

HALF A MILLION SPECIES: THE SPECIES 2000 & ITIS CATALOGUE OF LIFE AND THE GTI

***Frank A. Bisby¹ and Michael Ruggiero²**

¹Species 2000 Secretariat, School of Biological Sciences, The University of Reading, Reading, RG6 6AS, UK, f.a.bisby@sp2000.org

²Integrated Taxonomic Information System (ITIS), National Museum of Natural History, Smithsonian Institution, Washington, DC, 20560, USA, ruggiero.michael@nmnh.si.edu

Keywords: Catalogue of Life, Global Taxonomy Initiative, Global Strategy for Plant Conservation, taxonomy, species, plants, animals, fungi, micro-organisms

SUMMARY

The goal of the Species 2000 and ITIS Catalogue of Life programme is to create a comprehensive, uniform, validated electronic Catalogue of species. The objective is to provide a synonymic species checklist and a taxonomic structure for all of the world's known species as a contribution to the Planned Activity 7 of the Global Taxonomy Initiative (GTI) Programme of Work. The intermediate targets for reaching critical mass in the first phase of a 10-year programme from 2001 to 2011 have been met. The current Catalogue of over half a million species is being widely used by a number of international agencies even while it is still seriously incomplete. The goal of the second phase of the programme is to create a ring of regional taxonomic database hubs to which regional and national databases may be connected over the Internet. This second phase will enable i) connections between species-based systems in any country and the regional and global taxonomic checklists, and ii) the completion of the global Catalogue's goal of 1.75 million known species by 2011.

THE GOALS OF THE CATALOGUE OF LIFE

The Catalogue of Life programme was established in 2001 as a partnership between two already extensive programmes. The North American Integrated Taxonomic Information System (ITIS) had started as a U.S. federal programme, expanded to include Mexican and Canadian partners, and enlarged to provide global coverage for many groups. Species 2000 launched its global distributed programme to link taxonomic databases in 1996. By working together to create a common product, the Catalogue of Life partnership has enabled the two organisations to reduce duplication of effort, make better use of resources, and accelerate the development of the Catalogue.

Creating a comprehensive, uniform and validated electronic checklist and index to the world's known species is a challenging and ambitious objective. The Catalogue includes all groups of organisms, (i.e., plants, animals, fungi and micro-organisms), species from all environments, including marine, terrestrial and freshwater, and the domesticated and exotic species in urban and agricultural landscapes. As examples, the partners are working closely with marine biodiversity organisations such as the Ocean Biogeographic Information System (OBIS), and with the botanical institutions preparing the working list of the world's plants, Target 1 of the Global Strategy for Plant Conservation (GSPC).

The Catalogue is intended for use as a practical tool in inventorying and monitoring biodiversity world-wide and as a global taxonomic architecture for the GTI Planned Activity 7. It should provide:

1. a comprehensive catalogue for checking the status, classification and naming of species;

2. electronic baseline lists of species for use in inventorying projects worldwide;
3. a basis for linking species-based systems worldwide;
4. the index for an Internet gateway to species databases worldwide; and
5. a reference system for comparison between inventories.

The programme is a distributed one, both at the level of its organisation, and in its information technology. In its organisation, checklists for different taxonomic groups are maintained by many different organisations around the world and supplied to the Catalogue. At the information technology level, the *Dynamic Checklist* uses a federated computer system that harvests the appropriate data from the array of supplier databases across the Internet. These databases are operated by different groups or networks of specialists around the world. After appropriate checks and peer reviews, database organisations are invited to supply their data to ITIS or to join Species 2000 and to become regular suppliers to the Catalogue. The rationale is a) to make rapid progress by using all suitable existing datasets, b) to involve as wide as possible a community of taxonomic experts through these member organisations, and c) to allow the taxonomic work to go ahead in many parallel projects, thus permitting a significant scaling up of activity.

PROGRESS SO FAR

Three products were launched earlier in 2005, although each is presently far from complete. All are free of charge and open to all users:

1. *Species 2000 & ITIS Catalogue of Life: 2005 Annual Checklist*. The *Annual Checklist* is a fixed edition issued once a year since 2001 on CD-ROM and on the web. The 2005 edition (Bisby et al., 2005a and b) covers 527,366 species in certain groups of plants, animals, fungi and micro-organisms.
2. *Species 2000 & ITIS Catalogue of Life: Dynamic Checklist*. The *Dynamic Checklist* is a dynamic Internet system that harvests taxonomic sectors from an array of taxonomic databases around the world (Bisby et al., 2005c). It provides direct access to current data from the providers. Although the system was launched in October 2005, it will take several months before the datasets included are as extensive as the *Annual Checklist*. It has an additional component, the Euro-Hub, the first of the planned regional hubs, containing the *Fauna Europaea Checklist* and to be followed by the *Euro+Med PlantBase* and the *European Register of Marine Species*. Other regional hubs planned for the second phase of the programme will be added.
3. *Species 2000 & ITIS Catalogue of Life: Web-service*. The *Web-service* is an electronic service that can be queried automatically by other electronic systems. The coverage is the same as that of the *Dynamic Checklist*.

In 2001 a timetable and milestones were set for completion of all 1.75 million species by 2011. The intermediate milestones for 2003 and 2005 have been met.

YEAR	MILESTONE	OUTCOME (<i>Annual Checklist</i>) (by April of the year)
2003	300,000 species	304,710 species
2005	500,000 species	527,366 species
2006		Estimate: 750,000 species
2011	1,750,000 species	–

THE SECOND PHASE

The present programme of linking or incorporating Global Species Databases to contribute to the Global Hub will continue. But a second phase of the programme will be added, to create and link a ring of regional taxonomic hubs. These will be like the present Euro Hub — several regional databases connected to a single Internet hub to provide a regional checklist. The objective is to link several existing regional hubs that are under development and to create new hubs for certain other regions. The regional hubs will provide a platform for linking regional and national taxonomic databases to the Catalogue of Life network and a means of completing the Catalogue by 2011.

Acknowledgments

The programme has been supported by federal programmes of the U.S., Mexican and Canadian governments, by grants from the European Commission and from the Japanese Government, by GBIF, by the UK BBSRC, CODATA, the US NSF, and the University of Reading Trust Fund. Very substantial in-kind support has come from a wide network of institutions, database projects and individuals.

References

- Bisby, F.A., Ruggiero, M.A., Wilson, K.L., Cachuela-Palacio, M., Kimani, S.W., Roskov, Y.R., Soulier-Perkins, A. and van Hertum, J., eds. (2005a). *Species 2000 & ITIS Catalogue of Life: 2005 Annual Checklist*. CD-ROM, Species 2000, Reading UK.
- Bisby, F.A., Ruggiero, M.A., Wilson, K.L., Cachuela-Palacio, M., Kimani, S.W., Roskov, Y.R., Soulier-Perkins, A. and van Hertum, J., eds. (2005b). *Species 2000 & ITIS Catalogue of Life: 2005 Annual Checklist*. www.sp2000.org/AnnualChecklist.html
- Bisby, F.A., Ruggiero, M.A., Wilson, K.L., Gray, A., White, R.J., Jones, A.C., Roskov, Y.R., Soulier-Perkins, A. de Jong, Y., Harling, P., Donovan, E. and van Hertum, J., eds. (2005c, et seq.). *Species 2000 & ITIS Catalogue of Life: Dynamic Checklist*. www.sp2000.org/DynamicChecklist.html