



Best of both worlds?

PGR communities in and with non-HEI organisations

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Natural History Museum



Fiona Wilkie
Royal Botanic Gardens, Kew



UKRI aims for non-HEI engagement

- “To provide opportunities for students, preparing them to follow a **diversity of career paths** within and beyond academia”
- “To enhance **collaboration** and **knowledge exchange** within and between academia and other sectors for the benefit of the students, collaborative partners, award holders and, if applicable, wider society”



University of Sussex

Deadline: 17 February 2025

Restoring the Sussex Weald garden: Exotics, empire and ecobiography



University of York

Deadline: 2 February 2025

Women and biodiversity: gender and the making of the Kew Fungarium, 1900-1950



Royal Holloway University

Deadline: 19 February 2025

Economic Botany and the Chinese Maritime Customs Service



University of Reading

Deadline: 20 January 2025

University and evolutionary history of the shrimp plants (Acanthaceae: Justiciaceae) in the palaeotropics.



Swansea University

Deadline: 20 January 2025

Secondary metabolic gene evolution in the industrially important fungi.



Swansea University

Deadline: 20 January 2025

Assessing extinction risk for the African Baobab (Adansonia digitata L.) under climate change habitat degradation.



University of Bath

Deadline: 13 January 2025

Measuring the adaptive value of leaf traits using digital and experimental approaches.



Cardiff University

Deadline: 13 January 2025

Ecology and evolution of mycelial cord formation in terrestrial fungi.



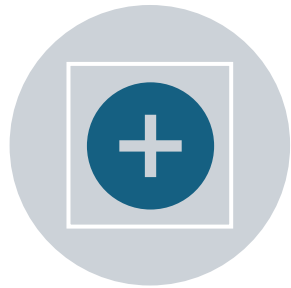
University of Reading

Deadline: 20 January 2025

Seed predation by insects and its implications for tropical plant diversity.



Other benefits cited



Increased depth of
understanding of sector
by students



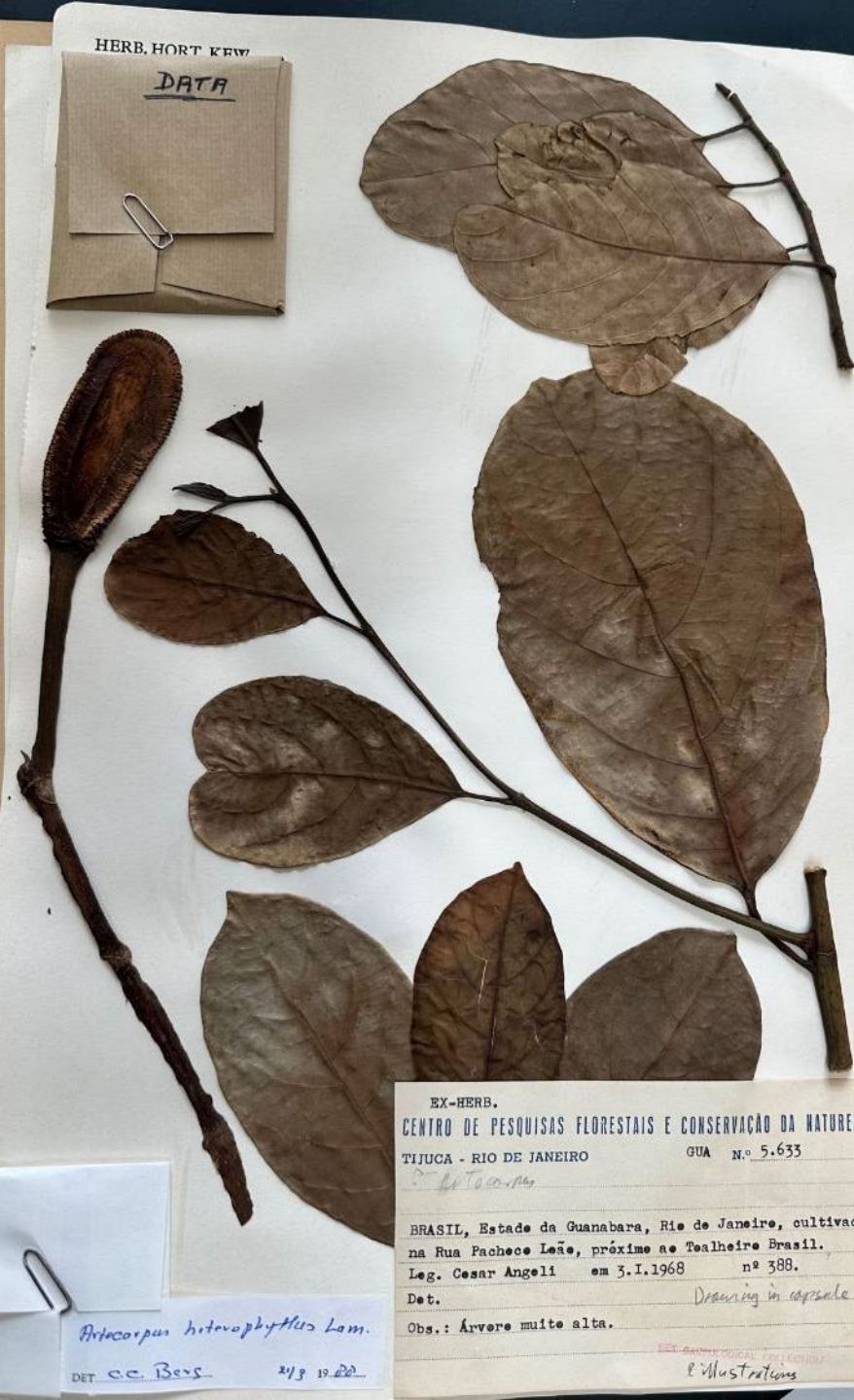
Real-world insights



Enhanced professional
networks



Practical experience



PGR provider categories

HEIs

Industry/third sector/CASE partner

Non-HEI research institutions

- Independent Research Organisations (88 organisations, including Natural History Museum, RBG Kew and Institute of Zoology)
- Public Sector Research Establishments (29 organisations, incl. Environment Agency and Natural England)
- UKRI institutes (25 organisations, incl. The Francis Crick Institute and John Innes Centre)



- 147 PhD students
- 34 UK universities (+ 37 international)



- 79 PhD students
- 26 UK universities



- 190+ PhD students



- 123 PhD students
- 34 UK universities (+ 5 international)



- ~ 220 PhD students
- 3 UK universities



- ~ 100 PhD students
- 12 collaborating universities

Research organisations and student provision:

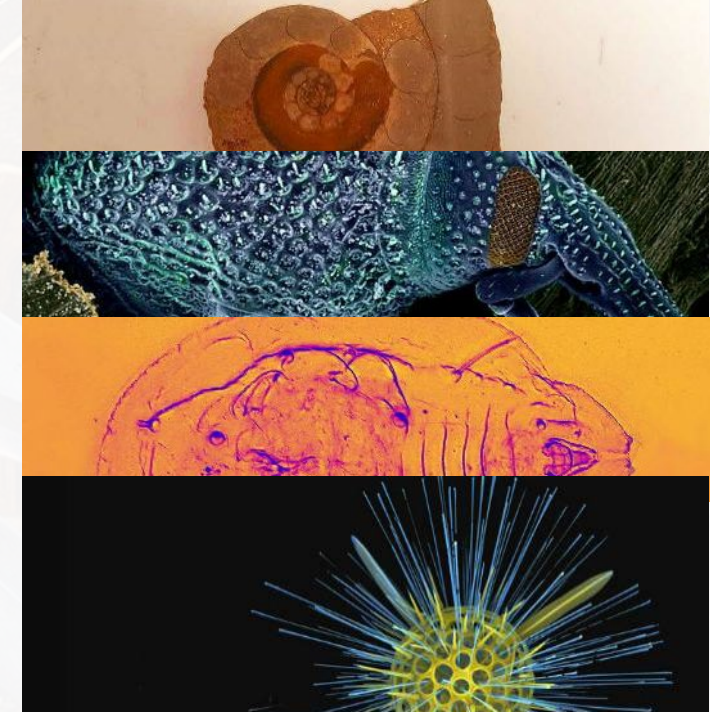
1. Resources



>80 million specimens



Extensive molecular labs



Imaging and analysis labs





Herbarium (7 million specimens)



Fungarium (1.25 million specimens)



Millenium seed bank
(2.4 million seeds)

Research organisations and student provision:
And extensive digitisation projects...



Distributed System of Scientific Collections





AN AERIAL VIEW

A TOP DOWN APPROACH TO **DIGITISATION**

USING WHOLE DRAWER IMAGING

Lizzy Devenish & Robyn Crowther

Whilst digital documentation of individual specimens is a goal for many museum collections, the overall time and cost required to complete this activity may be enormous - especially so for the Natural History Museum, London where its collection of pinned Coleoptera alone comprises roughly 9 million specimens over 33,000 drawers. Instead, digitisation above the specimen level allows for a massive amount of data to be collated at once - including number of specimens, basic conservation status, and/or the presence of type material. Although whole drawer imaging is not novel, it is usually completed using specialised equipment, which greatly inflates the cost of the workflow and potentially makes the process less replicable in some institutions. In this project, two separate imaging workstations were compared for image quality, ease of use, and equipment cost, which could then provide options for trailing drawer digitisation projects in a range of museums.

★THE CONTENTERS★

BOOK SCANNER

The SuperScan Quartz book scanner captures individual images whilst passing over the drawers, and instantly stitches and processes these into a single file. At an equipment cost of circa £3k, the images produced are 600 dpi and captured at a rate of 3.8 mins per image.

COST ----- Very High (~£50k)

IMAGING RATE ----- ~33/hr

IMAGE QUALITY ----- ★★☆☆

USABILITY ----- ★★☆☆



LIGHTBOX & CAMERA

The lightbox uses LED lighting and a Panasonic DC 5.6k monochrome camera attached to a copystand to capture a RAW image, which is later processed into a JPEG within Adobe Lightroom. Costing ~£1k, this set up takes 8 mins to capture a high resolution image of each drawer.

COST ----- Low (~£5k)

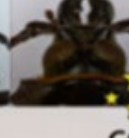
IMAGING RATE ----- ~75/hr

IMAGE QUALITY ----- ★★★★★

USABILITY ----- ★★★★★



IMAGE COMPARISON

	Lightbox	Scanner
Colour Depth		
Lighting		
Resolution		

WHOLE DRAWER EXAMPLE



The example image above was captured using the Lightbox and Camera

CONCLUSION

The Scanner evidently surpasses the output of the Lightbox and Camera in terms of image quality; however, as the aim of this project is to provide broad stroke collections documentation rather than producing diagnostic specimen images, it is recommended that the slight difference in image quality should not be the deciding factor when choosing equipment. In general, the lowest quality image that still allows for specimen metadata to be usable is regularly favoured, and more important are the imaging rates and the cost of each equipment which vastly affects an institution's overall ability to fully digitise its collections.

Based on the above comparisons, the Museum's Coleoptera collections consisting of 936 drawers would be completed in just 73 working days when using the Lightbox and Camera, as opposed to 315 working days when using the Scanner. Keeping this cost low means that an institution is more likely to be able to afford multiple units; in this case, almost 30 Lightboxes could be obtained for the price of a single Scanner - and can produce more than twice as many quality images at the same time, suggesting that the Lightbox and Camera is the ideal set up for this type of mass-digitisation project.

NUMBER OF WORKING DAYS REQUIRED TO IMAGE 936 DRAWERS

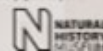


Equipment	Working Days
Scanner	315
Lightbox	73

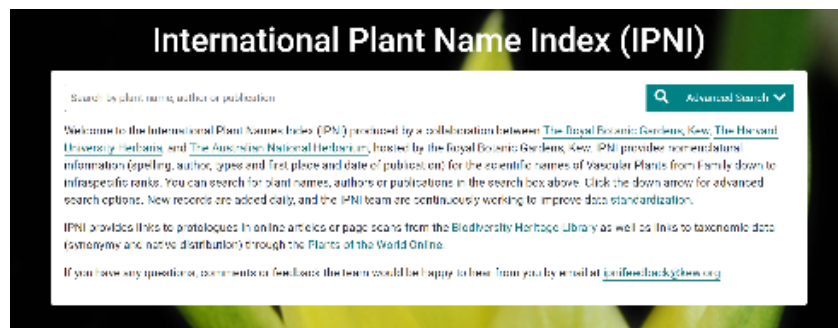
CONFIDENTIAL

© The Trustees of the Natural History Museum, London

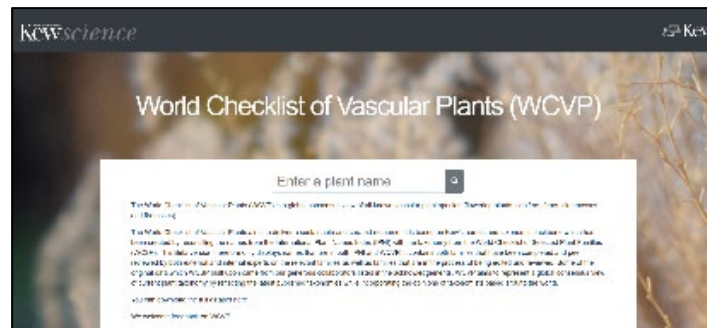
Museum's open-access Data Portal, they can be consulted virtually by users worldwide. Using a more cost-effective and efficient set-up will make this process easier, quicker, and will allow for rapid expansion of this process across other collection areas.



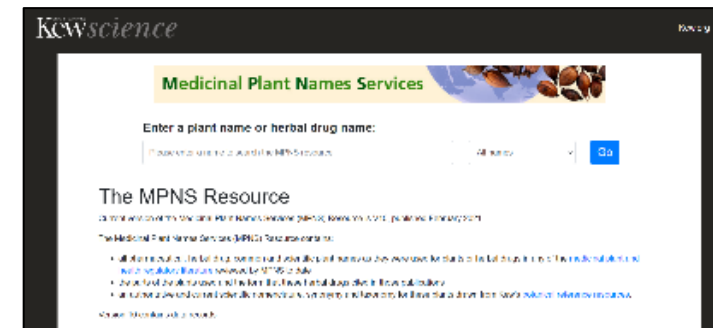
Digital collections



International Plant Name Index (IPNI)
1,400,000 records



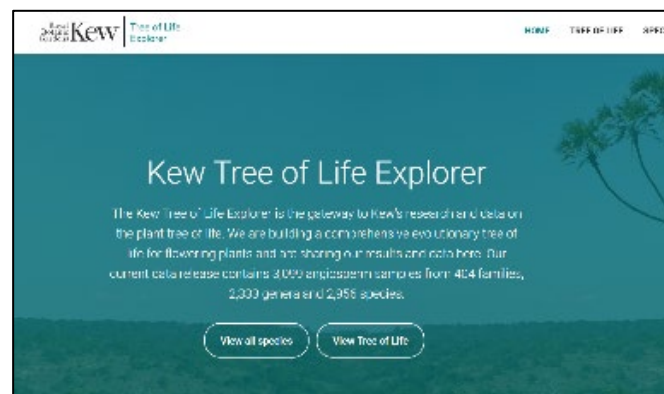
World Checklist of Vascular Plants:
1,383,297 records



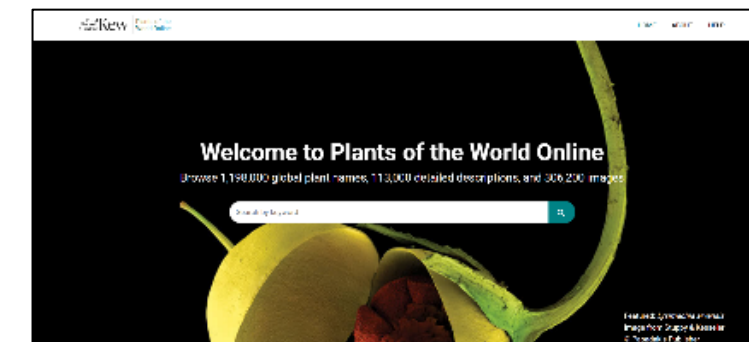
Medicinal Plant Names Services:
452,612 records



Plant DNA C-values Database:
18,283 records



Kew Tree of Life Explorer:
10,699 angiosperm specimens



Plants of the World Online:
1,198,000 records

Research organisations and student provision:

2. Expertise

- World leader in taxonomy and species identification: **together, NHM and Kew described over 400 new species in 2025** (including those described by students!)



L-R: *Solanum stellatocalycium* ©M. A.Cueva, *Heinrichiellus brevispinus* ©A.P. Ranjith, *Cyrtodactylus kampingpoiensis* ©Christina Ching



The bloodstained lip of *Telipogon cruentilabrum*, a new Ecuadorian orchid species that mimics insects to attract pollinators. © Gabriel Iturrald

Research organisations and student provision:

3. Public engagement and policy



PhD student Srishti speaking in the 2025 Royal Institution Christmas Lectures
© BBC

Scientist names ancient crocodile Jones after 'inspirational' teacher



PhD student Ewan in a BBC article about naming a newly identified species
© BBC



PhD student Laura at COP30, participating in the International Cryosphere Climate Initiative (ICCI) at the Cryosphere Pavilion
© Laura Molares Moncayo





9 SEPTEMBER 2025

The date palm that defied domestication - could it hold the key to resilient crops?

Jerónimo Cid, Paul Figg



Above the forest floor: how rare are orchids in the wild?

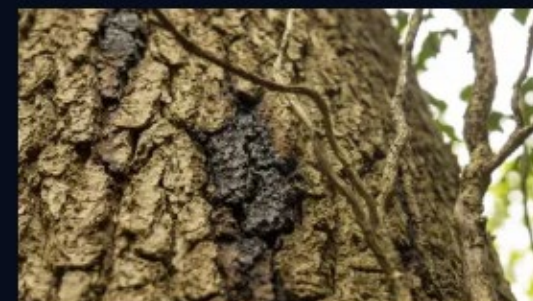
Vida Svahnström, Miguel Arredondo Uribe,
Natasha Ward



17 AUGUST 2023

Forgotten peas – future food?

Eleonora Moratto, Szymon Lara



12 MAY 2023

To catch a tree killer – Plant Health Week

Louise Gathercole

Research organisations and student provision:

4. Community and bigger picture



RBGK x NHM 3MT, Spring 2026



Placements for PhD students

Short-term opportunities for external PhD students on funded schemes to work with us at Kew.

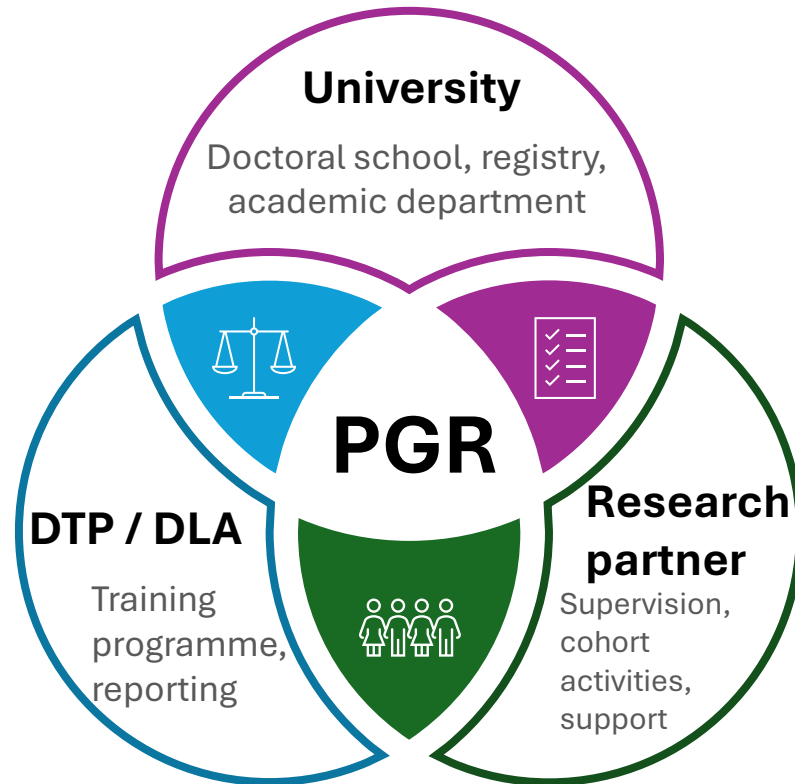
Placements for PhD students

Placements at Kew



IGNITE, GW4+ and ACCE+ training, NHM

Multiple cohorts - challenges



Competing requirements



Balancing priorities



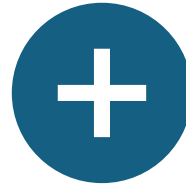
Cultivating belonging

Summary



Hidden PGR community

Extent of doctoral provision
across IROs and similar
Different to industry/CASE
partnerships



Benefits

Knowledge exchange
Non-HEI research culture
Access to public engagement,
policy and advocacy
Broader networks



Challenges

Multiple cohorts
Conflicting requirements
Sense of belonging

Community. Collaboration. Connection.

How can universities and non-HEIs work together to nurture – and build upon – this substantial PGR community?



Thank you

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