GBits Science Supplement

No. 2, April-May 2012

Welcome to this second edition of the GBits Science Supplement.

In the following pages, you will find a summary of research published during April and May 2012 for which the Global Biodiversity Information Facility (GBIF) has been identified as a source of data. The idea is to keep data publishers, policy makers, funding bodies, scientists and other interested readers informed about the variety of uses to which data accessed through GBIF are being put.

We group the research papers according to their relevance to the 20 Aichi Biodiversity Targets and strategic goals agreed by governments in 2010, as part of the Strategic Plan for Biodiversity 2011-2020. This emphasizes the value of data made accessible through GBIF in supporting the scientific needs associated with meeting those targets, thus helping to address the great challenges of biodiversity conservation and sustainable use.

Supplementing the standard citations (including links) for all the papers identified, the boxes highlight some especially significant cases to illustrate how scientists are making use of GBIF. A wider selection of papers including those discussing and mentioning GBIF can be found in the GBIF Public Library in the Mendeley academic social network platform.

For the first time in this edition, we are including a new section on GBIF data papers published in the past two months. These are peer-reviewed papers based on the metadata describing datasets made available through the GBIF network, helping to give due recognition to those sharing data. For background on the data paper concept and workflow, see this news item on the GBIF website.

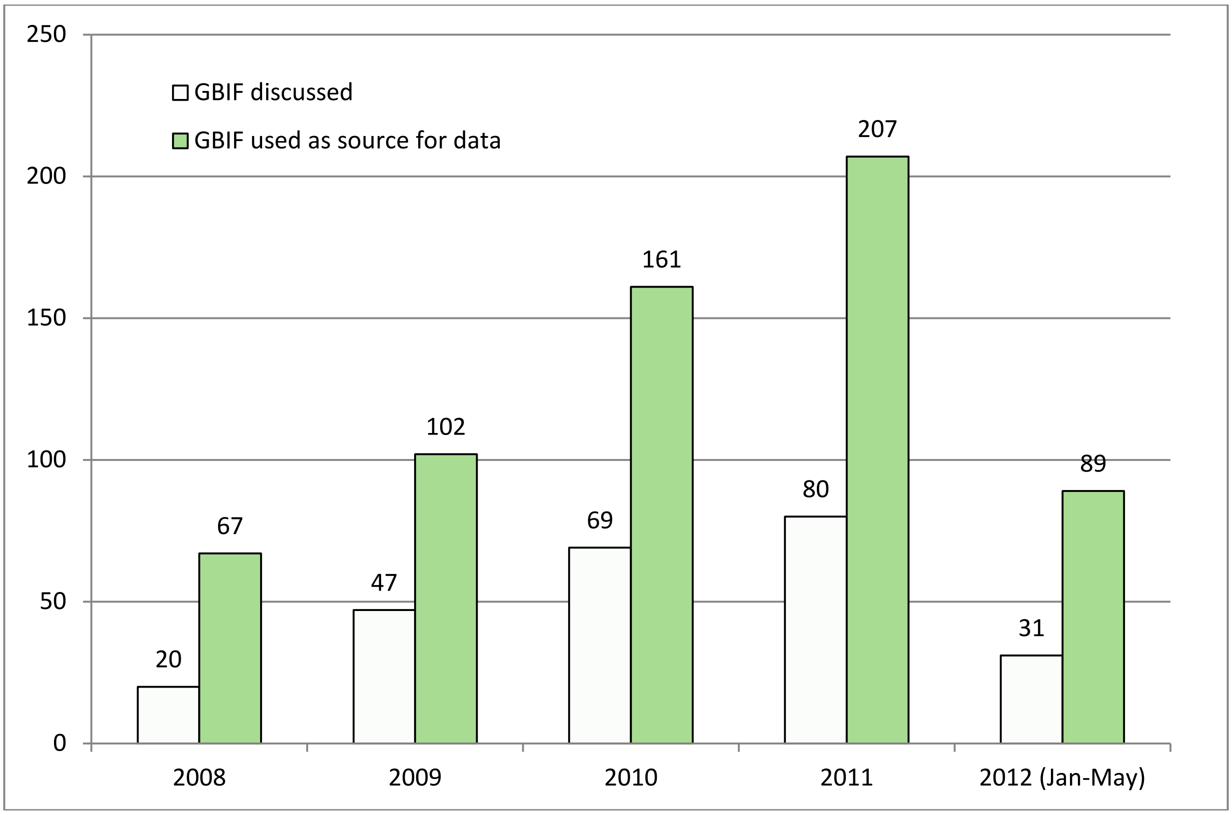
The supplement is published alongside the bimonthly GBits newsletter, which provides a range of news about biodiversity data publishing from around the GBIF community. If you are not already a subscriber, you can access GBits here and follow the instructions if you would like to sign up.

The GBIF secretariat communications team hopes you find this science supplement interesting and useful, and we would greatly appreciate feedback.

Contact for general inquiries: Tim Hirsch, Engagement Officer, GBIF Secretariat, thirsch@gbif.org

Contact for scientific queries relating to the content of research based on GBIF-mediated data, and to data content: Samy Gaiji, Senior Programme Officer for Science and Scientific Liaison, GBIF Secretariat, sgaiji@gbif.org

For inquiries on data papers and content mobilization, contact:
Vishwas Chavan, Senior Programme Officer for Content Mobilization, GBIF Secretariat, vchavan@gbif.org



Use and discussion of GBIF in scientific literature, 2008-12 (number of peer-reviewed, published research papers)

Research citing GBIF as a source of data, Apr-May 2012

Grouped by relevance to Aichi Biodiversity Targets[1]:

Strategic Goal B – Reduce direct pressures and promote sustainable use

Target 5. Reducing loss of natural habitats, degradation and fragmentation

Example: Grant, E.H.C. et al., 2012. Interbasin Water Transfer, Riverine Connectivity, and Spatial Controls on Fish Biodiversity B. Gratwicke, ed. *PLoS ONE*, 7(3), p.e34170. Available at: http://dx.plos.org/10.1371/journal.pone.0034170.

Summary: A team from the United States and India researched the impacts on the biodiversity of freshwater fish from major engineering projects linking up separate river basins to transfer water from wetter to drier regions. It took the example of India's Interlinking of Rivers Programme, which includes plans to move water across eight river basins in peninsular India via a network of more than 2000km of canals. The study used data on more than 450 species of freshwater fish occurring in Indian rivers, obtained partly from three collections accessed through GBIF. By modelling the current distribution of species across the study area, the research concluded that the water transfer project would reduce biodiversity across the whole system, alter patterns of local species richness, expand distributions of widespread species and make the different basins

[1] http://www.cbd.int/sp/targets/

more uniform, reducing community richness. The research further concluded that the negative ecological impacts could be reduced if the project changed the order in which canals were added. The authors suggest that better understanding of the relationship between fish biodiversity and the geometry of river networks can help balance society's demand for fresh water with the demands of ecosystems.

Target 7. Sustainable management of agriculture

Morales, A.M.A.P. et al., 2012. Advances on molecular studies of the interaction soybean - Asian rust. *Crop Breeding and Applied Biotechnology*, 12, p.1-7. Available at: http://www.sbmp.org.br/cbab/siscbab/uploads/c8eb9792-86b6-2ef2.pdf.

Murphy, H.T. et al., 2012. A Common View of the Opportunities, Challenges, and Research Actions for Pongamia in Australia. *BioEnergy Research*. Available at: http://www.springerlink.com/content/506205400h170m31/.

Target 8. Reducing impacts of pollution on biodiversity

Example: Chakrabarty, P. et al., 2012. SpeciesMap: a web-based application for visualizing the overlap of distributions and pollution events, with a list of fishes put at risk by the 2010 Gulf of Mexico oil spill. *Biodiversity & Conservation*, online. Available at: http://www.springerlink.com/index/10.1007/s10531-012-0284-4.

The research presents an application called SpeciesMap (http://speciesmap.org), which aims to help assess the impact of the Deepwater Horizon oil spill in 2010 on marine species in the Gulf of Mexico. The application uses occurrence records derived through GBIF on 124 fish species, including all 77 species endemic to the Gulf, to establish the area of overlap with the extent of the spill observed from satellite records. Maps are created to assess which species were potentially in the region of the spill and to what extent their range was exposed to pollution, so that species can be targeted for monitoring the long-term impact of the spill.

Target 9. Invasive alien species

Example: Taylor, S. et al., 2012. Climate Change and the Potential Distribution of an Invasive Shrub, Lantana camara L A. J. Cannon, ed. *PLoS ONE*, 7(4), p.e35565. Available at: http://dx.plos.org/10.1371/journal.pone.0035565.

Summary: Researchers from Australia investigated the potential future distribution of a highly invasive woody shrub, lantana (*Lantana camara L.*), which already has a profound economic and environmental impact worldwide. More than 1,700 occurrence records obtained through GBIF were used along with other data to create a worldwide model of areas favourable for the plant under present and future climate conditions. The study identified areas of North Africa, Europe, Australia and New Zealand where lantana could potentially expand its range, and recommended monitoring of these areas by biosecurity agencies for early signs that the plant was becoming invasive.

Barbosa, F.G. et al., 2012. Predicting the current distribution and potential spread of the exotic grass Eragrostis plana Nees in South America and identifying a bioclimatic niche shift during invasion. *Austral Ecology*, online. Available at: http://doi.wiley.com/10.1111/j.1442-9993.2012.02399.x.

Beans, C.M., Kilkenny, F.F. & Galloway, L.F., 2012. Climate suitability and human influences combined explain the range expansion of an invasive horticultural plant. *Biological Invasions*. Available at: http://www.springerlink.com/index/10.1007/s10530-012-0214-0.

Gallien, L. et al., 2012. Invasive species distribution models - how violating the equilibrium assumption can create new insights. *Global Ecology and Biogeography*, p.no-no. Available at: http://doi.wiley.com/10.1111/j.1466-8238.2012.00768.x.

Lu, H. et al., 2012. Environmental Suitability of the Red Spider Mite Tetranchus cinnabarinus (Acari: Tetranychidae) among Cassava in China. *Advanced Materials Research*, 518-523, p.5446-5449. Available at: http://www.scientific.net/AMR.518-523.5446.

Wetterer, J.K., 2012. Worldwide spread of the African big-headed ant, Pheidole megacephala (Hymeno-ptera: Formicidae). *Myrmecological News*, 17(17), p.51-62. Available at: http://www.myrmecologicalnews.org/cms/images/pdf/online_earlier/mn17_51-62_printable.pdf

Target 10. Climate change impacts

Example: Feeley, K.J. et al., 2012. The relative importance of deforestation, precipitation change, and temperature sensitivity in determining the future distributions and diversity of Amazonian plant species. *Global Change Biology*, online, p.n/a-n/a. Available at: http://doi.wiley.com/10.1111/j.1365-2486.2012.02719.x.

Summary: Kenneth Feeley from Florida International University in Miami led this study which aimed to establish the most important factors that would determine the future diversity and distribution of plants in the Amazon region. Using herbarium records obtained through GBIF and SpeciesLink (http://splink.cria.org.br), the research modeled current and future distributions of nearly 3,000 Amazonian plant species, under different scenarios related to the magnitude and extent of forest disturbance as well as the response of species to changes in temperature, precipitation and concentrations of carbon dioxide in the atmosphere. It concluded that the future diversity of the Amazon would depend primarily on the ability of species to tolerate or adapt to rising temperatures: if thermal niches are relatively fixed, climate change will overshadow the impacts of deforestation and potentially cause massive biodiversity loss; but even if plants can tolerate warmer temperatures, the impacts of greater seasonal water stress may be of similar magnitude to those of deforestation in the Amazon.

Butler, C.J., Wheeler, E.A. & Stabler, L.B., 2012. Distribution of the threatened lace hedgehog cactus (Echinocereus reichenbachii) under various climate change scenarios. *The Journal of the Torrey Botanical Society*, 139(1), p.46-55. Available at: http://www.bioone.org/doi/abs/10.3159/TORREY-D-11-00049.1.

Espíndola, A. et al., 2012. Predicting present and future intra-specific genetic structure through niche hindcasting across 24 millennia. *Ecology Letters*, online, p.no-no. Available at: http://doi.wiley.com/10.1111/j.1461-0248.2012.01779.x.

Kruitbos, L.M. et al., 2012. Hydroclimatic and hydrochemical controls on Plecoptera diversity and distribution in northern freshwater ecosystems. *Hydrobiologia*, online. Available at: http://www.springerlink.com/index/10.1007/s10750-012-1085-1.

Quiroga, M. P. et al., 2012. Shrinking Forests under Warming: Evidence of Podocarpus parlatorei (pino del cerro) from the Subtropical Andes. *Journal of Heredity*, online, p.1-10. Available at: http://jhered.oxfordjournals.org/cgi/doi/10.1093/jhered/ess031.

Williams, C.M. et al., 2012. Thermal Variability Increases the Impact of Autumnal Warming and Drives Metabolic Depression in an Overwintering Butterfly C. A. Navas, ed. *PLoS ONE*, 7(3), p.e34470. Available at: http://dx.plos.org/10.1371/journal.pone.0034470.

Strategic Goal C: Improve status of biodiversity by safeguarding ecosystems, species and genetic diversity

Target 12. Threatened species and extinctions

Example: Miller, J.S. et al., 2012. Addressing target two of the Global Strategy for Plant Conservation by rapidly identifying plants at risk. *Biodiversity & Conservation*, online. Available at: http://www.springerlink.com/index/10.1007/s10531-012-0285-3.

The authors from New York Botanical Garden, LaGuardia Community College and Smithsonian Institution addressed the challenge of meeting the target, under the Global Strategy for Plant Conservation (GSPC), to assess the conservation status of all known plants by 2020. Because the existing IUCN Red List process currently assesses only a small proportion of known plant species, the study compared and contrasted two streamlined methods for rapidly assessing which species could be considered under some degree of risk, using herbarium records with locality data. More than two thousand species native to the island of Puerto Rico were analysed, using records accessed through GBIF and the New York Botanical Garden's Virtual Herbarium. The analysis identified 570 of Puerto Rican species as being at some risk of extinction. While the authors do not propose the methods as an alternative to the Red List process, they argue that they could be an efficient means of meeting the GSPC target and identifying priority areas for conservation of plants.

Domínguez Lozano, F., Rebelo, A.G. & Bittman, R., 2012. How plant inventories improve future monitoring. *Biodiversity and Conservation*, online. Available at: http://www.springerlink.com/index/10.1007/s10531-012-0286-2.

Sandoval-Comte, A., Pineda, E. & Aguilar-López, J.L., 2012. In search of critically endangered species: the current situation of two tiny salamander species in the neotropical mountains of Mexico. *PLoS ONE*, 7(4), p.e34023. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22485155.

Strategic Goal D – enhance the benefits to all from biodiversity and ecosystem services

Target 14. Health and livelihoods

Fraga, J. et al., 2011. Genetic characterization of three Cuban Trichomonas vaginalis virus. Phylogeny of Totiviridae family. *Infection genetics and evolution journal of molecular epidemiology and evolutionary genetics in infectious diseases*, (November). Available at: http://www.ncbi.nlm.nih.gov/pubmed/22075038.

Stobbe, U. et al., 2012. Spatial distribution and ecological variation of re-discovered German truffle habitats. *Fungal Ecology*, online(0). Available at: http://www.sciencedirect.com/science/article/pii/S17545048120002

Strategic Goal E – enhancing implementation

Target 19. Improve the science base

Chappuis, E., Ballesteros, E. & Gacia, E., 2012. Distribution and richness of aquatic plants across Europe and Mediterranean countries: patterns, environmental driving factors and comparison with total plant richness H. H. Bruun, ed. *Journal of Vegetation Science*, online. Available at: http://doi.wiley.com/10.1111/j.1654-1103.2012.01417.x.

Dikow, T., 2012. Review of Namibimydas Hesse, 1972 and Nothomydas Hesse, 1969 (Diptera : Mydidae: Syllegomydinae: Halterorchini) with the description of new species. *African Invertebrates*, 53(1), p.1-34. Available at: http://www.africaninvertebrates.org.za/Uploads/a344a966-4d9b-4931-b426-0496b3da5fd3/dikow_correctedproof.pdf.

Escudero, M. et al., 2012. Selection and inertia in the evolution of holocentric chromosomes in sedges (Carex, Cyperaceae). *New Phytologist*, online. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22489934

Fernández Bidondo, L. et al., 2012. Continuous and long-term monoxenic culture of the arbuscular mycorrhizal fungus gigaspora decipiens in root organ culture. *Fungal Biology*. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1878614612000724.

Graham, B.A. & Burg, T.M., 2012. Molecular markers provide insight into contemporary and historic gene flow for a non-migratory species. *Journal of Avian Biology*, (February), p.1-17. Available at: http://doi.wiley.com/10.1111/j.1600-048X.2012.05604.x.

Laskaris, P., Sekine, T. & Wellington, E.M.H., 2012. Diversity analysis of streptomycetes and associated phosphotranspherase genes in soil. *PLoS ONE*, 7(4), p.e35756. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22540003.

Lortie, C.J. & Reid, A.M., 2012. Reciprocal gender effects of a keystone alpine plant species on other plants, pollinators, and arthropods. *Botany*, 90, p.273-282. Available at: http://www.nrcresearchpress.com/doi/abs/10.1139/b11-112.

Obermayer, W. & Randlane, T., 2012. Morphological and chemical studies on Platismatia erosa (Parmeliaceae) from Tibet, Nepal and Bhutan. *The Bryologist*, 115(1), p.51-60. Available at: http://www.bioone.org/doi/abs/10.1639/0007-2745-115.1.51.

Ortego, J. et al., 2012. Influence of environmental heterogeneity on genetic diversity and structure in an endemic southern Californian oak. *Molecular Ecology*. Available at: http://doi.wiley.com/10.1111/j.1365-294X.2012.05591.x.

Svensson, E.I., 2012. Non-ecological speciation, niche conservatism and thermal adaptation: how are they connected? *Organisms Diversity Evolution*. Available at: http://www.springerlink.com/index/10.1007/s13127-012-0082-6.

Data papers published April-May 2012

Landuyt, W.V., Vanhecke, L. & Brosens, D., 2012. Florabank1: a grid-based database on vascular plant distribution in the northern part of Belgium (Flanders and the Brussels Capital region). *PhytoKeys*, 12, p.59-67. Available at: http://www.pensoft.net/journals/phytokeys/article/2849/abstract/

Danis, B., Jangoux, M. & Wilmes, J., 2012. Antarctic Starfish (Echinodermata, Asteroidea) from the ANDEEP3 expedition. *ZooKeys*, 185, p.73-78. Available at: http://www.pensoft.net/journals/zookeys/article/3078/abstract/

Shao, K.T., Lin, J., Wu, C.H., Yeh, H.M. & Cheng. T.Y., 2012. A dataset from bottom trawl survey around Taiwan. *ZooKeys,* 198, p.103–109. Available at: http://www.pensoft.net/journals/zookeys/article/3032/a-dataset-from-bottom-trawl-survey-around-taiwan