

The Biodiversity Database of the Hohe Tauern National Park

Wolfgang Dämon, Patrick Gros

Abstract

The biodiversity database of the Hohe Tauern National Park is a multi-functional information system which documents all available data on the biodiversity of the Hohe Tauern region. The database, maintained at the "Haus der Natur" Museum of Natural History in Salzburg, is designed to integrate distribution data on all animal and plant species, while including parameters specific to certain systematic groups. Unit-level data originate from various sources such as field studies, museum collections, literature, and privately maintained databases provided by biologists. Unit-level data are referenced to comprehensive metadata concerning taxa, sites, collections, literature, and contacts. Many ways exist to access the information stored in the database. Possible applications of the biodiversity database are manifold and are of large interest to biologists, teachers, practitioners, politicians, and all who relate to the Hohe Tauern region.

Keywords

Biodiversity, database, digital distribution maps, Hohe Tauern National Park, "Haus der Natur" Museum of Natural History, Salzburg, Carinthia, Tyrol, Austria.

Project aims

The Hohe Tauern National Park biodiversity database was established with the aim of documenting all available data on the distribution of animals and plants in the Hohe Tauern region in one extensive database. The database is a multi-functional information system which allows data query relating to specific questions and quick retrieval in any desired structure and format. The search results are required to be presented so as to permit assessment of potential distribution areas with a special focus on threatened and target species and so as to include increases and decreases of distribution area sizes and population densities. The data should allow the definition of areas of high and specific biodiversity as well as areas requiring special protection and management actions. The database is a valuable basis for the compiled analysis and publication of existing biodiversity data. Furthermore, the project should emphasise the necessity to promote biodiversity research in the National Park, especially where data are scarce or obviously lacking.

Duration

The project started in the year 2000, and the total time for recording biodiversity data within the scope of this project should be seen as infinite. As nature is constantly reshaped by underlying dynamic processes (natural or non-natural) continual changes in biodiversity are to be expected and the documentation needs to be updated on a regular basis.

Area of study

The geographic area covered is the "Hohe Tauern region", including the core zone and the buffer zone of the National Park (ca. 1800 km²), as well as the total surface of the so-called National Park municipalities in Salzburg, Tyrol (Osttirol), and Carinthia.

Methods

The Biodiversity database is maintained at the "Haus der Natur" Museum of Natural History in Salzburg. Database management and data entry is carried out by a small team of biologists specialised in the taxonomy and ecology of vertebrates, invertebrates, and plants respectively, and with in-depth knowledge of informatics.

The main software used in the project is "BioOffice" (by BioGis Consulting), a database program based on a Microsoft SQL-Server with integrated GIS functionality (ESRI Map Objects). The program provides many useful options allowing the adaptation of the database model, application and user interface to exactly fit the scope and particular needs of the project. For each of the some

400 data fields used in this project policies for the contents as well as data integrity and consistency were agreed upon and documented.

Highly accurate and at the same time highly efficient procedures have been developed to guarantee standardised, consistent data.

For all main groups of organisms the database contains comprehensive and standardised taxonomic lists, including information on higher systematics, nomenclature, name codes, general distribution (in Austria, Europe), the degree of endangerment where defined in national and regional Red Lists, and the degree of protection according to European Union Directives.

Unit-level data records (so-called "objects") contain either observations of individuals in their habitat, or collected, prepared, and preserved specimens. Sources of unit-level data include published literature, unpublished project reports, expert mappings and expert opinions, private and public collections, and miscellaneous sources of observational data collected in the field and held by many zoologists and botanists (such as traditional paper card indexes, excursion lists and diaries, but also data already in some way digitised). Consequently, the database contains recently sampled data as well as historical data.

In the course of importing data from these sources, the reliability of the information is evaluated and commented on by scientists (e. g. with respect to taxonomic identification), assuring a high quality standard. Many ways exist to access the information stored in the database. The record sets retrieved from queries may be presented in user-defined reports and on digital maps, or may be exported to be analysed statistically or using GIS software.

Results and discussion

Currently the database contains ca. 61000 records (objects) concerning ca. 4400 species of animals and plants and ca. 5400 georeferenced sites. Table 1 shows the number of data broken down into the main groups of organisms. Since on average each record set comprises about 25 data fields (i. e. filled with information), the total amount of effective information is estimated to exceed 1500000 data.

	Unit-level Data	Taxa	Sites
Mammals	2419	69	522
Birds	23324	281	2552
Reptiles and amphibians	991	19	544
Butterflies and moths	14821	1290	625
Bees and bumble bees	5487	60	672
Grasshoppers	1481	41	623
Beetles	7857	1810	345
Dragonflies	92	27	18
Spiders	21	13	12
Flowering plants and ferns	4572	575	425
Lichens	130	107	24
Mosses	360	152	99
Total	61555	4444	5464

Tab. 1: Number of record sets in the biodiversity database

Among the most important data sources which have been integrated in the database so far are the following: data collections provided by specialists (of e. g. birds, butterflies and dragonflies); collections of specimens held in the "Haus der Natur" Museum of Natural History; research project reports commissioned by the National Park (vegetation science, monitoring of eagles, vultures, bats); some 150 published papers dealing with faunistics and floristics in the Hohe Tauern region, and last but not least observations reported by National Park authority employees and trainees. Remarkably, an overwhelming amount of data originates from private experts who volunteer their time to unsalaried investigations.

An exceptional number of data comes from a few regions, such as Badgastein, Heiligenblut (Großglockner region), or Prägraten. Actually, places like these have always attracted scientists. On the other hand, the data clearly indicate some regions where biodiversity data are scarce and on which research should be focused. The amount of data available from the core and buffer zones, and thus the number of known species, is rather small compared to the adjacent regions. However, when extrapolating species richness from the number of currently existing records, biodiversity in the core and buffer zones should be distinctly higher than in the adjacent areas.

During four years of database management we experienced the importance of keeping data standardised, cleansed and consistent, which was attempted rigorously from the beginning. However, the effort to maintain the database at a high quality level continuously grows with the number of integrated data sources and takes at least the same time as the digitisation of new data.

The biodiversity database serves as a tool to organise the huge amounts of data originally spread over many sources and makes them easily accessible for use in nature conservation, landscape planning and management of natural resources. It already proved to be a helpful service system for all those who have to consider biodiversity in a decision-making process. In the near future the information stored in the database should be available also to the public (e. g. in the National Park centers) and via the Internet. This should increase the awareness of the public for issues of biodiversity and biological sciences in general.

Contact

Dr. Wolfgang Dämon
wolfgang.daemon@hausdernatur.at

Dr. Patrick Gros
patrick.gros@hausdernatur.at

"Haus der Natur" Museum of Natural History
Museumsplatz 5
A 5020 Salzburg
Austria

ZOBODAT - www.zobodat.at

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Autor(en)/Author(s): Dämon Wolfgang, Gros Patrick

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