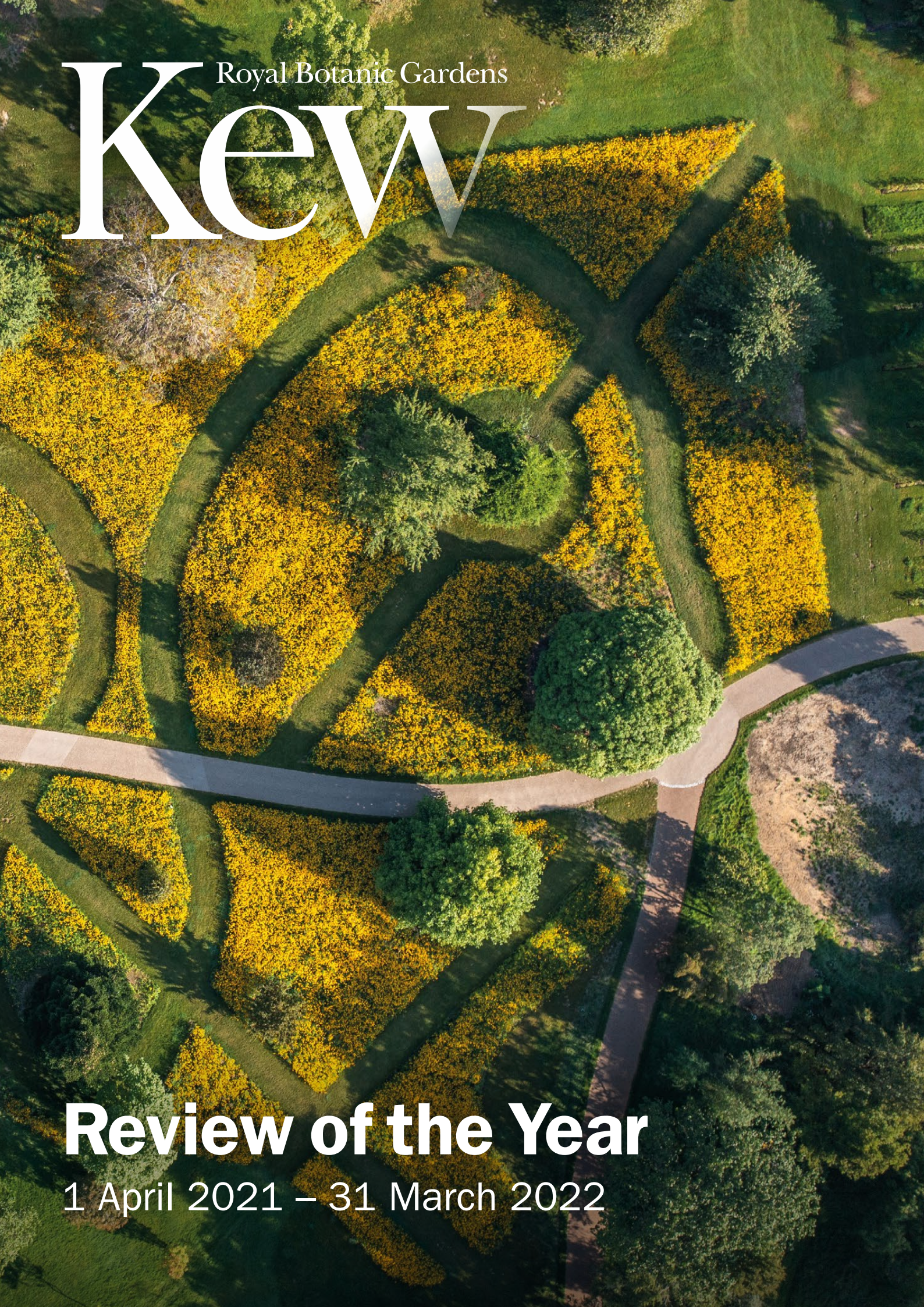
Royal Botanic Gardens

Kew



Review of the Year

1 April 2021 – 31 March 2022

Beech trees in early spring

A message from our Director

This year, I'm delighted to bring you news of several major milestones met here at Kew, along with the launch of a number of high-profile, landmark projects. Made possible thanks to the generosity of our supporters and partners, these projects promise to break new ground at the forefront of botanical science.

Plants and fungi underpin all life on Earth and their incredible properties remain largely untapped, offering great hope for tackling many of the pressing environmental challenges we face. Addressing the twin crises of climate change and biodiversity loss has never been more urgent and, as one of the planet's leading plant science organisations, we're uniquely positioned to influence evidence-based interventions at the highest levels. This will help to ensure that the value of biodiversity is understood and that the positive changes humanity makes are the right ones.

Alongside using our trusted voice to hold critical meetings with many high-profile delegates at last autumn's COP26, I'm pleased to share news in these pages of just how wide-reaching Kew's relationships, specialisms and ambitions remain. Among other highlights, we've been working with local partners in Veracruz, Mexico to restore some of the world's most precious forest habitats; using cutting-edge AI technology to aid policymakers worldwide in their conservation efforts; working with partners in Ethiopia and surrounding countries to diversify and strengthen their staple crops; and running weekly, small-group, child-led science clubs for families facing barriers to nature here at home.

On behalf of everyone here at Kew, I'd like to thank you for your continued support. In a year marked by significant financial challenges for us all, our friends, partners, supporters and advocates ensure Kew can continue to deliver our mission: to understand and protect plants and fungi for the wellbeing of people and the future of all life on Earth.

At Kew, we believe that where there are plants and fungi, there is hope.

Thank you.

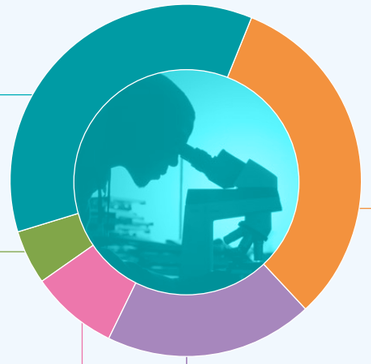
Richard Deverell
Director, Royal Botanic Gardens, Kew

On behalf of everyone here at Kew, I'd like to thank you for your continued support.

Financials

1 April 2021 – 31 March 2022

Royal Botanic Gardens, Kew income



36%
Defra grant
Funding as part of our status as a non-departmental government body

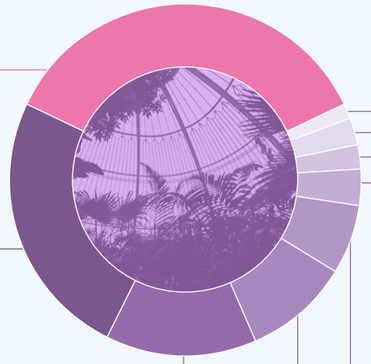
5%
Other grants
From research councils and other funding streams

8%
Membership
All membership categories including gift memberships and Wakehurst memberships

32%
Visitor and commercial income
From day visitor ticket sales, shops and catering, big ticket events, partnerships and sponsorship

19%
Kew Foundation grants and donations
Philanthropic support from individuals, trusts and foundations, and corporate partnerships

Kew Foundation income by area



£7.8m
Membership

£5.4m
Trusts and Foundations

£3m
Legacies

£2.1m
Major Gifts

£1.4m
Corporates

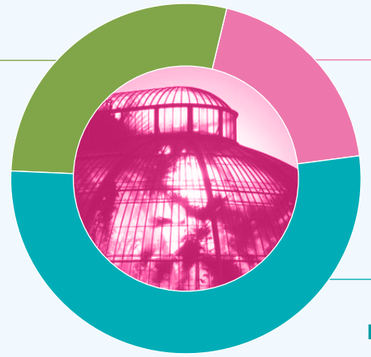
£0.3m
Commemorative

£0.4m
Interest and other

£0.5m
Patrons

£0.7m
Kew Fund

Royal Botanic Gardens, Kew spending



28%
Visitor activities

19%
Costs of generating funds

53%
Research and conservation

Kew Foundation income by purpose of gift

£12.3m
Unrestricted for general use

£7.1m
Research and conservation

£0.8m
Other

£0.8m
Horticulture and capital projects

£0.3m
Education and outreach

£0.2m
Scholarships, higher education and apprenticeships

£0.1m
Archives, library and galleries

Kew Foundation is a directorate of the Royal Botanic Gardens, Kew, responsible for generating funds through philanthropy and membership. Legacy gifts are made through the Foundation and Friends of the Royal Botanic Gardens, Kew, which is a separate legal entity to the Royal Botanic Gardens, Kew.

Kew on the world stage

An official UN partner at COP26

A delegation of our most senior ambassadors and experts went to COP26 in Glasgow in November 2021, representing Kew as an official partner of the United Nations Framework Convention on Climate Change (UNFCCC), supported by Bloomberg.

In preparation for this critical moment for the environment, we worked intensively for more than a year with UK government departments, the UN and other partners. Kew scientists staffed a display in the UN Pavilion, communicating the science behind nature-based solutions and the critical role nature will play in tackling the impacts of climate change.

The Kew Pavilion display saw many high-profile visits, which, along with several panel discussions held by our scientists, led to valuable conversations with corporate leaders, philanthropists, government officials, international ministers and other important delegates.

Kew's presence and advocacy for the role of nature at the event led to significant social media engagement, with over 70 pieces of media coverage, high-profile interviews, and advertisements in the *Financial Times* and *The Economist*.

In the months since the summit, we've been turning interest into commitment, converting the conversations enabled by our substantial platform into the relationships required to help meet the planetary emergency.

Kew's Director of Science Professor Alex Antonelli with Simone Vidal da Silva and Romancil Gentil Kreta, Indigenous leaders from Brazil, at COP26

Professor Sir Partha Dasgupta

Professor Sir Partha Dasgupta awarded Kew International Medal

In September 2021, Professor Sir Partha Dasgupta was awarded the 14th Kew International Medal, which is presented to one individual a year whose vital work is in line with Kew's mission: to understand and protect plants and fungi for the wellbeing of people and the future of all life on Earth.

Sir Partha, who is one of the world's most respected economists, was chosen to receive the prestigious medal following the publication of his groundbreaking report 'The Economics of Biodiversity: The Dasgupta Review', published earlier in the year.

Sir Partha said: 'Our long-term prosperity relies on rebalancing our demand of nature's goods and services with its capacity to supply them. To do so requires bringing face to face economics and ecology. I'm delighted and honoured to accept this award, from a world-renowned institution which continues to contribute so much to our understanding of the latter.'

The Millennium Seed Bank at Wakehurst

A prestigious award for the Millennium Seed Bank Partnership

In November 2021, Kew's Millennium Seed Bank Partnership (MSBP) received the Worldwide Award for Biodiversity Conservation and a prize of 250,000 euros in the 16th edition of the BBVA Foundation Awards for Biodiversity Conservation.

The MSBP is the largest *ex situ* plant conservation programme in the world, coordinated by Kew and made up of a network of international partners worldwide. It was recognised for 'its extraordinary contribution to the preservation of the world's plant biodiversity'.

The judging panel was particularly impressed by the programme's training capacity, noting that it 'reflects how cooperation without borders can advance nature conservation worldwide and successfully address the central challenge of preserving biodiversity'.

Kew featured in the *Guardian* and *Observer* seasonal appeal

In December 2021, Kew was chosen alongside three other charities as a beneficiary of the *Guardian* and *Observer* annual seasonal appeal. Over 9,500 readers raised more than £1 million for the four organisations, each chosen for their work tackling climate change.

The newspapers ran a series of in-depth stories covering the long-term work of the Kew Madagascar Conservation Centre, where 40 Malagasy scientists, students and support staff are permanently based. They work with collaborators, local partners and communities to safeguard rare plant species, protect grasslands to improve livelihoods, and conserve wild yams to increase food security. The appeal funding is supporting projects in Madagascar that seek to address the themes of climate change, biodiversity loss and the enhancement of livelihoods.

High-profile visits

In the summer of 2021, in the lead-up to November's COP26 climate summit in Glasgow, Kew Gardens hosted several critical international and UK government events and visits.

The Department for Business, Energy & Industrial Strategy hosted a dinner for London-based ambassadors to discuss commitments to the COP26 campaign on Forest, Agriculture and Commodity Trade, where Kew scientists shared their knowledge and expertise.

His Majesty King Charles III, our Patron, brought the President of Gabon, Ali Bongo Ondimba and a group of chief executives from his Sustainable Markets Initiative to Kew to discuss the urgency of the biodiversity crisis and showcase our work.

UK COP26 President Alok Sharma hosted an important meeting with the former President of Kenya, Uhuru Kenyatta; the former Secretary of State for Environment, Food & Rural Affairs, George Eustice, opened the UK government's pre-COP event; and US Special Presidential Envoy for Climate, former Secretary of State John Kerry, gave his pre-COP speech in a press conference before enjoying a behind-the-scenes tour.

His Majesty King Charles III and the President of Gabon, Ali Bongo Ondimba

News from Kew Science

A new science strategy

In September 2021, we launched Kew's 'Science Strategy 2021–2025', outlining our ambitious plan to help combat the unprecedented rate of biodiversity loss, and the fact that many of the useful properties of plants and fungi remain largely untapped, together with the extraordinary potential they hold.

With five priorities, the strategy details how we will innovate, inspire and use our influence to leverage Kew's considerable assets and achieve maximum positive impact. The strategy is aligned to 'Our manifesto for change 2021–2030', Kew's corporate strategy for the decade ahead, the ultimate goal of which is to help end the extinction crisis and create a world where nature is protected, valued by all and managed sustainably.


Lee Davies, Collections Manager, in the Fungarium

Two irreplaceable collections made globally available

Home to over seven million specimens, Kew's Herbarium is one of the largest in the world, with 20,000 new additions of plant specimens each year. Our Fungarium, with over 1.25 million samples of fungi from all seven continents, is one of the planet's oldest and most scientifically important collections of fungi. These two collections form an unrivalled evidence base that underpins much of Kew's research.

In October 2021, the UK government confirmed that it will fund £10 million of the £30 million needed to complete large-scale digitisation of the collections. Approximately 70 Kew staff will work with a third-party supplier to digitise up to 8.5 million plant and fungal specimens across four years, allowing us to protect and preserve the collections for future generations. Plus, via an innovative online portal, this important data will be made globally and freely available. Along with government funding, the digitisation of the Herbarium and Fungarium collections has been supported by the first Chairman of Kew's Board of Trustees, Lord John Eccles. We will continue to seek funding for the remaining costs.

The 'false banana' feeding millions

Enset (*Ensete ventricosum*) is a wild African banana relative whose domesticated form provides the staple food for 20 million people in Ethiopia – around a fifth of the population. It has flexible harvest times, stores well, and is relatively drought and disease tolerant, which earns it the name 'the tree against hunger' among the communities who grow it.

However, despite the fact enset grows in the wild across Africa, it is not cultivated and eaten more widely. In a new Kew paper, published in 2022 in the journal *Environmental Research Letters*, Kew scientists sought to understand why, and to model ways to overcome that anomaly, building on their long-running relationships with local researchers and farmers.

The team found that enset could be grown over a much larger area, expanding perhaps even twelvefold to make a valuable contribution to food security, with persisting suitability even under high-emission climate change scenarios. Their research also underlines the importance of conserving the wild enset growing in steep river valleys across eastern and southern Africa, which contains diversity that could be key in the future for plant breeding.

Diversifying farming systems will be critical to adapting the ways we grow and eat in the face of multiple environmental threats and, with partners, Kew is playing a major role. Enset could be an important part of this work.


Ensete ventricosum in the Temperate House


Ensete ventricosum growing next to maize

NEWS FROM KEW SCIENCE


Kew team collecting specimens in Ebo forest, Cameroon

205 plants and fungi officially named in 2021

In 2021, Kew and partners named approximately 205 plants and fungi from across the planet. The list spans an extraordinary breadth of species, from a ghost orchid that grows in almost complete darkness, to an insect-trapping tobacco plant, and a tropical pink voodoo lily found in Cameroon's threatened Ebo rainforest.

Sadly, several of the 205 species named with Kew's input this year are already extinct in the wild, and many are threatened. The new species lists we publish each year garner considerable press coverage and are a critical reminder of the urgent need to strive for their protection so that we have the opportunity to research their properties.

Improving biodiversity protection using AI technology

In a new paper published in *Nature Sustainability* in March 2021, Kew scientists and partners showed how artificial intelligence holds great promise for improving the sustainable use and conservation of biodiversity and ecosystem services in a rapidly changing, resource-limited world.

An international team – with individuals from Kew, the University of Fribourg in Switzerland, the University of Gothenburg in Sweden, and London-based company Thymia Limited – created a piece of software named CAPTAIN (Conservation Area Prioritisation Through Artificial INtelligence). The software integrates biodiversity data and conservation budgets with data concerning climate change and human pressures before calculating costs and benefits, with the paper detailing a novel framework that could be used to prioritise areas for protection.


Laetiporus sulphureus

Unlocking the genetic secrets of a popular UK fungus

The chicken-like texture and flavour of one of the most well-known fungi found in the UK, chicken of the woods (*Laetiporus sulphureus*), makes it highly sought-after in the culinary trade. It is also one of the key engineers of the hollowing process in veteran and ancient trees, a role that creates microhabitats booming with biodiversity.

This year, chicken of the woods became the first ever species of fungi in the Darwin Tree of Life project to have its full genome sequenced, with Kew scientists providing the specimen and contributing our barcoding expertise. It is an important milestone for the major Darwin Tree of Life project, an ambitious initiative under the wider Earth Biogenome Project, which comprises a consortium of 12 institutions led by the Wellcome Sanger Institute. The Darwin Tree of Life project is working towards determining the DNA sequence of all 70,000 species of plants, animals and fungi in Britain and Ireland and making the data freely available online.

With the chicken of the woods genome in place, we can expand our understanding of how this essential habitat-engineering fungus operates and interacts in its environment – critical information when it comes to protecting the myriad organisms that rely on dead wood and tree-hollow habitats.

Building a sustainable rattan industry

The long, flexible stems of the rattan palm, harvested extensively from the tropical rainforests of Asia and the Pacific regions, are the raw material for a multibillion-dollar trade in cane furniture and other woven articles.

However, there are fundamental knowledge gaps when it comes to the identification and conservation status of traded rattans, calling into question the sustainability of the industry. Currently, there are no means of identifying traded species once they have entered the supply chain, and important traded species are now commercially extinct in some parts of their range. Kew has joined forces with IKEA of Sweden AB to address this urgent problem and empower stakeholders to drive impactful, industry-wide change.

During 2021, our experts have been drawing on Kew's unrivalled collection of rattan specimens – the richest on the planet – to create a comprehensive genomic reference database for all rattan species. We are developing robust lab protocols for generating DNA data from rattan furniture, data that can then be used to identify the species involved. Plus, we are developing bioinformatic workflows for identifying rattans using DNA.

Once complete, the database and workflows will be made publicly and freely available. And, with less than ten per cent of rattan species currently published on the International Union for Conservation of Nature Red List of Threatened Species, we are laying the foundations for the first formal conservation assessment of all rattans, along with a strategy for doing so.


Rattan fibres being dried in Central Kalimantan, Indonesia

NEWS FROM KEW SCIENCE

Working with local communities to restore Mexican forests

Cascada de Texolo waterfall in the state of Veracruz

This year, we are raising funds with Herbal Essences, along with our partners from the NGO Pronatura Veracruz (PNV), to support community-based reforestation activities in Veracruz, south-east Mexico. Despite its location in the Mesoamerica Biodiversity Hotspot – one of the most biodiverse places on the planet – this area faces some of the highest deforestation rates in the world.

Since 2015, in partnership with the Facultad de Estudios Superiores Iztacala of the Universidad Autónoma de México (Fes-I UNAM) and with support from The Garfield Weston Foundation, Kew experts have been working to collect and conserve the seeds of over 400 useful native tree species. The seeds are banked in-country and duplicated at the Millennium Seed Bank at Wakehurst. Research is carried out on the seeds' germination requirements and desiccation tolerance (ability to withstand drying) for banking.

In Veracruz, we're working with PNV to grow seedlings of locally important tree species in community-managed nurseries, to support the reforestation of degraded areas. Species include a range of oaks, such as the endangered *Quercus insignis* and the near-threatened *Quercus pinnativenulosa*, which form part of the area's exceptionally biodiverse pine-oak forests and tropical montane cloud forests. With 90 per cent of the cloud forest in the project area having already been destroyed, this work to restore what has been lost could not be more critical.

Kew's continuing work in the region puts a particular focus on preserving the knowledge of local communities, whose understanding of which trees are useful for food, materials and medicine is often passed down through generations.

We are also making sure that this project supports local women. Around 60 per cent of those working in the local nurseries to propagate trees for replanting are women, and female scientists are in leadership positions for this programme at Kew and at Fes-I UNAM and PNV in Mexico.

This project forms part of the Herbal Essences 'Replant Our Planet' campaign, supporting community-based reforestation projects worldwide.

KEW SCIENCE IN FOCUS

Saving stately palms and leopard-print succulents

Spectacular diversity

With its long stretch of Indian Ocean coastline and diverse geology and geography, Mozambique is home to some spectacular plant and habitat diversity.

From a stately palm (*Raphia australis*) to a leopard-print succulent (*Orbea halipedicola*), many of its species are exceptionally beautiful and unusual, with a considerable number only to be found in Mozambique (endemic) or growing only in Mozambique and neighbouring countries (near-endemic).

These endemic and near-endemic species are vital for countries to identify and conserve. The plants themselves, and the habitats they form, provide important resources such as timber and medicine, and essential ecosystem services such as helping protect soils and watersheds.

However, many of Mozambique's unique plants are under threat, with an increasing demand for agricultural land and natural resources leading to large areas of forest and other natural habitat being cleared.

In a country like Mozambique, where there are a high number of species at risk and resources are limited, it's important to be strategic when it comes to conservation. Dr Iain Darbyshire, Mozambique Research Leader, says: 'The wellbeing of the world is dependent on plants, yet as many as two in five species face extinction. It is vital, therefore, that we effectively prioritise conservation efforts to allow plant diversity to recover and thrive, with all the societal benefits that can bring.'

In 2022, the first, seven-year phase of Kew's flagship programme, Tropical Important Plant Areas (TIPAs), is coming to a close. During that first phase, Kew experts like Iain have been working closely with partners in Mozambique and seven other countries and territories across the tropics, where biodiversity is often especially abundant. The teams identify areas that have exceptional plant richness or are home to rare and threatened species. They then designate the areas Important Plant Areas (IPAs), helping various stakeholders – from local communities to NGOs and national authorities – to ensure their protection and management.

Pressed and boxed specimens of *Raphia australis* in the Kew Herbarium

Broadening access to vital data

The TIPAs Explorer (https://tipas.kew.org) is a user-friendly online portal aimed at researchers, conservationists and policymakers worldwide. Continually updated as our in-country teams deliver new data, the tool shows how species are distributed, along with the threats faced and the levels of protection, with over 170 sites uploaded so far.

Creating a checklist

The first stage in the process, ahead of the fieldwork, is to produce a checklist for team members to use – a considerable undertaking. As Jo Osborne, Kew botanist and former TIPAs Project Manager, notes: 'Our knowledge of Mozambique's flora was based on herbarium specimens resulting from botanical fieldwork, both historical and recent, including species new to science that were only just described. So, gathering data to put together a checklist was no small task, involving lengthy reviews of literature and herbarium research. The pressed and dried plant specimens provide tangible evidence of where the endemic plants have been found and a wealth of information on their phenology and habitat.'

Once a checklist is in place, the expeditions commence, which in this case were in partnership with our colleagues from the Mozambique Agricultural Research Institute (IIAM) and Eduardo Mondlane University.

Evidencing the case

The Mozambique TIPAs team found it is home to an extraordinary 271 strictly endemic plants and a further 387 near-endemics. The sites they designated as Important Plant Areas form a network of 57 locations that make up a total of 22,950 square kilometres. That is less than three per cent of Mozambique's total land area, yet it accounts for important populations of 82 per cent of the country's threatened plants and nearly three-quarters of its vital endemic and near-endemic species.

The Mozambique results provide evidence that effectively managing a relatively small land area will have huge conservation benefits, vital in a country where legal protection has been granted to fewer than 50 per cent of the sites identified in this study to date.

Embedding knowledge and sharing results

Our TIPAs teams make good-quality data widely and easily available via the TIPAs Explorer portal, while also authoring papers and books in multiple languages, speaking at high-profile conferences, delivering in-person and virtual training, and engaging in a variety of in-country publicity and awareness-raising activities.

Orbea halipedicola

All of this helps us to share lessons learnt, refine methodologies, and strengthen the programme as it matures and spreads to new countries. Building capacity, supporting early-career botanists and engaging with local stakeholders are all central to the programme, such that knowledge becomes embedded and change is long term and sustainable.

What's next for TIPAs?

While the first seven-year phase of the TIPAs programme is now complete, our long-term partnerships are thriving, and conservation efforts continue in Bolivia, Cameroon, Guinea, Indonesian New Guinea, Mozambique, Uganda and a number of UK Overseas Territories in the Caribbean. In countries where IPAs are evidenced, accepted and in place, such as Guinea, our focus has moved towards working with our partners to support habitat protection by the people who live locally to these areas. We are helping improve livelihoods by supporting the sustainable use of those habitats and of underutilised indigenous plant species, which Kew scientists are researching.

We're also expanding our TIPAs partnerships into new countries, such as Ethiopia and Sierra Leone, with representatives from both of these countries approaching Kew for guidance in establishing a TIPAs programmes. While there is a long way to go, Iain says: 'The programme is transforming our understanding of some of the globe's most precious and threatened biodiversity hotspots.'

We thank Steve Lansdown CBE and Maggie Lansdown, and Oppenheimer Generations Foundation for their generous support of the TIPAs Mozambique project.

KEW SCIENCE IN FOCUS

Plants for healthy bees

We're investigating plants that can help protect vulnerable pollinators from disease

Lowland heathland in Lower Saxony, Germany

Critical ecosystem services at risk

Insect pollination services are valued globally at more than US$200 billion, with almost 90 per cent of the world's flowering plants – including many important food crops such as apples and strawberries – requiring animals like bees, wasps, flies and even birds and bats for pollination.

However, many wild pollinators are declining in the UK and around the world, with potentially severe impacts on agricultural productivity, ecosystem function, and human health and welfare.

Like humans, pollinators can catch diseases that make them sick, and the parasites that cause some of those illnesses are a natural part of the web of life. However, additional pressures such as habitat destruction and pesticides are pushing pollinators to the edge of their ability to cope. While sick colonies of domesticated pollinators can be treated by, for example, beekeepers, it's urgent that we ensure those in the wild can deal with disease threats too.

Finding medicinal compounds in plants

At Kew, Dr Hauke Koch, Research Leader in Pollinator Biological Chemistry, and Professor Phil Stevenson, Priority Leader for Trait Diversity and Function, have been working with partners to help address this critical challenge. They are investigating the complex relationships between plants and pollinating insects, a renowned area of expertise for Kew.

The team has been researching the chemistry of nectar and pollen in a wide range of plants to identify species that might provide medicinal benefits for vulnerable pollinators.

Heather, strawberry trees and lindens

One parasite of concern for bumblebees is *Crithidia bombi*. It's a microscopic parasite that attaches to the wall of the bumblebee's hindgut. Infected bumblebees often fail to start new colonies and can even die early. Since *Crithidia* is also one of the most widely occurring parasites in bumblebees it is an important research target.

In 2019, Koch and Stevenson made the important finding that a naturally occurring chemical in heather nectar, the UK's second most productive nectar plant, can prevent *Crithidia* infections in bumblebees. That finding helps underscore the importance of conserving heathlands, where heather grows, which have been disappearing at an alarming rate across Europe.

In 2022, the team identified two more nectar compounds, unedone from strawberry trees and tiliaside from linden trees, that may help bees to cope with the burden of disease.

The researchers fed unedone and tiliaside to buff-tailed bumblebees (*Bombus terrestris*) to test their effects against parasites, looking in detail at the complicated interactions of the two compounds and the bumblebee microbiome. They found that while those interactions were complex, with the bumblebee gut needing to 'activate' the compounds for them to take effect, both compounds inhibited the *Crithidia* parasite.

Koch and Stevenson published their findings in a special issue of the *Philosophical Transactions of the Royal Society B*, which, with contributions gathered from an important international conference held at Kew on the topic in September 2021, was dedicated to pollinator health.

Dr Hauke Koch catching bees

Bombus terrestris

Planting trees for bees

Dr Koch explains why these findings are so important: 'The benefits of planting trees to mitigate climate change, improve our wellbeing and support pollinator biodiversity, both in cities and the wider countryside, are increasingly recognised. We have shown that planting the correct tree species can not only help feed our pollinators, but also reduce their disease burden.' He adds: 'The global decline of plant tree diversity could mean that pollinators are losing health-promoting species without us realising it.' As such, the research is underscoring the critical need: 'to further study the importance of plant diversity for pollinator health and ensure that key beneficial plants like heather, strawberry trees and lindens are protected'.

Now, the team is doing exactly that, as part of Wakehurst's flagship Nature Unlocked programme. See page 20 and **kew.org** for more information.

We would like to thank the Peter Sowerby Foundation for their generous support of this project.

In the gardens

Palm House in the summer

One of Britain's top visitor attractions

Our 2021 summer and autumn festivals at Kew Gardens and Wakehurst – *Secret World of Plants*, *Summer of Sound* and *Japan* – as well as a series of specially commissioned exhibitions in the Shirley Sherwood Gallery of Botanical Art, a range of half-term activities including *The Beano* and *The Gruffalo's Child*, and our annual showstoppers, *Christmas at Kew*, *Glow Wild* and *Orchids*, saw visitors enjoying Kew again in impressive numbers. The Association of Leading Visitor Attractions (ALVA) confirmed Kew Gardens as second only to Windsor Great Park in its annual list of Britain's most-visited attractions in 2021, with 1,963,171 people sharing in the wonder of the natural world via our unique combination of heritage, science and horticultural excellence.

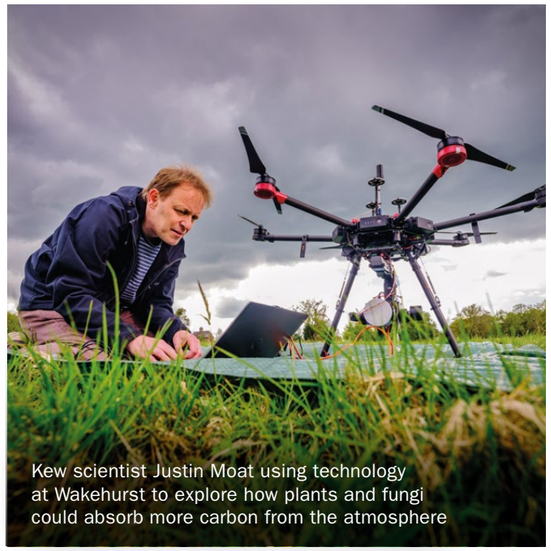
New at Kew Gardens

In December 2021, we opened the Family Kitchen & Shop at Kew Gardens. The multi-sensory eatery offers a place for families to eat, drink and learn more about the origins of food, with a bespoke design featuring vibrant sculptures of plants and fungi. And, in February 2022, a public viewing room to the Arboretum Nursery opened, inviting visitors to witness the specialist work going on inside. The three-year-old nursery has been specially designed for growing hardy plants, with six state-of-the-art environmentally controlled zones.

The Family Kitchen

IN THE GARDENS

Titan arum in the Princess of Wales Conservatory



Kew scientist Justin Moat using technology at Wakehurst to explore how plants and fungi could absorb more carbon from the atmosphere

A new Guinness World Record

With over 16,900 species, in 2021 Guinness World Records officially confirmed Kew Gardens as home to the 'largest collection of living plants at a single-site botanic garden'. From the longest and biggest plants to the smelliest and smallest, our extraordinary collections have long been breaking records, achieving global renown for their conservation value and variety.

A primetime hit

Channel 5 returned to Kew and Wakehurst this financial year to film a second series of the hit primetime show *Kew Gardens: A Year in Bloom*, offering an unprecedented behind-the-scenes look at what makes Kew so special to millions of viewers during summer 2022. Both series are currently available in the UK on My5, Channel 5's free streaming service.

Ed Ikin, Director of Wakehurst

Ed Ikin appointed Director of Wakehurst

In November 2021, Ed Ikin became our new Director of Wakehurst. After a successful career with the National Trust, Ed joined the Wakehurst team in 2015, becoming Deputy Director and Head of Landscape, Horticulture and Research to lead on major infrastructure projects including the new American Prairie landscape. He is a key figure in the shaping of Wakehurst's new flagship research project, Nature Unlocked: the Landscape Ecology Programme (see page 20).

Kew for £1

In January 2022, a new low-cost entry price arrived at Kew Gardens and Wakehurst, as part of our commitment to making a great day out in nature as accessible as possible.

People in receipt of Universal Credit, Pension Credit or equivalent legacy benefits can now enjoy each of our sites for just £1, an offer that was introduced along with a suite of lower-cost options listed at **kew.org**. During the first six months of the scheme, we welcomed 8,000 visitors to Kew and Wakehurst for £1.

Simon Toomer appointed Curator of Living Collections

In January 2022, Simon Toomer joined Kew in a new role, Curator of Living Collections. Simon brings a wealth of experience from his time at the National Trust, as Director of Westonbirt Arboretum, and as Chair of PlantNetwork, the primary network for holders of living plant collections in Britain and Ireland. Simon will focus on ensuring that Kew's Living Collections play a positive part in understanding, explaining and tackling the biodiversity and climate crises. He says: 'I will be working closely with science and species conservation teams to integrate our work, as well as looking at ways we can minimise carbon emissions and support Kew's wider drive for sustainability.'

Simon Toomer, Curator of Living Collections

Training at Kew

In 2021, we launched a new, paid, one-year training programme – Introduction to Horticulture – intended to to help open up the world of horticulture to people from ethnic minority backgrounds, who are under-represented in the sector. Participants on the course have been combining their time working hands-on at Kew with study days at Capel Manor College.

The new course is one of a range of educational opportunities at Kew, which span all educational levels and include one-off short courses and workshops, too. We continue to expand our education offer in partnership with leading institutions including Queen Mary University of London and Royal Holloway, University of London, and it's our priority to widen access to our resources and expertise in the decade ahead.

Above: Plant identification and fieldwork with students
Right: Training the next generation of plant taxonomists

Nature Unlocked

Producing vital data

At Wakehurst, we are working hard to fight three major environmental threats the UK is facing: biodiversity loss, climate change and land use change.

To combat these threats, we need nature-based solutions – interventions where humans act as stewards of nature, recognising and valuing its benefits and working with it to address social and environmental challenges.

But how can we ensure that the actions we take are not only rapid and at a large scale, but also effective and long term?

This year marks the first year of our major new research project at Wakehurst, Nature Unlocked: the Landscape Ecology Programme, which will help generate the data that is urgently needed to address that question.

Dr Mark Lee, a scientist from Royal Holloway, checking weather sensors in Bethlehem Wood, collecting real-time hydrological and meteorological data across habitats

A living laboratory

Biodiverse landscapes provide more ecological, environmental, cultural and socioeconomic benefits than less biodiverse landscapes, and are more resilient to flood, droughts and diseases.

Spanning over 500 acres in the heart of Sussex, Wakehurst boasts a varied and species-rich set of landscapes. Benefitting from centuries of human stewardship and leading best practice in sustainable land management, it is in a unique position to provide evidence of the value of UK biodiversity.

During the first year of an initial three-year phase of Nature Unlocked, Wakehurst has transformed into a unique living laboratory, with our scientists and partners undertaking extensive, interdisciplinary research into the site's range of rich habitats.

We're collecting high-quality scientific evidence – at a large scale, over the long term, and underpinned by an understanding of why nature matters for the culture and wellbeing of local communities.

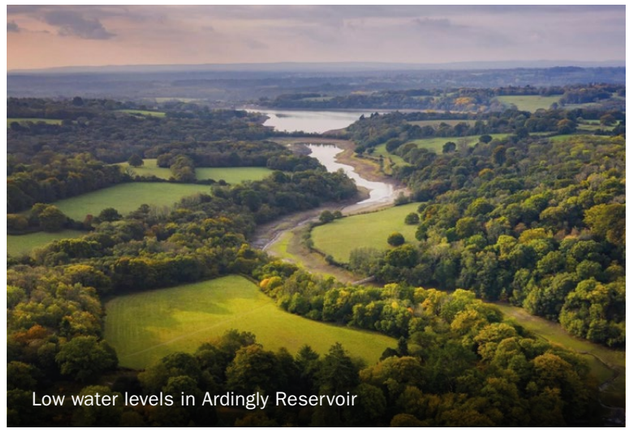
Citizen science volunteers at Wakehurst doing pollinator surveys in grasslands

WAKEHURST IN FOCUS

Nature Unlocked: our four research pillars

Water

Kew's experts are looking at how different habitats can improve resilience to climate impacts such as flooding and drought. This year, we've developed partnerships with institutions like Imperial College London and Royal Holloway, University of London to broaden research opportunities. Wakehurst boasts ornamental cascades, a lake, a reservoir, brooks and wetlands, with water flowing across multiple habitats to Ardingly Reservoir, which feeds the River Ouse. The 'water' strand of our research will explore how biodiversity influences hydrological flows and landscape function, which will feed into UK greenhouse gas emission inventories and land management.



Low water levels in Ardingly Reservoir

Two red mason bees (*Osmia bicornis*) mating in apple blossom

Pollination

Our scientists are investigating how biodiverse environments maximise the benefits of wasps, hoverflies and bees. This year, as part of the Nature Unlocked programme, Ground Control supported a University of Sussex MSc Student to investigate how roadside and trackside verges can be used to enhance biodiversity and boost populations of our vital pollinators. The results are informing Ground Control's management of these important habitats. Our experts also trained over 90 Ground Control staff in habitat restoration for pollinators.

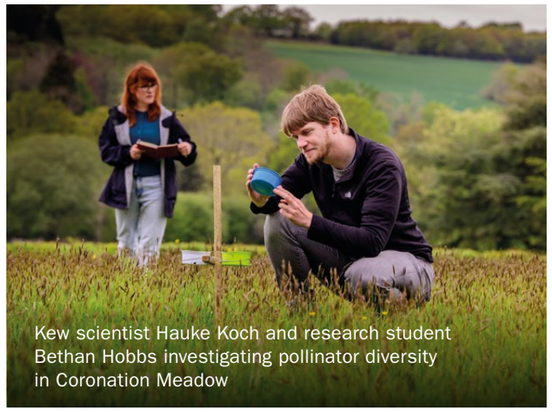
In the first year of a five-year partnership, Mount Anvil and Peabody have supported two early-career scientists to collect baseline pollinator diversity data across our habitats, and we hosted four citizen science days to train over 70 individuals to monitor pollinator trends. The data feeds into the UK Pollinator Monitoring Scheme's national database, and will be used as evidence to inform land management that takes into account pollinator diversity in urban spaces.

Nature Unlocked's pollination research will become part of a fully integrated UK research group on pollinator diversity and will have input into national strategies.

Carbon

We know that trees absorb carbon, but we're exploring how a combination of different plants and fungi could help store even more. This year, we continue to partner with Sky, who is supporting this strand of our research, to address the role of business in investing in nature for Net Zero.

In 2021, we received a £2.3m government grant to measure carbon sequestration in Wakehurst's biodiverse habitats. This is part of a wider UK pilot programme evaluating nature-based solutions involving Natural England; the Department for Environment, Food & Rural Affairs; the Department for Business, Energy & Industrial Strategy; the Environment Agency; and the Forestry Commission. Our carbon research will feed into a landscape-modelling tool, developed by the University of Sussex, that will provide evidence for government and businesses across the UK.



Kew scientist Hauke Koch and research student Bethan Hobbs investigating pollinator diversity in Coronation Meadow

Kew scientist Dr Gary Egan installing a greenhouse gas flux sensor at Wakehurst

Wellbeing

We're collecting scientific data on what it is about being in the natural world – especially rich, biodiverse habitats – that improves our wellbeing. With our partners, we're designing projects to engage Wakehurst visitors and local communities. We are building a robust body of evidence to support the importance of nature for mental and physical wellbeing for people from a range of backgrounds, as well as the need for access to it.

This year, with support from players of People's Postcode Lottery and in partnership with Royal Holloway, University of London, over 1,180 local schoolchildren have been involved in a variety of exercises, including walks, surveying, drawing exercises and forest bathing. In addition, over 300 adult visitors have gathered physiological data on the impact of being in the Wakehurst site by wearing heart-rate variability monitors. The results will form a report for local schools and communities and a peer-reviewed paper, helping to fill vital evidence gaps on the social values of biodiversity across UK landscapes.

Kew in the community


Youth Explainers in the Temperate House

A successful fifth year for the Youth Explainers

Every year, 25 young people aged 14 to 17 join us at Kew Gardens to become Youth Explainers, our award-winning volunteering programme. They enjoy weekly training sessions from October to March and spend April to September volunteering twice a month in the Temperate House to unlock its amazing stories for visitors.

Kew's Learning and Participation team works with schools in local London boroughs to make sure the programme reaches people who might not have had similar opportunities in the past. And, once our Youth Explainers are recruited, we work with them to enrich their communication and core science skills, helping to sow the seeds of exciting futures in science, industry and public life. Successful participants earn a Kew Young Environmental Leaders Award and the volunteering and skills requirements for a silver or bronze Duke of Edinburgh Award. One participant said: 'The amazing world around us relies on plants, and that can't be taken for granted.'

In this fifth year of the scheme, highlights included sessions with award-winning director Miranda Cromwell, who taught tools for improvisation and for communicating with clarity and enthusiasm, as well as game design workshops from Niantic creator Andrew Marks. The group learnt from young people with varied life experiences about how to make their work more accessible, which included developing their British Sign Language skills, and, in a first, the group held a model COP26 climate summit. Taking on the roles of world leaders and key communities affected in the fight for climate justice, the mock panel sessions made for plenty of inspiring and passionate debate.

A new weekly science club for families

With support from Richmond Parish Lands Charity, this year Kew piloted a new Saturday Science Club for families.

In collaboration with St Richard's CE Primary School and Ham Children's Centre, we welcomed 20 parents and 20 children from the local area who otherwise face barriers to entry for five sessions of high-quality, free science activities.

Running over a period of five months, the families got the unique chance to delve deeper into nature's seasonal changes and to develop relationships with the other families, with Kew and with plant science. Feedback from participants noted how much of a difference the programme had made to their children's happiness, confidence and curiosity in the wake of the pandemic. One parent noted: 'It allowed my child and I to bond and connect.' Another remarked that their child was: 'more observant. She really loves science and has started to describe herself as "a scientist"!'

The sessions were designed and delivered by Kew experts and a qualified science teacher, with a child-led approach ensuring the content remained dynamic and engaging. With research showing that children's ideas about science are often formed before the age of 11, and many primary-aged children already believing science isn't 'for them', Kew is delighted to be able to provide informal science learning experiences that help broaden perspectives and embed children's science capital for the future. We are seeking funding to make the club a permanent fixture.


Family learning in Edible Science: Kew's Kitchen Garden

In numbers: Grow Wild

Grow Wild is Kew's national outreach learning initiative, inspiring people to grow together, learn about nature and give back through volunteering. We work especially with those who face barriers to engaging with nature or are in urban or disadvantaged areas. Every year, we reach hundreds of thousands of people through our website, blogs, social media and free online events, covering a range of wellbeing, nature and science-related topics.

We distribute thousands of free seed kits and fungus-growing labs to bring people together and share the joys of growing.

We also support young people and communities with grants to run their own projects inspired by our UK native plants and fungi, helping them to transform urban spaces, share the wonder of UK native species and assist future environmental changemakers to thrive.

Grow Wild focuses on UK native plants and fungi because their species are declining due to habitat loss. They're also vital for biodiversity but are often underappreciated. Since 2013, over four million people have joined us online and on the ground, and we've won multiple national awards for our scale, impact and creativity.

10,000
The number of wildflower seed kits distributed to key workers this financial year. Each kit contained two seed packets – one for the applicant and one for them to send to a loved one. The campaign generated huge enthusiasm, with over 19,000 applications for kits in just a few days.

97%
The percentage of seed kit recipients (of 466 surveyed) likely to recommend Grow Wild. This year, 73 per cent of recipients intended to take further actions for nature beyond growing their Grow Wild wildflower seeds and 51 per cent had already done so.

46
The number of nationwide youth projects Grow Wild funded this year, each receiving £500 to run their own innovative project inspired by UK native plants and fungi. Each young person engaged others in their community through running workshops, creating artwork, transforming spaces and sharing their knowledge.

18
The number of young people completing a youth project who we also supported in an exciting new pilot, the Kew Youth Environmental Leaders Award, which equips young people to become our next generation of environmental leaders. One participant said: 'Grow Wild are incredibly supportive and what you will gain from this award exceeds just the funding. You will be encouraged to keep your project on target, you will be part of some career-boosting sessions, you will have so many questions answered: you won't regret it!'

5
The number of community project grants distributed to groups across London. Each project received £1,000 to transform a space with UK native plants.

1
An exhibition held at 70 St Mary Axe, showcasing the work of 18 young artists from across London who were awarded Grow Wild youth project grants in 2020 to create a unique piece of art inspired by UK native plants and fungi.

Top left: Community group Cordwainer's Grow
Middle: Community group Heath Hands
Right: *London Grows Wild Together* exhibition

We are grateful to all those who generously support Grow Wild, including The Finborough Foundation, 70 St Mary Axe Trustees, and the National Lottery Community Fund.

Thank you

The Board of Trustees of the Royal Botanic Gardens, Kew thank the following for their generous support of our vital work in the financial year 1 April 2021 – 21 March 2022

The A. G. Leventis Foundation
The Aldama Foundation
The Amar-Franses & Foster-Jenkins Trust
Margaret Andrews*
Annington
Arcadia – a charitable fund of Lisbet Rausing and Peter Baldwin
Barbara Aspinal
The Auriga Academy Trust
John Baker*
Bank of America
Jennifer Barrie-Murray*
Struan Bartlett
BBVA Foundation
Bloomberg LP
Boundless
Yvonne Boyce*
Rita Brown*
Brown Advisory
Dr Ann Burgess*
Marjorie Byers*
Bytes Software Services
The Calleva Foundation
Carlton Tower Hotel (Jumeirah Group)
Christine Chambers*
Patricia Crimmin*
CSSC Sports & Leisure
Helen and Peter Cullens
Daikin UK
Marion Davies*
The Dennis Curry Charitable Trust
Jonathan Drori
EcoWorld London
The Ellis Goodman Family Foundation
Empresaria Group plc
Esmée Fairbairn Foundation
Evolution Education Trust
Dame Amelia Fawcett DBE, CVO
Findlay Charitable Trust
Franklinia Foundation
Frugi
The Gatsby Charitable Foundation
Goldman Sachs Gives – Ben and Harriet Thorpe
Ramon Goodey*
Elizabeth Grenfel*
Ground Control Ltd
GSK
The Guardian and *The Observer*
Jennifer Homer*
IKEA of Sweden AB
The Ingram Trust
JATO Dynamics
The John Eccles Charitable Trust
The John Lewis Partnership
John Lyon's Charity
Margaret Kerr*
Kusuma Trust UK
Linde
Dora Lockley*
Stella Luce*
The Mallinckrodt Foundation
Barbara Mayer*
Alexander McQueen
Robert Meikle*
Pamela Millerson*
Jean Mist*
Gertrude Mortimer*
Patricia and David Moss*
Mount Anvil and Peabody
The Nicholas Bacon Charitable Trust
Roslyn Packer AC
PerkinElmer
Peter Sowerby Foundation
Jan and Linda Pethick
Players of People's Postcode Lottery
PuraPharm
Richmond Parish Lands Charity
James Robertson*
The Roger and Ingrid Pilkington Charitable Trust
John Rylett*
70 St Mary Axe Trustees
The Schroder Foundation
Jake and Hélène Marie Shafran
ShareGift
James Sherwood and Shirley Sherwood OBE
Sky
Gwendolyn Slade*
Starling Bank
The Steel Charitable Trust
SWIFT
Robert Swindale
Mr and Mrs Thirkell-White
The 3 Ts Charitable Trust
Pamela Turner*
Barbara Vine*
Vida Voles*
Margaret and David Walker
June Winfield*
The Winslow Family
The Woodspring Trust
Angela Yaffey*

Foundation Council

Pippa Wicks (Chair)
Marcus Agius
Judith Batchelar
Barbara Davis
Sarah Flannigan
David Fransen
Sarah Fransen
Joseph Gromacki
Margaret de Heinrich de Omorovicza
Razan Khalifa Al Mubarak
Kenneth Khaw
The Hon Robert Lloyd George
George Loudon
Jan Pethick
James Ritblat
Hélène Marie Shafran
John Taysom
Herta Von Stiegel
Johanna Waterous CBE
Ruth Yeoh

Patrons

Princess Augusta

Stephen Brenninkmeijer and Julie Fry
Dame Amelia Fawcett D.B.E., C.V.O.
Bob and Rohini Finch
Stephen and Julie Fitzgerald
David Fransen
Sarah Fransen
Michael and Joanna George
Mark and Meganne Houghton-Berry
The Hon Robert Lloyd George and Donna Lloyd George
Chrissie Marris
David Owen and Emma Walmsley
Marietta Schiestl
Carol and Pippa Sellars
Jake and Hélène Marie Shafran
Johanna Waterous CBE
Janet and Peter Winslow

Joseph Banks

Marcus Agius CBE and Kate Agius
Sir Henry and Lady Angest
Elizabeth Banks
Rosamund and Richard Bernays
Moira Black and Robert Gurd
Stuart Donachie and Chris Carter
Jonathan Drori and Tracy Chevalier
Lady Hamlyn
Sir John Kemp-Welch
Diane Klat
Latifa Kosta
Joan Lambert
Sonia and Nick Land
Flora and Sebastian Lyon
Jamie and Annabel Montgomery
Leo and Sue Noé
Peter Oliver and Philippa Watson
Tim Pennington and Kerry Godden
Jan and Linda Pethick
Brigid Philip
Michael and Sue Pragnell
Sheila Rankin
James and Joey Ritblat
Marilyn Taylor
John and Dina Taysom
Paul and Annette Wates
Pippa Wicks and Martin Taylor

Queen Charlotte

Jack Andrews MBE
Kate Bigwood
Miel de Botton
Christoph Burgard and Silke Petzold
Gay and David Cheyne
Joseph Childs
John Cook and Lucy Munro
Janet Cooper OBE
David Dutton and Mave Turner
Michael and Anna Hatchard
Frances Hellman and Warren Breslau
Shelley Jacobson and Brendan Robinson
Daphne Jarden
Maggie and Peter Murray-Smith
Richard Owen and Adrian Barbu
Elizabeth and Stephen Roberts
Sir Simon and Lady Robertson
Sibel Roller-Walach
Ruth and Tigg Savery
Martin Schoernig
Jeremy and Sarah Sillem
Caroline and Emma Snow
Sir Harry Solomon
Margaret and David Walker
Valerie and William Worth

William Hooker

Diana and Richard Allan
Abigail and Mike Amey
Catherine and John Armitage
James Bartos
Christopher and Margaret Beels
Rosamond Brown
Hirsh and Gill Cashdan
David and Elizabeth Challen
Sir Ian and Lady Cheshire
Maureen Cole
Sophie and Carlo Comninos
Lord and Lady De Ramsey
The Hon Simon Eccles and Carolyn Hitt
Nicholas and Jane Ferguson
Barbara Ghodse
Val Gooding CBE
Alan Greasley and Katriona Wilson
Margaret de Heinrich de Omorovicza
Gayle and Chris Hopkinson
Edward and Rosemary Hoult
Nicolás Ibáñez Scott and Jon Strickland
Sir Donald and Lady Insall
Russell Jacobs and Irina Lovkova
Edward Joy and Andrew Joy
Louise Kaye and Clare Arafa
Kristina and Jonathan Kenworthy
Jennie Kettlewell and Ian Bruce
Kenneth Khaw and Ruth Yeoh
John Kinnell and Beatrice Hartnoll
James and Clare Kirkman
Sonya Leydecker and Steven Larcombe
Jonathan and Helen Little
Jasmina Ljuhar
George and Angie Loudon
Dennis McGlade
Joanna Millan
Neil and Laurence Monnery
Zara and David Muren
Julian and Fiona Mylchreest
Grayson and Alexandra Nash
Bleddyn Phillips and Anne Pringle
Frances and Rodney Pickering
Brian Pitcher
Chelsea Purvis and Alnawaz Jiwa
Marie-Louise Rabouhans
Sally Rankin
Chris Rybczynski
Adrian Sassoon
Caroline and Mark Silver
Robert and Hilary Swift
Marian Thomas and Stephen Reisbach
Valentine Thomas
Stephen and Caroline Townley
Tamara Varga
Herta Von Stiegel
Sheenagh Wallace
Carol Walsh-Knutson and Kelley Knutson
Peter and Geraldine Williams

And all our other supporters, including those who have chosen to remain anonymous.

*signifies a legacy gift

Looking ahead

At Royal Botanic Gardens, Kew we have an ambitious plan to help stop biodiversity loss and develop sustainable solutions to some of our biggest global challenges.

As a world-leading plant science organisation with two beautiful botanic gardens at our core – Kew Gardens and Wakehurst – we are uniquely placed to generate evidence, solutions and action to restore and protect all life on Earth. And, with the support of philanthropists who share our vision for the world, we are launching a major fundraising effort to protect and restore global biodiversity and ensure the survival of future generations.

Over the coming years, together with our friends, partners and supporters, we will focus on delivering the strategic projects at the heart of 'Our manifesto for change 2021–2030', and look forward to sharing more about how you can help us with this important work.

Victoria amazonica in the Amazon rainforest in Peru

Royal Botanic Gardens, Kew, Richmond TW9 3AE
020 8332 5000 | kew.org | foundationdirector@kew.org

The Royal Botanic Gardens, Kew is an exempt charity.

Information correct at the time of going to print.
Printed October 2022.

Printed on 100% recycled paper.

Image credits

Contributing photographers: Andrew McRobb, Andrew Meredith, AVTG, Ekwoge Abwe, f.v.lara, Hauke Koch, Ian Alexander, Ines Stuart-Davidson, James Borrell, Jeff Eden, Jim Holden, jkraft5, Mike Bishop, Simon Fernandez, Visual Air, Vyacheslav Shevtsov, Yayan Indriatmoko.

Cover: © Visual Air

Royal Botanic Gardens Kew

kew.org

Registered with FUNDRAISING REGULATOR