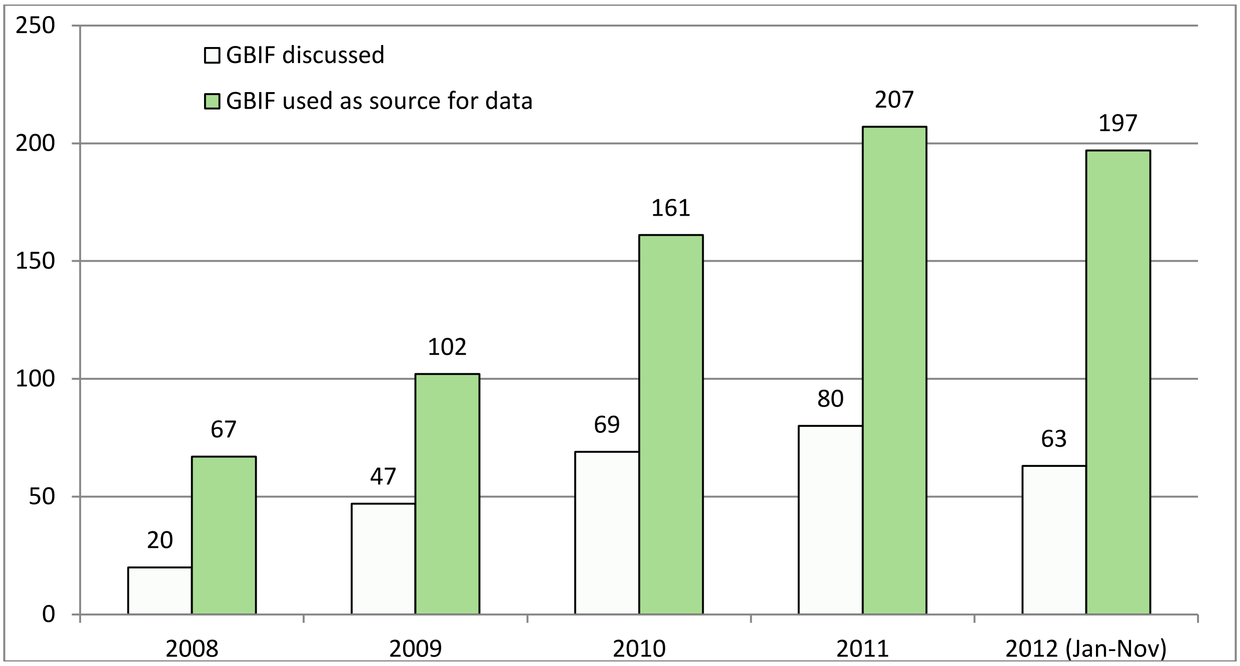
GBits Science Supplement

No. 5, October-November 2012

Welcome to this fifth edition of the GBits Science Supplement. It provides a summary of research published during October and November 2012 for which the Global Biodiversity Information Facility (GBIF) has been cited as a source of data. This period has been exceptionally productive, with such papers now being identified at the rate of approximately **one per day** (6-7 per week).

The supplement opens with summaries of some illustrative examples of recent uses of the data accessible through GBIF. It is followed by references and links to all the studies identified during the two months, grouped around their relevance to the Aichi Biodiversity Targets.[1] 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.

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.



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

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

Threatened species and protected areas

PRIORITIES FOR PROTECTING PLANT SPECIES DIVERSITY IN SOUTH AMERICA

Example: Ramirez-Villegas, J., Jarvis, A. & Touval, J., 2012. Analysis of threats to South American flora and its implications for conservation. *Journal for Nature Conservation*. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1617138112000830

Summary: In this study, researchers from Colombia, the United Kingdom and United States used a large volume of data published through GBIF to identify critical areas for conservation of plant diversity across South America. The team analysed records of more than half a million GBIF-mediated records of 16,000 plant species, and developed a map showing 'virtual parks' where a large number of threatened and locally-unique species occurred within a 100km area. These were found to correspond well with real, existing protected areas – by prioritizing 24 protected areas, the researchers argue, up to 70 per cent of South American plant diversity will be conserved. They also reveal gaps in existing coverage, suggesting new measures to conserve 200 plant species not currently included in any protected area. Critical areas to monitor, expand and strengthen are mainly located in the Ecuadorian and Colombian Andes, southern Paraguay, the Guyana shield, southern Brazil, and Bolivia. The lead author of the study said the analysis would not have been possible without the ability to access occurrence data through GBIF.

Agriculture and food security

ADAPTING AGRICULTURE TO FUTURE CLIMATE CONDITIONS: THE DATE PALM

Example: Shabani, F., Kumar, L. & Taylor, S., 2012. Climate Change Impacts on the Future Distribution of Date Palms: A Modeling Exercise Using CLIMEX V. Magar, ed. PLoS ONE, 7(10), p.e48021. Available at: http://dx.plos.org/10.1371/journal.pone.0048021

Summary: This research by a team from Australia used data accessed through GBIF to model changes in the areas likely to be suitable for cultivating date palms (*Phoenix dactylifera),* according to various future scenarios of climate change. After filtering from a total of 583 records for the species, 163 occurrence locations downloaded via GBIF were supplemented with 49 records from literature review to model the potential distribution of the date palm, based on current and projected future conditions of temperature and moisture. The results suggested that many parts of North Africa currently suited to date palm cultivation will become unsuitable by 2100. By 2070, Saudi Arabia, Iraq and western Iran are projected to become less suitable. On the other hand, some areas such as southeastern Bolivia and northern Venezuela will be more suitable for growing date palms. The authors suggest such projections can inform strategic planning by identifying new areas in which to cultivate this economically-important crop in future, and areas that will need attention due to reduced suitability compared with current agricultural practices.

CONSERVING GENETIC DIVERSITY OF FOOD CROPS IN WEST AFRICA

Example: Idohou, R. et al., 2012. National inventory and prioritization of crop wild relatives: case study for Benin. *Genetic Resources and Crop Evolution*. Available at: http://www.springerlink.com/index/10.1007/s10722-012-9923-6

Summary: This study by a team from Benin, China and the United Kingdom aimed to draw up a list of priority plants to conserve in Benin, based on their importance as wild relatives of the crops used by local people for food, livestock fodder, medicines and other purposes. An inventory of crop wild relatives (CWR) was compiled using a variety of sources, including records from major herbaria and gene banks worldwide, accessed online through GBIF. Using a series of criteria to rank their importance, the study identified 20 priority crop wild relatives for active conservation.

Human health

MODELLING DISTRIBUTIONS OF DISEASE-CARRYING ORGANISMS

Examples: Fuller, D.O. et al., 2012. Near-present and future distribution of Anopheles albimanus in Mesoamerica and the Caribbean Basin modeled with climate and topographic data. *International Journal of Health Geographics*, 11, p.13. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3416578&tool=pmcentrez&rendertype=abstract.

Foley, D.H. et al., 2012. SandflyMap: leveraging spatial data on sand fly vector distribution for disease risk assessments. *Geospatial Health*, 6(3), pp.S25–30. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23032280

Summary: The first of these studies by a team from the United States and Colombia looked at the projected spread of a major malaria-carrying mosquito in Mesoamerica and the Caribbean Basin. It used more than 300 records showing locations where the mosquito was present, obtained through GBIF itself and a GBIF-funded project, Mosquito Map (www.mosquitomap.org), as well as published data from mosquito surveys in Colombia. These points were combined with climate and topographical data to generate a model showing probability of the presence of the mosquito, under 'near present' (1950-2000) and future climate conditions, across the whole region. The major conclusion was that while the mosquito is unlikely to spread much further to the north or south, it is likely to invade high-altitude regions above 2,000 metres, putting many more people at risk of malaria in Mesoamerica and the Caribbean Basin by 2080.

The second study introduces SandflyMap, a new service arising from the GBIF-funded MosquitoMap project. It aims to map distributions of sand flies, associated with the spread of leishmaniasis disease. The purpose is to provide information for medical entomologists, disease control workers, public health officials and health planners. The authors encourage researchers to submit data on the occurrence of sand flies, which will also be deposited with GBIF. The study notes that few records of sand fly species relevant to disease are currently accessible via GBIF, and the authors hope that submission of collection data through SandflyMap will help remedy this situation.

Research citing GBIF as a source of data, Oct-Nov 2012

Grouped by relevance to Aichi Biodiversity Targets

Strategic Goal B – Reduce direct pressures and promote sustainable use

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

Habel, J.C. et al., 2012. A Forest Butterfly in Sahara Desert Oases: Isolation Does Not Matter. The Journal of heredity, online, pp.1–14. Available at: http://www.ncbi.nlm.nih.gov/pubmed/2313290

Target 9. Invasive alien species

Bourdôt, G.W. et al., 2010. The potential global distribution of the invasive weed Nassella neesiana under current and future climates. *Biological Invasions*, 14(8), pp.1545–1556. Available at: http://www.springerlink.com/index/10.1007/s10530-010-9905-6

Evangelista, P. et al., 2012. *Mapping Habitat and Potential Distributions of Invasive Plant Species on USFWS National Wildlife Refuges*, Available at: http://ibis-live.nrel.colostate.edu/WebContent/WS/ColoradoView/images/Colorado Data Page/USFWS_Refuge_Report_Evangelista_et_al.pdf

Follak, S. & Essl, F., 2012. Spread dynamics and agricultural impact of Sorghum halepense , an emerging invasive species in Central Europe. *Weed Research*, p.online. Available at: http://doi.wiley.com/10.1111/j.1365-3180.2012.00952.x

Gallagher, R.V. et al., 2012. The grass may not always be greener: projected reductions in climatic suitability for exotic grasses under future climates in Australia. *Biological Invasions*, online. Available at: http://www.springerlink.com/index/10.1007/s10530-012-0342-6

Iñiguez, C.A. & Morejón, F.J., 2012. Potential Distribution of the American Bullfrog (Lithobates Catesbeianus) in Ecuador. *South American Journal of Herpetology*, 7(2), pp.85–90. Available at: http://www.bioone.org/doi/abs/10.2994/057.007.0211

Jacquard, C. et al., 2012. Population structure of the melon fly, Bactrocera cucurbitae, in Reunion Island. *Biological Invasions*. Available at: http://www.springerlink.com/index/10.1007/s10530-012-0324-8

Lemke, D., 2012. *Alien plants and their invasion of the forested landscape of the southeastern United States*. Canterbury University. Available at: http://ir.canterbury.ac.nz/bitstream/10092/7107/1/lemkethesisfinal230912.pdf

Leuthardt, F.L.G. & Baur, B., 2012. Oviposition preference and larval development of the invasive moth Cydalima perspectalis on five European box-tree varieties. *Journal of Applied Entomology*, online. Available at: http://doi.wiley.com/10.1111/jen.12013

Lu-Irving, P. & Olmstead, R.G., 2012. Investigating the evolution of Lantaneae (Verbenaceae) using multiple loci. *Botanical Journal of the Linnean Society*, online. Available at: http://doi.wiley.com/10.1111/j.1095-8339.2012.01305.x

Petersen, M.J., 2012. Evidence of a climatic niche shift following North American introductions of two crane flies (Diptera; genus Tipula). *Biological Invasions*, online. Available at: http://www.springerlink.com/index/10.1007/s10530-012-0337-3

Porretta, D. et al., 2012. Glacial History of a Modern Invader: Phylogeography and Species Distribution Modelling of the Asian Tiger Mosquito Aedes albopictus L. A. Moreira, ed. *PLoS ONE*, 7(9), p.e44515. Available at: http://dx.plos.org/10.1371/journal.pone.0044515

Shaik, R.S. et al., 2012. Identification of the invasive weeds, camel melon, prickly paddy melon and colocynth in Australia — a morphological and molecular approach. In *Eighteenth Australasian Weeds Conference*. pp. 73–77. Available at: http://www.caws.org.au/awc/2012/awc201210731.pdf

Sheppard, C.S., 2012. Potential spread of recently naturalised plants in New Zealand under climate change. *Climatic Change*, online. Available at: http://www.springerlink.com/index/10.1007/s10584-012-0605-3

Steffek, R. et al., 2012. Distribution of "Candidatus Phytoplasma prunorum" and its vector Cacopsylla pruni in European fruit-growing areas: a review. *EPPO Bulletin*, 42(2), pp.191–202. Available at: http://doi.wiley.com/10.1111/epp.2567

Taylor, S., Kumar, L. & Reid, N., 2012. Impacts of climate change and land-use on the potential distribution of an invasive weed: a case study of Lantana camara in Australia. *Weed Research*, online. Available at: http://doi.wiley.com/10.1111/j.1365-3180.2012.00930.x

Target 10. Climate change impacts

Pomati, F. et al., 2012. Effects of re-oligotrophication and climate warming on plankton richness and community stability in a deep mesotrophic lake. *Oikos*, 121(8), pp.1317–1327. Available at: http://doi.wiley.com/10.1111/j.1600-0706.2011.20055.x

Ralston, J. & Kirchman, J.J., 2012. Predicted range shifts in North American boreal forest birds and the effect of climate change on genetic diversity in blackpoll warblers (Setophaga striata). *Conservation Genetics*, online. Available at: http://www.springerlink.com/index/10.1007/s10592-012-0418-y

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

Target 11: Improve coverage and management of protected areas

Otegui, J., Villarroya, A. & Ariño, A.H., 2012. Protected areas in the Spanish Pyrenees: A meaningful way to preserve biodiversity? *Environmental Engineering and Management Journal*, 11(6), pp.1133–1140. Available at: http://omicron.ch.tuiasi.ro/EEMJ/

Target 13. Preserving genetic diversity, including that of culturally-valuable species

Fresnedo-Ramírez, J. & Orozco-Ramírez, Q., 2012. Diversity and distribution of genus Jatropha in Mexico. *Genetic Resources and Crop Evolution*, (1979). Available at: http://www.springerlink.com/index/10.1007/s10722-012-9906-7

Thomas, E. et al., 2012. Present Spatial Diversity Patterns of Theobroma cacao L. in the Neotropics Reflect Genetic Differentiation in Pleistocene Refugia Followed by Human-Influenced Dispersal D. Q. Fuller, ed. *PLoS ONE*, 7(10), p.e47676. Available at: http://dx.plos.org/10.1371/journal.pone.0047676

Target 19. Improve the science base

Amboni, M.P.M. & Laffan, S.W., 2012. The effect of species geographical distribution estimation methods on richness and phylogenetic diversity estimates. *International Journal of Geographical Information Science*, online(November 2012). Available at: http://www.tandfonline.com/doi/abs/10.1080/13658816.2012.717627

Ariño, A.H. et al., 2012. Primary Biodiversity Data Records in the Pyrenees. *Environmental Engineering and Management Journal*, 11(6), pp.1059–1075. Available at: http://omicron.ch.tuiasi.ro/EEMJ/

Arrigo, N. et al., 2012. Quantitative visualization of biological data in Google Earth using R2G2, an R CRAN package. *Molecular Ecology Resources*, online. Available at: http://doi.wiley.com/10.1111/1755-0998.12012

Biswas, S. et al., 2012. New Records Of Four Reef-Associated Fishes From East Coast Of India. *Acta Ichthyologica Et Piscatoria*, 42, pp.253–258. Available at: http://www.aiep.pl/volumes/2010/3_3/pdf/10_1230_F1.pdf

Bracho-Nunez, A. et al., 2012. Leaf level emissions of volatile organic compounds (VOC) from some Amazonian and Mediterranean plants. *Biogeosciences Discussions*, 9(11), pp.15279–15328. Available at: http://www.biogeosciences-discuss.net/9/15279/2012/

Braithwaite, M. & Walker, K., 2012. *50 Years of Mapping the British and Irish Flora 1962-2012*, London. Available at: http://archive.bsbi.org.uk/ConferenceRep2012.pdf

Bystriakova, N. et al., 2012. Sampling bias in geographic and environmental space and its effect on the predictive power of species distribution models. *Systematics and Biodiversity*, 10(3), pp.305–315. Available at: http://www.tandfonline.com/doi/abs/10.1080/14772000.2012.705357

Cardiel, J.M. & Muñoz, P., 2012. Synopsis of Acalypha (Euphorbiaceae) of continental Ecuador. *PhytoKeys*, 17, pp.1–17. Available at: http://www.pensoft.net/journals/phytokeys/article/3190/abstract/synopsis-of-acalypha-euphorbiaceae-of-continental-ecuador

Chen, D. et al., 2012. Phylogeography of Quercus variabilis Based on Chloroplast DNA Sequence in East Asia: Multiple Glacial Refugia and Mainland-Migrated Island Populations. *PloS one*, 7(10), p.e47268. Available at: http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3480369&tool=pmcentrez&rendertype=abstract

Cires, E. et al., 2012. Unravelling the evolutionary history of the polyploid complex Ranunculus parnassiifolius (Ranunculaceae). *Biological Journal of the Linnean Society*, 107(3), pp.477–493. Available at: http://doi.wiley.com/10.1111/j.1095-8312.2012.01968.x

Collevatti, R.G. et al., 2012. A coupled phylogeographical and species distribution modelling approach recovers the demographical history of a Neotropical seasonally dry forest tree species. *Molecular Ecology*, online. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23094833

Convertino, M. et al., 2012. Inferring Species Richness and Turnover by Statistical Multiresolution Texture Analysis of Satellite Imagery K. P. Van Niel, ed. *PLoS ONE*, 7(10), p.e46616. Available at: http://dx.plos.org/10.1371/journal.pone.0046616

Cooper, E.M. et al., 2012. Biogeographical patterns of variation in Western European populations of the great green bush-cricket (Tettigonia viridissima; Orthoptera Tettigoniidae). *Journal of Insect Conservation*. Available at: http://www.springerlink.com/index/10.1007/s10841-012-9525-9

Dambach, J. et al., 2012. Effects of Late-Cenozoic Glaciation on Habitat Availability in Antarctic Benthic Shrimps (Crustacea: Decapoda: Caridea). *PloS one*, 7(9), p.e46283. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23029463

González-Salazar, C. & Stephens, C.R., 2012. Constructing Ecological Networks: A Tool to Infer Risk of Transmission and Dispersal of Leishmaniasis. *Zoonoses and Public Health*, 59, pp.179–193. Available at: http://doi.wiley.com/10.1111/j.1863-2378.2012.01479.x

Greve, M. et al., 2012. Continental-scale variability in browser diversity is a major driver of diversity patterns in acacias across Africa. *Journal of Ecology*, 100, pp.1093–1104. Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1365-2745.2012.01994.x/abstract

Güntsch, A. et al., 2012. Efficient rescue of threatened biodiversity data using reBiND workflows. *Plant Biosystems - An International Journal Dealing with all Aspects of Plant Biology*, 146(4), pp.752–755. Available at: http://www.tandfonline.com/doi/abs/10.1080/11263504.2012.740086

Henk, D.A. et al., 2012. Clonality Despite Sex: The Evolution of Host-Associated Sexual Neighborhoods in the Pathogenic Fungus Penicillium marneffei B. A. McDonald, ed. *PLoS Pathogens*, 8(10), p.e1002851. Available at: http://dx.plos.org/10.1371/journal.ppat.1002851

Herrera, S., Shank, T.M. & Sánchez, J. a, 2012. Spatial and temporal patterns of genetic variation in the widespread antitropical deep-sea coral Paragorgia arborea. *Molecular Ecology*, online. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23094936

Keppel, E., Sigovini, M. & Tagliapietra, D., 2012. A new geographical record of Polycera hedgpethi Er. Marcus, 1964 (Nudibranchia: Polyceridae) and evidence of its established presence in the Mediterranean Sea, with a review of its geographical distribution. *Marine Biology Research*, 8(10), pp.969–981. Available at: http://www.tandfonline.com/doi/abs/10.1080/17451000.2012.706306

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