



Ainsdale Sand Dunes National Nature Reserve, one of the most important wildlife sites in England. PHOTO CREDIT: Gary Hedges

LOCAL WILDLIFE ENTHUSIASTS DRIVE DNA BARCODE LIBRARY BUILDING IN THE UK

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Researchers in the UK are spearheading a number of high-profile initiatives designed to populate and fill gaps in the national DNA barcode library

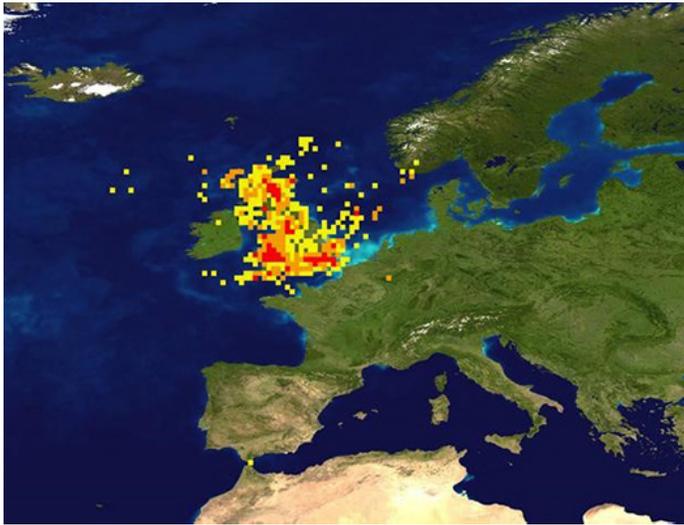
Despite some notable achievements, such as a [complete DNA barcode library for the native plants of Wales](#), the UK has lagged behind other European countries when it comes to growing its DNA barcode library. On BOLD there are 24,555 DNA barcode records for specimens collected in the UK (from 5,484 species) which is very similar to [Austria](#) (24,513 records, from 5,375 species), a land-locked country with roughly one third the land area and one seventh the human population. [Germany](#) leads Europe with 167,458 records from 14,805 species.

The UK is working to catch-up through a number of high-profile initiatives designed to populate and fill gaps in the UK's DNA barcode library and, in particular, bring [BIOSCAN](#) to UK insects.

The [Darwin Tree of Life](#) project is being led by the Wellcome Sanger Institute and involves a consortium of institutes, universities, museums, and agencies, including the Natural History Museum and Royal Botanical Gardens Kew. The project aims to deliver public DNA barcodes for 10,000 species by 2023 and ultimately sequence the genomes of all 66,000 species of plants, fungi, protozoa, and animals that are found in the UK.

DEFRA (the Department for Environment, Food & Rural Affairs) has established a Centre of Excellence for Environmental Genomic Applications. This virtual centre recognises the absolute necessity of DNA barcode libraries to [meet its aims](#) of “applying genomics methods (eDNA and metabarcoding) to detect

rare and invasive species, evaluate the effectiveness of conservation interventions, monitor the status and trends for key assemblages and taxa, and assess ecosystem health, functioning, and resilience”¹.



Distribution of DNA barcode records for the United Kingdom. IMAGE: BOLD Systems from 2020-03-10

What is special about these initiatives is that they capitalize on the UK’s large community of local wildlife enthusiasts. A recent workshop organised by BugLife (the Invertebrate Conservation Trust) and Natural England (the UK government’s adviser for the natural environment in England) to examine “gaps” in BOLD for “key English invertebrates” brought together members of the Caddisfly Recording Scheme, Cranefly Recording Scheme, the British Dragonfly Society, the Amateur Entomologists’ Society, amongst others. The UK’s exceptional network of dedicated volunteer wildlife recorders already contribute thousands of records to taxon-focused databases such as the UK Butterfly Monitoring Scheme (UKBMS), Local Record Centres, and through apps such as [iSpot](#) and [iRecord](#) which transmit data to the [NBN \(National Biodiversity Network\) Atlas](#).

The Darwin Tree of Life project kicked off last summer about 25 km north of Liverpool at Ainsdale Sand Dunes National Nature Reserve with a [DNA Bioblitz](#) attended by a team of local recorders including National Museums Liverpool entomologists. These local experts are passionate, driven and keen to contribute to DNA barcode libraries, but don’t necessarily have background knowledge in molecular biology or a basic skill set in “wet” lab techniques.

To address this we recently ran a DNA barcoding workshop at World Museum Liverpool for eleven

prominent local recorders connected with the Tanyptera Project. The [Tanyptera Project](#) is a seven-year initiative funded by the Tanyptera Trust to promote the study and conservation of insects and other invertebrates in the Lancashire and Cheshire region of Northwest England. To our knowledge this was one of the first DNA barcoding workshops run solely for non-professional scientists.



Participants during the World Museum DNA Barcoding Workshop in February 2020.

PHOTO CREDIT: Leanna Dixon

The 1.5-day workshop covered the key steps in DNA barcoding from lab to BOLD². Participants brought along their own invertebrates collected during recent local fieldwork and all successfully produced DNA barcodes for their specimens, which included springtails, bees, a cranefly, other flies, beetles, and spiders. The specimens have been vouchered into World Museum Liverpool’s National Entomology Collection which includes over 1 million specimens, and the sequences have been submitted to BOLD. One participant was able to [confirm the first record](#) of a Nationally Scarce blood bee in Cheshire – *Sphcodes ferruginatus* – raising interesting hypotheses about its potential host species.

At National Museums Liverpool, together with the Tanyptera Project, we are committed to continue developing our DNA barcoding educational offering for

local wildlife enthusiasts and supporting their work driving forward national initiatives to get more UK barcodes onto BOLD.

References:

1. Nelson M, Woodcock P, Maggs C (2018) Using eDNA and metabarcoding for nature conservation. *Joint Nature Conservation Committee (JNCC 18 25)*. Available at <http://data.jncc.gov.uk/data/99e1f69f-c438-439f-8401-dd8a6ce17320/JNCC18-25-Using-eDNA-and-Metabarcoding-for-Nature-Conservation.pdf>
2. Wilson JJ, Sing KW, Jaturas N (2019) DNA barcoding: Bioinformatics workflows for beginners. In *Bioinformatics and Computational Biology. The A to Z of Bioinformatics*. Ranganathan S, Nakai K, Gribskov M & Schönbach C, Eds. Elsevier Ltd., Oxford.

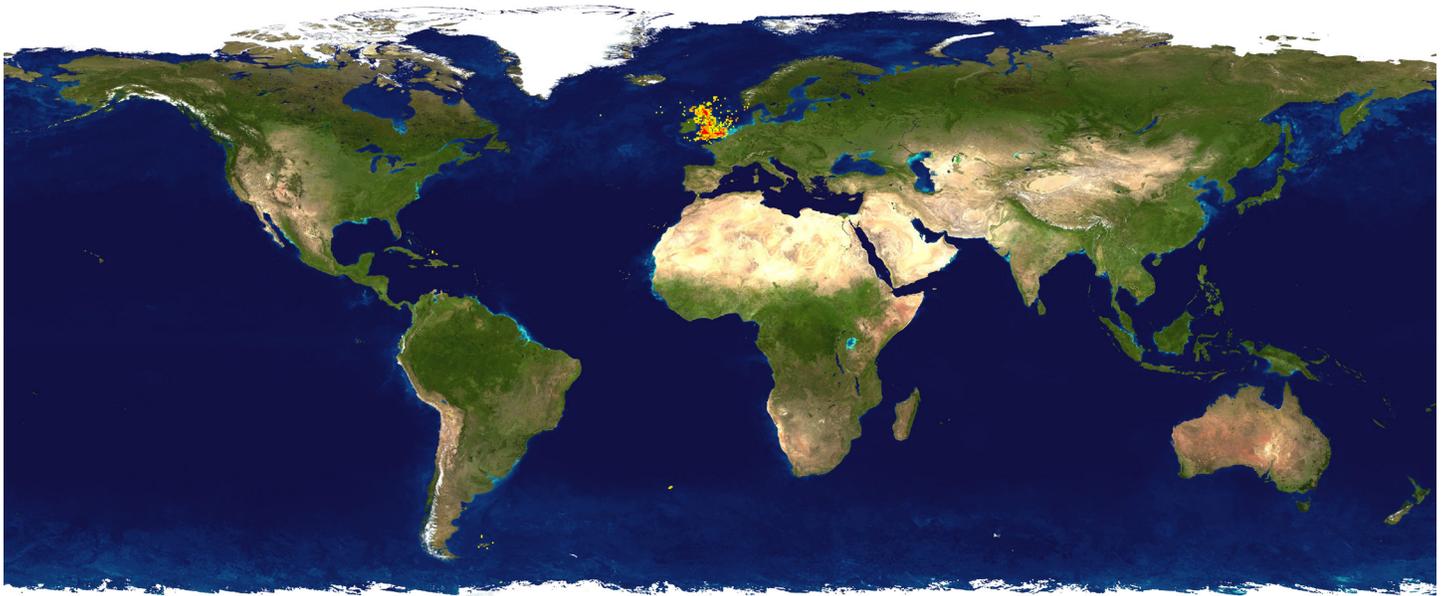


Sphecodes ferruginatus female blood bee collected in Cheshire, England.

PHOTO CREDIT: Chloe Aldridge

Online:

<https://ibol.org/barcodebulletin/nation-activities/local-wildlife-enthusiasts-drive-dna-barcode-library-building-in-the-uk/>



Distribution of DNA barcode records for the United Kingdom.

IMAGE: BOLD Systems 2020-03-10