, their processing is a latter task. Information of the DSHDMQ datasheets (textual notes) has secondary significance for the MÉTA program. Accordingly, it is not digitised, but conventional mode of processing is planned, considering that digitising would be an overinvestment, enlarging the data entry with 20–30%.
– The MÉTA data sheet packages first go through regional, then central quality control.
– The database should be suitable to manage several data sets (with different objectives) belonging to information subprojects.
– The database should be suitable for mapping of the spatial and thematic relationships of "MÉTA quadrate → MÉTA hexagon → habitat", "MÉTA quadrate → habitat description at landscape level", as well as of "MÉTA hexagon → potential vegetation".
– The database should be suitable to data exchange with GIS applications and for the implementation of spatial (GIS) queries and summarisations.
– The data provider/field surveyor and the expert of the professional revision (as authors) should remain identifiable for each record.
– The database should be well protected against unauthorised use, meanwhile effective solutions should be developed for authorised utilisation of the data.

The core entities of the MÉTA database are: information subproject, MÉTA quadrate, MÉTA hexagon, (semi-)natural habitat, potential vegetation (habitat) and surveyor (data provider). The most important attributes are: year of the survey, landscape health status, land abandonment (old-field), plant invasion in general and threatening invasive plants, list of habitats, estimated extent class of habitat's area, naturalness-based habitat quality, set of threatening factors of habitats, land use categories of grasslands, list of potential vegetation categories (habitats) according to Molnár Zs. *et al.* (2007). Among of these we consider landscape health status, land abandonment (old-field), plant invasion in general, estimated extent class of habitat's area and naturalness-based habitat quality as key attributes.

The main data tables are: PROJEKT, KVADRAT, HATSZOG, ELOHELY, POTVEG, TAJ, SZEMELY (and SZEREPKOR), KVADRATLOK and HATSZOGLOK (Fig. 2). The table PROJEKT defines segments (data sets) of database belonging to separate information subprojects with different aims. The most important one is the "Subproject for processing data-packages of the MÉTA program". Other information subprojects were defined for testing and quality control. The table KVADRAT defines MÉTA quadrates and their attributes (i.e. year of the survey, surveyor) belonging to a predefined project. The territory of Hungary is covered and cut into 2,834 MÉTA quadrates. The table HATSZOG consists of records of MÉTA hexagons with many-to-one relationship to KVADRAT table following the spatial hierarchy of quadrates and hexagons. This table holds actual information about MÉTA hexagons of a given project (i.e. landscape health status, land abandonment, plant invasion in general). Next table, called ELOHELY, is in many-to-one relationship to table hatszog. This table stores the actual habitat information (i.e. list of habitats, estimated extent class of habitat's area, naturalness and set of threatening factors of habitats, set of grassland use categories) of a given project. The table POTVEG is in many-to-one relationship to table HATSZOG and stores list of potential vegetation categories belonging to MÉTA hexagons. The table TAJ has many-to-one relationship to the table KVADRAT and stores landscape level information about habitats (i.e. threatening invasive plants). SZEMELY and SZEREPKOR tables store records defining all persons and actors (i.e. surveyor, regional project manager, supervi-

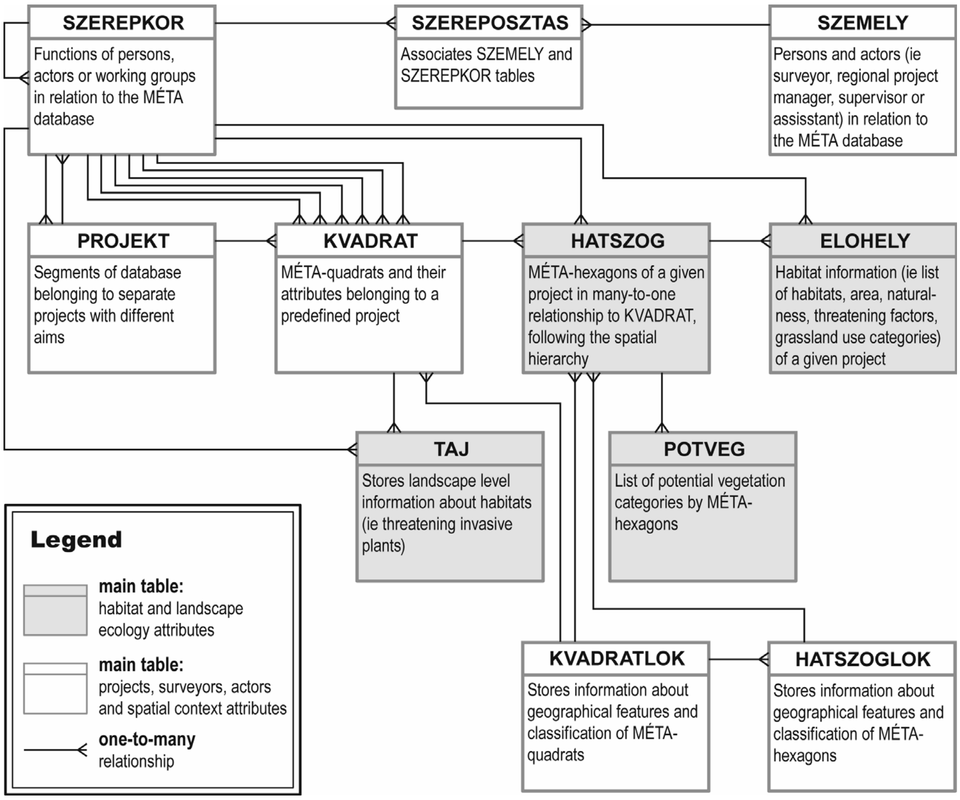

Fig. 2. Graphical representation of main tables and table relationships of the MÉTA database

sor or assistant) in relation to the MÉTA database. There are two tables KVADRATLOK and HATSZOGLOK that are independent of information subprojects. These tables are in relationship to tables KVADRAT and HATSZOG, respectively and store various information about geographical classification like administrative spatial units (i.e. settlement or county) (see Fig. 2 and Table 2 for further details).

The MÉTA database is structured to approximately third normal form, which means it is structured to avoid data redundancy. Complex data elements are reduced into their component parts as separate tables and relationships (Codd 1970, Halassy 1994). Each table stores information dependent upon a single key. Each datum or descriptive element is recorded only in one location, and the keys to those data are carefully dispersed among other tables as surrogates for data in the parent table. Because a normalised design often appears to be rather complex, standard view queries are constructed to aggregate and filter appropriate data from related tables into denormalised table views. This facilitates data review, or reporting, while the actual data structure is hidden from the user. Several standard denormalised table views are copied regularly to the MÉTA publishing server to provide further services.

The published version of the MÉTA database consists of several denormalised standard table views as simple plain tables: STV_A_KVADRAT, STV_A_HATSZOG, STV_A_ELOHELY, STV_A_POTVEG, STV_A_TAJIELOHELY, STV_A_KVADRATLOK, STV_A_HATSZOGLOK (see Table 2 also). These tables refer to the main data tables respectively described above.

Main work phases and resource allocation applied to develop the MÉTA database and basic information services

The main tasks and the work phases of the MÉTA program were overviewed, as the labour force allocation was estimated to sum up all the work of the program invested so far, and to compare the proportions of each work packages (information work packages included) (Table 3*a*). For the estimation of labour force the total time investment was considered, expressed in man-month (mmo), independently from the duties of the position (i.e. MÉTA surveyor, project and working group leader, general assistant and organiser, software developer and data entry assistant, data supervisor) regarding the period from 2002 till the end of 2007. The direct methodological and operational preparation of the project covered the 10.7% (93 mmo) of the total labour force investment. About the half of that (5.5%, 48 mmo) was the elaboration of the methodology and the habitat classification system, both are novel in their concepts and details. Considerable labour force (4.4%, 38 mmo) was invested for the teaching of the MÉTA methodology and for its uniform practice. Or-

Table 2

Fact sheet of the MÉTA database version 1.2: actual state of the normalised and published version. Due to the ongoing data entry and quality assessment, record numbers are continuously increasing yet

Normalised	Working size of the database		1.3 GB
	Number of main tables		9
	Number of main relationships		23
	Number of independent fields of the main tables		241
	Total sum of the record numbers of the 9 main tables		1,542,000
	Number of auxiliary (dependent or code) tables		39
	Time (in seconds) and frequency of archiving locally		90 sec, occasional
	Time (in minutes) and frequency of archiving to the remote archiving server		7 min, daily
	Time (in minutes) and frequency of exporting and updating standard view tables into publisher server		7–8 min, weekly
Published	Working size of the database		10.9 GB
	Number of standard view tables		7
	STV_A_KVADRAT:	number of fields	31
		number of quadrate records	2,834
	STV_A_HATSZOG:	number of fields	39
		number of hexagon records	241,431
	STV_A_ELOHELY:	number of fields	68
		number of habitat records	480,111
	STV_A_POTVEG:	number of fields	19
		number of pot. vegetation records	485,423
	STV_A_TAJIELOHELY:	number of fields	46
		number of habitat records (at landscape)	34,780
	STV_A_KVADRATLOK:	number of fields	27
		number of records	2,834
	STV_A_HATSZOGLOK:	number of fields	39
		number of records	267,813
	Time (in seconds) and frequency of archiving locally		204 sec, daily
	Time (in minutes) and frequency of archiving to the remote archiving server		43 min, weekly

Table 3a

Comparison of main tasks and resource allocation applied in the MÉTA program. Human resources are estimated in man-month (mmo)

Project plans and development of MÉTA methodology	Preparation of a detailed project plan >> *done*	7 mmo (0.8%)
	Developing the MÉTA methodology and a revised General National Habitat Classification System (Á-NÉR2003), and compiling manuals >> *done*	48 mmo (5.5%)
	Teaching the MÉTA methodology and organising methodical field trainings >> *done*	38 mmo (4.4%)
MÉTA survey (field work) management and administration	Estimated field work of the 207 MÉTA surveyors >> *continuous (ca 94% done)*	350 mmo (40.3%)
	Estimated home work of surveyors (prepare, fulfil and manage data sheet packages >> *continuous (ca 94% done)*	175 mmo (20.1%)
	Management and administration of the MÉTA program >> *continuous*	72 mmo (8.3%)
Develop and manage the MÉTA information system	Preparatory working phase >> *done*	19 mmo (2.29%)
	MÉTA database and information system development >> *continuous*	58 mmo (6.7%)
	MÉTA database replenishment and quality assessment >> *in progress*	94 mmo (10.8%)
	MÉTA query, GIS and printing services >> *continuous*	8 mmo (0.9%)
MÉTA program	Overall (2002–2007)	869 mmo (100%)

ganising and implementing the field work of the MÉTA survey was the greatest part of the work (68.7%, 597 mmo together). The field work can be estimated as approximately 7,000 working days of the 199 surveyors (40.3%, 350 mmo) and further 3500 working day for preparation, fulfillment and finalizing data sheet packages . We needed altogether 179 mmo (20.6%) for the information tasks, which is approximately the half of the time invested for the field survey. The estimated number of man-months of the MÉTA program is 869 until now. Considering the working days in a year, it would mean 87 years of work for one person. Our investment will grow further by the enhancement of the completeness and the quality of the database.

In the following table (Table 3*b*) the information work packages of the MÉTA program and the estimated labour force investment are shown, expressed in man-month. The centralised data entry and quality assessment (39.1%, 70 mmo and 13.4%, 24 mmo) gave the greatest part of the work. More than 90% of the data entry is ready (see Table 5), while significant amount of work should be invested for the quality control in the future.

Table 3b

Fact sheet of work packages and resource allocation of information system workgroup applied in the MÉTA program. Human resources are estimated in man-month (mmo)

Preparatory working phase	To prepare MÉTA quadrate and MÉTA hexagon GIS datasets according to the developed methodology (Molnár Zs. et al. 2007) >> *done*	2 mmo (1.1%)
	To prepare and print out the MÉTA working map sheets and related materials >> *done*	3 mmo (1.7%)
	To set up and develop hardware, software and netware environment >> *done*	4 mmo (2.2%)
	To improve skills of members of the information workgroup, learning appropriate software tools (MS SQL, ArcView Avenue, MS dotNET, ArcGIS 9, ArcGIS VBA, HTML ImageMapper, APC ActionApps) >> *continuous*	10 mmo (5.6%)
MÉTA database and information system development	To design, develop and implement the MÉTA database >> *done*	20 mmo (11.2%)
	To design, develop and implement data entry process and software >> *done*	5 mmo (2.8%)
	To develop and extend tables KVADRATLOK and HATSZOGLOK by geographical classification using GIS >> *done*	3 mmo (1.7%)
	To design, develop and implement software tools and procedures for quality assessment (re-enter 1%, MÉTA key attributes checking) >> *done*	3 mmo (1.7%)
	To design, develop and implement the "MÉTA On-line Database Access Service" application >> *done* https://msw.botanika.hu/meta/meta_a_vilaghalon.htm	5 mmo (2.8%)
	To design, develop and implement the "MÉTA SQL-Expert Information Service" application >> *done* https://msw.botanika.hu/meta/meta_SQL_szakerto.htm	9 mmo (5.0%)
	To design, develop and implement homepages related to the MÉTA program >> *done, redesign, integration and further development is under way* http://www.novenyzetiterkep.hu/meta/index.shtml http://www.novenyzetiterkep.hu/fototar/index.html http://www.novenyzetiterkep.hu/eiu/ http://www.novenyzetiterkep.hu/alku/	13 mmo (7.3%)
MÉTA database replenishment and quality assessment	To organise, manage, control and do centralised data entry >> *almost done*	70 mmo (39.1%)
	To organise, manage, control and do quality assurance processes >> *in progress*	24 mmo (13.4%)
MÉTA query, GIS and printing services	To develop and perform the MÉTA database queries, data transformation and data processes >> *continuous*	4 mmo (2.2%)
	To design, prepare and print working and final maps according to the needs >> *continuous*	4 mmo (2.2%)
MÉTA INFO	Overall (2002–2007)	179 mmo (100%)

Supporting projects of the MÉTA program

Our main objective is to compile a detailed habitat and landscape ecological handbook and atlas of the actual vegetation of Hungary. The MÉTA program run through and is supported by several projects, since it was not possible to obtain financial support for this huge project in one step. We provide here an actual overview of the supporting backgrounds (see Table 4).

Overview of the professional content, size and quality of the MÉTA database

One can hardly define a stable and final version of a database, because it is expanding and developing day by day, due to data entry and quality assessment. However, the main characteristics of the MÉTA database, version 1.2 are

Table 4

The MÉTA program was supported by several agencies and funding projects

Beneficiary institution	The Ministry of Environment and Water, as the beneficiary and potentially the main user of our results contributed to the success of some research proposals by providing supporting statements.	2002, 2005
Funding projects	The development of the database was supported by the project "Surveying and comparative analysis of Hungary's natural vegetation heritage, 2002–2005" funded by the Széchenyi Plan (NKFP 3B/0050).	2002–2005
	Further analysis was supported by the project "Interaction of natural and man-made ecosystems: landscape ecological studies of biodiversity and ecosystem functions in the Great Hungarian Plain, 2005–2008" funded by the Jedlik Ányos Program (NKFP 6-0013/2005).	2005–2008
	The GSDI Association announced grants awarded for 2005 to fifteen organizations around the globe. The grant is aimed at assisting HUNAGI–IEB HAS in building key components of emerging Spatial Data Infrastructure. The grant was enhanced with the addition of consulting from the GISCorps which allowed for an increase in the value of the grant.	2005–2006
Projects contributed to the MÉTA developments	Vegetation of Hungary in photos, development of the internet-based photo gallery and background database – National Cultural Fund, Environmental Education College (2521/0875).	2007
	Contribution to the MÉTA program – Support Fund of the President of the Hungarian Academy of Sciences (KinnoF–15/6/107/2007).	2007
	COMENIUS Network: SUPPORT - Partnership and Participation for a Sustainable Tomorrow. The overall objective is to promote education for sustainable development in European schools by linking schools, research institutions and communities in a web-based network.	2007–2009

a) basic structure of the database is finalised and main functions regarding data processing have been developed; b) accomplishment is higher than 90%; c) quality assessment is ongoing, d) scientific verification and data harmonisation are started.

Table 5 gives a present-day overview about the main features of the MÉTA database, the version is considered as 1.2. All of the queries resulting the main characteristics and parameters of the database had been run during January and February of 2008. Main characteristics are grouped into topics, like spatial features and configuration of MÉTA quadrates and hexagons; yearly achievements, seasonal features and completion of the MÉTA survey; content and quality measures of the MÉTA database.

The spatial hierarchy of MÉTA is twofold. MÉTA quadrates were defined as geographical quadrates at broad landscape level (width: 5′ longitude, heights: 3′ latitude, approximated area is about 3,500 hectares) according to the floristical mapping grids of Central Europe (Niklfeld 1971, Király and Horváth 2000). The quadrates have no regular rectangle shape, furthermore their area grow gradually toward South. Contrarily, MÉTA hexagons have regular hexagonal shape with uniform size at finer landscape scale (35 hectares each). Each MÉTA hexagon is assigned to a given MÉTA quadrate that spatially contains the centre of the hexagon. Accordingly, the size of full extent quadrates ranges between 3,424 hectares (ID = "7490.4") and 3,600 hectares (ID = "0176.3"), and the number of hexagons ranges between 95 and 105. At the border of Hungary partial quadrates (area is less than full extent but larger than or equal to 120 hectares) and fractional quadrates (area is less than 120 hectares), similarly partial hexagons (area is less than 35 hectares but larger than 12 hectares) and fractional hexagons (area is less than 12 hectares) were accounted.

We have two indicators of the completion of the MÉTA survey. One of them is considered at quadrate level, the second at hexagon level (see Table 5). Both of them show higher percentage than 90% (see yearly achievements also). The total area of (semi-)natural and degraded vegetation of Hungary is estimated to 1,800,000 hectares (19.4%). Approximately 1,714,000 hectares (18.4%) come from MÉTA hexagons including considerable (semi-)natural or degraded areas (where survey is compulsory, and the naturalness-based habitat ranges from 2 to 5) and further 86,000 hectares can be estimated based on the hexagons with some fragmented (semi-)natural areas (where survey is non compulsory – see Molnár Zs. *et al.* 2007). We consider 1,200,000 hectares (12.9%) as natural or semi-natural, where the naturalness-based habitat quality is higher than 2. These areas are highly fragmented and unevenly dispersed over the country (see map *https://msw.botanika.hu/meta/ FactSheet/NA.htm*). Consequently 62.4% of the hexagons include at least some fragmented (semi-)natural area (52.2%

Table 5

Fact sheet about actual state, content and quality measures of the MÉTA database 1.2

Spatial features and configuration of MÉTA quadrates and hexagons covering Hungary	
Number of MÉTA quadrates	2,834
Number and percentage of full extent quadrates (FEQ)	2,243 (79.1%)
No. and % of partial, but effective quadrates at the border of Hungary	551 (19.4%)
No. and % of fractional quadrates: less than 120 ha at the border	40 (1.4%)
Range of FEQ in hectares (ha)	3,424–3,600
Average size of FEQ in hectares (ha)	3,512
https://msw.botanika.hu/meta/FactSheet/KV.htm	
Range number of hexagons by FEQ	95–105
Average number of hexagons by FEQ	100
Number of MÉTA hexagons	267,813
Number and % of full extent hexagons: FHX – 35 ha each	263,661 (98.5%)
Number and % of partial, but effective hexagons: < 35 but ≥ 12 ha	2,579 (1.0%)
Number and percentage of fractional hexagons: less than 12 ha	1,573 (0.5%)
https://msw.botanika.hu/meta/FactSheet/HX.htm	
Completion of the MÉTA survey, proportions of (semi-)natural vegetation, and former and new knowledge on habitat stands	
Number and % of surveyed and digitised MÉTA quadrates	2,594 (91.5%)
Number and % of surveyed and digitised MÉTA hexagons	241,431 (90.2%)
% of surveyed hexagons including considerable natural areas – “compulsory” MÉTA hexagons	52.2%
% of surveyed hexagons with some fragmented natural areas – “non compulsory” hexagons	10.2%
% of surveyed hexagons without any natural areas (i.e. arable land, industrial/built up area)	37.6%
https://msw.botanika.hu/meta/FactSheet/NAC.htm	
Estimated area in ha and % of (semi-) natural vegetation	~1,800,000 ~19.4%
https://msw.botanika.hu/meta/FactSheet/NA.htm	
% of records filled on the basis of the surveyor’s earlier field experience (well known)	4.2%
% of formerly known and newly surveyed habitat stands	6.3%
% of newly surveyed habitat stands	70.9%
% of estimated (not visited) habitat stands	17.7%
https://msw.botanika.hu/meta/FactSheet/FNE.htm	
Professional content of the MÉTA database	
Total number of completed hexagon records	241,431
Total number of completed habitat records	480,111
Total number of completed potential vegetation records	485,423
Total number of completed habitat records at landscape level	34,780
Total sum of completed records	1,241,745
Range of number of habitat types by MÉTA quadrates (FEQ)	1–42
Average number of habitat types by MÉTA quadrates (FEQ)	14.2
Range of number of habitat types by MÉTA hexagons (FHX) with considerable natural areas	1–18

Table 5 (continued)

Average number of habitat types by MÉTA hexagons (FHX) with considerable natural areas	2.9
Yearly achievements of the MÉTA survey	
% of hexagons surveyed in 2003	21.8%
Cumulative % of hexagons surveyed till the end of 2004	67.3%
Cumulative % of hexagons surveyed till the end of 2005	87.9%
Cumulative % of hexagons surveyed till the end of 2006	90.5%
Cumulative % of hexagons surveyed till the end of 2007	90.7%
Cumulative % of hexagons planned to be finished till end of 2008 https://msw.botanika.hu/meta/FactSheet/YA.htm	100.0%
Seasonal features of the MÉTA survey	
% of hexagons surveyed in January/February/March	1.0%
% of hexagons surveyed in April	3.4%
% of hexagons surveyed in May	9.3%
% of hexagons surveyed in June	13.3%
% of hexagons surveyed in July	20.9%
% of hexagons surveyed in August	21.2%
% of hexagons surveyed in September	17.1%
% of hexagons surveyed in October	10.6%
% of hexagons surveyed in November/December	3.2%
https://msw.botanika.hu/meta/FactSheet/SM.htm	
Quality measures of the MÉTA database	
Total number of surveyors	199
% of surveyors qualified as "excellent"	5.8%
% of surveyed hexagons qualified as "excellent"	3.1%
% of surveyors qualified as "good or acceptable"	89.4%
% of surveyed hexagons qualified as "good or acceptable"	95.7%
% of surveyors and surveyed hexagons qualified as "not acceptable" (resurvey required)	4.8%
% of surveyed hexagons qualified as "not acceptable" (resurvey required)	1.2%
% of HATSZOG (hexagon) records with one missing field value	2.5%
% of ELOHELY (habitat) records with one missing field value	4.7%
% of TAJIELOHELY (landscape level) records with missing field value	7.3%
% of POTVEG (potential vegetation) records with one missing field value	1.7%
Average % of ALL records with missing at least one field value	3.2%
Estimated % of missing field values	< 0.15%

compulsory and 10.2% non-compulsory), while the 37.6% of them are indicated as hexagons without any (semi-)natural area.

The MÉTA program dramatically increased the up-to-date field experience of the researchers, as it is indicated by the figures of formerly known (6.3%) and newly surveyed habitats (70.9%). The percentage of the "not visited" records (however estimated by extrapolation of the surveyor, based on her/his local field experience) is relatively high (17.7%), but it well meets the criteria of the survey methodology (for more details see Molnár Zs. *et al.* 2007).

Table 6

Fact sheet of surveyors – estimated field work (man-days), area of the main surveyed habitat types (hectares), applied naturalness categories (hectares) and average of provided information density (number of recorded marks on datasheets by compulsory hexagons) of MÉTA surveyors. Abbreviations: MD = sum of the estimated field work (man-days), GR = sum of the grasslands surveyed (hectares), WE = sum of the wetlands surveyed (hectares), WO = sum of the woodlands surveyed (hectares), NH = natural, semi-natural habitats (%), DH = degraded habitats (%), NO = number of surveyed natural, semi-natural habitats (number), AID = average information density (score)

Surveyor (family and given name)	MD	GR	WE	WO	NH	DH	NO	AID
Agócs, József	2	44	640	368	*0*	*100*	**15**	2.0
Agyagási, Anett	2	30	13	4	*0*	*100*	**7**	29.0
Aradi, Eszter	1	75	95	0	*26*	*74*	**7**	11.1
Arany, Ildikó	41	6,393	1002	5,051	*24*	*76*	**35**	3.4
Aszalós, Réka	12	305	50	1,711	*39*	*61*	**35**	4.4
Bagi, István	22	3,731	3,907	1,054	*59*	*41*	**20**	3.7
Balogh, Lajos	3	508	25	210	*5*	*95*	**18**	7.1
Bányai, Renáta	24	1,467	539	2,028	*13*	*87*	**25**	5.7
Baranyi, Tamás (… *see Józsa, Árpád*)								
Barati, Sándor	76	9,565	640	1,3374	*0*	*100*	**37**	2.6
Baráth, Kornél	39	4,296	278	9,522	21	79	30	1.8
Bartha, Csaba	11	987	127	1,221	*21*	*79*	**44**	8.2
Bártol, István	2	299	30	0	*13*	*87*	**11**	6.7
Bátori, Zoltán	6	991	111	162	*21*	*79*	**11**	5.4
Bauer, Norbert	116	5,452	766	18,293	*37*	*63*	**51**	3.9
Bazsó, Tamás	4	51	52	453	*0*	*100*	**5**	3.3
Beránek, Ábel	19	2,912	232	2,482	*16*	*84*	**26**	2.8
Berczik, Ágnes	6	1,401	744	432	*17*	*83*	**17**	3.1
Biró, Marianna	11	2,806	836	403	*31*	*69*	**23**	3.1
Bódis, Judit	27	1,163	1,381	3,490	*16*	*84*	**32**	3.5
Bodonczi, László	78	1,605	1,125	13,311	*30*	*70*	**36**	3.3
Botta-Dukát, Zoltán	60	4,113	4,254	5,340	*34*	*66*	**26**	2.7
Bózsing, Erika	2	15	10	320	*0*	*100*	**4**	3.8
Bőhm, Éva Irén	22	1,550	167	5,025	*47*	*53*	**46**	3.0
Bölöni, János and Illyés, Eszter	31	3,266	312	8,896	*25*	*75*	**40**	2.3
Bölöni, János, Illyés, Eszter and Kun, András	27	1,823	91	4,247	*8*	*92*	**35**	3.6
Bölöni, János and Kun, András	12	1,785	17	2,525	*21*	*79*	**30**	3.0
Bölöni, János	28	2,005	348	8,802	*47*	*53*	**46**	1.9
Börcsök, Zoltán	78	2,066	988	7,736	*27*	*73*	**37**	4.9
Buday, Andrea	21	222	118	1,227	*6*	*94*	**9**	4.9
Czirbik, Csaba	64	23,213	4,831	2,079	*48*	*52*	**24**	2.8
Czóbel, Szilárd and Szirmai, Orsolya	51	5,677	749	17,251	*32*	*68*	**29**	1.6
Czúcz, Bálint and Czúcz, Judit	73	5,809	355	18,931	*44*	*56*	**54**	2.1
Czúcz, Judit (… *see Czúcz, Bálint*)								
Csathó, András István	38	1,158	476	434	*25*	*75*	**27**	26.3
Csecserits, Anikó	12	1,712	250	243	*18*	*82*	**30**	5.0
Cseresnyés, Imre	1	21	32	145	*0*	*100*	**4**	2.9

Table 6 (continued)

Surveyor (family and given name)	MD	GR	WE	WO	NH	DH	NO	AID
Csiky, János	3	47	58	39	*6*	*94*	**7**	9.2
Csubák, Attila (… *see Lőrincz, Tamás*)								
Dávid, János	107	1,348	803	21,092	*69*	*31*	**20**	4.3
Deák, Balázs	29	5,642	1,839	1,101	*57*	*43*	**19**	4.5
Deák, József Áron	276	49,050	20,418	16,266	*30*	*70*	**44**	8.2
Deli, Tamás	56	9,441	1,756	1,678	*10*	*90*	**32**	6.5
Dobolyi, Konstantin	9	677	6	2,125	*43*	*57*	**24**	2.6
Dobos, József	4	148	170	385	*51*	*49*	**9**	4.8
Dóka, Richárd	38	3,554	1,265	511	*27*	*73*	**23**	5.7
Drozd, Attila (… *see Urbán Sándor*)								
Elekes, Péter	50	8,130	1,495	3,717	*30*	*70*	**24**	2.9
Éliás, Tamás	10	742	187	2,337	*15*	*85*	**19**	2.2
Erős, Róbert	80	6,509	1,026	22,184	*49*	*51*	**42**	2.3
Erős, Zsolt (… *see Honti Julianna*)								
Fabók, Veronika	4	0	56	73	*26*	*74*	**4**	26.5
Farkas, József	57	9,184	716	3,889	*1*	*99*	**40**	6.5
Farkas, Sándor	3	27	7	47	*10*	*90*	**14**	26.6
Fehér, Balázs	20	2,066	220	376	*8*	*92*	**8**	3.8
Filotás, Zoltán	43	694	243	5,180	*30*	*70*	**21**	7.4
Fodor, Andrea	3	916	107	106	*42*	*58*	**9**	2.1
Fogarasi, Péter	104	5,738	5,231	6,551	*22*	*78*	**34**	4.2
Fráter, Erzsébet	22	959	378	3,556	*7*	*93*	**32**	4.1
Fridrich, Ágnes	24	1,389	148	6,447	*15*	*85*	**16**	1.9
Gál, Bernadett	12	790	220	2,728	*61*	*39*	**25**	1.6
Gálhidy, László	18	592	20	5,160	*64*	*36*	**23**	1.5
Garadnai, János and Rédei, Tamás	2	264	68	35	*0*	*100*	**4**	4.4
Garadnai, János	11	2,376	103	1,807	*13*	*87*	**16**	2.4
Geng, Imola	29	592	65	1,828	*29*	*71*	**16**	5.8
Gyarmati, Magdolna and Molnár, Csaba	4	169	1111	287	*65*	*35*	**21**	4.6
Gyarmati, Magdolna	62	2,303	9,444	3,728	*29*	*71*	**18**	5.1
György, Csaba	11	169	201	179	*14*	*86*	**17**	9.1
Hagyó, Andrea	33	934	565	4,095	*40*	*60*	**31**	5.0
Házi, Judit	14	765	176	3,183	*21*	*79*	**14**	2.2
Hegedűs, László	19	262	0	1,937	*76*	*24*	**14**	3.4
Hoffmann, Károly	38	7,039	824	870	*35*	*65*	**20**	4.5
Honti, Julianna and Erős, Zsolt	5	199	21	1,824	*25*	*75*	**20**	1.7
Horváth, András	42	3,074	4,355	135	*21*	*79*	**25**	6.3
Horváth, Dénes	6	573	213	228	*31*	*69*	**19**	5.7
Horváth, Endre and Bátori, Zoltán	2	80	1	229	*0*	*100*	**4**	5.7
Horváth, Tibor	5	339	242	725	*16*	*84*	**14**	3.6
Hődör, István	7	2,432	1,221	110	*82*	*18*	**14**	2.2
Hudák, Katalin	80	15,301	2,521	11,330	*0*	*100*	**35**	2.0
Hűvös, Récsy Annamária	7	469	40	1,904	*37*	*63*	**28**	2.6
Illyés, Eszter	40	1,863	214	937	*14*	*86*	**39**	9.8
Isépy, István	68	8,926	1,446	19,357	*40*	*60*	**48**	2.4
Jakab, Gusztáv	17	3,396	1,686	655	*53*	*47*	**22**	2.5

Table 6 (continued)

Surveyor (family and given name)	MD	GR	WE	WO	NH	DH	NO	AID
Józsa, Árpád and Baranyi, Tamás	108	5,959	8,768	3,635	*53*	*47*	**40**	5.4
Józsa Árpád, Korompai, Tamás and Baranyi, T.	15	135	2,466	1,262	*11*	*89*	**19**	2.2
Józsa, Árpád Csaba	82	7,533	5,161	1,111	*55*	*45*	**44**	5.9
Juhász, Magdolna	14	28	62	2,215	*15*	*85*	**12**	3.9
Kádár, Gergely	13	468	293	581	*3*	*97*	**10**	7.8
Karikó, Levente Kadosa	25	2,172	372	305	*26*	*74*	**15**	9.0
Kaszás, Attila	57	4,726	986	19,277	*0*	*100*	**18**	2.0
Kaszt, Erika	10	1,013	1,907	266	*35*	*65*	**22**	6.2
Kecskés, Ferenc	56	7,039	5,378	2,896	*58*	*42*	**28**	4.0
Kertész, Éva	15	1,348	632	703	*47*	*53*	**23**	5.7
Keszei, Balázs	15	199	980	632	*50*	*50*	**26**	6.9
Kettinger, Dóra	33	783	500	1,763	*12*	*88*	**18**	4.3
Király, Gergely	68	2,253	572	10,632	*17*	*83*	**41**	3.8
Kocsis, Márta	3	122	50	183	*0*	*100*	**13**	5.7
Kohári, György	106	3,867	2,636	7,124	*21*	*79*	**40**	5.8
Korompai, Tamás	2	518	14	506	*5*	*95*	**6**	2.2
Kovács, Gabriella and Medve, Anita	6	316	10	1,498	*2*	*98*	**18**	2.7
Kovács, J. Attila	164	12,705	3,334	53,778	*28*	*72*	**48**	2.5
Kovács, Orsolya	24	1,965	195	2,121	*17*	*83*	**33**	5.1
Kovács, Tibor	324	31,556	9,209	26,182	*39*	*61*	**54**	3.7
Kulcsár, László	10	82	79	1,021	*2*	*98*	**18**	5.0
Kun, András (… *see Bölöni, János*)								
Lájer, Konrád	2	0	0	25	*86*	*14*	**2**	39.8
Lelkes, András	105	883	1,838	21,005	*37*	*63*	**32**	3.3
Lennert, József	2	150	21	17	*14*	*86*	**11**	16.2
Lesku, Balázs	15	733	664	814	*20*	*80*	**17**	2.9
Lhotsky, Barbara	13	811	142	235	*5*	*95*	**16**	9.2
Lőrincz, Péter	70	5,422	2,993	15,011	*14*	*86*	**39**	2.5
Lőrincz, Tamás and Csubák, Attila	3	461	14	616	*20*	*80*	**12**	2.8
Lőrincz, Tamás	10	1,008	65	2,795	*35*	*65*	**26**	2.3
Lövész, Tamás	4	201	80	145	*17*	*83*	**10**	8.7
Magyari, Máté	31	474	19	6,930	*15*	*85*	**13**	3.3
Makra, Orsolya	3	19	47	101	*6*	*94*	**5**	9.8
Malatinszky, Ákos	31	4,501	319	9,088	*25*	*75*	**33**	1.9
Mányoki, Gergely	41	3,442	895	15,057	*36*	*64*	**45**	3.1
Margóczi, Katalin	15	1,569	445	1,071	*9*	*91*	**16**	3.5
Máthé, András	14	*under data processing, not evaluated yet*						
Medve, Anita (… *see Kovács, Gabriella*)								
Mester, Zsolt	8	206	526	200	*1*	*99*	**9**	9.3
Mile, Orsolya	13	721	1,261	149	*55*	*45*	**21**	7.0
Molnár, Ákos	9	653	2,189	602	*21*	*79*	**13**	2.2
Molnár, Attila	13	1,507	1,531	157	*8*	*92*	**13**	5.0
Molnár, Csaba and Türke, Ildikó Judit	18	1,669	339	6,007	*12*	*88*	**46**	2.4
Molnár, Csaba	70	7,086	1,265	8,794	*20*	*80*	**59**	4.1
Molnár, Tamás	4	422	3	1,088	*55*	*45*	**18**	2.5
Molnár, Zsolt	28	14,348	1,113	268	*46*	*54*	**18**	2.3

Table 6 (continued)

Surveyor (family and given name)	MD	GR	WE	WO	NH	DH	NO	AID
Morschhauser, Tamás	17	427	77	5,879	*47*	*53*	**23**	2.2
Nagy, Ágnes	6	732	837	403	*4*	*96*	**8**	3.3
Nagy, János	43	8,956	1,987	1,652	*29*	*71*	**31**	4.0
Nagy, József	39	2,200	198	14,179	*37*	*63*	**50**	2.5
Németh, Csaba	6	163	8	1,445	*30*	*70*	**15**	2.4
Ódor, Péter	11	224	199	2,805	*40*	*60*	**29**	3.0
Ónodi, Gábor	5	87	4	2,204	*40*	*60*	**17**	2.1
Ortmann-Ajkai, Adrienne	143	5,505	2,269	11,523	*21*	*79*	**49**	5.1
Osztermayer, Gábor	12	1,011	1,118	484	*16*	*84*	**30**	7.5
Óvári, Miklós	68	5,395	2,268	11,028	*21*	*79*	**35**	3.4
Paksa, Milán	10	122	21	1,991	*29*	*71*	**19**	6.1
Pál, János	10	655	82	1,452	*23*	*77*	**22**	3.1
Pál, Róbert	41	1,313	514	4,657	*23*	*77*	**20**	5.7
Pál-Mihók, Barbara	5	550	8	1,662	*56*	*44*	**19**	2.0
Pándi, Ildikó	125	8,126	4,606	783	*21*	*79*	**29**	5.8
Papp, Orsolya	27	1,587	249	5,531	*39*	*61*	**37**	2.5
Pfeiffer, Norbert	71	4,912	1,443	14,168	*9*	*91*	**41**	3.1
Pillinger, János	2	0	89	66	*0*	*100*	**7**	11.0
Purger, Dragica	26	452	594	1,291	*2*	*98*	**21**	7.4
Puskás, Gellért	10	1,131	142	2,319	*31*	*69*	**28**	2.6
Rakonczay, Katalin	8	520	46	111	*7*	*93*	**11**	8.7
Rédei, Tamás	30	2,847	944	480	*28*	*72*	**31**	6.1
Rév, Szilvia and Kun, András	22	457	1,612	402	*6*	*94*	**16**	5.6
Rév, Szilvia	27	1,528	1,047	1,902	*28*	*72*	**29**	4.2
Riezing, Norbert	111	1,825	1,593	8,956	*28*	*72*	**55**	5.6
Rogovszky, Zoltán	22	803	844	7,983	*59*	*41*	**37**	1.8
Rudolf, Kinga	14	614	83	2,482	*18*	*82*	**29**	3.9
Salamon-Albert, Éva	100	10,471	3,172	25,402	*12*	*88*	**35**	2.8
Somay, László	6	388	19	1,589	*59*	*41*	**18**	1.9
Somodi, Imelda	2	81	35	45	*35*	*65*	**8**	9.2
Szabados, Klára	22	3,341	1,720	2,352	*2*	*98*	**24**	4.1
Szabó, Annamária	4	0	212	155	*5*	*95*	**2**	10.0
Szabó, Emese	8	38	49	261	*23*	*77*	**17**	15.2
Szabó, Rebeka	4	510	738	95	*35*	*65*	**19**	3.3
Szabó, Zita	3	393	0	1,065	*48*	*52*	**5**	1.3
Szabó, Zsuzsanna	23	4,733	365	267	*15*	*85*	**16**	3.7
Szalma, Elemér	12	2,431	2,180	1,457	*52*	*48*	**17**	2.2
Szalóky, Ildikó	67	3,557	2,302	9,173	*30*	*70*	**42**	3.2
Szeglet, Péter	8	759	3,130	1,084	*53*	*47*	**20**	2.6
Szénási, Valentin	31	1,204	693	1,003	*15*	*85*	**27**	7.6
Szerényi, Júlia	46	1,787	2,595	3,699	*9*	*91*	**25**	7.3
Szigetvári, Csaba and Bártol, István	3	106	0	51	*11*	*89*	**4**	8.4
Szigetvári, Csaba	80	4,392	3,860	2,535	*14*	*86*	**43**	6.9
Szili, István	27	3,364	2,871	3,671	*8*	*92*	**28**	3.8
Szirmai, Orsolya	9	1,710	344	1,739	*26*	*74*	**14**	2.0
Szitár, Katalin	3	165	553	107	*38*	*62*	**13**	4.5

Table 6 (continued)

Surveyor (family and given name)	MD	GR	WE	WO	NH	DH	NO	AID
Szolláth, György	18	*under data processing, not evaluated yet*						
Szőllősi, Tünde	71	1,056	923	8,305	*1*	*99*	**25**	3.9
Szurdoki, Erzsébet	3	122	180	585	*37*	*63*	**14**	3.6
Takács, Balázs	2	34	19	518	*3*	*97*	**12**	2.6
Tatár, Andrea	6	*under data processing, not evaluated yet*						
Tari, Anna	7	436	983	728	*11*	*89*	**15**	3.2
Tatár, Sándor	7	97	151	281	*17*	*83*	**17**	8.9
Temesszentandrási, Zsófia	25	1,369	2,477	6,925	*54*	*46*	**40**	1.8
Tímár, Gábor	38	1,748	294	7,188	*17*	*83*	**52**	3.8
Tímár, Pál	149	18,219	5,064	9,740	*11*	*89*	**53**	7.0
Tinya, Flóra	7	449	1,065	451	*31*	*69*	**9**	2.6
Toldi, Miklós	74	1,439	1,139	13,672	*53*	*47*	**28**	3.0
Tóth, Albert	9	1,723	457	399	*27*	*73*	**15**	3.8
Tóth, Csaba	30	2,545	369	1,474	*22*	*78*	**33**	4.3
Tóth, János	4	175	0	170	*46*	*54*	**3**	6.2
Tóth, Tamás	108	13,965	4,730	3,550	*34*	*66*	**30**	8.4
Tóth, Tibor	13	4,964	822	68	*16*	*84*	**14**	2.5
Török, Péter	34	1,014	77	1,055	*5*	*95*	**16**	11.6
Turcsányi, Gábor	5	820	393	493	*30*	*70*	**13**	2.2
Türke, Ildikó Judit	23	942	113	3,179	*20*	*80*	**38**	4.4
Ujvári, Zsolt and Urszán, Tamás	14	1,687	23	4,549	*10*	*90*	**23**	1.6
Uracs, András	4	9	0	1,070	*19*	*81*	**4**	1.5
Urbán, Sándor and Drozd, Attila	136	12,400	6,519	3,199	*39*	*61*	**42**	6.9
Urszán, Tamás (… *see Ujvári, Zsolt*)								
Váncsa, Klára	5	18	61	20	*5*	*95*	**11**	82.3
Varga, Anna	5	240	163	191	*16*	*84*	**14**	9.1
Varga, Katalin	9	163	1,013	869	*5*	*95*	**15**	2.3
Vas, Mihály	38	1,151	1,625	779	*14*	*86*	**28**	11.7
Verő, György	16	1,670	534	3,175	*53*	*47*	**27**	1.7
Wágner, László	42	2,177	768	6,166	*8*	*92*	**24**	3.6
Zalatnai, Márta	3	225	734	0	*34*	*66*	**9**	6.0
Zólyomi, Szilárd and Tímár, Pál	2	229	56	61	*1*	*99*	**11**	6.4
Zólyomi, Szilárd	6	534	95	18	*12*	*88*	**19**	9.5
Zsidákovits, József	17	613	264	1,583	*37*	*63*	**16**	3.7
Zsólyomi, Tamás	11	279	456	353	*53*	*47*	**17**	8.1

* Calculations were made in February, 2008, when completeness of database is about 91%

In the case of 0.8% there is no indication of the source of knowledge. These percentages were calculated on the basis of habitat records (could be considered as "stands" or "cases").

The yearly growth of the database was highly dependent on the project financing. Obviously, the starting Széchenyi project (see Table 4) yielded almost the 90% of the establishment of the database content between 2003 and 2005. Further projects helped us in the additional financing of the field survey (including resurvey of low quality MÉTA quadrates), the database development and quality assessment issues.

The monthly distribution of surveyed habitat records shows high dominance of the months of the vegetation period, but there are several records obtained in late autumn, winter and early spring also (4.2% of surveyed hexagons between November and March). There could be considerable differences in habitat characteristics (i.e. phenology of invasion, estimation of naturalness) depending on seasonality, so further analysis must be taken carefully considering this aspect (Illyés *et al.* 2008).

Several measures of the MÉTA database help us to improve the quality of the database. One of the most important measures is the ratio of "not acceptable" hexagons (1.2%). Resurvey has been taken and financed in these cases in 2008. The surveyors were generally qualified according to several criteria, however each of the MÉTA quadrates were qualified one by one too. So, each surveyed quadrat was classified into "excellent", "good", "acceptable" or "not acceptable" categories, and then the percentage of these categories were calculated. Missing value of some fields is a relatively common phenomenon (at 4.7% of habitat records, but less than 0.15% of total information), which makes some problems in the further analysis. Discrete quality assessment procedures will be developed to manage and solve these problems. Our direct aim is to lower the missing values of key attributes (fields) in the next versions of the database.

Overview of the surveyor's field experience profiles

We compiled a fact sheet of surveyors that shows important characters of their field experience profile (Table 6). The estimated field work expressed in man-days is a predefined approximation for quadrate by quadrate, which is based on terrain and habitat characteristics and mapping difficulties. Individual differences between field work efforts of the surveyors have been occurred, however surveyors agreed in a real and general estimation of man-days, which were considered also. Surveyed habitats were grouped into broad habitat classes from the viewpoint of land cover formation (grasslands, wetlands and woodlands) and habitat quality (natural, semi-natural and degraded habitats). Sum of the area of surveyed habitats by classes and by surveyors was calculated. An average information density measure of surveyed compulsory hexagons was defined and calculated to indicate intensity of the survey. The total scores were standardised by the surveyed area. This measure is highly depending on the completion and amount of information given by records (i.e. accounting of recorded marks on data sheets), however it depends on landscape features also, mainly on average patch size and diversity of habitats (i.e. forest covered versus fragmented mosaic landscape).

The MÉTA program and the management is proud of the surveyors' team and gives help and stimulation to raise the skill and actual field and landscape experience of surveyors.

ONGOING DEVELOPMENTS AND FURTHER PERSPECTIVES

Our database is under continuous development. After the completion of the last field surveys in 2008, the data processing is planned to be finalised. The quality assessment of data is simultaneously running, primarily the replacement of the missing values and the control of the MÉTA key attributes. The evaluation and supervision of the professional content of the database is ongoing; their results will be validated in the database. All these small steps will lead to the closing of the basic data of the database, which is planned to be in 2009. This version will gain the 2.0 version number.

For the appropriate use of the data and results of the MÉTA program a) one should know thoroughly the methodology and the professional content of the database; b) effective information services should be provided for the work; c) the methodology, the database and the services should be documented in details and with the assurance of accessibility. Now we are working on the further development and documentation of the information services, as well as on the enhancement of the database quality. Besides the main objective of the MÉTA program, namely to present the vegetation heritage and landscape ecological state of Hungary in an atlas, there are several possibilities of utilisation and cooperation. Some example: evaluation of the state of Natura 2000 habitats in Hungary (Illyés and Bölöni 2007, Molnár Cs. *et al.* 2007); development and adaptation of landscape ecological, nature protection and environmental models (Czúcz 2007); to use as a knowledge base for land use expert system; to compile ecotouristical maps and handouts and to utilise in environmental education programs. We plan to test these research possibilities in the frame of projects concerning the applications of the MÉTA database. This will mainly mean interdisciplinary analyses in the future, like national and regional socio-economic studies; development of landscape ecological and landscape evolutional models; relational analysis of the flora, fauna, vegetation and land use. The MÉTA program gives a considerably detailed view on the landscape vegetational state of Hungary after the millennium. Several significant alterations are ongoing or have just started on landscape and regional level. Consequently, comparative analyses become soon reasonable, to get detailed and actual overview on the changes on landscape and regional level, and on processes of degradation, devastation, invasion and regeneration.

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