

A new All Taxa Biodiversity Inventory and Monitoring (ATBI+M) approach for improving biodiversity knowledge and data management for protected areas

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Abstract

As many protected areas lack comprehensive and accurate data about much of their biodiversity, the Mercantour National Park (PNM), France, and the Alpi Marittime Natural Park (PNAM), Italy, through collaboration with the National Museum of Natural History in Paris, joined a partnership with the European Distributed Institute of Taxonomy (EDIT). EDIT is a consortium of 28 leading scientific institutions supported by the European Commission (FP6), with the aim of integrating the taxonomic community through institutional collaboration and joint programme of activities. As part of these activities, EDIT Work Package 7 established the first European "All Taxa Biodiversity Inventory+Monitoring" (ATBI+M) pilot site at PNM/PNAM in 2007, also as a joint contribution towards the "Countdown 2010" activities for biodiversity protection.

During the first two years of collaboration, more than 80 researchers from EDIT visited the two Parks to record, collect, and inventory different taxa in the two parks. More than 3000 species were already recorded, and more than 8000 individual geo-referenced records have been generated. The second EDIT ATBI site was launched in 2008 in the Gemer area on the Western Carpathian Mountains, Slovakia. This ATBI+M site covers three national parks of carstic character, which represent a well preserved, typical environment of the Carpathian Mountains. Research activities at ATBI+M sites are accompanied by the EDIT summer school of taxonomy, where graduate students from different European countries are taught fields methods for taxonomy by experts from EDIT institutions and academic partners. The EDIT ATBI+M activities will continue for three more years, and are expected to significantly enhance our knowledge on European biodiversity and contribute to its protection, also through future monitoring activities. Depending on additional funding opportunities, the protected areas involved will continue their ATBI+M activities after EDIT

Keywords

biodiversity, inventory, taxonomy, protected area.

The impact of human activities on all ecosystems probably shows itself in the clearest way through a global drastic decrease in biodiversity, as direct or indirect consequence of habitat loss.

According to recent estimates, one living species becomes extinct every 20 minutes, which represents the highest rate in species loss ever occurred: for this reason it is commonly referred to the Sixth Mass Extinction, also called the "biodiversity crisis".

However, it should not be forgotten that species extinctions are a normal process and always have happened, while what is surprising about the actual situation is the impressive speed at which it is evolving.

According to the IUCN Red List, 12 to 52% of most common species are endangered; however we must consider that only 10% of all known species have been subject to conservation status verifications (HASSAN & SCHOLES, 2005).

Since this has to be considered a global issue, it is necessary that all measures and commitments are to be undertaken at an international level. One of the first responses has been the Convention on Biological Diversity in 1992, which "aims to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on Earth" (UNEP, 2002). The European Union included the principles and the proposed objectives in all environment protection action programmes, and became a priority for the Sixth Framework Programme (6FP) (2002-2012), and for many other local initiatives, also supported by the "Natura 2000 Network", the world largest connecting system among protected areas.

Thanks to the initiatives promoted by the European Distributed Institute of Taxonomy (EDIT), also supported by the 6FP, a great effort has been made and is still under way to create a network of scientific excellence at European level (and also to interact with non-European parties). The aim is to integrate the taxonomic community through institutional collaboration and joint activity programmes.

With the purpose of involving the scientific community in actual taxonomic and conservation issues, EDIT introduced the European "All Taxa Biodiversity Inventory + Monitoring" (ATBI+M) approach, based on the experience originating from the Great Smoky Mountains, USA.

The aim of this project is to create an exhaustive inventory of all species existing in a given territory through intensive community efforts. These activities allow taxonomists specialized on the study of a particular group of organisms to interact with their colleagues and to create strong connections between scientific institutions.

In particular EDIT intends with this project:

- to increase the knowledge regarding all taxa existing in the study area and the ecosystems in which they live;

- to encourage the spread of taxonomic knowledge and the interest in new field and laboratory work methodologies;

- to share the acquired knowledge among scientific institutions, stakeholders and local administrations;

- to rise awareness among the general public, and especially local populations, about biodiversity and its role and value.

The first ATBI+M was established in 2006, thanks to the collaboration between the Mercantour National Park (PNM), France, the neighbouring Alpi Marittime Natural Park (PNAM), Italy, and the National Natural History Museum of Paris and supported by the French Ministry of Environment, the Foundation Albert II of Monaco, the Government of Monaco. In 2008 a new ATBI+M site was identified in Slovakia, and in particular in the Gemer area which includes three national parks in the Western Carpathian Mountains (National Park Slovenský raj, Muránska Planina National Park and Slovenský kras National Park).

The Mercantour National Park, the Alpi Marittime Natural Park and the Gemer area were chosen as ATBI+M sites because of their large habitat and species diversity, but also due to the relatively easy accessibility to basic infrastructures.

Although the Mercantour-Marittime area has been studied for at least 2 centuries, especially concerning some groups of animals and plants, the knowledge regarding all existing species and habitats is not complete and often not available to park managers, researchers or to the general public. This is why it is crucial to gain more information regarding the biodiversity of these areas and to manage the data obtained in order to make then accessible to a large public.

Moreover, this inventory is not only a mere list of species but it is also a way to increase the awareness of the local authorities and the general public about the existing biodiversity, and about why and how to protect it. At the same time the inventory will bring together major experts and scientific institutions, that need to overcome old impediments and start collaborating with other institutions to share material and expertise. Finally, this inventory will allow to clearly define the actual situation, to compare it with future situations, so as to assess changes in biodiversity in dependence of time.

For both ATBI+M sites all research activities were implemented according to the EDIT action plan and the Parks regulations. The end of the ATBI+M project promoted by EDIT is fixed for middle 2011, but it might be prosecuted if enough funding for all programmed activities will be received.

For the Mercantour-Marittime territory, June 2009 represents the beginning of the third collecting season, while this will be the second year for the Gemer area.

- The project activities include:
- defining the collecting sites
 - informing the scientific community and providing useful information
 - coordinating researchers activities
 - managing data and updating the website.

In the Mercantour National Park and the Alpi Marittime Natural Park 17 sites were firstly selected according to their habitat characteristics and accessibility also with heavy gear necessary for the fieldwork.

All researchers were asked to collect only in those areas, while from this summer, the whole territory within the two parks can be surveyed so as to gain a better insight into the overall biodiversity.

More than 150 individual specialists are involved in the project activities and almost all of them already visited the Mercantour-Marittime territory from 2007 to 2008, collecting samples, identifying them and sending the results to EDIT, with the support of the two parks’ staff. All collecting activities were conducted according to the parks’ and EDIT’s regulations. Figure 1 shows a Malaise trap placed in Vallone del Gesso della Valletta in the Alpi Marittime Natural Park in August 2007.

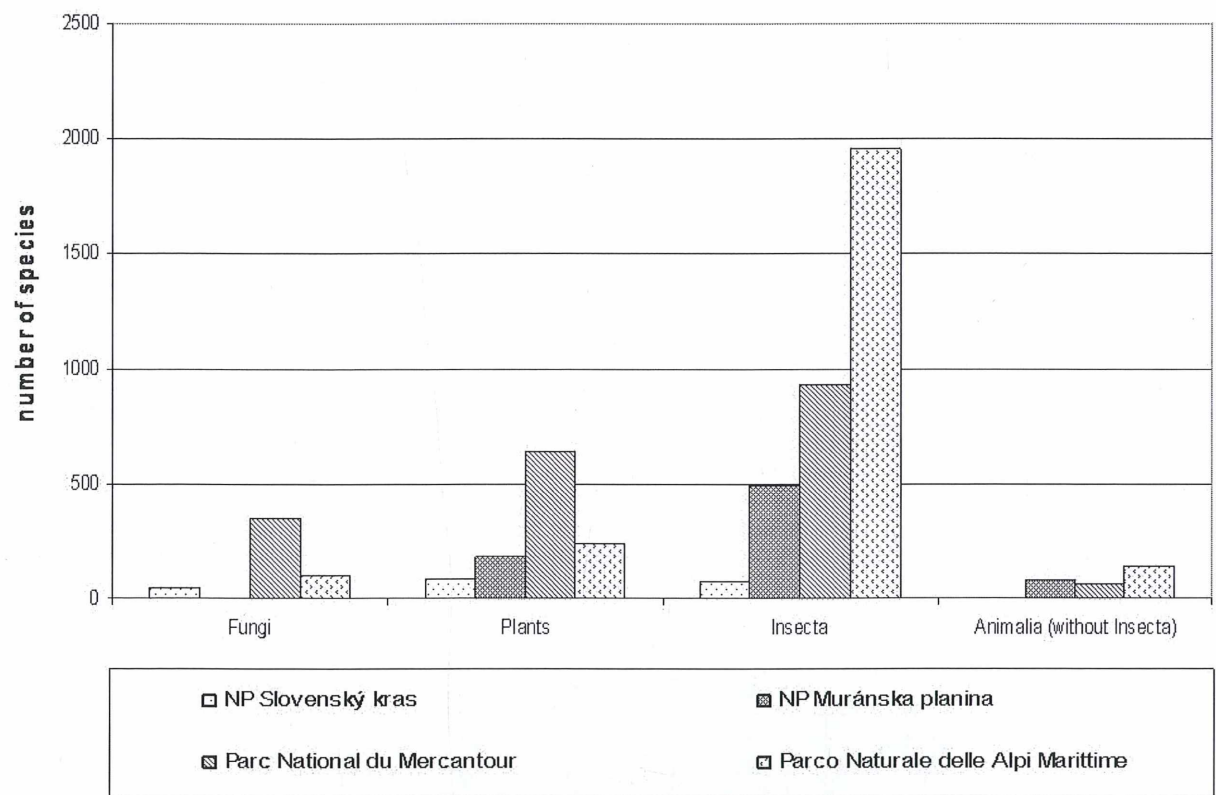


Figure 1: Recorded species at the National Parks during ATBI+M activities in 2007-2008: total number per kingdom (data include digitized records from available literature)

Until now 4444 species have been catalogued, of which 1996 species are from the Mercantour National Park and 2448 from the Alpi Marittime Natural Park. Insects are the most represented group.

The figures coming from the site Gemer are considerably lower than the other ATBI+M sites because of it’s recent origin and because research activities in 2008 were concentrated in Muránska Planina and Slovenský Kras.

Figure 2 clearly shows that the group counting the largest number of identified species is the class Insecta, followed by Plantae, and in particular the phyla Bryophyta and Marchantiophyta.

Among the insects, the order that has been mostly investigated is Lepidoptera, with almost 1800 species (Figure 3), while Coleoptera counts almost 500 identified species. The large predominance of data on butterflies and moths might be due to the high participation of experts on these groups together with the high ease in capturing samples compared to other insects.

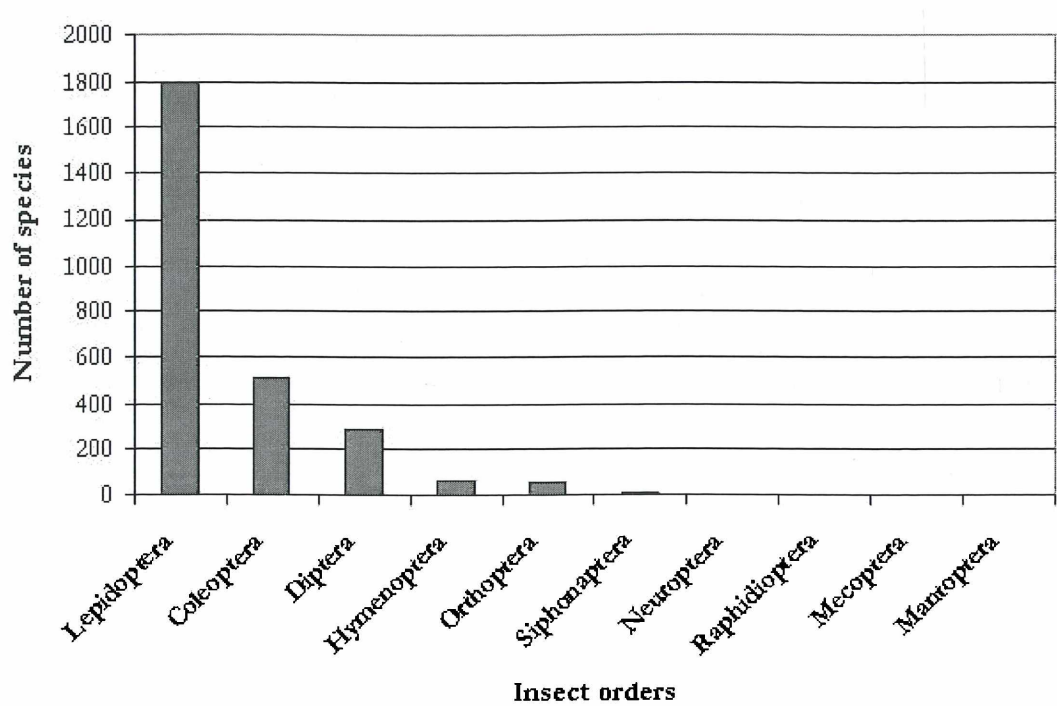


Figure 2: Number of species recorded within different insect orders

During these 4 years of studies (2007-2010) for the Mercantour-Maritime territory we expect to gain more information on known species and on new ones (to the area or to science) especially for insects and other minor groups (e.g. Fungi, Diatomeae, Malacofauna, Micromammals, etc). Concerning big mammals, birds and vascular flora, much is already known, thanks to the monitoring activities carried out by individual specialists and by the parks staff. However, some inventorying activities will be carried out, in order to update the old checklists and to study distributions or other specific topics. Thanks to the suggestions and expertise of a recently formed Scientific Committee these activities will be accurately planned and carried out.



Figure 3: Malaise trap placed in Vallone del Gesso della Valletta (Alpi Marittime Matural Park) (Photo: Daniele Birtele)

The data generated by EDIT's ATBI+Ms are also accessible world-wide through the Global Biodiversity Information Facility (GBIF). The data for Mercantour/Alpi Maritime are available at <http://data.gbif.org/datasets/resource/7949/> and for the Gêmer region at <http://data.gbif.org/datasets/resource/7950/>. Another possibility to search for observation and collecting data is the "EDIT Specimen and Observation Explorer for Taxonomists" (<http://search.biocase.org/edit>; ZIPPEL et al. 2009)."

Figure 4 is an example made for the Mercantour National Park that shows the data (identified species) growth that accompanied the Park from it's institution to the beginning of the systematic inventorying activities.

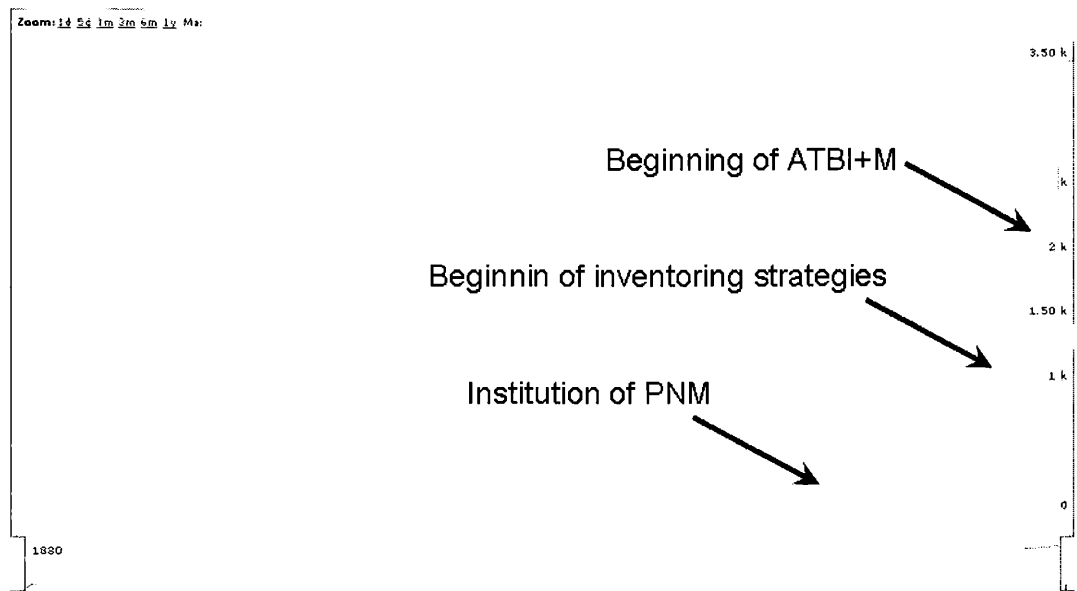


Figure 4: Growth in the number pf species catalogued in the Mercantour National Park from its institution and after the beginning of the ATBI+M activities

With the beginning of 2008, as some results became available, a media event was organised for the ATBI+M Mercantour-Marittime and several articles on national and local newspaper and magazines were published. It is also thanks to this type of communication that now a large part of the scientific community, nationally and internationally is aware of the existence of the ATBI+M sites and is interested in participating. From 2009 different activities with local schools and other public events will take place in both Parks. Moreover we intend to inform and involve the public and especially the local population through the organisation of public events. Specific activities with students will be continued.

The involvement of all these parties, local population, general public and scientific community, is indeed essential to allow for a better protection and management of the biodiversity as well as to help improving land management practices.

Although it is too early to draw final conclusions for the whole inventory, it is important to highlight the good response of the scientific community, both involved in fieldwork activities and in the identification process. It is our intention to improve the efficiency of field work in such a way, that the whole territory can be studied according to standardised methodologies.

This experience is particularly important for protected areas because it shall help the general public understand that it is not only necessary to preserve the existing species within an area, but also to maintain the biological potential that these areas have. The Mercantour-Marittime territory, as well as the Gêmer area are partly subjected to land exploitation due to agricultural practices and suffer from loss of habitat and general damages to various ecosystems (water pollution, colonization of invasive species...).

The Inventory represents a unique opportunity for these protected area to draw the attention of the whole scientific community and the public (especially the local population) to the importance of taxonomy and scientific surveys within the framework of environmental protection strategies: preservation of an environment can only be done if park manages are aware the biological diversity and its distribution. This type of knowledge can define the real potential of an area, and allow a real protection, though the integration of local culture and land use.

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