

## OPINION: WHY MUSEUM COLLECTIONS AND HERBARIUMS DATABASES NEED TO BE WIDELY AVAILABLE OVER THE INTERNET

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**Abstract.** In the era of information, the necessity to biological data to be widely available over the internet is almost imperative. With this end in view, many worldwide databases were created (like Global Biodiversity Information Facility, Ocean Biogeographic Information System, HerpNet etc.), but, unfortunately none of Romanian museums or universities have any contribution to it. I take this opportunity to suggest that all curators of museum and herbarium collections should provide open data of their collections over the internet. In my opinion, if this process is applied it will increase the rate of international collaborations of Romanian authors, and the animals and plants from these collections will be more studied than in the present.

**Keywords:** biodiversity databases, Romanian institutions, GBIF, HerpNet, OBIS.

**Rezumat. Opinie: De ce datele colecțiilor muzeelor și herbarelor trebuie să fie accesibile pe internet.** În era informației, necesitatea ca bazele de date biologice să fie accesibile pe internet este aproape imperativă. În acest sens, au fost create numeroase baze de date internaționale (cum ar fi Global Biodiversity Information Facility, Ocean Biogeographic Information System, HerpNet etc.), dar, din păcate, muzeele și universitățile românești nu contribuie la aceste baze de date. Cu această ocazie, sugerez curatorilor colecțiilor din muzee și herbare să facă disponibile pe internet datele existente. În opinia mea, dacă această deschidere ar avea loc va crește numărul colaborărilor internaționale realizate de autorii români, iar animalele și plantele din aceste colecții vor putea fi studiate mai mult decât în prezent.

**Cuvinte cheie:** baze de date de biodiversitate, instituții românești, GBIF, HerpNet, OBIS

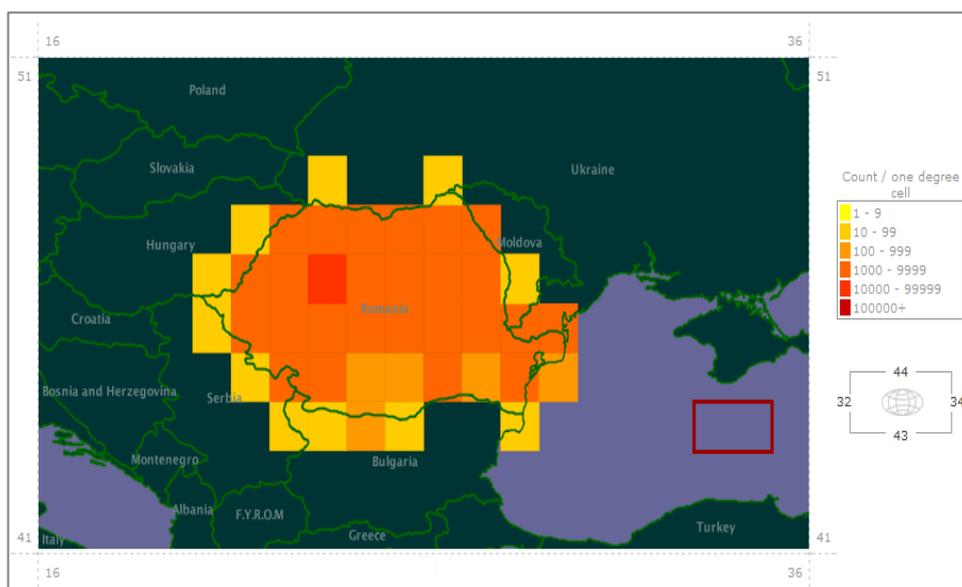
In the era of information, the availability of biodiversity information is a major issue in the process of protecting threatened species and global habitat loss (Bisby, 2000). At this time, a series of global databases with biodiversity data distribution are available over the internet: Global Biodiversity Information Facility (GBIF, <http://www.gbif.org>), Ocean Biogeographic Information System (OBIS, <http://www.iobis.org>), HerpNet (<http://www.herpNet2.org>) and other thematic and regional databases.

GBIF is an intergovernmental organization which provides “an internet accessible, interoperable network of biodiversity databases and information technology tools” (Edwards, 2004), with a “mission to make the world’s biodiversity data freely and universally available via the Internet” (Lane, 2004). At this moment GBIF is the most comprehensive database with biodiversity data which is freely available. GBIF provides biodiversity information from museum and herbarium collections and other organizations around the globe (Yesson, 2007). In his latest version, GBIF 1.3.2 comprises 312,669,756 indexed records (where 271,791,688 records have geographical coordinates) for all taxonomical groups, data provided by 342 publishers and 8548 databases.

In the GBIF, from Romania, there are 104,917 records with coordinates from a total of 143,247 records offered by 311 datasets (table 1, fig. 1) from 25 counties. All specimens recorded from Romania are provided by non-Romanian residents (table 1); no one within the Romanian principal institutions that hold organism databases contributes to GBIF.

**Table 1.** Datasets which provide more than 500 records from Romania (from GBIF: <http://www.gbif.org>).

Dataset	Count	Non-Georeferenced Count
Biologiezentrum Linz	85723	5803
Museo Nacional de Ciencias Naturales, Madrid: MNCN_ICTIO	0	3543
EURISCO, The European Genetic Resources Search Catalogue	15406	2526
Real Jardin Botanico, Madrid: MA-Fungi	26	1883
European Moth Nights	0	1616
Real Jardin Botanico, Madrid: MA-Funhist	0	1325
CABI Bioscience Fungus Collection	0	1295
Phanerogamie	1	882
Lund Museum of Zoology - Insect collections (MZLU)	0	839
Collection Mollusca SMF	0	838
Real Jardin Botanico (Madrid), Vascular Plant Herbarium (MA)	1	828
Fishbase	121	805
Botany (UPS)	327	631
NMNH Vertebrate Zoology Fishes Collections	22	544



**Figure 1.** Point density of records with coordinates for Romania from GBIF (<http://www.gbif.org>).

Also, a thematic database in herpetology (HerpNet) provides for Romania only 406 records, and of these 220 are with coordinates. In this case also, no Romanian institution is involved to provide data regarding their collections. For these records a number of 14 institutions have contributed (e.g. Field Museum - FMNH Herpetology Collections, Zoological Institute RAS - Amphibian specimens, MCZ-Harvard University Provider - MCZ Herpetology Collection, California Academy of Sciences (CAS) - CAS

Herpetology Collection Catalog, Staatliches Museum für Naturkunde Stuttgart - Staatliches Museum für Naturkunde Stuttgart, University of Colorado Museum of Natural History - CUMNH Herpetology Collection etc). Although, *Vipera ursinii modavica* is endemic in to Romania (Nilson & Andren, 2001; Krecsak & Zamfirescu, 2008) and the species holotype is held in the Natural History Museum of Iași (Nilson *et al.*, 1993) none of these databases (e.g. GBIF, HerpNet etc) have the record of the holotype of the subspecies because of the lack of transparency from Romanian institutions. This situation is the same with other species which have the holotype in the Romanian museums or other institutions with scientific collections.

The importance of such databases was proved by their contribution to the knowledge about the distribution of threatened species, given that some of the records had not been yet published in thematic scientific papers. Also, GBIF and HerpNet records are generally used as data for species distribution and niche modelling around the world (e.g. Gaikwad *et al.*, 2011; Snäll *et al.*, 2011).

Another importance of GBIF and all other such databases is the strong transparency regarding museum collections and consequently a better opportunity of collaboration between experts from different countries. In the field of taxonomy, GBIF is widely used in numerous recent published papers (e.g. Miller *et al.*, 2010; von Konrat *et al.*, 2010 etc). Also, these databases indirectly protect the threatened species due to this transparency and the fact that an expert from a field can simply study exemplars already collected, without the need to overcollect more individuals of the studied species from the field.

Unfortunately, in Romania does not exist a program to provide wide access to a database with collections and many experts (from and outside of Romania) are confused with regard to which museum or herbarium collections are held in specific institutions of Romania and for this reason the collaboration is very difficult.

In the light of these arguments, I suggest that all curators of herbarium and museum collections to build databases where to provide information regarding their collections, and to make them widely available over the internet. In this way Romanian institutions will be more visible around the world and the material from collections will be really studied, not only collected for patrimony.

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