Annual Report

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Botanischer Garten Berlin

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Annual Report 2023 – 2024
Botanic Garden and Botanical Museum Berlin

Botanischer Garten Berlin

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Verbascum arcturus, Imbros Gorge, Crete.

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Greenhouse for useful tropical plants.

Dialogue with society is important to us. Botanical gardens are ideal places for this, as they reach many people with a wide range of appealing attractions.

Prof. Dr Thomas Borsch
Director of the Botanic Garden Berlin

In 2024, the German Federal Government adopted the National Biodiversity Strategy 2030. With this strategy, Germany is committing itself to the goals of the Kunming-Montreal Global Biodiversity Framework and the EU Biodiversity Strategy 2030. A wide range of measures are to be implemented to achieve measurable goals. For this to succeed, the federal and state governments need reliable data, practical action must be knowledge-based, and society must be involved. This is exactly what we are working on at the Botanic Garden Berlin.

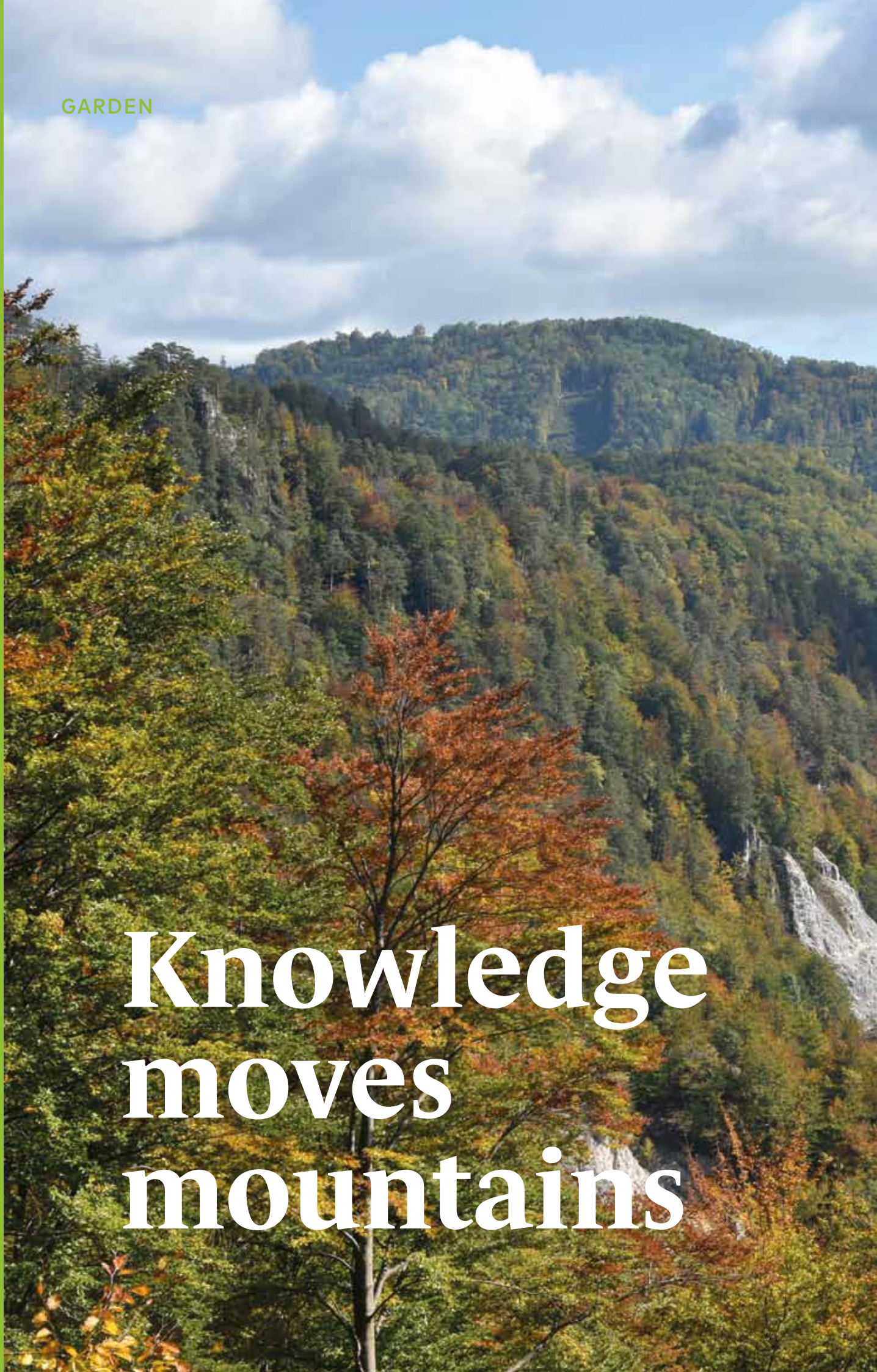
In view of the multiple crises we are facing, our mission to preserve and promote the diversity of plants, fungi and algae is becoming increasingly important. In these critical times, we see it as our responsibility not only to impart knowledge, but also to actively contribute to the protection and preservation of biodiversity. With our collection-based research, we are developing approaches for action together with partners in Berlin, Germany and internationally. Dialogue with society is important to us. Botanical gardens are ideal places for this, as they reach many people with a wide range of attractive offers.

This annual report provides an insight into our diverse activities and developments in the garden and its collections over the past two years. During this time, the comprehensive renovation of the garden's infrastructure was finally completed. Now it is even more important to maintain our work despite rising costs and austerity measures so that we can continue to be a place of education, research and recreation for Berliners and visitors from all over the world.

Despite these challenges, we remain optimistic. We firmly believe that, together with our tireless staff, loyal visitors and supporters, we can secure the future of our soon to be 350-year-old institution. I would like to express my sincere thanks to you all!

With best wishes,

Berlin, March 2025



Knowledge moves mountains

The "Carpathians and Pannonian Plain" section of Plant Geography is getting a new look

It is a legendary region that remains little known to many people even today. Countless myths and stories surround the Carpathians, which stretch in a 1,300-kilometre arc through eight European countries. The largest parts are in Poland, Slovakia, Ukraine and Romania, with smaller areas in Austria, the Czech Republic, Serbia and Hungary. Everywhere, the fascinating landscape with its high mountains, forests and steppes seems to have inspired people's imaginations.

For more than 120 years, visitors have been able to take a little trip into this world at the Botanic Garden Berlin. The 13-hectare "Plant Geography" section has always included a separate area with rock gardens, woodlands and steppes. Anyone who visited in 2023 will have noticed the first changes: the "Berlin Carpathians" are getting a new look – a process that will continue over the next few years.

"We had several reasons for redesigning this part of the outdoor exhibition," says Dr Gerald Parolly, who heads the Biological Collections Department at the Botanic Garden. The basic concept of the layout is based on the work of Carpathian expert Ferdinand Albin Pax. The first volume of his "Grundzüge der Pflanzenverbreitung in den Karpathen" (Fundamentals of Plant Distribution in the Carpathians) was published in 1889, just in time to serve as a detailed blueprint for the original planting of the Carpathian section at that time. "Since then, however, we have learned a great deal more about the local flora," explains Gerald Parolly. "Today, experts divide the Carpathians biogeographically in a different way than they did more than a hundred years ago. Many geographical names have also changed." Names such as "Transylvanian Alps" are no longer universally understood.

Mountain pines, spruce trees, rowan trees and Silesian willows line a stream in the High Tatras, Slovakia.

So it made sense to update the area names and subdivisions. Especially since the "Plant Geography" is gradually getting a modern information system with new signs as part of the "Joint Task for the Improvement of Regional Economic Structure" (GRW) funding programme financed by the federal government and the state of Berlin – so the "planting" of the signage should not lag too far behind.

There was and still is room for improvement in the plant stock of the "Berlin Carpathians." We already brought the garden area of the "Pannonian Steppe" in front of the Carpathian hills into excellent condition some time ago. This included the complex installation of a large-scale drainage system," explains Angela Schuhmann. She heads the "Plant Geography" garden area and is responsible for its horticultural maintenance with her team. This miniature landscape shows the vegetation of the large lowlands between the Carpathian arc, the Alps, the Balkans and the Dinaric Mountains. It consists mainly of steppes, dry scrub, sparse woods and salt flats.

However, the stone structures intended to represent the flora of the mountains were in need of renovation. Some species were in the wrong place, while others grew unnecessarily in multiple locations. "This made it difficult to see how the different altitudinal zones, habitats and biogeographical sub-regions of the Carpathians differ from one another," recalls Gerald Parolly. The revised planting also allows for better comparison with neighbouring sections of the "plant geography" such as the Alps, the low mountain ranges of Central Europe and the Balkans. At the same time, visitors can experience the unique flora of the region, which includes around 2,700 species of vascular plants.

The flora and vegetation of the densely wooded Western Carpathians are reminiscent of the Eastern Alps in many places. Species such as Clusius' gentian, Carpathian cushion moss (*Cherleria langii*) and single-headed cat's-ear

400
plant species
are only found in the Carpathians

(*Hypochaeris uniflora*) grow here and there. At the dry, warm foot of the mountains and in the foothills, the influence of the steppe flora from the east is unmistakable. Especially towards the south, more and more (northern) Balkan species such as the Transylvanian autumn crocus (*Crocus banaticus*) and the red lungwort (*Pulmonaria rubra*) appear. Finally, there are more than 400 endemic species, i.e. species that are only found in the Carpathians or in parts of them. These include the Carpathian bellflower (*Campanula carpatica*) and, in the Western Carpathians, the Tatra wallflower (*Erysimum wahlenbergii*).

In order to better reflect this diversity, Gerald Parolly modified the original concept and partially reorganised the "Berlin Carpathians" geographically and ecologically. There are still four hills representing different mountain ranges. They now have different names and some of them represent different areas than before.

Instead of travelling to the "Transylvanian Alps," visitors now travel to the Southern Carpathians. There is also a hill for the Western Carpathians with the High Tatras, for the Eastern Carpathians and for the Apuseni Carpathians in Romania, which are connected to the rest of the Carpathian arc by hilly landscapes. "Until recently, three of the four hills were dedicated to the flora of the north-western section of the Carpathians, just as the focus was in Pax's standard work," explains Parolly. The new classification better reflects the biogeographical reality. The mountain flora of these four sub-regions differ so significantly that they can each be well represented in the Botanic Garden. However, the geographical reallocation of the hills means that many plant species will have to be moved to different beds, and it will take a few years before the planting is finalised in detail.

In the case of the forests, the differences between the Eastern, Southern and Apuseni Carpathians are not so great. For this reason,

The Carpathians are home to some of Europe's last forests that have been largely untouched by humans, such as the primeval fir and beech forest in the region around Banská Bystrica, Slovakia.

the garden areas designated for them will be merged in future. Only the Western Carpathians will remain separate in terms of forest.

"Even the best plan is useless if you can't make it happen," emphasises Gerald Parolly. This challenging task is in the hands of Angela Schuhmann and her team. The gardeners will have relatively little work to do in the forests, as the redesign will be carried out step by step. "The basic planting of large trees from the time the garden was founded is very suitable," says Angela Schuhmann. Instead, the main task is to remove species from the undergrowth that do not occur in the Carpathians or to keep overly proliferating plants in check. New plantings are essentially limited to shrubs and perennials, which will help to highlight the differences between the Western Carpathians and the rest of the mountain range, as well as between different locations and altitudes.

One section of the Eastern and Southern Carpathians presented the team with a particular challenge. It was supposed to showcase plants from the shrub and herbaceous vegetation of the mountain forest zone. However, it was so overgrown with weeds and species from other habitats that little remained of the original exhibition concept. "We had no idea where to start," recalls Angela Schuhmann. So the garden team decided on a radical cure: a fresh start! Suitable plants were removed so that they could be reused later. Then, in the winter of 2023 and spring of 2024, electric vehicles and a mini excavator arrived. The area was completely cleared, dug out to a depth of 40 centimetres and filled with new substrate.

"It was a logistical challenge," says the expert, "but thanks to the help of many people, it was accomplished." The section is surrounded only by small paths, and so an access road had to be constructed to reach it with the necessary

A hummingbird hawk-moth on a knapweed (*Centaurea phrygia*) in the Liptov Carpathians, Slovakia.

equipment. Then, over a period of three days, soil was removed. Between 60 and 70 cubic metres of material had to be replaced, stones removed and replaced.

Today, this area still looks slightly bare with its limestone gravel on the surface. But replanting has begun. Here, too, the challenges lie in the details. A good portion of the necessary plants were already available, as the Botanic Garden has been collecting wild plants and seeds from the Carpathians since the 1970s. Although this was sometimes difficult during the Iron Curtain era, a remarkable collection has been amassed over the years. To better differentiate the different sections of the garden, additional species had to be procured.

The Botanic Garden obtains most of its seeds through an international seed exchange with other botanical gardens. According to Gerald Parolly's experience, wild varieties of steppe species from the Carpathian region are much more commonly offered in seed catalogues than mountain plants. "However, we recently received more than 20 mountain species from the Romanian Southern and Eastern Carpathians, mainly for the newly created area," he adds. Some of them are still being grown, while others have already been planted out.

In contrast, there were no good sources for the Western Carpathians. A visit to the site provided a solution. The Friends of the Botanic Garden and Botanical Museum Berlin-Dahlem generously supported this project. This enabled Gerald Parolly, Birgit Nordt, curator of the Mediterranean and temperate living collection since 2025, and Dr Juraj Paule, curator of the herbarium, to travel to the Slovakian Western Carpathians for a week in October 2022 to establish professional contacts, bring back seeds of as many species as possible to Berlin and gain insights into the local vegetation and flora.

The Kežmarský Valley at Zelené pleso (Green Lake) in the High Tatras, Slovakia.

Travelling by car via Bratislava, they first drove through the Carpathian foothills to the Great Fatra, then to the Low Tatras and finally to the High Tatras and some neighbouring mountain ranges. The weather was not necessarily on the travellers' side: "In the beech forest near Badín, we had pouring rain and, in the mountains, fresh snow down to the valley at the beginning," smiles Gerald Parolly. "At the summit, we scraped around in the snow like reindeer looking for fruiting plants."

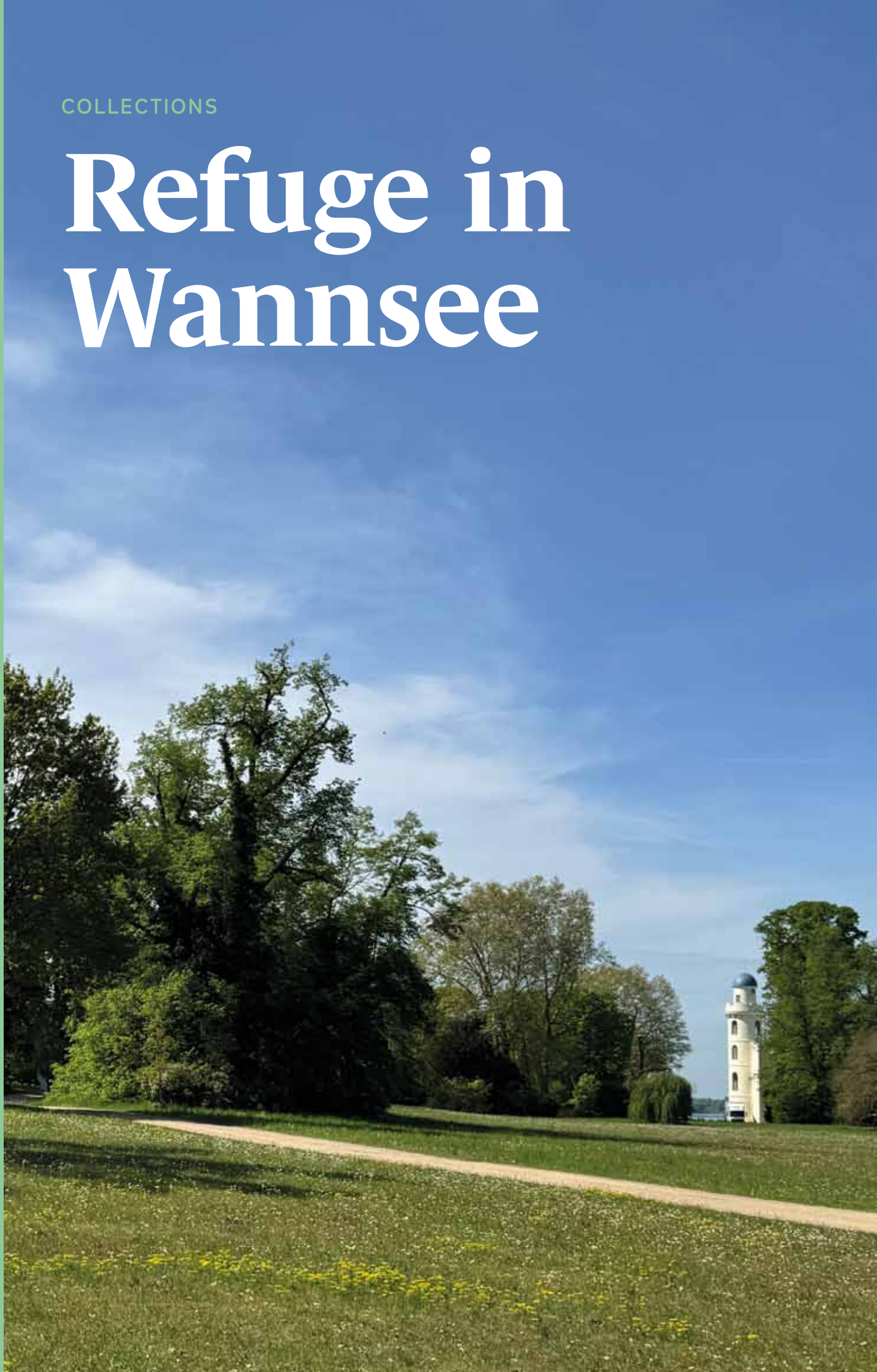
Nevertheless, it was an extremely successful excursion. As is so often the case, this was mainly due to the excellent cooperation with colleagues on site. The team was not only supported by researchers from the Faculty of Forestry at the Technical University of Zvolen. Juraj Paule established contact with Dr Zuzana Kyselová from the Botanic Garden in Tatranská Lominica at the foot of the High Tatras. The team owes her for seeds from more than 50 plant species that had not previously been seen in Berlin. These include the northern milk-vetch (*Astragalus norvegicus*), the woolly chickweed (*Cerastium eriophorum*) and the Tatra larkspur (*Delphinium oxysepalum*). In addition, there were living ferns for the forest undergrowth and cuttings of several willow species, such as the Silesian willow, which is typical of the region.

Particularly important: Zuzana Kyselová showed her Berlin colleagues the locations of interesting species and explained how the vegetation in different areas is differentiated

New addition to the arboretum: a whitebeam (*Sorbus*) from the Great Fatra, Slovakia.

and interlinked. This is an immensely valuable experience, even for proven experts. "Seeing things for yourself makes it much easier to understand a landscape – and to translate this new knowledge into garden planting," explains Gerald Parolly. Numerous photos were taken on site to document the habitats. These will help Angela Schuhmann and her team to continue modelling a mini version of the Carpathians. So that a small piece of the world of legendary mountains and valleys will also remain alive in Berlin.

Refuge in Wannsee



A botanical species conservation project was launched on Peacock Island in 2023

Peacock Island in Berlin's Wannsee has often been a refuge throughout its eventful history. Sometimes for nobles and kings in search of relaxation. Sometimes for an alchemist and glassmaker who wanted to work on secret experiments unobserved. In the 19th century, more and more exotic animals moved into the local menagerie. And in 1924, one of Berlin's first nature reserves was designated there to preserve rare plants and bird breeding sites worthy of protection.

Its relative seclusion on the outskirts of the city made the small island an ideal location for all these purposes for centuries. And so it is again today. Together with the Stiftung Preußische Schlösser und Gärten Berlin-Brandenburg (SPSG) and the Berlin Nature Conservation Foundation (SNB), the Botanic Garden Berlin is pursuing an ambitious goal there: at the beginning of November 2023, experts began reintroducing endangered wild plants to the island to prevent their final disappearance from Berlin.

The success of such projects depends on a great deal of scientific and horticultural preparatory work. First of all, we need the right plant material. In this case, it comes from the Botanic Garden Berlin, which has been operating Germany's oldest wild plant seed bank since 1994. The Dahlem Seed Bank stores seeds from many countries around the world, including those of endangered species. By using them for research and exchanging them with other botanical gardens, these biological treasures are a contribution to the preservation of biological diversity.

A project funded by the Federal Ministry for the Environment called "Wild Plant Protection Germany II" (WIPs-De) focuses on endangered species that are mainly found in this country and for which Germany therefore has a special responsibility. "We particularly collect

New plants of fragrant scabious (*Scabiosa canescens*) for Peacock Island in Berlin.

the seeds of such species, dry them and freeze them," explains Dr Elke Zippel, head of the Dahlem Seed Bank. Some of this material is used to grow new plants to support or rebuild populations in their natural habitats.

"However, you can't just plant any old plants anywhere," emphasises Prof. Dr Thomas Borsch, Director of the Botanic Garden. The challenge is not only to understand the different requirements of each species and select suitable locations accordingly. Scientific species conservation often requires genetic testing. "With some endangered plants, we often don't even know exactly where the species boundaries lie," explains the researcher. In such cases, it is difficult to decide what should be protected at all.

This applies, for example, to the broad-leaved marsh-orchid (*Dactylorhiza majalis*). This typical wetland orchid comes in a wide variety of sizes, shapes and colours. Are they all the

The team from the Botanic Garden Berlin reintroducing endangered plants on Peacock Island.

same species, or are there several species hidden behind the name? As part of his doctoral thesis, Max Fussan is currently working at the Botanic Garden Berlin to clarify this question. In a project funded by the Zwillenberg-Tietz Foundation, he is investigating orchids from different areas of Berlin and Brandenburg, as well as other populations from Central Europe, to identify differences and similarities in their genetic makeup.

However, even representatives of the same species can be genetically astonishingly variable. After all, populations from different geographical regions have often adapted to the specific characteristics of their habitat. "Preserving this diversity is particularly important in times of climate change," says Thomas Borsch. This is because it offers considerable potential for adaptation. For example, some individuals are better able to cope with drought, while others may be more resistant to disease.

"That's why we want to create the largest possible populations of endangered species when carrying out reintroduction measures or population support," explains Elke Zippel. These populations should then not only be able to reproduce on their own, but also adapt to changing conditions. "Evolution must continue, and to do that, we need to preserve intraspecific diversity," says the biologist. Genetic knowledge is important here, and the team at the Botanic Garden has already developed this for a number of endangered species, from arnica (*Arnica montana*), known as a medicinal plant, to the fragrant scabious (*Scabiosa canescens*), which grows on dry grasslands.

Each species displays its own population genetic pattern. In some cases, there are significant differences even between neighbouring populations, while others are similar across larger regions. Even if species only grow in a few scattered refuges where they have little contact with other members of their species, this does not always have the same consequences: while some populations are fit despite their isolation, others are already suffering from inbreeding.

All of this must be taken into account when selecting the right seeds for a reintroduction project. As a rule, seeds from plants from the

same region are used. "Sometimes, however, it can make sense not to limit yourself to one source," explains Elke Zippel. "This can increase the genetic diversity of the new population."

When putting such conservation concepts into practice, the experts at the Botanic Garden focus on the regions of Berlin, Brandenburg and Mecklenburg-Western Pomerania. There is plenty to do there. In the capital alone, more than 700 species of wild plants are considered acutely endangered. To secure a future for as many of them as possible, the Botanic Garden often works together with the state-owned Nature Conservation Foundation Berlin.

"Many Berlin plants are endangered because their habitats are gradually disappearing," explains Justus Meißner, who heads the Flower Protection Coordination Office there. For example, many survivalists that have adapted to nutrient-poor conditions are in distress. "The poor, sandy soils on which they grow are changing due to nutrient inputs from the air, causing nutrient-poor grasslands to be overgrown by competitive species and sparse forests to become increasingly dark," says the botanist. But on Peacock Island, these endangered specialists are to be given a new future. The project team has initially focused on three species.

One of these is an old acquaintance of the researchers at the Botanic Garden, which they have already studied extensively genetically: the pale purple-flowered fragrant scabious. This once widespread dry grassland inhabitant grew in Berlin in only one dune area in the north of the city. Elke Zippel collected seeds there, from which new plants grew in the Botanic Garden. "It was quite trouble-free with this species," says the expert. "Scabious thrive easily in flower pots."

A hundred of the scabious pampered in this way found a new home on the meadow at the Meierei when the Peacock Island project was launched in November 2023. The project team also planted a total of fifty plants of German greenweed (*Genista germanica*) and hairy greenweed (*Genista pilosa*) on the heathland behind the historic rose garden.

The seeds of wild plants are stored at temperatures as low as –24 °C in the walk-in freezer.

The fragrant scabious (*Scabiosa canescens*) is one of the rarest plants in Berlin.

"Peacock Island is the ideal location for these Red List species," says Professor Dr Michael Rohde, Garden Director of the Stiftung Preußische Schlösser und Gärten Berlin-Brandenburg. "It offers the right type of poor soil, is a nature reserve and is excellently maintained by our gardening teams." There is therefore a good chance that the new arrivals will be able to establish themselves there in the long term. Especially as they face fewer threats there than elsewhere: there are no rooting wild boars on Peacock Island, nor are there people prone to vandalism or dogs that introduce unwanted nutrients with their faeces.

Elke Zippel is very satisfied with the results of the project so far. "The scabious plants are already looking good less than a year after planting," reports the biologist. The two greenweed species require more patience as they grow very slowly. But the project team will not be discouraged by this – on the contrary: the efforts are to be extended to other dry grassland species such as the St Bernard's lily (*Anthericum liliago*).

Perhaps the refuge in Wannsee will even offer a new chance for the broad-leaved marsh-orchid. After all, there are also wetlands on Peacock Island where this decorative orchid was once native. Water buffalo have been grazing on the pike-spawning meadow for several years. They ensure that many herbs can establish there again and that willows, which displace such meadow flowers, cannot grow tall.

However, orchids are particularly challenging candidates for reintroduction projects. This is not only due to their long development time, but also to their special requirements. Although orchids produce thousands of seeds in each capsule, they need the support of certain fungi to germinate and grow. This makes cultivation time-consuming and expensive.

But the Berlin botanists have an idea that could lead to success: in the Havelland region, they want to collect not only broad-leaved marsh-orchid seeds, but also enlist the help of local moles. They will bring soil from their molehills, which already contains the necessary fungi.

"The Peacock Island alone will not save the species that have established there, of course," emphasises Thomas Borsch. "It can only be one piece of the mosaic for their conservation." That is why similar projects are also underway in other parts of Berlin and Brandenburg. Success has been achieved, for example, in the reintroduction of the meadow pasque flower (*Pulsatilla pratensis*), of which only a few specimens were still growing in Brandenburg.

However, effective species protection does not just mean specifically promoting endangered plants. To give these often weak competitors a real chance, measures against more powerful rivals are often necessary. There are a whole range of invasive species that have been introduced from other parts of the world and are displacing native vegetation through their rapid spread.

One of these so-called neophytes is sand lucerne, which experts are watching particu-

larly critically. It is a cross between the yellow-flowered native sickle medick (*Medicago falcata*) and its purple-flowered relative, lucerne (*Medicago sativa*), which originates from south-eastern Europe and western Asia. The resulting plant grows to over half a metre in height and is extremely competitive. Thanks to its long roots, which enable it to reach moister soil layers, it copes very well with drought. Like all leguminous plants, it also has so-called nodule bacteria, which help it to utilise nitrogen from the air.

In agriculture, it is therefore often used as a catch crop to enrich the soil with nitrogen. It is also popular as livestock feed because it sprouts quickly after mowing, even in dry weather. However, this robust plant is no longer confined to agricultural land. In recent years, it has spread rapidly in Berlin, conquering more and more roadsides and embankments and overgrowing painstakingly maintained dry grasslands. Species that are less competitive, such as spring cinquefoil and thrift, sand everlasting and blue hair-grass, often lose out. "Something urgently needs to be done," says Elke Zippel.

Hairy greenweed (*Genista pilosa*) is threatened with extinction and can now be found in only a few places in Berlin.

The experts at the Botanic Garden recommend, for example, that you take a close look when buying seed mixtures for your garden or balcony. If hybrid alfalfa is included or there is no information about the composition on the packet, it is best to avoid it. Gardeners in public spaces should also keep their eyes open to spot new populations as quickly as possible. And where the plant first spreads, it should be removed immediately.

Effective species protection therefore consists of many individual measures that must be properly coordinated. And given the massive losses, time is of the essence. "If Berliners want to preserve biodiversity in their city, then we as an urban society must act now," emphasises Thomas Borsch. The same applies nationwide, of course. "Species protection must be rolled out much more widely," says the botanist. "And for it to be successful in the long term, it must be accompanied by scientific research."

In the laboratory of evolution

Box trees provide new insights into how biodiversity in the Caribbean developed

For many people, the Caribbean is a dream destination, with white sandy beaches, palm trees rustling in the wind and colourful coral reefs.

But the island world also has another side that makes it an extremely exciting field of scientific activity: it is one of the world's most important treasure troves of biological diversity. On the largest island, Cuba, alone, there are an estimated 7,000 species of higher plants. Half of these are so-called endemics, which grow nowhere else in the world.

In addition, there are almost 11,000 fungi and lichens – and these are only the ones that science has taken note of so far. "In reality, there are certainly many more," says fungus specialist Dr Robert Lücking, who heads the Evolution and Biodiversity Department at the Botanic Garden Berlin. He knows this from his own experience. He has been to Cuba six times since 2016, searching for unknown lichens. During these excursions, he and his team have found numerous previously undocumented species. Some new discoveries, such as the genus *Saxiloba*, even shed new light on the evolution and relationships of entire lichen groups.

Anyone studying the plants, fungi and lichens of the Caribbean is therefore likely to encounter something new at any time. Research into the diversity of the region has a long tradition of collaboration with German scientists. Close cooperation between the Caribbean state and the GDR began in the 1960s and was continued by the Botanic Garden Berlin in 1993, three years after German reunification. To this day, scientists from Cuba and Germany work closely together to research the island's biodiversity and thereby support its conservation and sustainable use. They

Master's student María Fernanda Santana Baranda (left) from the University of Havana and the Botanic Garden of Havana and Dr Bibiana Moncada (right) from the Botanic Garden Berlin examine lichens at the Botanic Garden of Havana.

are continuing the mammoth project begun around 50 years ago to systematically record the plants, lichens and fungi of the entire island. What species are there? Where exactly do they occur? And what are their special characteristics? These questions are answered in the "Flora de la República de Cuba," 27 volumes of which have been published since 1998.

"Everyone working on the flora meets once a year in Havana," reports Robert Lücking. As a rule, there is also an excursion, which is always particularly exciting. "Our colleagues there know every plant in the area," says the Berlin researcher. "Even if there are only three specimens of a species left, they know where they grow."

Fieldwork enables the collection of material for further research. In this context, insights into the genetic makeup not only help to distinguish individual species from one another, but also to clarify their relationships. Molecular family trees are the key to answering a number of questions. How did Caribbean biodiversity arise? Did mainland dwellers repeatedly migrate there, or did the groups of organisms develop such an astonishing wealth of different species locally? And what are the factors that led to the emergence of new species?

A study published in 2023 provides new answers to these questions. It was conducted by a team led by Dr Pedro González Gutiérrez, who completed his doctorate at the Botanic Garden Berlin and now works for the Centro de Investigaciones y Servicios Ambientales research institute in Holguín, Cuba. Since 2023, he has also been co-editor of Flora de Cuba. Together with colleagues, he has studied the evolution of box trees, which have produced a particularly large number of unique species in the Caribbean.

While only the common boxwood (*Buxus sempervirens*), familiar from many gardens, grows in Germany and Europe, the genus boasts around 40 different species in Cuba. Given that only 100 *Buxus* species are known worldwide, this is an astonishing number. Especially since most Cuban box trees are found only there. How is it possible that such abundance has developed in a relatively small area? To understand the reasons for this boom, the

The German-Cuban team is working together on databases for the flora.

researchers genetically examined almost all species and subspecies in the Caribbean and neighbouring regions.

"This study involved a great deal of fieldwork," says Prof. Dr Thomas Borsch, Director of the Botanic Garden Berlin, who participated in this study as Pedro González Gutiérrez's doctoral supervisor and also conducts research on the evolution of the flora of Cuba and the Caribbean. Dr Rosalina Berazaín Iturralde from the Botanic Garden of Havana, for example, has been collecting box trees for decades. The joint field trips, which are organised every year in different regions of Cuba with the support of the Friends of the Botanic Garden Berlin-Dahlem, have also yielded valuable new plant material. This is sometimes a rather strenuous and time-consuming undertaking, as some of these plants are only known from a few, often very remote mountainous regions. "You have to get there first," says Thomas Borsch. But it is thanks to this research that many species have been discovered in the first place. And molecular family trees now make it possible to reconstruct their evolutionary history.

Buxus cristalensis is endemic to the Sierra del Cristal in eastern Cuba.

"With the help of the molecular clock, we were able to find out when speciation took place," explains the Berlin botanist. The history of Caribbean boxwoods began around 13 million years ago in the Miocene epoch. At that time, their ancestors came from Mexico to Cuba, where they gave rise to numerous new species over time. What is particularly exciting is that around three million years ago, the genus *Buxus* began to spread from Cuba to other Caribbean islands and northern South America.

Many of the endemic boxwood species in Cuba are found exclusively on serpentine sites, such as here in the Sierra de Cajálbana.

How the new arrivals managed to make the necessary journeys across the sea is still not entirely clear. Hurricanes probably played an important role as means of transport.

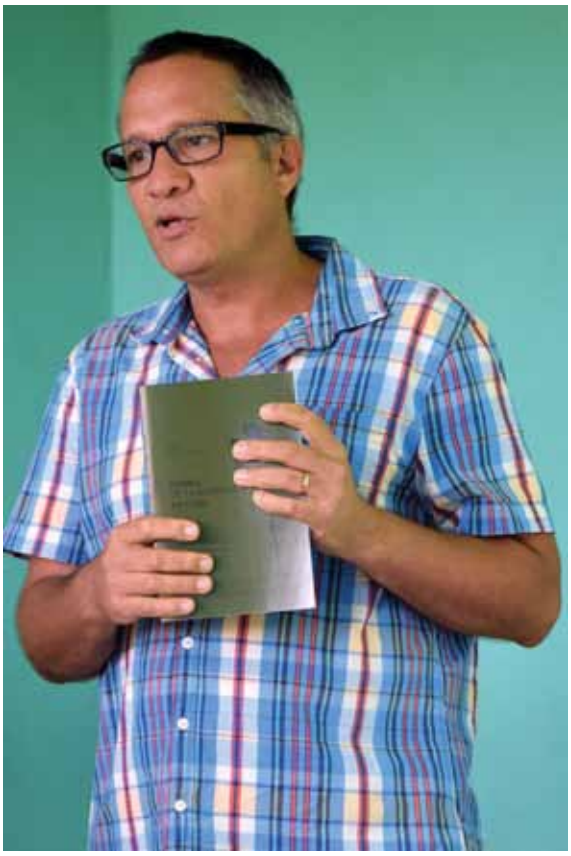
According to the latest findings, the source of the Caribbean *Buxus* boom lies in Cuba. But how did such a wealth of species develop there in the first place? Pedro González Gutiérrez's study has also shed new light on this question. A striking number of Cuba's endemic *Buxus* species (82 percent) grow on a special type of soil. There, a greenish rock called serpentinite weathers into soil that is naturally rich in nickel and chromium.

For many plants, this is a death sentence. But box trees have adapted over millions of years. The researchers imagine this as a gradual process: initially, there were probably plants that were able to cope with the harsh conditions and thus had an advantage. These then developed into endemic species that only occurred on such soils. Finally, true specialists evolved that accumulated large or even very large amounts of nickel in their leaves.

This ability is widespread among Cuban box trees: 59 percent of them are nickel accumulators or hyperaccumulators. Their newly developed talent may not only have made it easier for these survivalists to grow on serpentine soils. The deposits may also have offered some protection against herbivores and pathogens. And since the metal-rich soils are scattered across Cuba like another archipelago of islands, the conditions were favourable for the evolution of new species: many isolated populations emerged, which adapted to their respective environments and developed more and more distinctive characteristics over time. Eventually, the genetic differences became so great that they could be considered separate species.

Nickel accumulation could therefore be a key factor in the evolution of Cuban box trees and the tremendous surge in speciation on the island. And this may not only apply to the *Buxus* genus. Other plant groups have also produced nickel specialists in Cuba. Overall, one third of the island's endemic flora is restricted to areas with special metal-rich soils.

With additional support from the Alexander von Humboldt Foundation, which has been promoting the partnership between the Botanic Gardens of Havana and Berlin since 2024, the German-Cuban research team aims to gain an even better picture of the evolutionary history of the enormous biological diversity of Cuba and the Caribbean. "We want to investigate not only the relationships and speciation rates of other groups of flowering plants, but also those of lichens and fungi," says Thomas Borsch. So, we can expect further surprises from the Caribbean's laboratory of evolution. Funding from the Humboldt Foundation will also enable the first steps to be taken towards digitising the newly built, modern herbarium at the Botanic Garden of Havana, promoting a new generation of young scientists and making the results freely accessible and available online.



Dr Pedro González Gutiérrez from the Centro de Investigaciones y Servicios Ambientales research institute has worked on various families for the Flora de la República de Cuba.

Phyllanthus imbricatus is an endemic plant that grows only on Isla de la Juventud, Cuba.

The year in review 2023

2023

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April

The Embassy as a showcase for Mexican plant diversity: together with UNAM, BO Berlin is designing a Mexican landscape garden (Paisaje Botánico Méxicano) as a living exhibition on the premises of the Mexican Embassy in Germany. The grand opening will take place at the invitation of Ambassador HE Francisco José Quiroga Fernández (2nd from left).

City Nature Challenge

Citizen Science inspires enthusiasm for biodiversity in the city: in the heart of Berlin, participants in the 6th International City Nature Challenge discover lichens under the guidance of Dr Bibana Moncada and Dr Robert Lücking and achieve record results in Berlin.

May

Colonial exhibition practices questioned: a workshop examines the concept of the new permanent exhibition at the Botanical Museum in Berlin as part of the "Decolonising Museums" workshop series.

After a long break, succulent plant enthusiasts return to the Berlin Cactus Days at the Botanic Garden. The special focus is on plants from Mexico, as the Latin American country is home to the world's greatest diversity of cacti.

June

Langer Tag der StadtNatur

Not just plants to discover: during Berlin's "Long Day of Urban Nature," visitors can learn interesting facts about the hidden champions of botany on mushroom and lichen tours.

Long-standing cooperation strengthened: on the occasion of the 5th anniversary of the German branch of the Universidad Nacional Autónoma de México (UNAM) at the FU Berlin, Dra. Susana Magallón, Director of the Instituto de Biología, UNAM, and Prof. Dr Thomas Borsch sign a cooperation agreement to strengthen their long-standing collaboration.

Girls'Day Mädchen-Zukunftstag

Botany and species conservation as a future field of work: girls can find out about the work of the Dahlem Seed Bank and its contribution to the protection of endangered native plants or gain practical experience in a citizen science project that records the effects of climate change on the growth phases of plants.

Jul

July

Botanical Night: under the motto "Sound of Botania," the Botanic Garden transforms into an enchanting, illuminated wonderland with sound artists and performers.

Aug

August

Learn and marvel in the great outdoors: during the summer holidays, children and families can spend a week experimenting, painting, crafting and playing at the Botanic Garden Berlin.

Sep

Culture Summer Festival at BO Berlin: Circle of Live is a live musical improvisation format lasting several hours. Through interaction between the audience and the extraordinary live artists, collectively improvised electronic soundscapes are created.

Oct

October

The Kulturkorso network reveals green secrets: on the guided tour "What is the secret of the Gleditsch palm tree?", visitors learn about a milestone in botany and a museum object with a history.

Nov

November

From 16 November 2022 to 15 January 2023, the Christmas Garden Berlin opens its doors for the seventh time. After dark, over 85,000 visitors experience the impressively illuminated and musically staged garden landscape with over 30 illuminated stations. Since its premiere in 2016, the energy efficiency of this major event has been continuously improved. 95 percent of the illuminations use LED technology.

Dec

The year in review 2024

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Foundation of the German DiSSCo node: as part of the Distributed System of Scientific Collections (DiSSCo) research infrastructure, over 170 natural history museums, botanical gardens and university collections from all over Europe are already networked. In Germany, six of the largest natural history collections have joined forces to form the DiSSCo node in order to digitally network their more than 140 million collection objects for scientific purposes and make them freely accessible.

May

Year of Biodiversity at the FU Berlin: to mark the International Day for Biological Diversity (22 May) and the start of the Year of Biodiversity, the FU Berlin hosts a science picnic in the Botanic Garden.

First Taxonomy Recognition Day at the BO Berlin: knowledge about species is dwindling, and taxonomy, the science of researching, describing and documenting living organisms, is in crisis. On the first Europe-wide Taxonomy Recognition Day (23 May), visitors are able to experience taxonomy in action and get an idea of how new species are discovered and researched at the Botanic Garden Berlin.

July

Botanical Night: to mark the 15th anniversary of Botanical Night, the Botanic Garden once again transforms into the luminous dreamland "Botania."

XX International Botanical Congress in Madrid: every six years, botanists from all over the world meet at the International Botanical Congress. Scientists from the Botanic Garden are also well represented in Madrid.

IBC 2024 XX International Botanical Congress Madrid Spain

Aug

August

Celebrating diversity: Queens & Flowers, the drag summer festival, takes place for the first time in Berlin's green south-west. In the open-air spaces around the Botanic Garden's greenhouses, floral splendour and drag art merge into a celebration of queer culture for everyone who cares about diversity.

Sep

September

Bioeconomy and integrated biodiversity management: as part of Amazonas Week, the Ambassador of the Republic of Colombia, HE Yadir Salazar Mejía, invites experts from science and politics to a joint event with the Amazon research institute SINCHI from Bogotá at the Botanic Garden. The event highlights how a broad-based bioeconomy can offer prospects for sustainable development. The Instituto SINCHI and the BO Berlin sign a cooperation agreement to provide a framework for the necessary research.

Orchid show: for the 15th time, orchid lovers meet at the Botanic Garden Berlin to discover and exchange knowledge and amazement about orchids.

Oct

October

Netzwerk Kulturkorso tells the story of "The first time": plants from the Caucasus have long enriched Central European gardens, and some were presented to the public for the first time and scientifically described in the plant geography section of the Botanic Garden Berlin.

30 years of collecting and preserving: the Dahlem Seed Bank celebrates its 30th anniversary with a symposium.

Nov

November

For the eighth time, the wintry Botanic Garden transforms into "Christmas Garden Berlin," a place full of lights and unforgettable moments.

Dec

December

Interdisciplinary workshop: in December, scientists from a wide range of disciplines meet at the Botanic Garden to discuss Georg Schweinfurth's research work and collections.

Botany from A to Z

The Botanical Museum's new permanent exhibition is taking shape

Want to travel from one island to the next and gather exciting information about the world of plants, fungi and algae? That's exactly what you will be able to do at the Botanical Museum. The concept and design for the new permanent exhibition are now finalised and have been taking shape since 2023. They focus on accessibility and contemporary presentation that will appeal to a wide range of visitors.

"We are taking a slightly different approach than we have done in the past," says Susanne Feldmann, who heads the Museum and Exhibitions Department at the Botanic Garden. The former exhibition also featured attractive objects such as flower models to convey basic knowledge of botany. However, at the time, the exhibition was primarily aimed at students and other people with a specialist interest in the subject. The material presented was not always easy to digest.

"The new exhibition focuses much more on the question: What does all this have to do with me?" explains Dr Eva Häffner, who works as a scientific coordinator at the Botanic Garden. The new concept is specifically designed to appeal to a broad audience. Whether families with children or school classes, young people or adults without an academic background: everyone who is interested should be able to explore the many fascinating facets and fun side of botany.

Visitors entering the museum via the Engler Hall immediately become part of a media installation. LED monitors will be mounted on the large column in the centre of the darkened room, drawing guests into one of the major themes of botany: "growth" – not only of plants, but also of the knowledge that researchers have gathered over centuries.

After this introduction, visitors will enter the heart of the permanent exhibition: 26 themed "islands" await them in a large room. Arranged alphabetically, each station offers a unique perspective on the world of plants, fungi and algae. "It wasn't easy to implement this idea in the space available," recalls Sophie Merz from the design agency merz merz, which was responsible for designing the exhibition. At first glance, the room, which measures more than 400 square metres, appears huge. However, it has many windows and columns but few walls – not particularly favourable conditions for an exhibition. After all, the whole thing should appear light and uncluttered.

The design team solved this problem with delicate, three-dimensional constructions made of tubular steel. Each island consists of an airy spatial structure to which objects, images, infographics and texts are attached. "The green colour of the metal recedes into the background, so that the focus is on the exhibits," says Sophie Merz. "They seem to float through the room like in a botanical cloud."

A visualisation by the design agency merz merz shows how visitors will move around the Botanical Museum Berlin in the future.

In addition to this lightness, the exhibition designers also wanted to create as varied a design as possible. "Depending on the theme, the islands vary in size and structure," explains Susanne Feldmann. "Each one has its own unique character." Sometimes the focus is on photos or attractively designed infographics, sometimes on models or other objects. All the islands will have a particularly attractive eye-catcher to arouse the curiosity of the audience and invite them to explore again and again.

"We want to appeal to all the senses," says Susanne Feldmann. Sometimes the audience will be greeted by the scents of medicinal plants or the ephemeral essence of a tree. Then they can feel what fossils or various plant materials feel like, from linen fabric to pineapple leather. And at the island F for "forest," a sound installation awaits. There will also be various hands-on activities where both children and adults can get involved. For example, they can weigh how many trees have to "work" for a year to offset the carbon dioxide emissions of their last holiday trip.

As expected, visitors to the exhibition first encounter the island A for "Anfänge" (beginnings). This L-shaped structure features a diorama of the Devonian period, the dawn of plant life, around 419 to 359 million years ago. A large photo also shows what the forests looked like in the subsequent Carboniferous period. Plant fossils from this era are also on display. The excursion into the world of primitive plants also explains how photosyn-

thesis and thus the use of solar energy was "invented." But this island is not only about the origins of plants, but also about those of the Botanic Garden. Postcards of the institution at its former location in Schöneberg are among the treasures on display, as is the document with inventory number 1 from the Willdenow herbarium, the nucleus of the biological collections in the building. "We will offer up to three different narrative strands on each island," explains Eva Häffner. One will focus on biological topics, another on the history and current work of the Botanic Garden. And a third will highlight societal aspects and the complex relationships between plants, fungi, algae and humans. Island L, which stands for "learning," encompasses all three perspectives. The botany perspective presents plants as surprisingly adaptive and communicative organisms. For example, an experiment shows that pine trees remember attacks by harmful insects and mount a faster defence response the next time they are attacked. The institutional perspective shows three attractive plant models that represent different ways of imparting knowledge at the Botanic Garden. And in the societal narrative strand, visitors can test whether they suffer from the widespread "plant blindness": many people discover lots of animals in pictures, but overlook the flora that is also depicted.

"With so many topics and narrative strands, you have to be careful not to overwhelm people," says Sophie Merz. The art of omission therefore plays an important role in the design of such an exhibition. Above all, however, no one will be forced to see everything in a single visit. "You can follow the letters from A to Z, but you don't have to," emphasises Eva Häffner. Some visitors may be drawn from one eye-catcher to the next or follow the trail of interactive stations. Others may be interested in a specific topic and can use a network of references to explore how it relates to other topics.

No matter how visitors ultimately arrive at the island Z for "Zeit" (time), they will all have experienced the world of botany in the exhibition in their own personal way and taken their own insights with them. In the best-case scenario, they will even leave the museum realising that we can all contribute to protecting biodiversity on Earth.

A science picnic for diversity

The kick-off event for the "Year of Biodiversity" at Freie Universität Berlin took place in 2024 at the Botanic Garden

Dr Ina Czyborra (Senator for Science, Health and Care) in conversation with (from left to right) Jörg-Andreas Krüger (President of the Nature and Biodiversity Conservation Union, NABU), Prof. Dr Günter M. Ziegler (President of the FU Berlin) and Prof. Dr Thomas Borsch (Director of the BO Berlin).

Biological diversity is in crisis worldwide, with an estimated 150 animal and plant species going extinct every day. To draw attention to this problem and show possible solutions offered by science and research, the Freie Universität Berlin (FU) declared 2024 the "Year of Biodiversity". The kick-off event took place on 22 May, International Day for Biological Diversity, at the Botanic Garden.

"Our scientists deal with plant diversity every day," says Stephanie Henkel, who heads the Communications and Marketing Department at the Botanic Garden. "So it's our job to share as much knowledge as possible on this topic." But how could this exchange take place? Together with the FU, the idea was born to kick off the theme year with a "science picnic." Anyone interested could visit the Botanic Garden free of charge on this day and learn about the various facets of the topic in a relaxed atmosphere and through direct contact. In front of the Main Tropical Greenhouse, scientists from the Botanic Garden and the

Children learn about biodiversity and species protection at the stand of the FU initiative "SUSTAIN IT."

FU gave short, vivid and entertaining presentations about their work and their commitment to protecting biodiversity. A wide range of disciplines were represented, from political science to biodiversity informatics. In ten- to fifteen-minute presentations, topics ranged from botanical species conservation and the consequences of climate change to the question of how the importance of biodiversity can be conveyed through music. Topics also included "The miraculous reproduction in the realm of lichens" and "The apple orchard as a hands-on laboratory." At the same time, there were various guided tours in German and English, and the Biology Library at the Botanic Garden presented itself, as did the Blooming Campus initiative, which promotes greater biological diversity on the FU campus.

It became clear time and again that the future of humanity is closely linked to the preservation of biological diversity. Whether it is pollinating plants or ensuring water and air quality, the Earth's ecosystems provide a multitude of services that are irreplaceable for human life. These services can be provided only as long as the species involved and their interactions still exist.

"We wanted to invite visitors to engage with this important topic in a relaxed and personal way," says Stephanie Henkel. She is very pleased with the success of the event. The programme was well attended up until the evening, with many students as well as interested garden visitors and tourists stopping by. Despite heavy thunderstorms that poured down on Berlin on the Day for Biological Diversity, the stream of visitors remained steady. The Science Picnic was so well received by both the researchers and the audience that similar events are to be held in the future.

Thorsten Laute, Technical Director of the Garden Operations Department, gives visitors a glimpse behind the scenes and shows them the technology used in the greenhouses.

Seeds in cold dormancy

The Dahlem Seed Bank celebrated its 30th anniversary in 2024

"All the flowers of all the tomorrows are in the seeds of today," says an Ancient proverb. This is precisely the motto of a Berlin institution that celebrated its 30th anniversary in 2024: since 1994, the Dahlem Seed Bank has been collecting plant seeds in order to preserve them in a germinable state for as long as possible. This living treasure is not only intended for research and teaching or for exchange with other botanical gardens. It can also help save endangered species from extinction.

It was the purchase of a freezer that heralded a new era in the so-called seed room of the Botanic Garden Berlin. With its help, experts were now able to store collected seeds for much longer than before. The first seeds, which were carefully cleaned, dried, sealed in glass tubes and frozen there in autumn 1994, came from Balearic cabbage, a species that grows only on Mallorca. Like many other plants, it was cultivated at the Botanic Garden at the time to secure its future. "Establishing such conservation cultures is time-consuming and expensive," says Dr Elke Zippel, head of the Dahlem Seed Bank. "That's why we wanted to store seeds from these species as a precaution, in case something happens to the plants."

A lot has changed at the facility since those early days. When it moved to a modern building in 2015, which was built specifically for this purpose from a private bequest, the old seed room not only got its current name. The Dahlem Seed Bank also gained new technical capabilities for drying, examining and freezing the collected material. Today, it has two drying chambers, refrigerators, a fully equipped laboratory for germination tests and a walk-in freezer chamber where millions of seeds from some 3,500 plant species from more than 80 countries are stored at minus 24°C.

Unlike in the past, the focus is no longer solely on material from the Botanic Garden. "Today, we concentrate on seeds that we collect outdoors in the plants' natural habitats," says Elke Zippel. "And since botanical species conservation has become an increasingly important part of our work over the years, we focus primarily on rare and endangered species." Among the rarest items in the collection are seeds from Ruthe's marsh-orchid (*Dactylorhiza ruthei*) and a gentian (*Gentianella uliginosa*), of which there are only a few remaining specimens worldwide.

Both species are mainly found in north-eastern Germany. Elke Zippel and her team are frequently out collecting there and in central Germany. They are working in this region as part of the nationwide project "Wild Plant Conservation Germany" (WIPs-De), in which the botanical gardens in Mainz, Osnabrück, Potsdam and Regensburg are also involved. The experts take care of endangered species in their respective regions that are mainly found in Central Europe and for which Germany has a special responsibility. It's not just about

This collaboration puts everyone in a good mood. Stefan Richter (Managing Director of the Berlin Nature Conservation Foundation) and Prof. Dr Thomas Borsch (Director of the BO Berlin) sign a cooperation agreement.

freezing seeds from these "species of responsibility." They are also used to grow new plants for reintroduction projects. Elke Zippel and her team of six have already planted arnica, Cheddar pink and fragrant scabious in suitable locations in Berlin and Brandenburg.

They often work together with the state-owned Foundation for Nature Conservation Berlin (Stiftung Naturschutz Berlin – SNB). Since 2023, for example, a joint species conservation project has been running on Berlin's Peacock Island. Both institutions wanted to expand this cooperation. At the seed bank's anniversary celebration on 8 November 2024, they signed an agreement to continue working together to preserve biodiversity in Berlin.

Since its inception, the Dahlem Seed Bank has established a network of different partners. To counteract the loss of biological diversity, it works with nature conservation authorities, other botanical gardens, associations and seed banks. It is a member of the European Native Seed Conservation Network (ENSCONET), a consortium of 28 European wild plant seed banks that work according to common international standards. So that the seeds of yesterday can actually become the flowers of tomorrow.

Research – Preserve – EXPLAIN

In 2023 and 2024, three departments of the Botanic Garden got new heads. Together with their teams, they are responsible for the three core tasks of the institution. We asked them four questions about taking on their new roles at the BO Berlin.

How long have you been head of your department at the Botanic Garden and Botanical Museum?

Dr Luiza Bengtsson: I have been head of Department III – Museum and Society at the BO Berlin since September 2024.

What did you do before that?

Luiza Bengtsson: I have a PhD in biochemistry and have been intensively involved in science communication for over a decade. After completing my doctorate, my research took me to the USA before I returned to Berlin. There I worked in biomedical research for seven years before devoting myself to my real passion: bringing more science into society and more society into science. At the Max Delbrück Center in Berlin-Buch, I spent over ten years developing dialogue formats that promote exchange between science, education and society. In 2023, I took over as director of Berlin Science Week and launched new formats such as the Art Science Forum, which attracted record audiences.

What do you find particularly exciting about your new position? And what is the biggest challenge?

Luiza Bengtsson: I am thrilled by the connection between science, the public and culture in such a unique place as the Botanic Garden and Botanical Museum Berlin. Here, science is not only communicated, but brought to life – with interactive, creative and innovative approaches that fascinate a wide audience.

My department is as diverse as the plant world itself: the Museum and Exhibitions tell the natural history and significance of the plant world. Education and Outreach bring botany closer to our visitors in an exciting way – understandable, tangible and interactive. Publishing and Graphics publish botanical research – from specialist journals for the scientific community to publications for the general public. And the Science History Collection preserves Berlin's botanical research history.

But all this is happening at a time of change – and that is precisely where the greatest challenge lies. The museum is being renovated and a new permanent exhibition is being created. The Education and Outreach Department has been in development since 2023, with new formats being developed and tested. A generational change and strategic developments are on the agenda in the Publishing and Graphics Department. The science history collection urgently needs a sustainable concept for cataloguing and storage.

And last but not least, the Botanic Garden needs to become even more visible to the public and attract new visitors – an exciting task, especially in times of limited resources. Challenging? Yes. But that's exactly what makes it so exciting!

Dr Luiza Bengtsson.

What goals have you set for yourself and your staff?

Luiza Bengtsson: Our goal is to further develop the Botanic Garden and the Botanical Museum as a living interface between science, culture and society. The museum should establish itself as an interactive place of knowledge with a modern permanent exhibition that opens up new perspectives on the plant world. In the area of education and outreach, we want to create innovative formats that enable dialogue with a wide range of target groups. The science history collection should not only be preserved, but also made more actively available for research and teaching. And in the area of publishing and graphics, the aim is to further strengthen scientific publishing activities – both for experts and for a broader audience.

A central focus is on cooperation – because together we are stronger. We want to involve Berlin society, associations and institutions even more closely in our activities in order to position the Botanic Garden as an active contributor to environmental education and sustainable thinking. Our goal is for the activities of the Museum and Society Department not only to impart knowledge, but also to provide impetus for social change – with an impact that extends far beyond Berlin.

To achieve this, solid financial and human resources are essential. Only with a stable workforce, sustainable structures and strategic partnerships can the Museum and Society Department continue to expand its role as a bridge between science and society and successfully implement innovative formats.

Thank you very much for talking to us!

The sponge garden

New water management concepts were also implemented during the renovation of the path network.

Anyone who saw the newly renovated paths in the Botanic Garden in 2023 might have been shocked at first: a black strip of asphalt running across the entire site from one entrance to the other? Was that really necessary? "It really didn't look nice at first," admits garden manager Thorsten Laute. But since summer 2024, not only are all the paths finished, so there are no more closures, but the black asphalt is also no longer visible, as planned.

"Before the renovation, the paths were in very poor condition, so we had to do something," recalls Thorsten Laute. After all, not only visitors but also the hundred or so gardeners wanted to be able to move around the grounds safely and with reasonably dry feet. So there was no way around extensive construction work, which was financed by the federal government and the state of Berlin as part of the "Joint Task for the Improvement of Regional Economic Structure" (GRW) funding programme.

Most of the approximately 15-kilometre-long network of paths was not asphalted: most sections were given a water-bound surface that allows precipitation to seep into the ground. However, there are two exceptions: the main path, which is approximately 800 metres long and ten metres wide, has a vehicle-width asphalt strip in the middle. In addition, a circular path approximately six metres wide through the centre of the garden has been asphalted.

There are very practical reasons for this. "You have to remember that we have to drive on our grounds 365 days a year," explains Thorsten Laute. "It's not like a park, where no one is out and about in bad weather anyway." It is important for the gardeners to be able to reach their work sites with their electric vehicles even on rainy days. However, a water-bound path surface cannot withstand this load for long. It also cannot tolerate winter maintenance, because the brushes on the snow-clearing equipment would sweep away not only the snow but also the path surface. So there was no alternative to this type of surface for these two important connecting paths.

Visually, this is no longer noticeable because the black surface has been covered with the same path surface mixture used for the other garden paths. The soil in these few areas is, of course, still sealed. This means that precipitation cannot seep away and form new groundwater. However, this is not a new phenomenon: before the renovation, these paths consisted of rubble from houses that were destroyed during the Second World War. "These areas were therefore already heavily compacted," says Thorsten Laute.

The overall situation in terms of groundwater recharge has indeed improved significantly. While rainwater used to be partially drained from the paths and ended up in the sewer system, it can now seep away completely on site. Precipitation from the roofs of the nearly two-hectare greenhouses is collected in large cisterns with a capacity of well over 1,000 cubic metres and used for irrigation, yet a different solution had to be found along the paths. "Unfortunately, we cannot use this rainwater for watering," explains the expert. "To do so, we would first have to treat it, which would involve a lot of effort."

The paths in the Botanic Garden have been completely renovated. On the left, the old path during construction, and on the right, the new path.

The alternative now consists of so-called trench drain systems hidden in the ground along the paths. These are gravel-filled hollows with a total volume of more than 700 cubic metres. In addition, ready-made plastic modules were used, which are more space-saving and can also be installed under the paths in some cases. The aim is the same in both cases: these systems collect the precipitation in their cavities, hold it and then allow it to gradually seep into the ground. The 43-hectare garden thus becomes a kind of sponge that stores water for dry periods.

Water also played an important role in other aspects of the renovation. The construction work provided an opportunity to install an automatic irrigation system in three decorative areas at the entrances and in the Italian garden. This can be controlled by mobile phone so that it is switched on mainly at night when the precious liquid does not evaporate immediately. In addition, the water can be distributed throughout the garden as required so that there is as little competition as possible between the different areas.

"We can already supply several thousand square metres with the new system," reports Thorsten Laute. However, as a precaution, the necessary pressure water pipe was laid along the main path through the entire garden. This means that further areas can be connected if necessary. All this is intended as an investment in the future. After all, Berlin too must prepare itself for the increasingly frequent dry periods brought about by climate change. The motto at the Botanic Garden is: every drop counts.

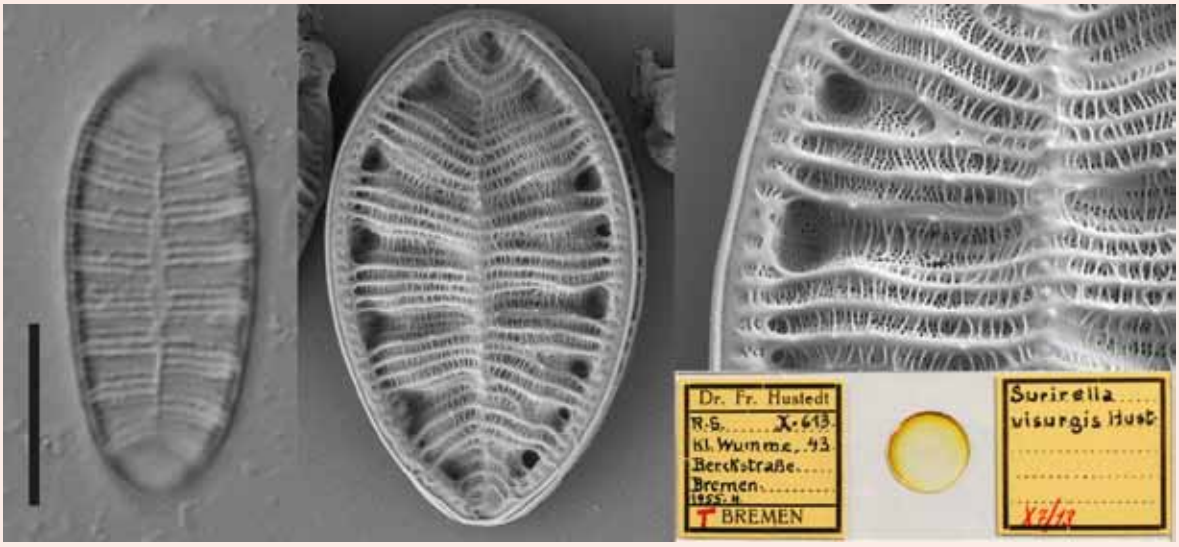
A new treasure in Dahlem

In 2024, the Botanic Garden acquired the extensive "Hustedt Collection." It now has the world's largest collection of diatoms.

Dr Friedrich Hustedt in his study in 1932.

A fascination with the algae known as diatoms never left Bremen teacher Dr Friedrich Hustedt (1886–1968) throughout his life. He combed countless water samples for the tiny single-celled organisms with their decorative shells, admired their beauty under the microscope and scientifically described their diversity. Over the years, he not only discovered around 2,000 new species and produced more than 7,000 detailed sketches. He also built up a unique collection, which had been housed at the Alfred Wegener Institute (AWI) in Bremerhaven since 1986. In the summer of 2024, it moved to the Botanic Garden Berlin because this is the only place in Germany where it can be properly cared for.

"We were very pleased about this," says Dr Nelida Abarca, curator of the algae herbarium, who works in the diatom research group. The Hustedt collection is both historically and scientifically very interesting. Some samples were brought back by the famous Norwegian polar explorer Fridtjof Nansen, while others originate from the first German Antarctic expedition on the ship Gauß between 1901 and 1903. "The collection also contains many old type specimens, which were used to describe the respective species for the first time," explains the expert. "And it complements our own collection very nicely."



The diatom (*Surirella visurgis* Hustedt) was collected in 1955 in the Kleine Wümme (Bremen) and first described by Hustedt. The species is both benthic and planktonic and is not uncommon in waters with medium electrolyte content. Researchers at the Botanic Garden Berlin have documented it in the flood ditch of the Spree in Berlin and in the Adventfjorden near Spitsbergen in Norway.

However, the move was a complex and lengthy undertaking that required detailed planning. Not only did a removal company, cabinets and shelves have to be organised, but above all, sufficient space had to be created for such an extensive and scientifically irreplaceable collection. The Hustedt Collection, which was constantly being expanded at the AWI, now comprises more than 100,000 specimens on glass slides and 40,000 dried or liquid-preserved samples. In addition, there are around 9,000 publications, books and special prints.

Fitting everything in was a real challenge, but it worked. Many boxes have already been unpacked, and most of the specimens and raw materials have been stored away. "Everyone at the Botanic Garden has supported me, from the Department of Evolution and Biodiversity to the Friends of the Botanic Garden and the Biological Collections Department to the administration and the caretaker," says Nelida Abarca. "Otherwise, it would not have been possible."

The next step is to combine the existing Berlin collection with the new additions to create a large diatom knowledge repository. "That will probably keep us busy until 2025," estimates Nelida Abarca. She is already receiving numerous enquiries from colleagues around the world who want to come to Berlin and use the material from the Hustedt collection, which is now accessible again, for their research. However, it is currently very difficult to find out which samples and preparations are available, as this can currently only be done using Excel tables.

The diatom experts at the Botanic Garden are therefore working with their colleagues at the Center for Biodiversity Informatics and Collection Data Integration to create a joint database for all diatoms stored in Berlin. In future, anyone interested will be able to look up what material is available in the world's largest diatom collection. In the long term, they will also be able to view the digitised specimens online.

A boost for “World Flora Online”

At the International Botanical Congress in July 2024, the global inventory of plant diversity met with great interest

Every six years, botanists from all over the world meet at the International Botanical Congress (IBC) to discuss the latest scientific developments. The congress covers a wide range of topics, from systematics to ecology and from genetics to nature conservation. This was also the case at the twentieth congress, which took place in Madrid in July 2024. An international project in which the Botanic Garden Berlin is significantly involved attracted a great deal of attention there: World Flora Online (WFO).

“This programme has set itself the task of recording the global diversity and threat status of all land plants and making this information available on an online portal,” explains Prof. Dr Thomas Borsch, Director of the Botanic Garden Berlin. The WFO thus fulfils one of the 16 specific targets of the Global Strategy for Plant Conservation, which is part of the UN Convention on Biological Diversity. More than 50 botanical gardens and other scientific institutions from various regions of the world are collaborating on this unique information system.

To realise this ambitious project, leading experts on specific plant groups have joined forces to form international networks. The task of these so-called Taxonomic Expert Networks (TENs) is to collate all new data and research findings on plant biodiversity. “The TENs are the backbone of the WFO and a milestone in the development of international research cooperation,” emphasises Thomas Borsch. Digital tools and workflows now make it possible to collaborate very effectively in such global networks and to bring all experts on board, regardless of where in the world they work.

The TENs not only enable the global inventory of plants to be kept up to date. They are also crucial in ensuring that scientists researching different plant groups are directly and visibly involved. Updates are not only necessary because new species are constantly being discovered. “Due to the dynamic development of evolutionary research, there are constantly new findings about where species boundaries lie,” explains Thomas Borsch. It is therefore quite possible that different names are used for the same species. Or that a single name refers to different plant species.

Such inconsistent naming can lead to problems. This is because different data and information about plants are linked to their names. Confusion in naming can therefore mean that existing knowledge is not correctly assigned. Anyone wishing to study the distribution, ecology or conservation status of plants therefore needs a consistent species list as a basis.

World Flora Online provides precisely this taxonomic basis. Since summer 2024, it has been publishing a global list of all plants, which

is updated every six months. This has created an up-to-date and reliable source of information that can be used, for example, to assess global environmental changes much better than before. The list also supports the globally sound implementation of national biodiversity strategies.

At the Botanical Congress in Madrid, Thomas Borsch, his colleague Dr Nadja Korotkova and other WFO participants had the opportunity to present the project and its relevance. A symposium was held to present and discuss topics such as the development of digital workflows, interfaces between the WFO and normative requirements for protected species (CITES) and synergies for national eFlora databases, using Mexico as an example. In addition, all interested parties were able to find out how they can contribute their own expertise to World Flora Online in an engagement workshop. This offer met with great interest – and has taken the WFO a good step forward. The success was immediately apparent in concrete figures: before the congress, there were 49 Taxonomic Expert Networks for various plant groups, but by February 2025 there were already 61 TENs. And 22 more are planned.

Scientists and interested laypeople can find information about land plants on the World Flora Online portal.

RESEARCH – Preserve – Explain

In 2023 and 2024, three departments of the Botanic Garden got new heads. Together with their teams, they are responsible for the three core tasks of the institution. We asked them four questions about taking on their new roles at the BO Berlin.

How long have you been head of the department at the Botanic Garden and Botanical Museum?

PD Dr Robert Lücking: I have been head of Department I – Evolution and Biodiversity since March 2023.

What did you do before that?

Robert Lücking: I have a doctorate in Biology from the University of Ulm and habilitated in Botany at the University of Bayreuth, specialising in the taxonomy of fungi and lichens as well as tropical ecology. After working as a scientist in Germany and abroad, I spent almost 15 years at the Field Museum in Chicago, USA. I have also conducted research and taught at various universities in Brazil and the USA. In 2015, I moved to Berlin and took over the curatorship of lichens, fungi and mosses in the herbarium of the Botanic Garden. Since 2023, I have also been teaching as a private lecturer in the Department of Biology, Chemistry and Pharmacy at Freie Universität Berlin in the field of integrative taxonomy and the biodiversity of lichens and fungi.

What do you find particularly exciting about your new position? And what is the biggest challenge?

Robert Lücking: I find it particularly exciting to coordinate the three research areas (plants, algae and fungi) at the Botanic Garden and to develop overarching questions. This takes place both within the framework of our institution's international collaborations and in the rapidly developing field of integrative taxonomy. Biological collection objects are the starting point for the scientific knowledge process for all groups of organisms. This allows me to contribute my own expertise on fungi and lichens to other areas and learn something new about plants and algae every day, which is very enriching for everyone involved! Science communication is also part of my daily work. I think it's great to develop stories from research projects and thereby bring our work into the spotlight in a way that is understandable to everyone.

A major challenge is to achieve the greatest possible scientific impact with limited staff. This means using resources as effectively as possible to achieve far-reaching results. Various important taxonomic databases and platforms developed at the Botanical Garden, which represent important global knowledge resources, help us to do this. One example is the Euro+Med PlantBase which allows users to search for plant species in Europe and the Mediterranean region and find out where they occur. Euro+Med is the European Union's standard source of knowledge on the diversity of wild plants. We also operate PhycoBank, a portal where all new algae names are registered worldwide. In the future, we want to raise awareness of these and other resources through targeted high-impact publications. Our own research also leads to the discovery and scientific description of a large number of new species worldwide. And even in Germany, there is still much to discover right on our doorstep! In order to make the relevance of our research more understandable, we also want to become more involved in science communication and, together with our colleagues in the Museum and Society Department, strengthen citizen participation in scientific work, i.e. citizen science approaches.

PD Dr Robert Lücking.

What goals have you set for yourself and your staff?

Robert Lücking: Within the next five years, we want to position the Evolution and Biodiversity Department even more strongly in international biodiversity research. We have the objects and data for many questions, so we want to generate knowledge ourselves through big data analysis and thus leverage our research infrastructures for the BO and Berlin as a centre of science.

We often work in long-standing international research networks. These require researchers to have specific skills, both in terms of language and in understanding cultural differences and peculiarities, for example in the Cuba-Caribbean region, including Mexico and Colombia. The same applies to the Eastern Mediterranean region and the Caucasus. Many research questions can only be addressed through such regional or even global approaches, and our experience makes us ideally suited for this. It is important to introduce future generations of researchers to this work. To this end, we must also position the fields of plants, fungi and algae well with regard to rapidly developing methods such as phylogenomics and artificial intelligence, as these will determine botanical systematics and evolutionary research in the coming years. Botanical biodiversity research is interdisciplinary and transdisciplinary. It is therefore crucial to have the right staff in these areas, in the form of teams with complementary tasks and skills.

Another focus is application-oriented research on botanical species conservation and biomonitoring in Germany. In recent years, we have been able to compile fundamental data on the genetic diversity of selected endangered species as part of third-party funded projects. There is a great need for research in this area, which we intend to address.

Thank you very much for talking to us!

A difficult legacy

A workshop at the Botanical Museum in 2023 focused on how the new permanent exhibition can address the topic of colonialism.

How much colonialism is still present in Berlin's museums, their collections and exhibitions today? And how should this legacy be dealt with? These are questions that preoccupy employees at a wide variety of institutions in the capital. They are aware that action needs to be taken. However, it is difficult to decide in each individual case which specific measures are appropriate and sensible.

That is why the pilot project "Dekoloniale Memory Culture in the City" and the Kompetenzstelle DeKolonisierung of the Stiftung Stadtmuseum, in cooperation with the Berliner Museumsverband, have organised a series of workshops on the topic of "Decolonisation of Museums." In 2023, Berlin museum professionals met in four workshops at the Mitte Museum, the Brücke Museum and the Botanical Museum to discuss solutions to the specific challenges facing these institutions. "It was a very open and constructive exchange," recalls Nadine Csonka, who heads an internal working group on colonial contexts at the Botanic Garden. "I found the composition of the workshops particularly important," she explains. "Because experts from museums, academia and civil society were present at every meeting."

The workshop at the Botanical Museum focused on how colonial heritage and decolonisation efforts can be addressed in the new permanent exhibition, which is already largely designed. This was precisely the problem facing the staff at the Botanical Museum at the time: planning for the new exhibition was already well advanced, but the topic of colonialism was not yet sufficiently represented.

And yet there is a lot to tell on this subject, especially in the Botanical Museum. While the history of botany in general is closely linked to colonialism, the Botanic Garden Berlin played a special role in this regard. From 1891 to 1920, it was home to the Botanische Zentralstelle für die deutschen Kolonien (Botanical Research Centre for the German Colonies), which was responsible for researching and utilising the plant diversity found there. As early as 1889, following a decision by the Federal Council of the German Empire, all botanical material collected during expeditions financed by the German Empire was handed over to the Botanic Garden Berlin.

"Of course, we want to show this part of our history in the exhibition," emphasises Susanne Feldmann, who heads the Museum and Exhibitions Department and also took part in the workshops. But how can we integrate colonial references into the exhibition concept? Which objects should be displayed and which should not? And how should they be classified in order to raise awareness of the issue among all visitors without offending those affected? And what does this mean for the way the museum works? The workshop provided a whole range of ideas.

Among the "A to Z islands," which will illuminate various topics in the new permanent exhibition from botanical, societal and institutional perspectives, there are several that lend themselves to a self-critical examination of colonialism and the associated role of the Botanic Garden and Botanical Museum.

Dr Nils Köster (Botanic Garden Berlin), Danielle Rosales (visual intelligence and communication) and Dr Matthias Henkel (Museum Neukölln) at the workshop in the Botanical Museum Berlin (from left to right).

These include, for example, the island T for "Tropics." Here, the colonial ties of the institution will be made visible through very specific objects. For example, a so-called Wardian case will be on display, which was formerly used to transport plants. It probably originates from the museum's own carpentry workshop and symbolises the colonial transfer of plants. At that time, the European powers brought numerous tropical crop species from their natural habitats to the colonies in order to establish lucrative plantation economies there. This continues to have negative effects on people and nature in the former colonised areas to this day. Botanical gardens such as the one in Berlin served as trans-shipment points.

Such "highlights" throughout the exhibition are intended to draw visitors' attention to colonial contexts. A booklet with more detailed information to take home and a special series of events on the topic are planned. "We also want to invite people from the former colonies to share their perspectives," says Nadine Csonka. The aim is to create a lively exhibition that not only looks at the history of botany and its colonial contexts through European eyes, but also offers a different perspective. Just as the Botanic Garden and the Botanical Museum contributed to the spread of colonial ideas, they now want to play a part in deconstructing them.

The education initiative

Eva Patzschke has been head of the new Education and Outreach Department since 2023

"Come with us on a journey of discovery into the world of plants that we use every day! We will learn about seasonal fruits and vegetables, fragrant herbs and edible flowers in a playful way..." This is how the invitation to a course begins, in which primary school classes can explore the world of useful plants.

Eva Patzschke is very passionate about such programmes. "I would be delighted if every child in Berlin visited the Botanic Garden at least once during their school years," says the biologist, who has worked for many years in the fields of knowledge transfer, science communication and environmental education. At the beginning of 2023, she took over as head of the newly created Education and Outreach Department at the Botanic Garden. Since then, she has been building a team, developing new concepts for educational work and establishing contacts within and outside the garden. This network aims to help make the Botanic Garden an important player in the city in terms of education.

Mushroom identification, plant sponsorships and individual guided tours have been available for a long time. "We will of course continue

The magnifying glass – an important tool for exciting discoveries.

Eva Patzschke.

to offer all of this," emphasises the expert. But there will also be many new additions. The Botanic Garden wants to be even more open to Berlin's urban society. The aim is to impart knowledge about the fascinating world of plants and to give access to nature to a broad variety of people.

Eva Patzschke and her team want to start this in nursery schools, for example, where children can playfully find out how closely their everyday lives are connected to plants. Through experiments they can discover how colours can be extracted from plants. Older schoolchildren can gain botanical knowledge that relates to a wide range of areas in the curriculum. Where better to learn about adapting to drought than in a cactus greenhouse?

"Experimental learning is also very important to us," says Eva Patzschke. The new useful plant garden offers completely new opportunities. It is financially supported by the Berlin Senate Department for the Environment and designed by her team in collaboration with Parzelle X – Office for Landscape Architecture & Nature Education. Children and young people can not only learn about plants that are suitable for eating, dyeing or energy production. They can also try their hand at gardening.

Eva Patzschke and her team are also significantly expanding the range of activities geared at adults. "There is a lot of interest in guided tours, for example," she reports. That is why there are now regular public Sunday tours and group offers on various topics. Many visitors would like to gain an overview of the Botanic Garden, its history and its tasks. Special tours focusing on herbs, medicinal plants or tropical crops are also popular. Guided tours in various languages will be offered in future to expand the range of tourist attractions.

If you prefer to explore the garden and its plants in a more creative way, there are also a whole range of events to suit you. In a workshop on "nature journaling," participants can record their botanical discoveries in drawings, words and numbers. Eva Patzschke sees great potential in such unusual approaches: "This allows us to make botany accessible to people who are more interested in creativity than science."

Out of the shadows

Since 2024, the Botanic Garden has had a new curator for fungi and a new curator for lichens and mosses.

These organisms have always seemed a little mysterious. At least that's suggested by their name "cryptogams," which comes from Greek meaning "hidden marriage." For almost 300 years, this term was used to describe algae, mosses, ferns, lichens and fungi, i.e. organisms without flowers or seeds, understood as plants in the broadest sense. In modern taxonomy, the term "cryptogams" is no longer used, as these are very different groups of organisms. However, "cryptogams" often still lead a shadowy existence in science, and many species remain undiscovered.

Dr Bibiana Moncada examines lichens on tree trunks in the Düppeler Forest on Berlin's Königsweg.

To draw more attention to these fascinating organisms, two new experts joined the Botanic Garden Berlin in 2024. Dr Bibiana Moncada is the curator responsible for lichens and mosses, while Dr René Jarling is the curator responsible for fungi. So there is no longer just one person who has to devote equal attention to all groups of organisms. "That makes sense," says René Jarling. "It's a very large group of organisms, and you can't find anyone today who has a complete overview of them all."

Since childhood, he has been fascinated by fungi – even though he doesn't enjoy eating them at all. What appeals to him is the search for organisms that may only appear for two or three weeks a year. "It's a bit like a treasure hunt," explains the researcher. "And you are constantly rewarded with new discoveries." His enthusiasm for his new position at the Botanical Garden is evident: "This is my dream job!"

Bibiana Moncada also finds her research subjects particularly appealing. "Mosses and lichens are fascinating in many ways," she says. After all, mosses were the first land plants on Earth, and lichens boast a unique symbiosis of algae and fungi. Both groups of organisms fulfil important ecological functions, but have also long been used by humans as dyes for textiles or for medicinal purposes, and are important environmental indicators. And last but not least, lichens and mosses also score points in aesthetic terms: "With their unique architecture, they form miniature forests of incomparable beauty," enthuses Bibiana Moncada.

Dr René Jarling searching for fungi in the Botanic Garden.

The biologist spends most of her working time caring for the collections, which comprise a total of around 650,000 specimens. She also devotes herself to her own research. This involves recording the diversity of lichens in tropical regions such as Colombia, Mexico and the Philippines, evaluating lichen species for red lists and revising historical lichen collections. "For example, I discovered a species of lichen in our herbarium that was previously unknown in Germany but is probably already extinct," reports the researcher.

Meanwhile, René Jarling continues to pursue his passion for scientific treasure hunts. Like his colleague, he spends most of his time looking after the collection. But he also finds opportunities to research the regional diversity of fungi. "There are still many undescribed species in Berlin and Brandenburg," he says, based on his research at the sites of former forest fires.

Even in the Botanic Garden itself, he keeps coming across surprises. "One of our gardeners discovered a small yellow cup fungus called *Peziza chrysopela* in a flower pot," says René Jarling. "It has only been found a few times worldwide." An earlier discovery reveals that this fungus was already present in the palm house of the Botanic Garden in Schöneberg at the end of the 19th century and probably moved to Dahlem from there. A total of around 1,000 known species of fungi grow in the greenhouses and outdoor areas of the Botanic Garden, 250 of which have been identified by René Jarling since the beginning of 2024. "We have a special responsibility for some of them," he emphasises. "Because it is quite possible that they are already extinct in the wild."

In future, the curator wants to further develop the Botanic Garden's collection with a regional focus. "My wish would be to keep a specimen of every fungus in the North German lowlands at the garden," he describes one of his goals. Bibiana Moncada also wants to enrich the Berlin collection with fresh material from Berlin and Brandenburg. She also sees interesting research questions in the region. "Many of the lichen species that died out due to air pollution are now returning to the Berlin area as air quality has improved significantly," explains the biologist. "Comparing them in a historical and modern context is very exciting." In addition to digitising the collections, the two experts have many other ideas for bringing "the hidden marriages" out of the shadows.

Research – PRESERVE – Explain

In 2023 and 2024, three departments of the Botanic Garden got new heads. Together with their teams, they are responsible for the three core tasks of the institution. We asked them four questions about taking on their new roles at the BO Berlin.

How long have you been head of the department at the Botanic Garden and Botanical Museum?

Dr Gerald Parolly: I took over as acting head in 2021 and have been the official scientific director of Department II – Biological Collections since July 2023.

What did you do before that?

Gerald Parolly: I have a degree in biology and did my doctorate on a vegetation science topic in the high mountains of Anatolia. I then researched and taught as a research assistant at the Institute of Biology at the Freie Universität Berlin. Turkey was also a focus of my work, but for many years I also worked on bryology, mainly in Peru and Ecuador. Even back then, I was regularly involved in projects at the Botanic Garden Berlin, such as Euro+Med PlantBase and the Caucasus Biodiversity Initiative. I have been a permanent member of the Botanic Garden since 2011, where I have been curator of the Mediterranean and Temperate Living Collections. For the past few years, I have also been co-editor of the long-established Schmeil-Fitschen, a standard work for the identification of all wild and frequently cultivated vascular plants in Germany and its neighbouring countries.

What do you find particularly exciting about your new position? And what is the biggest challenge?

Gerald Parolly: The variety of tasks, because my department covers the living collections in the open air and in the greenhouses, the collections of dried plants, mosses, lichens and fungi in the herbarium, the DNA bank with DNA and tissue samples, and the Dahlem Seed Bank, which stores millions of wild plant seeds. The botanical objects in these very different types of collections are linked to each other and to the associated research data. My focus is on developing these collections and the workflows for the physical curation of these objects. Collaboration with our Center for Biodiversity Informatics and Collection Data Integration (ZBS) and the Evolution and Biodiversity Department requires constant internal communication and, of course, communication with the public – because we are working on topics that are very relevant to society. The survival of humanity explicitly depends on plants as a key resource.

I like to describe the collections and their management as a dynamic system with additions and departures within a constantly changing framework. That would be a challenge even with optimal resources! A shortage of skilled workers, a backlog of building renovations, increasing bureaucracy and extreme weather conditions, as well as a constant stream of new tasks, do not exactly make it any easier. Despite everything, or perhaps precisely because of it, developing the department under these conditions is exciting! And the greatest asset we have for coping with this and finding solutions is the outstanding commitment and wealth of ideas of our colleagues in the various departments. This gives me courage.

At the moment, I have practically no time for my own research, for example on questions of garden history or the flora and vegetation of Southwest Asia.

Dr Gerald Parolly.

What goals have you set for yourself and your staff?

Gerald Parolly: Compared to other countries, Germany lags behind in terms of digitising collections. A key goal for the herbarium is therefore to digitise all four million plant specimens in its collection. It's not just about making it easier to find the specimens you're looking for. With herbarium collections that are fully digitised, completely new questions can be addressed, including through AI-supported processes. Whether physical or digital, all our collections must be organised in such a way that they provide the best possible service for biodiversity research.

Botanical species conservation is firmly anchored not only in our research, but also in the Dahlem Seed Bank and in the garden with its conservation cultures and reintroduction programmes. In recent years, botanical species conservation tasks have also been funded by federal and state projects. A concrete milestone would be the continuation of the Wild Plant Conservation Germany (WIPs-De) project where we cooperate with four botanical gardens nationwide to preserve and protect so-called responsibility species in Germany and support them through education and public outreach.

I have a dream for the Botanic Garden as a whole: to showcase Engler's garden, this globally unique arrangement with vegetation from the northern hemisphere in the outdoor grounds and the southern hemisphere in the greenhouses, as a model, collection and exhibition. Living plants are both exhibition objects and research resources, and in some cases, we have conservation cultures of very rare species or species that are no longer known in the wild. And yet the living collections are acutely endangered by the dilapidated structure of the greenhouses and a lack of staff. It is important to raise awareness among political decision-makers and, at the same time, to use the available resources in such a way that the collections are fit for the future.

Thank you very much for talking to us!

Collecting for sequences

A conversation with Dr Belen Escobari, who has been head of the Botanic Garden's DNA bank since 2023

Dr Escobari, you have been head of the DNA bank since 2023. What are the tasks of the DNA bank?

The DNA bank is part of our biological collections, alongside the living collection, the herbarium and the Dahlem Seed Bank. It is both a research resource and a service facility – for our institution and for researchers and institutions worldwide. Here we store DNA and tissue samples from plants, fungi, algae and microorganisms. So I curate two physical collections, which are stored in their own collection room. I manage and catalogue these collections and make them available to users.

The DNA bank also forms a central interface between the research laboratories, the scientists in the Evolution and Biodiversity Department and the computer scientists at the Center for Biodiversity Informatics and Collection Data Integration (ZBS). In other words, I coordinate material and workflows – IDs and data must always be passed on with the physical samples and scientific standards must be adhered to. Whether it's the quality of the metadata supplied with the samples or something like collection permits, I have to check, advise and ask questions in each individual case – it's all part of the service.

Incidentally, our institution is committed to the FAIR principles for handling data, which are guidelines to ensure that scientifically generated data are findable, accessible, interoperable and reusable.

DNA bank curator is probably not a profession you can train for. What did you do before?

I studied biology at the Universidad Mayor de San Andrés in La Paz and graduated in 2016. In 2022, I completed my doctorate at the Freie Universität Berlin; my supervisors were Prof. Dr Thomas Borsch and Dr Norbert Kilian from the Botanic Garden. During the pandemic, I was unable to go to the lab for two years, so I focused more on data analysis. This led to a part-time position on a project at the ZBS, where I learned a lot about databases and structures. When the position of DNA bank curator was advertised in 2023, I applied and was successful.

Did you also work with DNA samples in your previous research?

Of course. In my dissertation, I worked a lot with molecular methods and data, and I am very familiar with this field. My doctoral thesis focused on the genus *Gynoxys*, a group of composite plants from the Andes. I wanted to know how the approximately 150 species developed and where they occur. Many of these yellow-flowering woody plants look very similar. And *Gynoxys*, as we know from this study, is still relatively young in terms of its phylogenetic history. Without comprehensive genetic testing, using only traditional methods, I wouldn't have got very far. The samples I collected for this are now in our DNA bank.

When I applied for the job, I didn't have much experience in collection management, but that's now a big part of my work. For me, it means learning by doing, and I'm supported by experienced colleagues.

Dr Belen Escobari preparing tissue samples for research.

How do you store the samples?

It varies. Unsurprisingly, the tissue collection consists of plant tissues that are dried with silica gel. These are mostly young leaf fragments. The drying process must be done as quickly as possible to preserve the DNA. The DNA is ultimately extracted from the tissue samples. We store the individual accessions in tea filters labelled with barcodes. These are kept in airtight, carefully labelled containers on silica gel in a cool room. More than 25,000 tissue samples are available for research.

The actual DNA collection, i.e. the isolates, is organised differently. The DNA extracted from the plants is stored in small, tube-shaped vessels filled with liquid. These samples must be frozen to ensure that they remain usable even after many years. We use refrigerators that cool to –80 degrees Celsius; sometimes –60 degrees is sufficient, which saves energy.

The space we need is growing as the collections keep getting bigger. So I will soon have to look for additional storage capacity.

What is your work like? Your everyday routine is certainly varied, isn't it?

Absolutely! And it changes from day to day, almost on demand. External or internal requests often determine what I do first. Some days it's like working at a supermarket checkout – I scan barcodes on tea bags or herbarium specimens.

Speaking of herbarium records: it is crucial to link samples and data to a herbarium record that can be re-identified and stored permanently. It is equally important to check the legal framework. For each collection, there are rules governing whether material can be transferred to other institutions and whether there are restrictions on transfer or use. This can vary depending on the country of origin. The Nagoya Protocol plays an important role here. This is an international agreement that regulates access to genetic resources.

The holdings of our DNA bank are part of the Global Genome Biodiversity Network (GGBN), a worldwide network of DNA and tissue banks. Our samples are digitally accessible via the GGBN online portal.

Where do the DNA bank's accessions actually come from?

Very often from our collections – the herbarium or the garden. They often come to my desk through project-related collecting trips or from cooperating institutions. If there is a request for a particular plant species, we first check whether we already have material in the DNA bank and a specimen in our herbarium. This is often the case. Sometimes, however, we only have the species in our living collection; in that case, I go to the garden and collect a tissue sample and a herbarium specimen. Nice – a little collecting trip here in the Botanic Garden.

Just as we send samples all over the world, we also receive them from all over the world for various research projects. The collections in the DNA bank reflect our main areas of research. Geographically speaking, most of the specimens come from Cuba and the Caribbean, the Mediterranean region and the Caucasus. The native flora is well represented, with several thousand accessions, mainly thanks to the GBOL project (German Barcode of Life – Reference Library of German Plants, Animals and Fungi).

Who uses the material and what is it used for?

In most cases, the questions concern research into biodiversity. How are the different species of a plant group related to each other? And how can we distinguish between different species? All these questions require the inclusion of samples from many different geographical areas. Since individual researchers cannot collect samples everywhere themselves, the samples from the DNA bank are crucial.

However, population genetic aspects are also becoming increasingly important. Not only do taxa differ from one another, but populations of a species can also be genetically diverse and face different levels of threat depending on their location. Knowledge gained from population genetic studies, which we are conducting on arnica (*Arnica montana*) and broad-leaved marsh-orchid (*Dactylorhiza*

The curator must wear special gloves when removing DNA samples stored at -80 °C.

majalis), for example, is playing an increasingly important role in botanical species conservation. As technologies are developing rapidly, it can be very interesting to re-examine DNA from the same individuals many years later using different methods. The DNA bank makes this possible!

Thank you very much for talking to us!

New perspectives on a sensitive heritage

In a workshop at the Botanic Garden, international experts discussed the plant remains from ancient Egyptian tombs collected by Georg Schweinfurth.

Ahmose, Amenhotep I, Ramses II – numerous pharaohs, but also priests and private individuals from ancient Egypt, share a little-known commonality: plants were found in their tombs as floral decorations, grave goods and offerings to the dead. And they continue to fascinate experts long after their deaths. A large collection of such objects, dating from around 3000 BCE to 700 CE, was compiled at the turn of the 19th century by the German-Baltic botanist Georg Schweinfurth. Around 400 of these pieces are now stored in the Botanical Museum in Berlin. In December 2024, with the support of the Fritz Thyssen Foundation, a three-day interdisciplinary workshop was held, taking this collection as its starting point.

Susanne Feldmann and Dr Norbert Kilian from the Botanic Garden organised the event together with Egyptologists Dr Thomas Gertzen, Prof. Jochem Kahl and Prof. Tonio Sebastian Richter from the Freie Universität Berlin. Around 40 experts from various disciplines in Egypt, Germany, Italy, Switzerland, the United Kingdom and the USA accepted the invitation and discussed questions relating to Schweinfurth's scientific legacy. They focused on his collecting and research activities, his networks, the significance of his work for modern science, and the appropriate presentation of the objects to the public. "What made this event so special was the many different facets that were discussed," says Norbert Kilian.

The use of plants in ancient Egypt was just as much a topic as legal and ethical aspects to be considered when dealing with mummies. Sometimes the focus was on Schweinfurth's role in colonialism, then again on the special way in which he prepared his finds. All workshop contributions will be published in the journal Englera. "Although they were developed from different disciplines, there were always clear links between the topics," says Susanne Feldmann. Like a mosaic, the individual findings came together to form a picture. "And that's exactly what we hoped to achieve with the workshop."

Poster for the scientific workshop.

One of around 400 objects containing ancient Egyptian plant remains from the Botanical Museum's collection.

The research into Georg Schweinfurth's scientific legacy reflects the holistic approach that he himself advocated. "Schweinfurth saw plants and their use as the foundation of human culture," explains Norbert Kilian. For the scientist, who was born in Riga in 1836 and died in Berlin in 1925, there was therefore no contradiction between the natural sciences and the humanities. He incorporated all disciplines relevant to the study of the plant world. This approach is not only very modern in terms of methodology. Its results are also relevant today. For example, they can provide valuable information about the history of vegetation and changes in biodiversity in Egypt and other regions.

However, from today's perspective, Schweinfurth's collection also raises critical questions: even if the excavations were legal under the laws prevailing in Egypt at the time, were they also legitimate? How should the associated disturbance of the dead be assessed ethically? And what options are there for presenting and classifying the collection in such a way that the colonial context in which it was created is also adequately visible? "These are sensitive issues that have hardly played a role to date," says Susanne Feldmann. In future, the team at the Botanic Garden's intends to address such questions in depth. "Collegial exchange on these aspects is important to us," says the head of the Museum and Exhibitions Department.

She and Norbert Kilian are very satisfied with the results of the workshops. The aim was, on the one hand, to gain an overview of the current state of research on Schweinfurth and the plant remains he collected and prepared from ancient Egyptian tombs. On the other hand, the aim was to network the experts working on this topic. "Both were very successful," says Norbert Kilian. "There was great interest in deepening the cooperation." This may also open up new opportunities for the future presentation. Georg Schweinfurth had distributed his finds to various museums and institutions in Egypt and Europe. "Perhaps we can now bring them back together virtually and present them jointly," hopes Susanne Feldmann. Then the public could also be fascinated by the millennia-old plant remains.

Queens of Flowers and Secrets of Nature

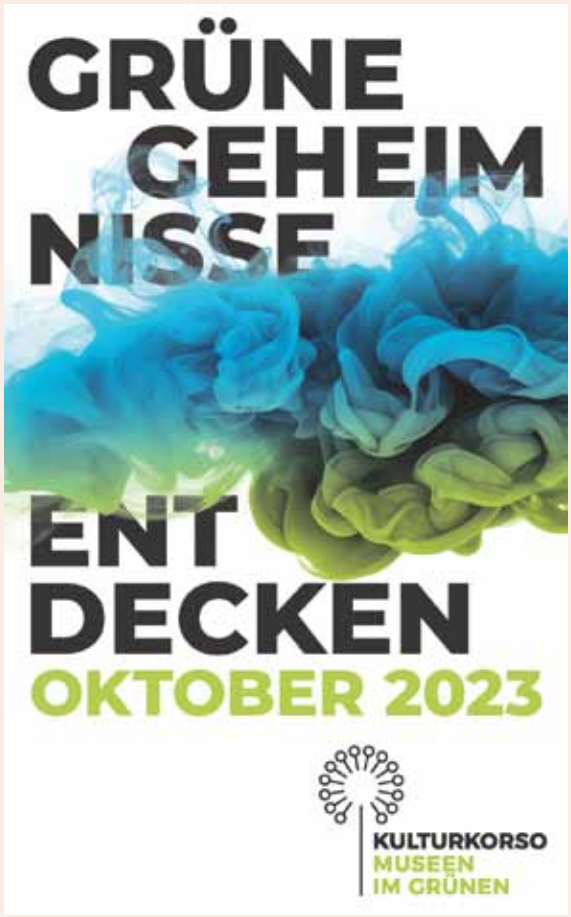
Cultural events 2023–2034 at the Botanic Garden

There are days when a special kind of magic happens at events in the Botanic Garden. That's when Stephanie Henkel has achieved her goal. "We want to keep offering special events that combine nature, culture and science," says the head of the Communications and Marketing Department. The focus is on programmes that are tailored to the character of the garden and the vision of the institution, rather than on replaceable mass events.

This also includes joint activities with other cultural institutions in Berlin's green southwest: 14 museums and exhibition venues have joined forces to form the "Kulturkorso Berlin – Museen im Grünen" network to jointly promote the attractive combination of culture and nature, supported by the Steglitz-Zehlendorf district authority. Once a year, they organise a month of activities, offering special tours, workshops and behind-the-scenes glimpses on a specific theme.

October 2023, for example, was themed "Green Secrets." "All the participating venues searched for exciting stories about objects or facilities that had hardly been told before," says Stephanie Henkel, explaining the idea. The Botanical Museum, which is closed for construction work, revealed such a secret and opened its doors at short notice for the event. It is home to a historical exhibit that helped settle a once highly controversial question: is there sex in the plant kingdom? "We have the original palm tree on which Johann Gottlieb Gleditsch discovered sexual reproduction in vascular plants in 1749," says Susanne Feldmann, head of exhibitions and museums at the Botanic Garden. "When you tell stories like this on a special tour, visitors naturally become curious about the reopening." During the 2024 action month, visitors were able to discover evidence of "Berlin's first cherry tomato" in the herbarium under the motto "The first time." The seeds of the plant had been sent to Berlin by none other than Alexander von Humboldt from his research trip to Latin America.

The Botanic Garden has also celebrated premieres in other cultural fields. For example, the "Circle of Live" concert, which was organised in cooperation with the Kultursommer Festival Berlin. In August 2023, guests were able to spend a whole day listening to electronic music on the lawn in front of the



Poster for the Kulturkorso event series Grüne Geheimnisse (Green Secrets).

Visitors at the Queens & Flowers Festival in the Botanic Garden Berlin.

greenhouses. In this improvisational format by Swedish composer Sebastian Mullaert, the participating artists musically inspired each other on stage. "The meditative soundscapes fit very well with the calm of the place," recalls Stephanie Henkel.

A similarly relaxed atmosphere prevailed a year later when the Botanic Garden teamed up with the Steglitz-Zehlendorf district and Place2Be Berlin, the queer tourism and event platform of the city magazine SIEGESSÄULE, to organise the "Queens & Flowers" festival. This time, the theme was diversity in all its facets. There was a varied programme, with family activities in the afternoon, guided tours of the greenhouses and various musical shows in the garden. Drag queens read from children's books for the little ones, and the Botanic Garden's education team invited visitors to paint with plant colours.

There was an overwhelming response to the drag summer festival, which was sold out before the doors even opened. A diverse audience enjoyed the peaceful atmosphere and the performances of the drag queens. "The Botanic Garden is a place where everyone is welcome," emphasises Stephanie Henkel. "At this event, you could feel how diversity can enrich life."

The Kulturkorso Berlin month and the Queens & Flowers summer festival were sponsored and supported by the Wirtschaftsförderung Steglitz-Zehlendorf, the Senate Department for Economic Affairs, Energy and Public Enterprises, and visitBerlin.

Learning to read landscapes

In spring 2023, students explored the flora of Crete together with scientists from the Botanic Garden.

Beaches with sand dunes, groves of Cretan date palms, riparian forests of plane trees and rugged high mountains – what at first sounds like a perfect holiday idyll is also the ideal destination for the academic training of students in the field of biological diversity. This is because more than 2,100 species of plants grow on Crete, around 160 of which are found nowhere else on earth. The connection between plant diversity, the wide variety of habitats and location factors can best be conveyed on an excursion.

In spring 2023, students from the Freie Universität Berlin (FU) had the opportunity to hone their species knowledge on the Greek island. The group of 20 spent a week in the west of the island near the city of Chania, followed by another week in the southeast. Led by Dr Nils Köster and Dr Gerald Parolly from the Botanic Garden Berlin, they went out into the field every day to learn about the different plants and vegetation types.

Students comparing and identifying plants.

This often involved long walks on rocky and steep trails leading into the wilderness, especially in mountainous regions. "That was quite a surprise for me, because I didn't have much hiking experience," recalls Marc Tehranian, who is studying for a master's degree in Biodiversity, Evolution and Ecology at the FU. However, it did not dampen their enthusiasm – quite the contrary: "It was the most fun I've ever had, being out in nature every day," enthuses Shane Hanrahan, who is enrolled in the same programme.

The botanical work consisted of discovering plants in the field, identifying them and classifying them ecologically. "We were all responsible for different plant families, which we then had to present to the others," Marc Tehranian describes the concept. This was a challenge for him, as he had previously completed his bachelor's degree in environmental management and was therefore a relative newcomer to botany. But that didn't bother him: "It wasn't a problem at all; you could ask beginner's questions in a relaxed atmosphere." Shane adds: "At the same time, the whole thing was always practical – Nils and Gerald explained lots of topics from their research and collection perspectives." Qualification for the next generation of researchers and curators.

Delighted by the discovery and successful identification: *Saxifraga rotundifolia* subsp. *chrysosplenifolia* in the Imbros Gorge, Crete.

The students didn't just learn about the plants that grow on Crete and where they grow. Topics such as evolution, the history of flora, dispersal and flowering biology, and the development of a flora or an identification key were also on the agenda. The cultural history of the area was also discussed. The aim was to develop an eye for the traces left by climate, geology, land use and a variety of other factors in the landscapes. For example, if numerous thorny species such as Greek spiny spurge grow in an area, this may indicate the influence of nibbling goats. This is because they don't leave much else behind.

"I had already read about such connections," says Shane. But she couldn't really imagine it all until she saw it for herself. "You shouldn't just learn about plants from books, but out in nature," she believes. She was able to apply her new knowledge just six months later when she recognised many plant genera and vegetation types during a trip to Mallorca. And she now knows what kind of research she enjoys most: "I really like being in the lab," says the student. "But I've realised that fieldwork is my thing."

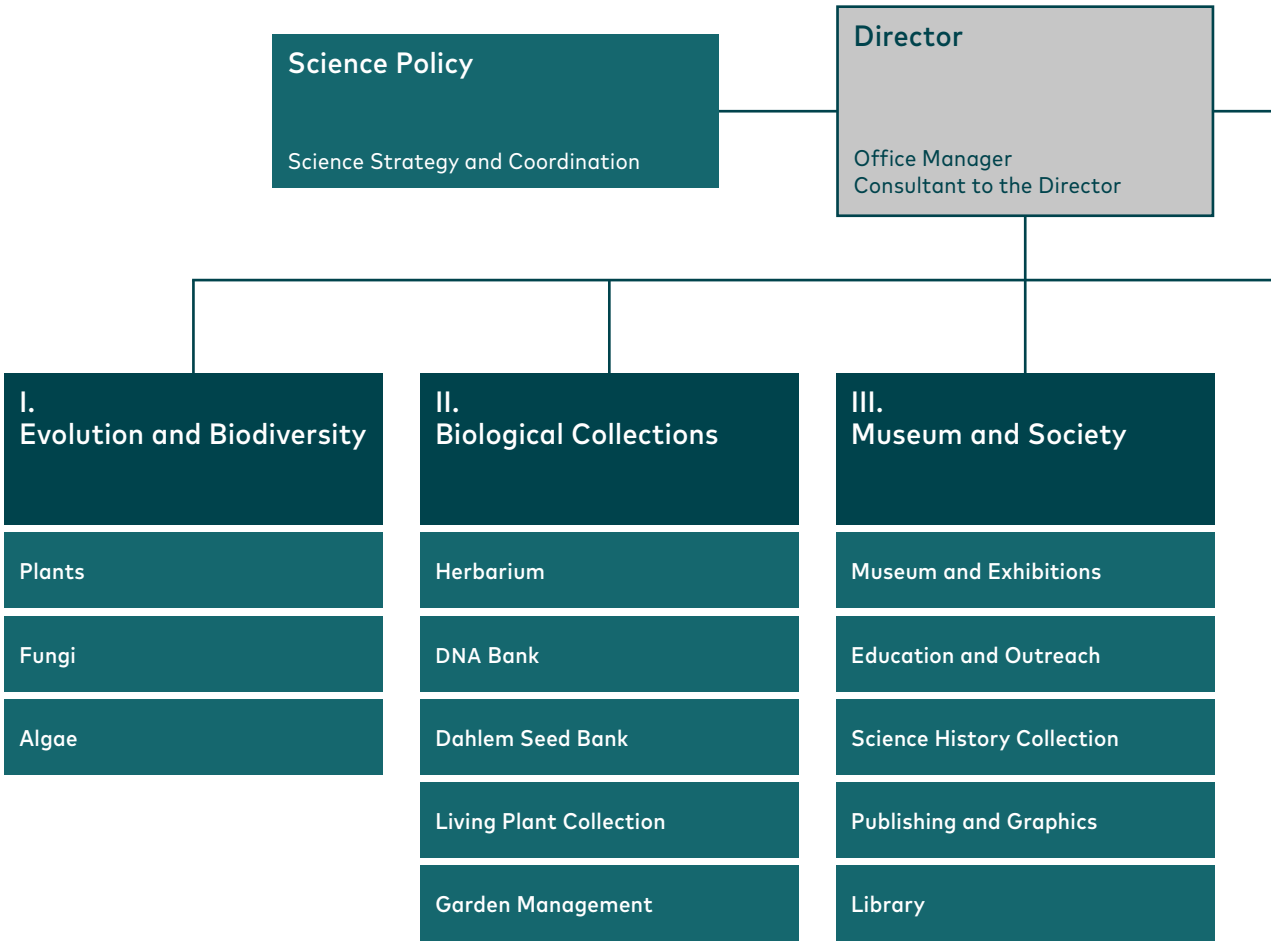
The experience was also worthwhile for Marc. "That's exactly what you want to do when you study biodiversity," he says. In addition to gaining specialist knowledge, he also made contacts and friends. And he developed a new passion for photographing plants. He was so enthusiastic that he took part in another excursion organised by Nils Köster and Gerald Parolly in 2024. This time, the destination was the Alps.

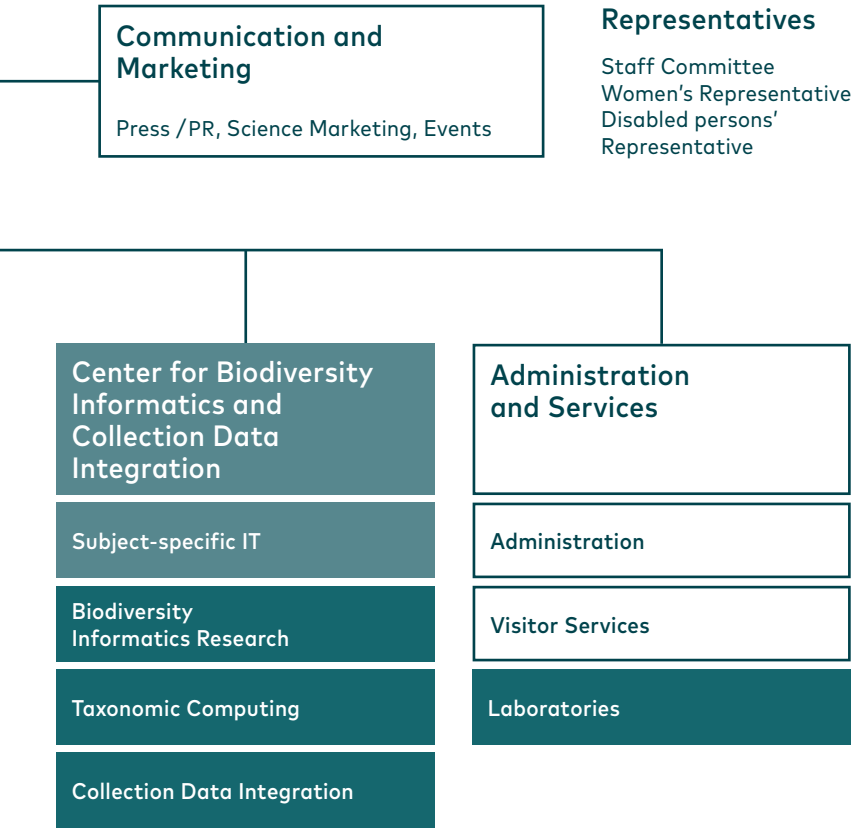
Shane and Marc now work as student assistants in the herbarium of the Botanic Garden.

The flora of Crete is covered by the multi-volume Flora of Greece. This work is based on a long-term project by the major Greek universities and the Hellenic Botanical Society in collaboration with the Botanic Garden Berlin. The aim is to comprehensively record and describe the flora of Greece.

BOTANIC GARDEN BERLIN

Together we are a unique knowledge hub for botany.




Communication and Marketing
Press /PR, Science Marketing, Events
Representatives
Staff Committee
Women's Representative
Disabled persons' Representative
Center for Biodiversity Informatics and Collection Data Integration
Subject-specific IT
Biodiversity Informatics Research
Taxonomic Computing
Collection Data Integration
Administration and Services
Administration
Visitor Services
Laboratories

2023/2024

Facts & figures

STAFF

EMPLOYEES TOTAL

98
SUPPORT STAFF

34
SCIENTISTS AND CURATORS

94
EMPLOYEES IN THE GARDEN

95
SUPPORT STAFF

35
SCIENTISTS AND CURATORS

99
EMPLOYEES IN THE GARDEN

VISITING SCIENTISTS

incl. visiting scientists in the herbarium

TRAINEES

12
2023

12
2024

VOLUNTARY ECOLOGICAL YEAR / FEDERAL VOLUNTARY SERVICE

0
2023

3
2024

NATIONAL

33
2023

38
2024

INTERNATIONAL

54
2023

64
2024

DOCTORAL STUDENTS

2023–2024

3 NATIONAL
6 INTERNATIONAL

5 FEMALE
4 MALE

AFFILIATED AND HONORARY SCIENTISTS

2023–2024

Dr Neela Enke
Prof. Dr Werner Greuter
Dr Elham Hatami
Peter Hirsch
Dr Regine Jahn
Dr Katy Jones
Prof. Dr. Hans-Walter Lack
Dr Bibiana Moncada
Dr Daniel Montesinos Tubée
Dr Demetrio Mora
Dr Rosa Rankin
Dr Thomas Raus
Michael Ristow
Dr Henricus Sipman
Prof. Dr Arne Strid
Prof. Dr Eckhard Willing
Dr Brigitte Zimmer (Prof. a.D.)

VOLUNTEERS

2023–2024

Jessica Baldwin; Evelin Bartels; Ute Braun; Lotte Burkhardt; Uschi Christahl; Christian Feldt; Sybille Fiedler; Gudrun Genschow; Bettina Gmelin; Christine Hillmann-Huber; Monika Kuberek; Erich Liebert; Janina Lindner; Thomas Menzel; Martine Musau Mulamba; Nikolaus Nolden; Martina Redlin; Gudrun Scharte; Cora-Beate Schaumann; Regina Stark; Gabriele Winde; Sabine Zehrer.

Due to data protection regulations, we are only permitted to name volunteers who have explicitly given their consent. The BGBM is supported by numerous volunteers who are not named here but to whom we owe enormous thanks for their ongoing commitment.

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Kusber, W.-H., **Abarca, N.**, **Skibbe, O.**, **Zimmermann, J.** & **Jahn, R.** 2024: Phycobank Registration Database – why registration matters. – Pp. 91–92 in: Levkov, Z., Mitic-Kopanja, D. & Zaova, D. (ed.), Book of Abstracts, 15th European Diatom Meeting, 7–9 May 2024, Ohrid, North Macedonia.

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Parolly, G., **Raab-Straube, E. von** & **Vogt, R.** 2024: Familie: *Asteraceae* [*Compositae*], Korbblütler, Köpfchenblütler. – In: **Parolly, G.** & Rohwer, J. G. (ed.), bearbeitet von Koltzenburg, M., **Nordt, B.**, **Parolly, G.**, Rohwer, J. G. und Schmidt, P. A., Die Flora Deutschlands und angrenzender Länder: ein Buch zum Bestimmen aller wildwachsenden und häufig kultivierten Gefäßpflanzen, 98. überarbeitete und erweiterte Auflage (Quelle & Meyer Bestimmungsbücher). – Wiebelsheim, Hunsrück: Quelle & Meyer.

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CONTRIBUTIONS TO TAXONOMIC INFORMATION SYSTEMS

The World Flora Online Consortium, Elliott, A., Hyam, R., Watson, M., ..., **Berendsohn, W.**, ..., **Kilian, N.**, ..., **Korotkova, N.**, ..., **Malekmohammadi, M.**, ..., **Müller, A.**, ... & Zizka, G. 2024: World Flora Online Plant List December 2024. – Published online: https://zenodo.org/records/14538251.

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SPECIES NEWLY DESCRIBED BY BGBM AUTHORS

2023–2024

LICHENS

NAME	COUNTRY OF ORIGIN
Acanthothecis aggregata Aptroot, Lücking & M. Cáceres[17)]	Brazil
Chapsa constrictospora Aptroot, Lücking & M. Cáceres[17)]	Brazil
Chapsa diorygmoides Aptroot, Lücking & M. Cáceres[17)]	Brazil
Chapsa lichexanthonica Aptroot, Lücking & M. Cáceres[17)]	Brazil
Diorygma gyrosum Aptroot, Lücking & M. Cáceres[17)]	Brazil
Diorygma lichexanthonicum Aptroot, Lücking & M. Cáceres[17)]	Brazil
Diorygma norsubmuriforme Aptroot, Lücking & M. Cáceres[17)]	Brazil
Diorygma salxanthonicum Aptroot, Lücking & M. Cáceres[17)]	Brazil
Ocellularia flaviradiata Aptroot, Lücking & M. Cáceres[17)]	Brazil
Coenogonium carassense D.O. Lima, Aptroot, Lücking & M. Cáceres[18)]	Brazil
Coenogonium itabaianense D.O. Lima, Aptroot, Lücking & M. Cáceres[18)]	Brazil
Coenogonium pilosum D.O. Lima, Aptroot, Lücking & M. Cáceres[18)]	Brazil
Coenogonium subimplexum D.O. Lima, Aptroot, Lücking & M. Cáceres[18)]	Brazil
Allographa exuens Lücking, B. Moncada & Álvaro[19)]	Colombia
Allographa guainiae Lücking, N. Marín & B. Moncada[19)]	Colombia
Allographa labiata Lücking, N. Marín & B. Moncada[19)]	Colombia
Allographa lichexanthonica Lücking, N. Marín & B. Moncada[19)]	Colombia
Allographa sessilis Lücking, N. Marín & B. Moncada[19)]	Colombia
Allographa suprainspersata Lücking, N. Marín & B. Moncada[19)]	Colombia
Astrothelium bireagens Lücking, N. Marín & Álvaro[19)]	Colombia
Astrothelium stromatolucidum Lücking, N. Marín & Álvaro[19)]	Colombia
Carbacanthographis submultiseptata Lücking, N. Marín & B. Moncada[19)]	Colombia
Chapsa inconspicua Lücking, B. Moncada & Álvaro[19)]	Colombia
Coenogonium velutinellum Lücking, N. Marín & Álvaro[19)]	Colombia
Fellhanera naevioides Lücking, B. Moncada & Álvaro[19)]	Colombia
Fissurina sipmanii Lücking, B. Moncada & Álvaro[19)]	Colombia
Glyphis lirellizans Lücking, N. Marín & B. Moncada[19)]	Colombia
Graphis papillifera Lücking, N. Marín & B. Moncada[19)]	Colombia

LICHENS

NAME	COUNTRY OF ORIGIN
Graphis pseudoglyphis Lücking, N. Marín & B. Moncada[19)]	Colombia
Malmidea flavimarginata Lücking, N. Marín & Álvaro[19)]	Colombia
Malmidea isidiopiperina Lücking, B. Moncada & Álvaro[19)]	Colombia
Malmidea papillitrailiana Lücking, B. Moncada & Álvaro[19)]	Colombia
Myriotrema araracuarense Lücking, B. Moncada & Álvaro[19)]	Colombia
Ocellularia areolata Lücking, B. Moncada & Álvaro[19)]	Colombia
Ocellularia caquetensis Lücking, B. Moncada & Álvaro[19)]	Colombia
Ocellularia inspersipallens Lücking, B. Moncada & Álvaro[19)]	Colombia
Ocellularia rufocinctoides Lücking, B. Moncada & Álvaro[19)]	Colombia
Ocellularia sipmanii Lücking, B. Moncada & Álvaro[19)]	Colombia
Pseudopyrenula daironii Lücking, N. Marín & Álvaro[19)]	Colombia
Pyrenula asymmetrica Lücking, N. Marín & B. Moncada[19)]	Colombia
Redingeria pseudostromatica Lücking, Álvaro & B. Moncada[19)]	Colombia
Lobariella foreroana B. Moncada & Lücking[20)]	Colombia
Sticta henrici B. Moncada, D.Rincón & Lücking[20)]	Colombia
Yoshimuriella enfogoa B. Moncada & Lücking[20)]	Colombia
Tephromela vinacea L.A.Santos, Aptroot, Lücking & M. Cáceres[21)]	Brazil
Lecanora notatictria L.A. Santos, M. Cáceres, Aptroot & Lücking[22)]	Brazil
Lecanora irregularicrocea L.A. Santos, M. Cáceres, Aptroot & Lücking[22)]	Brazil
Lecanora flavocaesia L.A. Santos, M. Cáceres, Aptroot & Lücking[22)]	Brazil
Lecanora saepiphila L.A. Santos, M. Cáceres, Aptroot & Lücking[22)]	Brazil
Lecanora parahelva L.A. Santos, M. Cáceres, Aptroot & Lücking[22)]	Brazil
Lecanora xanthoverrucosa L.A. Santos, M. Cáceres, Aptroot & Lücking[22)]	Brazil
Pyrenula cubica Sipman[23)]	Guyana
Pyrenula flavida Sipman[23)]	Guyana
Pyrenula rubromarginata Sipman[23)]	Guyana
Pyrenula submicromma Sipman[23)]	Guyana
Carbacanthographis denudata Sipman[24)]	Guyana
Carbacanthographis granulosa Sipman[24)]	Guyana
Carbacanthographis isidiata Sipman[24)]	Guyana
Carbacanthographis latisporoides Sipman[24)]	Guyana
Carbacanthographis lucidocleitops Sipman[24)]	Guyana
Carbacanthographis minutissima Sipman[24)]	Guyana
Carbacanthographis multiseptatoides Sipman[24)]	Guyana

LICHENS

NAME	COUNTRY OF ORIGIN
Carbacanthographis nigra Sipman[24)]	Guyana
Carbacanthographis protocristata Sipman[24)]	Guyana
Pyrenula gigaspora Soto-Medina, Aptroot & Lücking[25)]	Colombia
Ocelullaria vallensis Soto-Medina & Lücking[25)]	Colombia
Sticta hypoglabra B. Moncada & Lücking[26)]	Colombia, Ecuador
Fissurina azorica van den Boom, Sipman & Lücking[27)]	Portugal (Azores)
Fissurina elaiocarpoides van den Boom, Sipman & Lücking[27)]	Portugal (Azores)
Fissurina nigrolabiata van den Boom, Sipman & Lücking[27)]	Portugal (Azores)
Topeliopsis juniperina van den Boom & Sipman[27)]	Portugal (Azores)
Fissurina bispora Aptroot, Lücking & M. Cáceres[28)]	Brazil
Fissurina diamantica Aptroot, Lücking & M. Cáceres[28)]	Brazil
Fissurina endothallina Aptroot, Lücking & M. Cáceres[28)]	Brazil
Fissurina lirelloreagens Aptroot, Lücking & M. Cáceres[28)]	Brazil
Fissurina reticulolirellina Aptroot, Lücking & M. Cáceres[28)]	Brazil
Graphis inspersonorstictica Aptroot, Lücking & M. Cáceres[28)]	Brazil
Graphis polystriatosubmuriformis Aptroot, Lücking & M. Cáceres[28)]	Brazil
Graphis viridithallina Aptroot, Lücking & M. Cáceres[28)]	Brazil
Heiomasia hypostictica Aptroot, Lücking & M. Cáceres[28)]	Brazil
Leucodecton aurantiacum Aptroot, Lücking & M. Cáceres[28)]	Brazil
Mangoldia thallolomoides Aptroot, Lücking & M. Cáceres[28)]	Brazil
Myriochapsa negativa Aptroot, Lücking & M. Cáceres[28)]	Brazil
Myriochapsa triseptata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Myriotrema inspersosticticum Aptroot, Lücking & M. Cáceres[28)]	Brazil
Myriotrema reticulatum Aptroot, Lücking & M. Cáceres[28)]	Brazil
Myriotrema roseum Aptroot, Lücking & M. Cáceres[28)]	Brazil
Myriotrema xanthonicum Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia coronatoverrucosa Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia griseosorediata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia inspersomuriformis Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia inspersulascens Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia microschizidiata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia norsorediata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia pallidocolumellata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia pedicellata Aptroot, Lücking & M. Cáceres[28)]	Brazil

LICHENS

NAME	COUNTRY OF ORIGIN
Ocellularia pertusella Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia pseudocyphellata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia psorinspersa Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia psorsorediata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia roseoisidiata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia sorediopseudochapsa Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia verruciinspersa Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia vulcanica Aptroot, Lücking & M. Cáceres[28)]	Brazil
Ocellularia wirthiotremoides Aptroot, Lücking & M. Cáceres[28)]	Brazil
Phaeographis aureopruinosa Aptroot, Lücking & M. Cáceres[28)]	Brazil
Phaeographis coccinea Aptroot, Lücking & M. Cáceres[28)]	Brazil
Phaeographis fuscobilabiata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Phaeographis macrocephalica Aptroot, Lücking & M. Cáceres[28)]	Brazil
Phaeographis norscalpturata Aptroot, Lücking & M. Cáceres[28)]	Brazil
Phaeographis pallidoxanthonica Aptroot, Lücking & M. Cáceres[28)]	Brazil
Rhabdodiscus lineatus Aptroot, Lücking & M. Cáceres[28)]	Brazil
Stegobolus negativus Aptroot, Lücking & M. Cáceres[28)]	Brazil
Thalloloma xanthohypoleptum Aptroot, Lücking & M. Cáceres[28)]	Brazil
Allographa effusosoredica P. A. Ansil, Rajeshk., Lücking & B. O. Sharma[29)]	India
Phylloblastia iranica S. Kazemi, Lücking & Sipman[30)]	Iran
Sticta isidiolobulata Ossowska, B. Moncada, Lücking & Kukwa[31)]	Bolivia
Sticta macrolobata Ossowska, B. Moncada, Lücking & Kukwa[31)]	Bolivia
Sticta madidiensis Ossowska, B. Moncada, Lücking & Kukwa[31)]	Bolivia
Sticta montepunkuensis Ossowska, B. Moncada, Lücking & Kukwa[31)]	Bolivia
Aptrootia khaoyaiensis Polyiam & Lücking[32)]	Thailand
Wetmoreana bahiensis Wilk & Lücking[33)]	Brazil
Wetmoreana circumlobata Wilk & Lücking[33)]	Paraguay
Wetmoreana rubra Wilk & Lücking[33)]	Bolivia
Wetmoreana sliwae Wilk & Lücking[33)]	Peru
Wetmoreana sliwae subsp. *subparviloba* Wilk & Lücking[33)]	Peru
Wetmoreana variegata Wilk & Lücking[33)]	Peru

VASCULAR PLANTS

NAME	COUNTRY OF ORIGIN
Rhodospatha antonensis Croat & O. Ortiz[1)]	Costa Rica, Panama
Rhodospatha osaensis Croat, Grayum & M. Cedeño[1)]	Costa Rica, Panama
Rhodospatha ovatifolia Croat, Grayum & M. Cedeño[1)]	Costa Rica, Panama
Monstera caribaea M. Cedeño, O. Ortiz & A. Hay[2)]	Costa Rica, Panama
Monstera lamersiana M. Cedeño & A. Hay[2)]	Costa Rica
Monstera panamensis M. Cedeño & O. Ortiz[2)]	Panama
Casearia isthmica de Mestier & O. Ortiz[3)]	Panama
Paronychia compacta Montesinos & Iamonico[4)]	Peru
Paronychia glabra Montesinos, E. Rodr. & Iamonico[4)]	Peru
Stellaria apurimacensis Montesinos & D. Cornejo[5)]	Peru
Stellaria congesta Montesinos & Borsch[5)]	Peru
Stellaria galianoi Montesinos & Borsch[5)]	Peru
Stellaria macbridei Montesinos & Borsch[5)]	Peru
Stellaria patagonica Montesinos & Borsch[5)]	Argentina
Stellaria spinulosa Montesinos & Borsch[5)]	Peru
Stellaria utcubambensis Montesinos & Borsch[5)]	Peru
Stellaria villasenorii Montesinos & Borsch[5)]	Chile
Stellaria xanthophylla Montesinos & Borsch[5)]	Peru
Stenospermation coques Al. Rodr., O. Ortiz & M. Cedeño[6)]	Peru
Hieracium fridae-bornmuelleriae Gottschl. & Vogt[7)]	Poland
Centaurea dolopica Zograf., Koutr., Liveri & Dimop.[8)]	Greece
Iresine viridipallida Borsch & Flores-Olv.[9)]	Mexico
Iresine velizii Borsch & Flores-Olv.[9)]	Guatemala
Spathiphyllum ayalae Croat & O. Ortiz[10)]	Panama
Spathiphyllum bobdressleri Croat & O. Ortiz[10)]	Panama
Spathiphyllum cotonense M. Cedeño & O. Ortiz[10)]	Costa Rica
Spathiphyllum darienense Croat & O. Ortiz[10)]	Panama
Spathiphyllum luteynii Croat & O. Ortiz[10)]	Panama
Spathiphyllum morii Croat & O. Ortiz[10)]	Panama
Monstera harrisoniorum Croat, M. Cedeño & O. Ortiz[11)]	Panama
Anthurium gallegoanum da Pena, Croat & O. Ortiz[12)]	Panama
Anthurium laetevirens O. Ortiz, da Pena & Croat[12)]	Panama

VASCULAR PLANTS

NAME	COUNTRY OF ORIGIN
Anthurium mariposense Croat, da Pena & O. Ortiz[12)]	Panama
Anthurium niveospadix da Pena, Croat & O. Ortiz[12)]	Panama
Anthurium pacoraense da Pena, Croat & O. Ortiz[12)]	Panama
Achyranthes graminiformis Di Vincenzo, Berendsohn, M. Wondafrash & Borsch[13)]	Tanzania
Limonium artelariae Koutr.[14)]	Greece
Monstera cedenoi O. Ortiz, Croat & J. Hughes[15)]	Costa Rica
Anthurium cascantei O. Ortiz & M. Cedeño[16)]	Costa Rica
Anthurium embera O. Ortiz & M. Cedeño[16)]	Panama

DIATOMS

NAME	COUNTRY OF ORIGIN
Gomphadelpha kociolekii R. Jahn & N. Abara[34)]	USA
Planothidium wetzelii Schimani, N. Abarca & R. Jahn[35)]	Antarctica
Chamaepinnularia australis Schimani & N. Abarca[36)]	Antarctica
Fragilaria vaucheriaefalsa Van de Vijver, Kusber & D. M. Williams[37)]	United Kingdom
Cocconeis azteca L. D. Mora & N. Abarca[38)]	Mexico
Cocconeis ectorii L. D. Mora, Stancheva & N. Abarca[38)]	Mexico
Frustulia subtorfacea Van de Vijver, Jüttner & Kusber[39)]	Finland
Staurosirella neorhomboides Van de Vijver, Kusber & Jüttner[40)]	United Kingdom

FUNGI

NAME	COUNTRY OF ORIGIN
Arrhenia bryophthora Karich, Jarling & R. Ullrich[41)]	Germany
Bryopistillaria clavarioides Karich, Jarling & R. Ullrich[41)]	Germany

NEWLY DESCRIBED FAMILIES AND GENERA

2023–2024

NAME	ORGANISM	REGION OF ORIGIN	FAMILY / GENUS
Adelphomyces Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Aptrootidea Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Aulaxinella Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Batistomyces Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Bezerroplaca Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Caleniella Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Monocalenia Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Pseudocalenia Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Roselviria Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Santricharia Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Sipmanidea Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Verruciplaca Xavier-Leite, M. Cáceres & Lücking[42)]	Lichen	Pantropical	new genus
Gomphadelpha R. Jahn & N. Abarca[43)]	Diatom	Holarctic	new genus
Evelynastra Di Vincenzo, Berendsohn, M. Wondafrash & Borsch[44)]	Vascular plant	Africa	new genus
Sebsebea Di Vincenzo, Berendsohn, M. Wondafrash & Borsch[44)]	Vascular plant	Africa	new genus

SOURCES

THE FULL BIBLIOGRAPHIC REFERENCES CAN BE FOUND IN THE LIST OF PUBLICATIONS ON PP. 71–81

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4) Iamonico & Montesinos-Tubée 2023 – Plants 12: Article 1064.
5) Montesinos-Tubée & Borsch 2023 – Willdenowia 53: 115–148.
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7) Vogt & Gottschlich 2023 – Phytotaxa 613: 81–126.
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11) Croat & al. 2024 – Phytotaxa 656: 1–197.
12) da Pena & al. 2024 – Aroideana 47(1): 191–225.
13) Di Vicenzo & al. 2024 – Taxon 74: 66–100.
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15) Ortiz & al. 2024 – Webbia 79: 305–310.
16) Ortiz & al. 2024 – Webbia 79: 311–350.
17) Aptroot & al. 2023 – Plant and Fungal Systematics 68: 249–261.
18) Lima & al. 2023 – Plant and Fungal Systematics 68: 462–474.
19) Lücking & al. 2023 – The Bryologist 126: 242–303.
20) Moncada & al. 2023 – Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales 47: 619–640.
21) Santos & al. 2023 – Cryptogamie Mycologie 44: 11–25.
22) Santos & al. 2023 – Journal of Fungi 9: 415.
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29) Ansil & al. 2024 – Phytotaxa 664: 31–45.
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33) Wilk & Lücking 2024 – IMA Fungus 15: Article 9.
34) Abarca & al. 2023 – Nova Hedwigia 117: 213–254.
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40) Van de Vijver & al. 2024 – Plant Ecology and Evolution 157: 174–201.
41) Karich & al. 2024 – Mycological Progress 23: Article 28.
42) Xavier-Leite & al. 2023 – Mycological Progress 22: Article 88.
43) Abarca & al. 2023 – Nova Hedwigia 117: 213–254.
44) Di Vicenzo & al. 2024 – Taxon 74: 66–100.

ONLINE RESOURCES AND DATABASES

1. DIGITISED COLLECTIONS AT THE BGBM

Virtual Herbarium – Digital specimen images at the Herbarium Berolinense – Access to the Berlin data in the JACQ system (see below) *https://ww2.bgbm.org/herbarium/default.cfm*

BoGART – Database of BGBM's living collection *https://ww2.bgbm.org/bogartdb/BogartPublic.asp*

LICHCOL – BGBM's lichen and fungus herbarium database *https://archive.bgbm.org/scripts/ASP/lichcol* (will be integrated into the BGBM herbarium database in the JACQ system – see below).

DNA-Bank – Information system for the BGBM DNA Collection (access via the Global Genome Biodiversity Network portal) *https://data.ggbn.org/ggbn_portal/search/result?institution=BGBM%2C+Berlin*

MuseumPlus database of the BGBM in the Europeana Collections Portal *https://www.europeana.eu/en/search?query=europeana_collectionName%3A%2211635_OpenUp_MuseumPlus%22*

2. TAXONOMIC INFORMATION SYSTEMS ON ORGANISMAL GROUPS

AlgaTerra – Information system on terrestrial and limnic microalgae – continuously updated *http://www.algaterra.net*

Cichorieae Portal – Global online monograph of the *Cichorieae* (*Asteraceae*) – continuously updated *https://cichorieae.e-taxonomy.net/portal*

Caryophyllales Portal – A global synthesis of species diversity in the angiosperm order *Caryophyllales* – continuously updated *https://caryophyllales.org*

PhycoBank – Registration system for nomenclatural acts of algae *https://phycobank.org*

3. FLORAS AND CHECKLISTS

Euro+Med PlantBase – The Information Resource for Euro-Mediterranean Plant Diversity – continuously updated *http://ww2.bgbm.org/EuroPlusMed/query.asp*

Med-Checklist – A Critical Inventory of Vascular Plants of the Circum-Mediterranean Countries – as published in book form *https://ww2.bgbm.org/mcl*

Flora Hellenica Database (Arne Strid) *https://www.florahellenica.com*

Flora of Greece – an annotated checklist *https://portal.cybertaxonomy.org/flora-greece*

Flora of Cyprus – A Dynamic Checklist – Online flora of vascular plants in Cyprus with illustrations, distribution maps and identification keys – continuously updated *https://flora-of-cyprus.eu*

Flora of Cuba Database – Base de Datos de Especímenes de la Flora de Cuba – con Mapas de Distribución Versión 10.0 (2014) a Versión 11 (2016) (database of herbarium specimens of the flora of Cuba with distribution maps) *https://ww3.bgbm.org/FloraOfCuba*

Flora de Cuba en Línea *https://portal.cybertaxonomy.org/flora-de-cuba-en-linea*

The *Spermatophyta* and *Pteridophyta* of Cuba – A Preliminary Checklist *https://portal.cybertaxonomy.org/flora-cuba*

Dendroflora de El Salvador *https://portal.cybertaxonomy.org/salvador/listado*

4. SERVICE PORTALS FOR COLLECTION DATA

VH/de – Virtuelles Herbarium Deutschland – Digitized collection information from German herbaria *https://herbarium.gbif.de/de/*

GGBN – Global Genome Biodiversity Network – International DNA bank network *https://www.ggbn.org*

Botanic Garden Berlin Observations (BoBO) *https://bobo.biocase.org*

Caucasus Plant Biodiversity Initiative, Specimen explorer with focus on Caucasian Plants *https://caucasus.e-taxonomy.net*

gardens4science – Online collection catalogue for botanical gardens *https://gardens4science.biocase.org*

5. WEB SERVICES

UTIS – Unified Taxonomic Backbone for the European Biodiversity Observation Network (EU BON) *https://cybertaxonomy.org/eu-bon/utis*

Name rest services – Access to the data stored in the various databases of the EDIT Platform (e.g. also for the Catalogue of Life) *https://cybertaxonomy.org/cdmlib/rest-api-name-catalogue.html*

BioCASe – Biological Collections Access Service. Service – Machine-readable access to the BGBM collection data *https://ww3.bgbm.org/biocase*

6. SOFTWARE

EDIT Platform for Cybertaxonomy – Open-source software tools and services covering all aspects of the taxonomic workflow *https://cybertaxonomy.org*

BioCASE Network Software Components – Software components for networking and providing collection data in the BioCASE, GBIF and GGBN networks *https://www.biocase.org/products/index.shtml*

AnnoSys – Online annotation of biodiversity data *https://annosys.bgbm.fu-berlin.de*

JACQ Virtual Herbaria – Unified and jointly administered specimen management system for herbaria – Collaborative collection management for herbaria – in cooperation with the Natural History Museum and the University of Vienna *https://www.jacq.org/#collections*

Die Herbonauten – Das Herbar der Bürgerwissenschaften (The Herbonauts – the herbarium of citizen science) *https://herbonauten.de*

B-HIT Berlin Harvesting and Indexing Toolkit – Software platform for harvesting distributed collection and observation data *https://wiki.bgbm.org/bhit*

MetBaN: Automated pipeline for metabarcoding data using taxonomic/phylogenetic classification of organisms *https://github.com/sproft/MetBaN*

7. ARCHIVED SYSTEMS

The following information systems will continue to be provided technically, but will no longer be updated:

Bohlmann Files – A Database of Natural Substances in the *Compositae* – for access contact *n.kilian@bo.berlin*

DERMBASE – Names of *Dermateaceae* (*Ascomycetes*) *https://ww2.bgbm.org/projects/dermbase/query.cfm*

IOPI-GPC – International Organization for Plant Information, Provisional Global Plant Checklist *https://ww2.bgbm.org/IOPI/GPC/default.asp*

Names in Current Use for Extant Plant Genera (NCU-3e) – Standard list of generic names and publication citations for plants, algae and fungi *https://archive.bgbm.org/iapt/ncu/genera/Default.htm*

IAPT Registration of Plant Names Trial – Trial database for the registration of newly published plant names *https://archive.bgbm.org/registration/QueryForm.htm*

EXTERNALLY FUNDED RESEARCH PROJECTS

FUNDING ORGANISATION	PROJECT TITLE	PROJECT MANAGERS	TERM
Alexander von Humboldt Stiftung (AvH)	Generating a knowledge base on the plant and fungal biodiversity of Cuba	Thomas Borsch	2024–2026
Alexander von Humboldt-Stiftung (AvH)	AvH Grant for a research fellow from Peru	Thomas Borsch	2021–2023
Berliner Sparkasse	Getting creative in the Botanic Garden	Eva Patzschke	2023–2025
Bundeministerium für Bildung und Forschung (BMBF)	GGBN-Tec – Technical and organisational measures for establishing the technical secretariat of the Global Genome Biodiversity Network (16LC2020A)	Anton Güntsch	2022–2026
BMBF	Plant Climate Culture – Citizen scientists investigate the effects of climate change on plant development in urban areas – TP FU Berlin (01 BF2114A)	Gerald Parolly	2021–2024
BMBF	Establishment of a competence network for lichen biota in tropical dry forests (01DN23013)	Robert Lücking	2023–2025
Bundesamt für Naturschutz (BfN)	WIPs-De II – Reintroducing and supporting populations of endangered species for which Germany has a special responsibility (WIPs-De II) (FKZ 3518685B01)	Thomas Borsch / Elke Zippel	2018–2025
Deutscher Akademischer Austauschdienst (DAAD)	A treasure from the past: Scientific and historical value of lichen collections	Robert Lücking	2024–2025
Deutsche Forschungsgemeinschaft (DFG)	SPP 1158 – Biodiversity and biogeography of marine benthic diatoms in Antarctic and Arctic shallow water coastal zones to evaluate the degree of endemism using fine-grained taxonomy and eDNA metabarcoding (ZI 1628/2-1)	Jonas Zimmermann	2019–2024
DFG	A new story told by herbarium collections – unravelling the patterns of clonal diversity	Juraj Paule	2023–2026

FUNDING ORGANISATION	PROJECT TITLE	PROJECT MANAGERS	TERM
DFG	SPP 1991 – The CARRARA Pipeline: Using machine-learning techniques for automated species delimitation in intensively hybridising plant genera based on herbarium specimens (VO 1595/4-1)	Robert Vogt / Norbert Kilian	2020–2026
DFG / NFDI	Nationale Forschungsdateninfrastruktur (DFDI) – NFDI4BioDiversität consortium – Biodiversity, ecology and environmental data (NFDI 5/1)	Anton Güntsch	2020–2025
Deutsches Zentrum Kulturgutverluste	Provenance research at the BGBM library relating to cultural property confiscated as a result of Nazi persecution	Norbert Kilian	2021–2026
Various foundations	Moss garden	Nils Köster	2021–2034
European Union (EU)	DiSSCo Transition HE Lump Sum – HEU: HORIZON-INFRA-2023-DEV-01-02	Thomas Borsch / Eva Häffner	2023–2025
EU	DiSSCo Prepare: Distributed System of Scientific Collections – Preparatory Phase-EU-Horizon 2020: INRADEV-02-2019-2020 – Project (GA Nr. 871043)	Anton Güntsch	2020–2023
EU	BiCIKL: Biodiversity Community Integrated Knowledge Library – EU-Horizon 2020: H2020-INFRAIA-2018-2020 – (GA Nr. 101007492)	Anton Güntsch	2021–2024
EU	TETTRIS: Transforming European Taxonomy through Training, Research, and Innovations (GA Nr. 101081903)	Anton Güntsch	2022–2025
EU	SYNTHESYS PLUS – Synthesis of systematic resources, Network Activities (Horizon 2020-INFRAIA) (GA Nr. 823827)	Anton Güntsch	2019–2023
EU	SYNTHESYS PLUS – Synthesis of systematic resources, DE-TAF Access (Horizon 2020-INFRAIA) (GA Nr. 823827)	Robert Vogt	2019–2023
Kulturstiftung des Bundes	Connect – Comprehend – Communicate: Amazonia as a Future Laboratory	Thomas Borsch	2020–2023
Kulturstiftung der Länder	MykoLibri II – The library of fungus books of Hamburg collector Christian Volbracht, part 2: publications from 1576 to 1821	Norbert Kilian	2023–2024
Schwandt-Stiftung	Gardening and landscaping	Sylke Gottwald	2021–2025

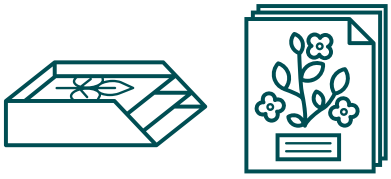
FUNDING ORGANISATION	PROJECT TITLE	PROJECT MANAGERS	TERM
Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt	Botanic Garden Berlin: Consultation centre for urban biodiversity, urban ecology and botanical species conservation	Robert Lücking	2024–2025
Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt	Educational programme for the Botanic Garden Berlin	Eva Patzschke	2024–2025
Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt	Method development of metabarcoding for benthic diatoms in urban surface waters	Jonas Zimmermann	2020–2024
Senatsverwaltung für Mobilität, Verkehr, Klimaschutz und Umwelt	Nature education BO Berlin: Launch of a comprehensive educational programme for the Botanic Garden Berlin	Thomas Borsch / Eva Patzschke	2022–2023
Senatsverwaltung für Kultur und Gesellschaftlichen Zusammenhalt	Digitisation and presentation of the portrait collection of the Botanic Garden Berlin in a semantic web pilot project	Norbert Kilian	2024–2024
Stiftung Deutsche Klassenlotterie Berlin	MykoLibri II – The library of fungus books of Hamburg collector Christian Volbracht, part 2: publications from 1576 to 1821	Norbert Kilian	2023–2024
Verein der Freunde	Herbonauten III – Technical update and optimised maintenance of the herbarium platform for citizen scientists "Die Herbonauten"	Anton Güntsch	2022–2023
Verein der Freunde	Grant for revising the Garden's North America plant geography area	Gerald Parolly	2021–2023
Verein der Freunde	Lichenological-botanical research and collection trip to the island of Astypalea	Eckhard von Raab-Straube	2022–2023
Verein der Freunde	Lichenological-botanical research and collection trip to the island of Limnos (Aegean Sea, Greece)	Eckhard von Raab-Straube	2024–2024
Verein der Freunde	Chemical analysis of Aegean lichens	Eckhard von Raab-Straube / Henricus Sipman	2023–2023
Verein der Freunde	Collecting trip to the Carpathians and the Transylvanian Basin	Gerald Parolly / Albert-Dieter Stevens / Nadja Korotkova	2019–2024
Verein der Freunde	Cultivation and investigation of new diatom cultures to support future project applications	Jonas Zimmermann	2020–2024

FUNDING ORGANISATION	PROJECT TITLE	PROJECT MANAGERS	TERM
Verein der Freunde	Preliminary work for the monographic treatment of further *Cymbellales* genera based on cultures	Jonas Zimmermann	2024–2025
Verein der Freunde	Cultivation and investigation of new diatom cultures from polar regions	Jonas Zimmermann / Katherina Schimani	2023–2024
Verein der Freunde	Relocation and storage of the Hustedt diatom collection from the AWI Bremerhaven to the BGBM	Jonas Zimmermann / Nelida de la Cruz Abarca Mejia	2023–2025
Verein der Freunde	Diversity of the genus *Philodendron* (*Araceae*) in Central America. A collecting expedition as a basis for phylogenetic studies	Nils Köster	2022–2024
Verein der Freunde	Funding for a collecting and research trip related to the research project on the phylogeny and taxonomy of the genus *Centaurea* (knapweed) in Greece	Norbert Kilian	2022–2023
Verein der Freunde	Phylogenetic revision of the lichen genus *Coccocarpia* as an environmental indicator in urban and suburban areas of the metropolis of Bogotá, Colombia	Robert Lücking	2024–2024
Verein der Freunde	Integration of 35 years of documented global diversity of lichens	Robert Lücking	2023–2024
Verein der Freunde	Lichens from the Philippines	Robert Lücking	2023–2024
Verein der Freunde	Lichens from Brunei	Robert Lücking	2022–2024
Verein der Freunde	Flora of Bogotá (Colombia): Molecular inventory of lichen fungi using the ITS barcode gene	Robert Lücking	2016–2024
Verein der Freunde	Continuation of the Flora de Cuba project and the project to research the endemism of the flora of Cuba and the Caribbean	Thomas Borsch	2019–2023
Verein der Freunde	Taxonomic research and fieldwork for a checklist of flowering plants in Georgia (Caucasus)	Thomas Borsch	2024–2024
Verein der Freunde	Cooperation with the National Herbarium of Ethiopia (ETH), Addis Ababa University	Thomas Borsch	2023–2024
Verein der Freunde	Research into the endemism of the flora of Cuba and the Caribbean	Thomas Borsch / Robert Lücking	2023–2025

FUNDING ORGANISATION	PROJECT TITLE	PROJECT MANAGERS	TERM
Volkswagen Stiftung	Building a Plant Diversity Information Infrastructure for Georgia	Thomas Borsch	2023–2025
Volkswagen Stiftung	Building a Plant Diversity Information Infrastructure for Azerbaijan	Thomas Borsch	2023–2025
Volkswagen Stiftung	Building a Plant Diversity Information Infrastructure for Armenia	Thomas Borsch	2023–2025
Zuwendung (Privatspender)	Development of the useful plant garden	Gerald Parolly	2022–2024
Zwillenberg-Tietz-Stiftung	Genetic diversity of *Dactylorhiza* majalis (*Orchidaceae*) and strategies for the conservation of an endangered plant species in Germany	Thomas Borsch	2022–2025

COLLECTIONS

LIVING COLLECTION



HOLDINGS	2023	2024
Families	311	313
Genera	3,251	3,260
Taxa (species, subspecies, varieties etc.)	18,499	18,397
Accessions	31,613	31,296
Wild provenances (in %)	58.93	58.69

ARRIVALS/RELEASES	2023	2024
Accessions	886	949
Deaccessions	986	1,266

RELEASE OF MATERIAL	2023	2024
Total release of material, accessions	871	831
Total release of material, plant (parts)	5,807	5,488
Accessions to other gardens	400	173
Plant (parts) to other gardens	721	285
Accessions for teaching	238	330
Plant (parts) for teaching	3,339	4,655
Accessions for research	185	248
Plant (parts) for research	418	334
Schools accessions	48	80
Schools plant (parts)	729	214

DAHLEM SEED BANK	2023	2024
Holdings, number of accessions	18,930	18,284
New additions, number of accessions	294	550
projects	69	32
long-term storage (base collection)	157	68
Index Seminum (access collection)	68	450
Inclusions in the Index Seminum, of which	3,866	3,220
seed samples sent out	769	1,723
domestic	242	511
international	527	1,212
Recipients of seed samples	47	91

COLLECTIONS

HERBARIUM

HOLDINGS	2023	2024
Total number of specimens	3.96 Mio.	4 Mio.
Type specimens	>44,000	>45,400
Garden herbarium	52,594	52,636

NEW ADDITIONS	2023	2024
Total new additions, of which	7,567	37,926
through donation	2,410	33,143
through exchange	751	369
through purchase	111	3,550
through our own collecting activities	4,295	864
New additions to the garden herbarium	245	42

LOANS, EXCHANGES, VISITORS	2023	2024
Loan requests	212	261
Loans from the Herbarium Berolinense to other institutions Number of specimens	1,530	3,433
Number of shipments	18	18
Number digital loans	87	124
Loans to the Herbarium Berolinense from other institutions Number of specimens	575	642
Number of shipments	14	20
Number of institutions with which we had loan – exchanges	141	174
Specimens permanently given to exchange –partners	184	4,025
Visiting scientists	71	80

DIGITAL HERBARIUM	2023	2024
Newly digitised specimens, of which	44,381	35,961
as a result of loan requests	1,037	2,932
in the context of projects	43,344	33,029
Total number of specimens available online	755,575	791,536
Hits/downloads	172,473	196,468

DNA BANK	2023	2024
Holdings (number of DNA samples)	44,625	45,425
New additions through our own research activities	c. 500	c. 800
DNA samples sent out (number)	262	455
DNA samples sent out (recipients)	21	25

LIBRARY

HOLDINGS AND CATALOGUES	2023	2024
Monographs and journal volumes	221,685	223,308
Current journals with print editions	533	533
Offprints	145,346	145,546
CD-ROMs, DVDs and video cassettes	521	523
Microfilm and microfiche titles	4,178	4,178

NEW ADDITIONS	2023	2024
Monographs	998	1,063
through purchase	313	515
through exchange/purchase	685	494
Bound journals	544	560
through purchase	152	156
through exchange/purchase	392	404
Offprints	142	200
CD-ROMs and DVDs	11	2
Expenditure on contributions to databases and online journal packages	33,735 €	37,703 €

BGBM PRESS: PUBLICATIONS

WILLDENOWIA

Willdenowia 53(1&2) https://bioone.org/journals/willdenowia/volume-53/issue-1-2
Willdenowia 53(3) https://bioone.org/journals/willdenowia/volume-53/issue-3
Willdenowia 54(1) https://bioone.org/journals/willdenowia/volume-54/issue-1
Willdenowia 54(2&3) https://bioone.org/journals/willdenowia/volume-54/issue-2-3

ANNUAL REPORT

Jahresbericht 2022. Botanischer Garten und Botanisches Museum Berlin. – https://doi.org/10.3372/JB.2022.de.1
Annual Report 2022. Botanic Garden and Botanical Museum Berlin. – https://doi.org/10.3372/JB.2022.en.1

FLORA OF GREECE

Goula K. 2023: *Apocynaceae*: *Amsonia* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apoc-amso.ed1

Goula K. 2023: *Apocynaceae*: *Apocynum* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apoc-apoc.ed1

Goula K. 2023: *Apocynaceae*: *Cionura* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apoc-cion.ed1

Goula K. 2023: *Apocynaceae*: *Periploca* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apoc-peri.ed1

Lansdown R. V. 2024: *Araceae*: *Lemnoideae* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.arac-lemn.ed1

Sarika M. 2024: *Apiaceae*: *Berula* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apia-beru.ed1

Sarika M. 2024: *Apiaceae*: *Cicuta* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apia-cicu.ed1

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Tan K. & Panitsa M. 2024: *Acanthaceae* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.acan.ed1

Turland N. J. 2023: *Arecaceae* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.arec.ed1

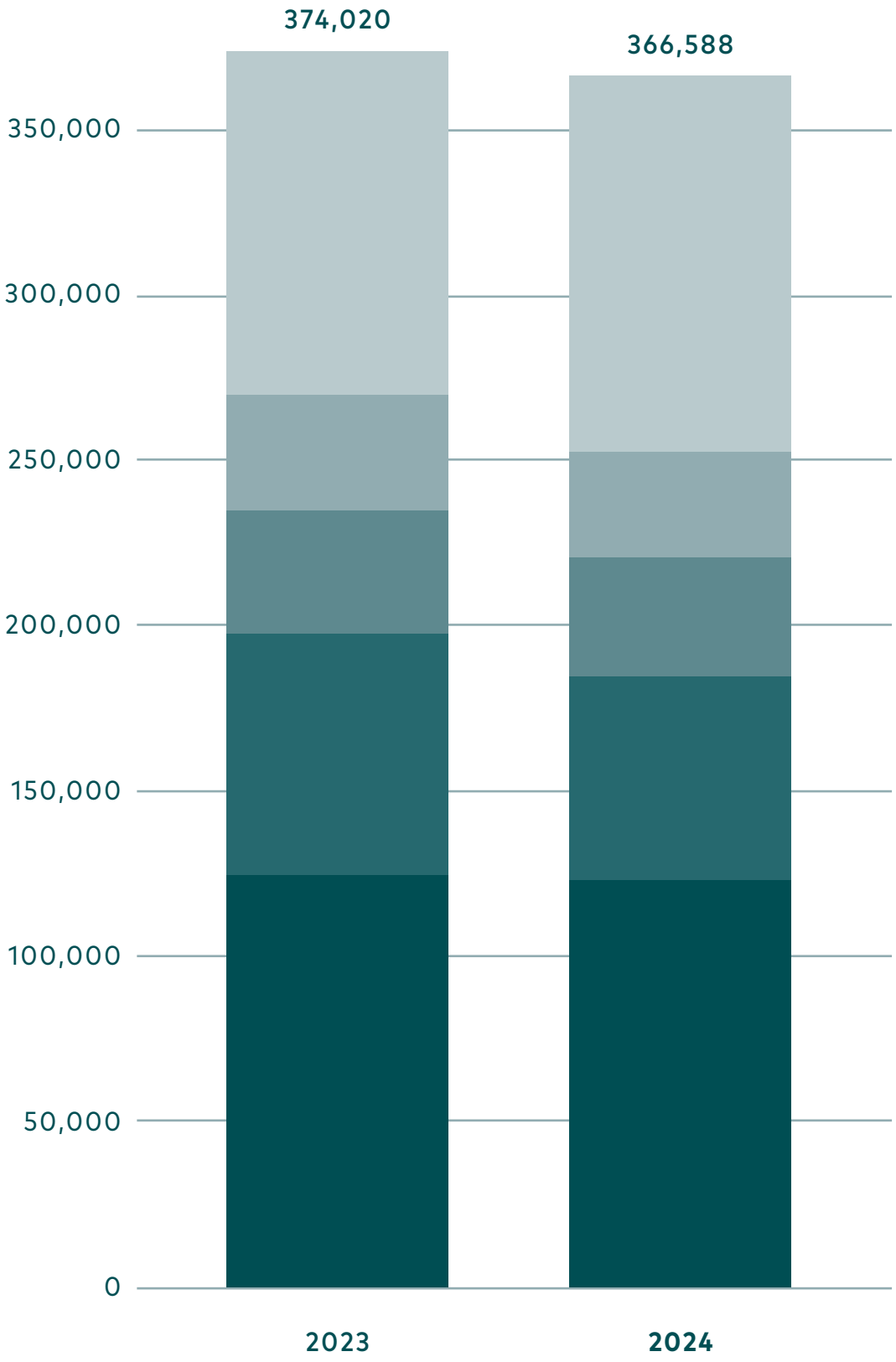
Zikos A. 2024: *Apiaceae*: *Coriandrum* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apia-cori.ed1

Zikos A. 2024: *Apiaceae*: *Orlaya* (ed. 1). – In: Flora of Greece Editorial Committee (ed.), Flora of Greece Volume 1. – Athens: Hellenic Botanical Society; Berlin: Botanic Garden and Botanical Museum Berlin. https://doi.org/10.3372/fog.v1.apia-orla.ed1

OTHER PUBLICATIONS

Greuter W. & Rankin Rodríguez R. 2023: CCNR. Cuba's Native Relatives of the World's Useful Plants being the 2nd, revised and enlarged edition of A Checklist of Cuban wild relatives of cultivated plants important for food, agriculture and forestry. – Berlin: Botanischer Garten und Botanisches Museum Berlin, Zentraleinrichtung der Freien Universität Berlin; La Habana: Jardín Botánico Nacional, Universidad de La Habana. https://doi.org/10.3372/cubalist.2023.1

VISITOR NUMBERS

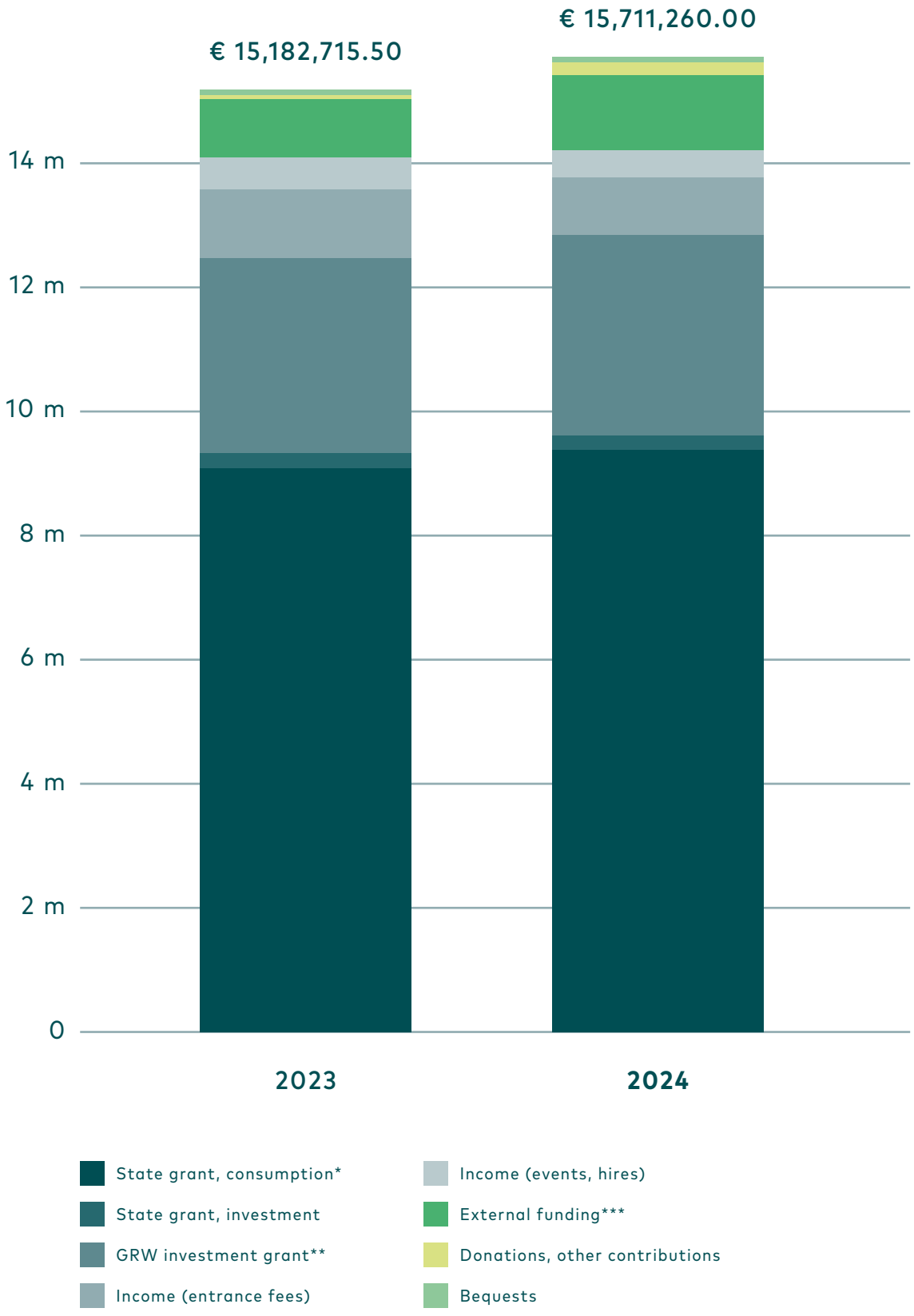


ENTRY

STANDARD CONCESSIONS WITH ANNUAL PASS FREE * EVENTS

* e.g. small children or students on relevant courses

BUDGET



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** GRW is the national scheme for improving regional economic structures.

*** BMBF, BfN, DFG, EU, VolkswagenStiftung, among others.

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