



**GLOBAL
BIODIVERSITY
INFORMATION
FACILITY**

GBits Science Supplement

No. 4, August-September 2012

Welcome to this fourth edition of the GBits Science Supplement.

In the following pages, you will find a summary of research published during August and the early part of September 2012 for which the Global Biodiversity Information Facility (GBIF) has been identified as a source of data.

The period covered by this edition is shorter than the usual two months, so that it could be published in time for the 19th meeting of the GBIF Governing Board, taking place in Lillehammer, Norway, from 16-21 September. That means the number of papers cited is somewhat smaller than in previous editions, but the content shows that important research enabled by the investment of GBIF Participants continues to appear regularly in the scientific literature.

As usual, 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.

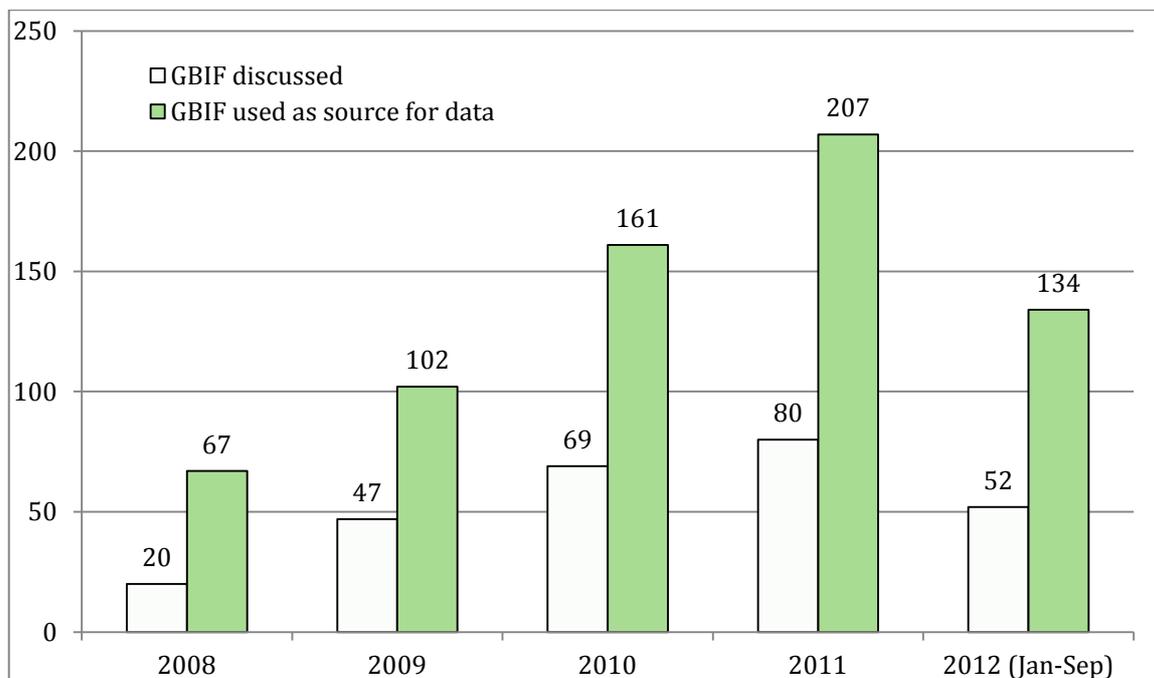
Supplementing the standard citations (including links) for all the papers identified, the boxes highlight some selected cases to illustrate how scientists are making use of GBIF. A wider selection of papers including those discussing and mentioning GBIF can be found in the [GBIF Public Library](#) in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

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



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, Aug-Sept 2012

Grouped by relevance to Aichi Biodiversity Targets¹:

Strategic Goal B – Reduce direct pressures and promote sustainable use

Target 9. Invasive alien species

Example: Michael, P.J., Yeoh, P.B. & Scott, J.K., 2012. Potential Distribution of the Australian Native *Chloris truncata* Based on Modelling Both the Successful and Failed Global Introductions. *PloS One*, 7(7), p.e42140. Available at: <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3407094&tool=pmcentrez&rendertype=abstract>.

Summary: A team of researchers in Australia modelled the current and future distribution of Australian windmill grass (*Chloris truncata*). The plant is a native species that has been a component of pasturelands in Australia, but it is considered a weed and is associated with spread of disease among people, crops and livestock. Pastures dominated by windmill grass have been found to be less productive.

In this study, the plant's response to constant temperatures and soil moisture levels was measured to draw parameters for a bioclimatic distribution model. Information on the plant's current distribution came from a number of sources including GBIF. The model also took into account the native distribution in eastern Australia and naturalized distribution in Western Australia.

¹ <http://www.cbd.int/sp/targets/>

Although the soil information helped explain the distribution in Australia, it did not help determine potential global distribution because of the lack of similarities in soil types between continents. However, the addition of a climate change projection showed that the plant would be increasingly suited to other parts of the world where it has failed to become established until now. The model predicts that southern Africa, eastern Europe and Asia are likely to become more suitable for the species in the future, thus making it a threat internationally.

Fernández, M. et al., 2012. Does adding multi-scale climatic variability improve our capacity to explain niche transferability in invasive species? *Ecological Modelling*, 246, pp.60–67. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0304380012003742>.

Wetterer, J.K., 2012. Worldwide Spread of the Moorish sneaking Ant, *Cardiocondyla mauritanica* (Hymenoptera : Formicidae). *Sociobiology*, 59(3), pp.985–997. Available at: http://scholar.google.com/scholar_url?hl=en&q=http://antcat.org/documents/5737/wetterer_2012_sociobiology-worldwide-spread-of-cardiocondyla-mauritanica.pdf&sa=X&scisig=AAGBfm3rLOObzXAT1DLFopVIOhJiaSAbJw&oi=scholaralt.

Target 10. Climate change impacts

Example: Lee, D.N., Papeş, M. & Van Den Bussche, R. a., 2012. Present and Potential Future Distribution of Common Vampire Bats in the Americas and the Associated Risk to Cattle R. M. Brigham, ed. *PLoS ONE*, 7(8), p.e42466. Available at: <http://dx.plos.org/10.1371/journal.pone.0042466>.

Description: This study, by researchers at Oklahoma State University, modelled the current and potential future distribution of the common vampire bat (*Desmodus rotundus*) to help predict the risk of cattle rabies in North, Central and South America, thus indicating areas that should be a focus for rabies prevention efforts.

The common vampire bat, as a carrier of the rabies virus, has a significant effect on the cattle industry in Latin America. The species also causes decreases in milk production and increases the risk of secondary infection in livestock.

To produce an ecological niche model for the bat, the research used 984 spatially-unique data points showing locations where the species occurs, based on museum records discovered and downloaded via the GBIF data portal. The data were filtered from an original download of more than 9,700 records, with older records, duplicates and those with inexact coordinates being excluded.

The modelling helped look at the current potential distribution of the species, and its future distribution for the years 2030, 2050, and 2080 based on climate scenarios from the Intergovernmental Panel on Climate Change (IPCC). Distribution information was then combined with cattle density data and documented rabies outbreaks to identify high-risk areas for livestock.

The study results show that most of Mexico and Central America, as well as portions of Venezuela, Guyana, the Brazilian highlands, western Ecuador, northern Argentina, and areas east of the Andes in Peru, Bolivia, and Paraguay are currently highly suitable for the vampire bat. Climate

projections predicted suitability in these areas and in French Guyana, Suriname, Venezuela and Colombia. The paper notes that areas with large numbers of cattle at risk include Mexico, Central America, Paraguay and Brazil.

Contradicting previous studies, the research suggests that the vampire bat was unlikely to spread significantly into the United States under future climate scenarios, with only southern Florida showing suitable conditions for the species.

Watling, J.I. et al., 2012. Do bioclimate variables improve performance of climate envelope models? *Ecological Modelling*, 246, pp.79–85. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0304380012003468>.

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

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

Maxted, N. et al., 2012. Temperate forage and pulse legume genetic gap analysis. *Bocconeia*, 24. Available at: <http://www.herbmedit.org/bocconeia/24-115.pdf>.

Strategic Goal E – enhancing implementation

Target 18 – Respect traditional knowledge, innovations and practices

Example: van Andel, T. et al., 2012. In search of the perfect aphrodisiac: Parallel use of bitter tonics in West Africa and the Caribbean. *Journal of Ethnopharmacology*, pp.1–11. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0378874112005338>.

Summary: This study looked at how African slave communities went about adapting their traditional knowledge of herbal medicine after they were transplanted into entirely new environments in the Caribbean region.

Earlier work suggested that enslaved Africans would have sought out plants familiar to them or brought from their homelands, so that Caribbean remedies would mainly consist of plant taxa that occur on both sides of the Atlantic, would be rich in weeds and introduced plants, and poor in native forest species.

To test this hypothesis, the researchers analysed ‘bitter tonic’ mixtures used in the Caribbean and West Africa today as aphrodisiacs and/or to treat impotence, to see whether they were composed of the same or related plant species.

The study identified 324 species used as ingredients in 35 African and 117 Caribbean aphrodisiac mixtures. The plants were compared using a number of factors, including information on their distribution based on records available through GBIF.

The results showed that, in fact, recipes from the Caribbean mostly contained new and unrelated plants, including many New World forest species, with taste, appearance and pharmacological properties similar to those used in Africa. The research suggests that enslaved Africans applied their Old World knowledge with great creativity and flexibility, reinventing their herbal medicine by finding native plant substitutes through trial and error, and by learning from Amerindians and Europeans.

Target 19. Improve the science base

Furze, J.N. et al., 2012. Facilitating description of fuzzy control algorithms to ordinate plant species by linking online models. In *Proceedings of 2012 International Conference on Modelling, Identification, and Control*. Wuhan, Hubei, China: IEEE, pp. 933–938. Available at: http://ieeexplore.ieee.org/xpl/login.jsp?tp=&arnumber=6260180&url=http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6260180.

Griffiths, H. et al., 2012. You're so vein: Bundle Sheath Physiology, Phylogeny and Evolution in C3 and C4 plants. *Plant, Cell & Environment*, (online). Available at: <http://doi.wiley.com/10.1111/j.1365-3040.2012.02585.x>.

Hof, A.R., Jansson, R. & Nilsson, C., 2012. The usefulness of elevation as a predictor variable in species distribution modelling. *Ecological Modelling*, 246, pp.86–90. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0304380012003778>.

Milanovich, J.R. et al., 2012. Do species distribution models predict species richness in urban and natural green spaces? A case study using amphibians. *Landscape and Urban Planning*, 107(4), pp.409–418. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0169204612002216>.

Pérez1, S.G., López, J.E. & McCarthy, T.J., 2012. Five new records of bats for Guatemala, with comments on the checklist of the country. *Chiroptera Neotropical*, 18(1), pp.1106–1110. Available at: <http://chiroptera.unb.br/index.php/cn/article/viewFile/65/122>.

Rojas, C., Herrera, N. & Stephenson, S.L., 2012. An update on the myxomycete biota (Amoebozoa: Myxogastria) of Colombia. *Check List*, 8(4), pp.617–619. Available at: <http://www.checklist.org.br/getpdf?SL042-12>.

Thessen, A.E., Patterson, D.J. & Murray, S. a., 2012. The Taxonomic Significance of Species That Have Only Been Observed Once: The Genus *Gymnodinium* (Dinoflagellata) as an Example P. López-García, ed. *PLoS ONE*, 7(8), p.e44015. Available at: <http://dx.plos.org/10.1371/journal.pone.0044015>.

Tippery, N.P. & Les, D.H., 2012. Hybridization and systematics of dioecious North American Nymphoides (*N. aquatica* and *N. cordata*; Menyanthaceae). *Aquatic Botany*. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0304377012001325>.

Yahara, T. et al., 2012. Strategies to Observe and Assess Changes of Terrestrial Biodiversity in the Asia-Pacific Regions S. Nakano, T. Yahara, & T. Nakashizuka, eds. *The Biodiversity Observation Network in the Asia-Pacific Region*, pp.6–10. Available at: <http://www.springerlink.com/index/10.1007/978-4-431-54032-8>