Ukraine National Review: World Biodiversity and European Taxonomy

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1-Taxonomic Information: Strategy and Methods

Inventory and Identification: "What is it, and how does it fit among its relatives?"

1.1 Does your country use taxonomy-based tools for biodiversity assessments and policy making? What are these tools?

Yes it does. Tools in general include taxonomic analysis made by experts in particular taxonomic group. The taxonomic analysis is obligatory for:

- Setting up the Red Data Book of Ukraine
- Preparing National reports according to different international agreements in the field of biodiversity conservation.
- Organisation of new reserved territories. The decision to create new reservations is made on the basis of taxonomic research.
- Design of a cadastre of animals and plants for particular region and Ukraine in general.
- Cases of CITES administering at customs points.

1.2 Does your country have a national species checklist? When was it last revised and updated? Is there any national assessment of which taxonomic groups in particular lack taxonomic information? Did you submit a response to the GTI questionnaire on these issues?

There isn't the national species checklist in Ukraine. Only a few taxonomic groups have been studied thoroughly. That has been resulted in the checklist of all classes of vertebrates (for example birds (Fesenko, Bokotei, 2007), fish (Shcherbukha, 2004), vascular plants (Mosyakin, Fedoronchuk, 1999)), but only some groups of invertebrates (*Collembola*, *Protura*). Some data on *Gastropoda, Oribatida, Carabidae, Buprescidae,* and free-living *Nematoda* exist. Soil invertebrates are the least studied.

There are some regions where the species checklist is under realization. First of all they are Carpathians, Crimea and Dnipropetrovs'k region (e.g., Bulakhov, Pakhomov, 2006; Bulakhov et al, 2007, 2008).

Ukraine has no national assessment of which taxonomic groups in particular lack taxonomic information. Especially unfavourable factor is an absence of the national programme of the national species checklist creation. However, in 2008 the Research Taxonomy Centre of Ukraine (http://izan.kiev.ua/rtcu/) was established. It is a response to the Global Taxonomy Initiative. The Ukrainian Centre is planned to take place in the world network within European Local Area. The principal scopes of the Centre activity are coordination and support of taxonomic study in Ukraine, information support, development of contacts and exchange of information between Ukrainian taxonomists and foreign ones, including a response to the GTI questionnaire. The efforts of the Centre will be devoted against information gaps and fragmentation in national taxonomic study. For the successful results the main attention will be focused on the creating and

development of databases on taxonomy and researchers. Unfortunately the lack of financing hampers the progress of the Centre development.

Understanding Patterns and Change: "Where is it, what's happening to it, and where is it going?"

Describe 1-2 flagship projects related to bullet points below and suggest some recommendations useful for meeting as a result from these projects:

1.3 Please outline any national taxonomy-based monitoring or surveys designed to establish the distribution, status and trends of any taxonomic group.

National taxonomy-based monitoring in Ukraine may be regarded as multipointed studies of different areas and purposes. Among them is an Annals of Nature. The Annals of Nature is annual data collection for assessment of state and trends of natural complexes of the nature reserve. The studies are carried out according to standardized programme and it is obligatory for the reserves.

Other taxonomy-based survey is a design of a cadastre of animals and plants for particular regions and Ukraine in general.

Projects related to distribution, status and trends of a particular taxonomic group are subjects of many dissertations in the field of zoology and botany in Ukraine. For example, for invertebrates this subject of the research averages 70 % of all dissertations. Some groups – amphibians, birds, chiropterans and carnivores – are well studied at the regional level and partially at the national one. A study of taxonomic status, distribution and trends of vipers in Ukraine (Kotenko et al, 1999, Újvári B. et al, 2002) may be considered as a good example.

Great contribution was made by scientists of the I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine (www.icfcst.kiev.ua/siz/depart/taxonomy/dept-proj-last.htm):

1. Revision of chalcidoid wasps of genus *Erimerus* and *Monodontomerus* of Holarctic region. Reseacher: Prof. Zerova M.D.
2. Taxonomy of subfamily *Oligositinae (*family*Trichogrammatidae)* of East Palaearctic region. Researcher: Dr. Fursov V.N.
3. Taxonomy of subfamily *Toryminae (*family *Torymidae)* of the fauna of Ukraine and adjusted areas. Researcher: Dr Seryogina L.Ya.
4. Taxonomy of genus *Entedon* (family *Eulophidae*) of the fauna of Ukraine. Researcher: Dr Gumovsky A.V.
5. Taxonomy of subfamilies *Eucolinae* and *Charipinae (*family *Cynipidae*) of the fauna of Ukraine. Researcher: Dr Djakontchuk L.A.
6. Taxonomy of subfamilies *Teleasinae* and *Baeinae* (family *Scelionidae*) of the Palaearctic region. Researcher: Dr Kononova S.V.
7. Taxonomy of genus *Ophion* (*Ichneumonidae, Metopiinae, Metopiini*) of the fauna of Ukraine. Researcher: Dr Tolkanitz V.I.
8. Revision of subfamily *Microgasterinae* (family *Braconidae*) of the Palaearctic region. Researcher: Dr Kotenko A.G.
9. Taxonomy of subfamilies *Myrmicinae, Dolichoderinae* and *Ponerinae* of West Palaearctic region. Researcher: Dr Radchenko A.G.
10. Annotated list of family *Noctuidae (Lepidoptera)* of the fauna of Ukraine. Researcher: Dr Klyuchko Z.F.

Other project, as an example, related to taxonomy-based survey is "Phyletic and typological organisation of biodiversity of certain groups of contemporary and fossil biota at the territory of Ukraine". Taxonomical groups under research were *Collembola*, *Protura,* free-living *Nematoda, Gastropoda, Oribatida* and *Carabidae.* (leading organisation – State Museum of Natural History of National Academy of Science of Ukraine, Lviv).

Recent overview of biodiversity monitoring programmes in Ukraine (Kostiushyn et al, 2008) described 95 relevant programmes (www.biomon.org/en/). Most of them involved taxonomists.

1.4 Is there any coordinated effort in your country regarding bar-coding for identification or the assessment of biodiversity?

There isn't any effort in this field in Ukraine.

1.5 Are you aware of any major efforts (or projects) in your country to integrate morphological and molecular taxonomy?

There are several research projects integrated morphological and molecular taxonomy. Most of them concern invertebrates. Recent success achieved at the I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine was implemented into doctoral dissertation of Dr. V.O.Gumovsky – "Ichneumon-flies of families *Eulophidae, Tetracampidae* (*Hymenoptera: Chalcidoidea*): morpho-biological features and phylogeny". A serious effort was mounted to clearing taxonomy of *Collembola*, *Protura* and free-living nematodes *Dorylaimida* (leading organisation – State Museum of Natural History of National Academy of Science of Ukraine, Lviv. http://museum.lviv.net/en/index.php).
As to vertebrates, the studies relating to the European pond turtle (Kotenko et al, 2005), the green lizard (Böhme et al, 2006) and the sand lizard (Kalyabina-Hauf et al, 2004) may be designated. Considerable achievements were made in taxonomy of mice (Mezhzherin, 1998) and amphibians (Mezhzherin et al, 1998).

2-Taxonomy as a Basis for Ecological Research and Sustainable Management of the Biodiversity

Ecological Functions and Services: "What does it do, and what does it interact with?"
How does taxonomic research contribute to better understanding of the functions and attributes of species, and to the management of biodiversity?

2.1 Do you know projects involving taxonomists in the understanding of ecological functioning, or the assessment of ecosystem services?

Some taxonomical researches are usually used for:

- Preparing National reports on the Convention on Biological Diversity;
- Environmental Impact Assessment;
- Nature protection management of biological diversity of a particular territory.

Among specific projects are:

- "Monitoring of natural community of coastline and overflow lands of the Danube Biosphere Reserve under resumption of deep-water ships' traffic "Danube–Black Sea"" (from 2008);

- "Transformation processes in the basin of the river Dniester" (2000–2004). The project integrated taxonomical research aimed to zooindication of natural and anthropogenic processes including forest management in the Carpathians.
- BBI-MATRA project "Establishment of Ramsar sites in the Danube-Carpathian region of Ukraine". The project included taxonomical analysis of the bird communities.

2.2 What is the contribution of taxonomy in your country to the management of biological invasions?

Biological invasion is considered as a dangerous threat to the native biological diversity of Ukraine. Unfortunately that consideration didn't put into any special programme of research and prevention of the invasion. The lack of funds makes the relevant studies fragmentary or conducted as a part of a large project.

At the same time Ukrainian experts participate in the ALARM project (Assessing LArge scale Risks for biodiversity with tested Methods. www.alarmproject.net/alarm). Real pains of experts (including taxonomists) realised an undoubted contribution to the management of biological invasions in Ukraine. For instance: Alexandrov et al, 2007.

Ukrainian experts take part in the DAISIE project (Delivering Alien Invasive Species Inventories for Europe. www.europe-aliens.org).

There are limited cases of participating of taxonomists in the quarantine regulations use at the customs points.

2.3 What is the contribution of taxonomy in your country to efforts to understand the status and trends of key functional groups such as pollinators?

Special projects on pollinators are not known.

But there are some projects conducted in the I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine that concerned some key functional groups:

1. Development of ecological management for oak plantations (*Quercus robur*) for their protection against leaf-mining moth (*Acrocercops brongniardella*) on the territory of Kiev-city and adjacent forestry zones. Researcher Leader: Dr Fursov V.V. (www.icfcst.kiev.ua/siz/depart/taxonomy/dept-Oak-Moth-1999.htm);
2. Complex of entomophagous insects of sucking pests of trees in the Ukraine. Researcher: Dr Nikitenko G.N.;
3. Entomophagous insects of leaf-mining moths of oaks *(Quercus spp.)* in Central forestry-steppe zone of the Ukraine. Researcher: Sviridov S.V.

Soil detritophagous animals are also key functional group in the ecosystem. For the last 15 years taxonomical research of that group in Ukraine developed into 34 new species of collembolan, 5 species of proturan and 15 new species of free-living nematodes.

Taxonomy, biodiversity and its conservation: "How to manage it in sustainable way?"

Describe 1-2 flagship projects related to bullet points below and suggest some

2.4 Are there also non-professional organisations recording biodiversity data collections (e.g. ornithologists) involved in the decision process of landuse planning etc.?

Most developed non-professional organisation in Ukraine that concerned taxonomical data collection is a Ukrainian Society for the Protection of Birds. (www.birdlife.org.ua/eng/index.htm). Members of the Society actively take art in the collection of data on biodiversity and in the nature protection management including establishing new reservations.

2.5 Are there some indicators (or red-list species) either for monitoring Natura 2000 sites or for delimitation and management of nature reserves used in your country?

Natura 2000 is extended to the EU countries and it is not implemented in Ukraine yet. Nonetheless the Programme of integration of Ukraine into European Union presupposes development of the Emerald Network. It is an ecological network made up of "areas of special conservation interest". The Network created according to the resolution of the Standing Committee of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) (www.coe.int/t/dg4/cultureheritage/regional/EcoNetworks/EmeraldNetwork_en.asp#TopOfPage).

Ukraine also tries to adapt the legislation to demands of the Natura 2000 in the area of creation the Ecological Network under administering of the Ministry for Environmental Protection of Ukraine. Other example is the meeting "Natura 2000: From Concept to Realization" Lviv, Ukraine: 23-25th of October, 2007. In general, the Nature Reserves are considered as sites of the Natura 2000.

In many cases the red-list species widely used as a key reason for the management of the nature conservation, ecological network realization and nature reservations. Thus, in Ukraine some effort has been devoted to the conservation of wild animals and plants and the red-list species are used for delimitation and management of nature reserves.

Other aspect of indicators use is working out indicators for transformed ecosystems. For example, the Project "Biodiversity Indicators for National Use: Agrobiodiversity, Ukraine" (Ministry for Environmental Protection of Ukraine and UNEP World Conservation Monitoring Centre) www.ulrmc.org.ua/services/binu/index.html. However, the state of biodiversity of nature reserves is a control.

2.6 Which taxonomy-related research (standardized taxonomic metadata, delivery of checklist building tools, building expertise network) in developing non-European biodiversity-rich countries is supported by policy-makers from your country based on your national expertise and experience?

There are some limited projects. For example,

South and Central America, South-East Asia – research of ants (*Formicidae*): researcher Dr Radchenko A. G. Guatemala: taxonomy and distribution of dipteran (*Insecta: Diptera: Tephritidae, Ulidiidae*): researchers Drs. Korneev V.O. and Kameneva O.P. (I.I. Schmalhausen Institute of Zoology of National Academy of Sciences of Ukraine). Mostly it was devoted to the delivery of checklist building tools. Experts in botanical taxonomy participated in international projects resulted in the editions: "Flora of North America", "Flora of China", etc. (N.G. Kholodny Institute of Botany NANU).

2.7 Is there a National Needs Assessment of GTI in your country? If yes, what are your specific needs, e.g. for conservation, protected areas, CITES/customs, dealing with invasive species etc?

No, there isn't. The National Needs Assessment of GTI has not been conducted in Ukraine.

3- Taxonomy, Potential Users and Capacity Building of Experts

Open Access to Information: "How to find out about it?"
How does taxonomic information get from where it resides to where it is needed elsewhere in the world?

3.1 To what extent is taxonomic research in your country contributing to international biodiversity initiatives and projects (e.g. GTI, GBIF, PESI, EOL)

Ukrainian experts contribute to some international biodiversity initiative. For example GTI (CBD), "Fauna Europea" (www.faunaeur.org/), Checklist of the Collembola (www.collembola.org). There isn't constant cooperation with Global Biodiversity Information Facility (GBIF), Pan-European Species directories infrastructure (PESI) or Encyclopaedia of Life (EOL). In general, the extent of Ukrainian contribution may be characterized as inadequate. Potential abilities of the experts are much more considerable than used.

3.2 What is the state of the art in biodiversity informatics in your country? e.g. e-taxonomy and e-science tools)

The state of the art in biodiversity informatics in Ukraine is unsatisfactory. Though the relevant work is carried out, the progress is insignificant. As an example, there are e-version of the Red Data Book of Ukraine and the Cadastre of animals and plants of Ukraine. Unfortunately due to lack of funds the last one is not accessible and the both are not carried on properly.

3.3 Has there been a national assessment of best practices for taxonomic data quality and validation?

No.

3.4 Do you have any national guidelines on how to approach the proof of absence?

Ukraine has no it.

3.5 What are the taxonomic standards used in the databases (TDWG, Darwin core, COL, PESI, etc.)?

There aren't any standards. Some databases have been designed according to a viewpoint of particular expert. For example, databases "Collembolan of Ukraine", "Proturan of Ukraine" and "Gastropods of West Ukraine" (State Museum of Natural History NASU, Lviv. http://museum.lviv.net/en/index.php), databases of systematic collections including holotypes, paratypes and other types of vertebrates of the Zoological Museum of NSNM NANU, Kyiv (www.museumkiev.org/index_main.html), databases of systematic collection of Zoological Museum of the Dnipropetrovs'k National University and other Universities of Ukraine.

3.6 Could you identify the major digitization efforts for biodiversity data (e.g. collections, observations, species checklists)?

The corresponding efforts for biodiversity data in Ukraine may be pointed up by digitization of zoological museum's collections and herbaria. Scientific Collections of the I.I. Schmalhausen Institute of Zoology NASU illustrates some advancement in that field: Systematic, Holotypes, Paratypes and other types collections: *Protozoa; Plathelminthes; Acanthocephala; Nemathelminthes; Annelida; Mollusca; Arthropoda: Crustacea, Collembola* and *Insecta, Arachnoidea*. Unfortunately through the Internet you have access only to stored numbers of specimens of the groups, but not to the particular species or its descriptions.

There are dozens of different scientific collections in Ukraine, but the digitization is at the first step of implementation. The following advances in digitization Ukraine has as well:

- Information Taxonomy System (soil and fossil fauna) in the State Museum of Natural History NASU, Lviv (http://museum.lviv.net/en/index.php)
- E-checklist of species (*Oribatida, Gastropoda, Carabidae, Buprescidae, Collembola, Protura, Ephemeroptera, Trichoptera*) of Ukraine or several regions.
- Crimean Malacological Site (http://malacology.crimea.edu/?Lang=ENG)

3.7 Is there any effort in your country to make taxonomic information especially identification services easily accessible and useful to practitioners?

There aren't special efforts in Ukraine to make identification services easily accessible and useful to practitioners. For the practical needs the special service exist in Ministry of Agrarian Policy of Ukraine, Ministry of Health of Ukraine and State Forestry Committee of Ukraine. In general, practitioners may apply to any state Institute or University for a consultation, but the built system doesn't exist.

Capacity Building in Biodiversity-rich Countries and Worldwide

What is the state of training and education in systematics and are there any gaps in capacity?

3.8 Are there any policy initiatives in your country to orient capacity building in taxonomy?

Unfortunately, there isn't any policy initiative put into practice.

3.9 Are there any sources of finance or policy actions in your country dedicated to applied taxonomy (e.g. identification tools, training for parataxonomists, i.e. field-trained biodiversity collection and inventory specialists recruited from local areas)?

Applied taxonomy is under development in some Research Institutions and Universities as traditional lines of research from the times of the USSR. Considerable achievements in that field are supported by government (public) financing in frames of applied research projects. However there isn't special programme of the applied taxonomy advance. Mostly that develops as a part of the ecology and biodiversity research projects.

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